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THE USE OF THE MMPI-A SHORT FORM FOR IDENTIFYING STUDENTS WITH EMOTIONALITY IN THE SCHOOLS

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ABSTRACT OF THE DISSERTATION

Matthew Turner

The Graduate School
University of Kentucky
2007

THE USE OF THE MMPI-A SHORT FORM FOR IDENTIFYING STUDENTS
WITH EMOTIONALITY IN THE SCHOOLS

ABSTRACT OF THE DISSERTATION

A dissertation submitted in partial fulfillment of the
requirements for the degree of Doctor of Philosophy
in the college of Educational and Counseling
Psychology at the University of Kentucky

By

Matthew Turner

Lexington, Kentucky

Director: Dr. H. Thompson Prout, Professor of Educational and Counseling
Psychology

Lexington, Kentucky

2007

Abstract of Dissertation

THE USE OF THE MMPI-A SHORT FORM FOR IDENTIFYING STUDENTS
WITH EMOTIONALITY IN THE SCHOOLS

This study investigated the utility of the MMPI-A short form described by
Archer, Tirrell, and Elkins (2001) for detecting the presence of emotionality in
adolescents in the school setting. Students were placed in one of three groups
based on their performance on an established and frequently used self-report
measure of personality, the Behavior Assessment System for Children-II (BASC-
2). Subjects who had significant elevations on one or more of the scales in
Internalizing Index on the BASC-2 were placed in the Clinical group and subjects
who had significant elevations on one or more of the scales the School Problems
Index or Personal Adjustment Index were placed in the Adjustment group.
Those without significant elevations on the BASC-2 were placed in the Non-
clinical group. Differences between the three groups on each of the MMPI-A
short form clinical scales were reported. The results indicated that the students
in the Clinical group scored higher than students in the Non-clinical group on
each of the MMPI-A short form scales. Adjustment group scores tended to be
higher than Non-clinical group scores but not all scales were significantly higher.
Discriminant analysis correctly classified 75% of the non-clinical group, 52% of
the Clinical group, but only 37% of the Adjustment group. These findings,
combined with additional analysis of clinical relevant data, provided positive
indicators supporting the use of the short form in clinical settings.

Keywords: MMPI, MMPI-A, short form, personality assessment, BASC

Matthew Turner

November 26, 2007

THE USE OF THE MMPI-A SHORT FORM FOR IDENTIFYING STUDENTS
WITH EMOTIONALITY IN THE SCHOOLS

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November 26, 2007
Date

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DISSERTATION

Matthew Turner

The Graduate School

University of Kentucky

2007

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DISSERTATION

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By
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When I decided to return to school to obtain a PhD, I had no idea that the task would be so great and the process so tedious. I certainly have the fine institution that is the University of Kentucky to thank for presenting me with every possible bureaucratic hurdle imaginable. I've learned a great deal about perseverance, attention to minute details, and the importance of multiple forms, behavior management plans, and the inclusion of cover sheets on the TPS reports. In that respect, UK has shown me that what does not kill you truly does make you stronger.

I would like to thank each of the members of my committee, Tom Prout, Harold Kleinert, Rich Gilman, and Lynda Brown-Wright. Each member willingly gave up their time to assist me with this endeavor despite obviously busy schedules. I very much appreciate their time and expertise. A special thank you is reserved for Dr. Harold Kleinert, who has been a mentor for me during my time at UK and an unbelievable help when I needed a fast response or a local contact at the University. Harold, you are one in a million, and an excellent editor to boot.

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This manuscript represents the completion of a life goal, which could not have been possible without the love, support, and inspiration of my wife, and partner in life, Diane.

I'll remember many aversive events when I reflect on this process. However, I will forever be grateful that Diane was not only encouraging and supportive, but did whatever was necessary to give me the time I needed to get things done. I'll especially remember little Xavier working on his "dissertation" side by side with me, an ingenious idea only Diane could have dreamt up.

Diane, "thank you" does not adequately express my gratitude. While the journey has been long, I am happy that we have taken it together. I look forward to our next life adventures. I love you.

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Chapter One: Introduction

The intent of this study was to investigate the validity of the short form of

the MMPI-A that was described by Archer, Tirrell and Elkins (2001). Of

particular interest was the potential use of this tool by school psychologists who

are often called upon to conduct evaluations to assess the emotional status of

students referred for possible inclusion in special education services. Should the

MMPI-A short form prove useful in detecting emotionality in adolescents, it may

be a viable tool for psychologists to use when conducting such evaluations. This

chapter provides a review of trends related to adolescent assessment in the

schools as well as a review of the MMPI, including the developments of the

MMPI-2, MMPI-A and MMPI short forms.

The review is divided into four major sections for organizational clarity.

The first section, Assessment, reviews the literature related to emotional

assessment of adolescents, including the mental health needs for adolescents,

trends in psychological test usage, and the assessment of behavioral and

emotional problems in the school setting. The second section, MMPI, focuses on

the Minnesota Multiphasic Personality Inventory (MMPI: Hathaway &

McKinley, 1943) including a review of the design of the instrument, the

development of the most recent versions of the test, and the frequency of its use

among psychologists today. The third section, MMPI short forms, details the

different approaches that have been devised when developing short forms,

provides a historical review of the short forms that have been reported in the literature, offers an analysis of short form research, and highlights the directions for future short form research. Finally, the last section illustrates the rationale for studying the MMPI-A short form, emphasizing the possible benefits for special education assessments.

<center>*Assessment*</center>

Mental Prevalence Health Rates

Considerable research has documented the large numbers of children and adolescents who are experiencing mental health problems. Bower (1969) estimated that approximately 10% of school aged children and adolescents were experiencing at least moderate mental health problems that might warrant special education interventions. More recent reports estimated that between 17% and 22% of individuals under the age of 18 had significant emotional or behavioral concerns (Kazdin & Johnson, 1994). This number represented between 11 and 14 million children in the United States. Doll (1996) reported similar findings, suggesting that approximately 18% to 22% of youths less than 18 years of age showed signs of diagnosable psychological conditions. Archer (1997) reported that adolescents appear to have higher rates of psychopathology than other age groups. In a review of several studies, Archer cited wide ranging psychopathology prevalence rates, with some reported rates reaching as high as 41% in adolescents. He argued that differences in methodology likely

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contributed to the variance across studies and concluded that true prevalence rates were most likely between 12% and 22%.

Archer (1997) also pointed out the uniqueness of the adolescent time frame. Adolescence was described as a time of "storm and stress" with thoughts and behaviors that might be considered atypical in other populations. He claimed that adolescence is characterized by behaviors that may be disruptive or problematic, but not necessarily indicative of a psychological condition. Thus, properly assessing between stable symptoms of a psychological condition and transitory symptoms associated with adolescence presents a problem for clinicians. As such, the assessment approach for these individuals may be different than with child and adult assessments and tests that measure psychological constructs should have corresponding normative groups.

The majority of studies on prevalence rates have focused only on general child and adolescent psychopathology and not on special education placement. However, the data does provide an overall glimpse of the mental health needs of adolescents. Archer's conclusions regarding adolescence suggest a slightly higher need for this population. Further, the uniqueness of this age group requires an adolescent specific assessment approach.

EBD Prevalence Rates

According to data provided by the United States Department of Education, (NCES, 2005) approximately 489,000 students were identified as having an Emotional and Behaviorally Disturbance (EBD) in the 2004 to 2005 school year. This was approximately 1% of the total school enrollment that year.

This ratio has been fairly consistent over the past 20 years, but has steadily increased from .85% of all students reported in 1981.

These numbers are far less than estimates of adolescent psychopathology as a whole, which supports the view that psychopathology is not sufficient for an EBD diagnosis. These figures are also lower than professional estimates of student needs. Researchers have reported that minimal estimates indicate that at least 2% of the students should qualify as EBD (Skiba, Grizzle, & Minke, 1994). In fact, these same authors report EBD estimates as high as 6% of the school population. These data suggest that between 500,000 and 2.5 million children who are in need of services are presently not identified in the United States. Thus, it appears that the current methods of identifying students for EBD placements may not be adequate.

Psychological Test Usage

The reasons for the under identification of EBD students are unclear but the available body of research on psychological test usage suggests some potentially relevant findings that could explain this phenomenon. For example, there is an underutilization of personality testing in the schools and time constraints in the school setting. While prevalent in clinical settings, personality instruments are used less frequently in the schools, which may account for the discrepancies between EBD estimates and actual EBD figures in the schools.

It was not until relatively recently, that the first wide scale survey on psychological test usage with adolescents was published (Archer, Marush, Imhof, & Piotrowski, 1991). One hundred and sixty five practitioners reported

the frequency of specific tests used in their work with adolescents. The results indicated that the Wechsler scales of intelligence were used most often. The Rorsharch, the Bender-Gestalt, the Thematic Apperception Test, the Sentence Completion Technique and the Minnesota Multiphasic Personality Inventory (MMPI) were respectively the next most frequently used instruments. The authors noted that the MMPI was the most frequently administered objective personality measure. In fact, the MMPI was mentioned almost twice as frequently as the next most commonly used objective personality instrument, the Millon Adolescent Personality Inventory (MAPI). While this study illustrated the popularity of this instrument for use with adolescents, it was lacking in school psychologist representation. With only 7% of the respondents working in a school setting, these results provided little insight to assessment practices in the schools.

Archer and Newsome (2000) followed up this survey several years after the introduction of the adolescent specific version of the MMPI, the MMPI-A. The results were similar in that the Wechsler scales continued to be the most frequently used instruments. The Rorschach, the Sentence Completion Technique, the Thematic Apperception Test, the MMPI-A, the Child Behavior Checklist- Parent Form, and the House-Tree Person Technique were the next most frequently used instruments in order of popularity. Again, the MMPI-A was the most frequently used objective personality instrument and was reported to be one of the five most frequently used instruments in practice. As was the case in the first survey, specific school practices cannot be generalized from this

study, as only 6.4% of the respondents indicated that they worked in the school setting.

Kamphaus, Petoskey, and Rowe (2000) reviewed the literature on child psychological testing and identified three emerging trends. First, they argued that schools are more frequently becoming the site of assessment for children. This was due to increases in special education services, more frequent pre-referral screenings, and the movement towards school-based health services. Second, a dramatic rise in the popularity of short form intelligence tests was reported. Third, the researcher identified a trend towards increased use of behavior rating scales. Time saving and cost-efficiency were reported to be significant factors in the emergence of the latter two trends.

Overall, the data on psychological test usage suggests several relevant findings. First, the MMPI-A is currently the most frequently used objective personality instrument. It is generally regarded as a valid and reliable measure backed by an extensive research base, which probably accounts for its universal acceptance (Archer & Newsome, 2000). The research is heavily skewed towards clinical and private practice settings, which makes generalization difficult for assessment practices in the schools. Further, the available data on trends in the schools suggests that the MMPI-A is not frequently used. Instead, brief instruments and rating scales are gaining popularity due to the time constraints in the school or educational setting. Lastly, based on this information, it seems clear that quickly administered instruments with good psychometric properties are of great value in the current school psychology climate.

Assessment of EBD in the School Setting

In order to provide a comprehensive evaluation of an EBD referral, current best practices suggest a multidimensional approach that gathers data from the parent, the teacher, and the child (McConaughy, & Ritter, 2002). These same authors recommend that a combination of some of the following procedures be used: behavior rating scales, self-report measures, interviews with the child, parent, and teacher, direct observation, a review of background information, and personality assessment. Knoff (2002) suggested that psychologists employ tests that measure a variety of constructs such as self-concept, sense of identity, stress tolerance, coping strategies, outlook on life, and interpersonal relationships. Given the diversity and depth of these constructs, there are many ways to approach such an assessment. Researchers corroborate this notion and it is widely reported that there is great variability in the methods and instruments used by psychologists when conducting personality assessments of students with possible behavior or emotional concerns (Woody, Lavoie, & Epps, 1992). It appears that there is no set standard for such an assessment. Most often, the battery is tailored to fit individual preferences and psychologists select their assessment procedures based on their training, familiarity with the literature, and experience (Knoff, 2002).

Despite the various individual approaches to EBD assessments, there has been relative consistency in the types of information that psychologists gather when conducting such evaluations. Goh, Teslow and Fuller (1981) examined surveys from 274 school psychologists across the nation regarding their testing

methods and preferred instruments. They reported that the most frequent types of assessment devices were intelligence (26.9%), achievement (22.2%), perceptual functioning (22.8%), personality (14%), behavior rating (8.6%), preschool (5.3%), and vocational interest (1%). Personality instruments were used in only approximately half of the cases. The most frequently used personality instruments were the Bender-Gestalt Test, the Sentence Completion Techniques, the House-Tree-Person Test, the Thematic Apperception Test (TAT), the Children's Apperception Test, the Draw-A-Person Test (Machover), the Rorschach Technique, and the self-concept scale. The authors noted several trends, but there are two important issues to note. School psychologists tended to gravitate towards quicker, "easy-to-use procedures" as opposed to the lengthier methods such as the Rorshach and the TAT. Secondly, all of the most popular personality measures were projective techniques, despite the availability of established objective personality instruments such as the MMPI and the Children's Personality Questionnaire. Although the authors made no specific reference, it is worth noting that no self-report measures were reported among the most commonly used instruments.

Goh and Fuller (1983) followed up with a review on then current practices in personality and behavior assessment in the schools. They expressed concern regarding psychologists' apparent reliance on projective techniques. They questioned the subjective nature of interpretation and cited their low reliability as a problematic issue. They further questioned the use of brief projective measures such as the Sentence Completion techniques, as it was uncertain if

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these instruments could provide adequate information regarding personality functioning. The authors reported few psychologists used self-report inventories. They also predicted a shift toward more behavioral methods and the use of rating scales. However, they viewed the rating technology of the time to be too "unsophisticated" to have gained wide spread acceptance.

Prout (1983) summarized two national surveys on methods employed by psychologists when conducting social-emotional evaluations. The most frequently used instruments or techniques were as follows: clinical interviews, informal classroom observations, human figure drawings, Bender-Gestalt, Incomplete Sentences, classroom observations, House-Tree-Person, clinical analysis of intelligence test responses, behavior rating scales, and kinetic family drawings. Similar to Goh, Teslow, and Fuller (1981), Prout (1983) reported a tendency by psychologists to prefer brief, projective techniques. He speculated that this might be due to quicker administration times, ease in scoring, lessened training requirements, and a possible avoidance of instruments heavily tied to psychodynamic theory. Interview and observation were reported to be the most frequently used techniques. Objective personality instruments including the MMPI were infrequently used. In fact, behavior rating scales were the only objective personality instruments ranked in the top ten in terms of frequency used. Prout suggested that the objective personality instruments were probably not preferred by school psychologists because they required certain reading levels and were geared more towards the adult population. The author acknowledged a difference in test preference between clinical and school

settings, reporting that traditional projective measures such as the Thematic Apperception Test (TAT) and the Rorschach were used more frequently in clinical settings.

Several studies evaluated the types of data used to place students in EBD programs. Zabel, Peterson, Smith, and White (1982) surveyed 683 elementary and secondary special education teachers on the types of data that were available to them when making eligibility decisions. Formal observation data, behavior rating scales, and descriptions of classroom requirements were reported to be the most valuable types of information. Unfortunately, the most valuable type of data was also reported to be the least available. Data such as health and family information, cognitive scores and achievement test scores were easily accessible, but were perceived as being of little value.

In a similar study, McGinnis, Kiraly, and Smith (1984) reviewed files of 45 elementary school students identified as EBD. Six sources of data were identified as most important for determining EBD eligibility. These were personality assessment, structured observations, clinical interpretation of observations, anecdotal records, behavior rating scales, and affective assessment (i.e., self concept inventories). Only 24.4% of the cases reviewed contained information from at least three of the six sources. These findings raised questions about the thoroughness of the data used to make EBD eligibility decisions.

Smith, Frank, and Snider (1984) also attempted to evaluate the availability and quality of data gathered on students identified for EBD programs. The researchers reviewed 60 files and found that data on intellectual assessment,

academic assessment and health related information was readily available. Information on actual behavior, social function and affective assessment were not judged to be very available. Similar to the research previously reported, the most readily available data were considered the least valuable and the most valuable data were not readily available. Further, half of the files were deemed insufficient for determining eligibility due to a lack of critical data. The researchers concluded EBD diagnoses were in many cases based on lower quality and too few data sources.

Clarizio and Higgins (1989) examined how psychologists interpreted the EBD criteria and the extent to which assessments complied with the legal definition. Eighty-three psychologists from two north central states completed a survey. Although there was variability in the specific instruments used, the researchers reported high levels of agreement among psychologists on the types of data that were gathered for social emotional assessments. Most psychologists reported using cognitive and academic measures in their evaluations to assess the students' ability or "inability" to learn. Other techniques used included interviews with teachers, parents and the student, observations, behavior rating scales, projectives, adaptive behavior scales, and personality tests. Psychologists' ratings indicated that data obtained directly from the child, as opposed to data from teachers or parents, were most valuable. They also rated interviews as being the most valuable source of information. Personality tests were ranked fourth of five measures in terms of perceived value, falling behind observations, and behavior ratings. Only two objective personality tests were mentioned and

their frequency of use were both less than 25%. In contrast, eight projective instruments were identified as possible tests used in EBD cases and 55% of the respondents said they might include a measure such as the TAT. This suggests that objective personality measures were not regularly used or considered a critical component of the evaluations. More likely, the information gained from children in these evaluations was gathered from the interviews and the projective measures. The authors also concluded that there were several areas of assessment that needed improvement, such as the assessment of peer relationships, depression, Attention Deficit Hyperactivity Disorder (ADHD) and determining the difference between EBD and social maladjustment. It was also noted that the determining impairment "to a marked degree" as outlined in the definition of EBD in Individuals with Disabilities Act (IDEA, PL 102-119), was a source of confusion among psychologists.

The confusion regarding the "marked degree" clause in the EBD definition spurred an investigation on how psychologists assess the severity of EBD (Clarizio & Klein, 1995). The researchers examined how psychologists used different criteria to determine severity of an EBD. Eleven criteria were derived from a previous pilot in which psychologists identified the criteria that they used to determine severity. The researchers surveyed 92 psychologists from several states who ranked the eleven criteria in order of importance when determining severity of an EBD. The results suggested a great deal of agreement among the psychologists. The four criteria that were reported to be most important were impairment of functioning, physical danger, frequency, and chronicity. Thus, it

appears that psychologists as a group have developed some degree of agreement with regards to ambiguous terminology in the laws. However, the authors reported little agreement on how these data were gathered and expressed concern regarding the lack of concrete terminology in the law.

More recently, Shapiro and Heick (2004) surveyed school psychologists regarding current practices of EBD assessment. Similar to Kamphaus, Petosky and Rowe (2000), the researchers reported a trend towards increased use of behavior checklists. In fact, 75.7% of respondents indicated that they used behavior checklists in 8-10 of their last cases referred for behavior or emotional problems.   Projective measures were used less frequently, as 36.6% of respondents indicated that they were used on 8-10 of their last cases. The use of the MMPI-A or similar personality instrument was rare. While some type of self report checklist or questionnaire was reported as frequently used, almost 33% of the respondents reported that student-completed rating scales were used in 3 or fewer of their last 10 cases referred for behavior and/or emotional problems. This reflects a drastic increase in use of self report measures from early surveys (Prout, 1983). However, it also suggests that a considerable portion of such assessments do not include self report data on a standardized measure or questionnaire despite recommendation of best practices in assessment (McConaughy & Ritter, 2002).

In summary, school psychologists appear to assess EBD using a battery of tests that fit their individual preferences (Woody, Lavoie, & Epps, 1992). Trends in test preferences suggest that psychologists historically have gravitated

towards brief, projective instruments with objective personality instruments reportedly used infrequently (Clarizio & Higins, 1989; Goh & Fuller, 1983; Goh, Tesler & Fuller, 1981; Prout, 1983). Behavior checklists appear to have gained widespread acceptance and some self-report rating measures may be used more frequently, but objective personality measures continue to be used less frequently in school settings (Shapiro & Heick, 2004). In addition, review of records of EBD students indicated a frequent lack of available information on critical data such as personality assessment (McGinnis, Kiraly & Smith, 1984; Smith,Frank, & Snyder, 1984;; Zabel, Peterson, Smith & White, 1982) Psychologists report that data obtained directly from the child are considered to be the most valuable information in an assessment, but direct self-report measures are rarely utilized (Clarizio & Higgins, 1989). Problematic areas of assessment include internalizing concerns, attentional problems, severity of emotional concerns and social maladjustment determinations.   Further, ambiguous terminology like "marked degree" complicates the determination of the presence of an EBD.

Collectively, these findings suggest that psychologists face considerable challenges in EBD assessment. Researchers indicate that psychologists should employ tests that measures constructs such as peer relationships, depression, self-concept, sense of identity, stress tolerance, and outlook on life (Knoff, 2002). Yet, it appears that many of these constructs are not being assessed well (Clarizio & Higgins, 1989). Clinical judgment is heavily relied upon in making eligibility recommendations. As such it is essential that psychologists arm themselves with

the appropriate tools to guide their judgment. It stands to reason that the availability of objective personality measures would be of great value in assessment of adolescents. Specifically, instruments that gather data via self-report and instruments that measure the spectrum of constructs that comprise EBD would be useful in school based assessment. To date, some tests have been developed to meet this need, such as the Behavioral Assessment System for Children (Reynolds, & Kamphaus, 1992, 2004), but only a handful of instruments are identified as being routinely used by clinicians in and out the school settings (Archer & Newsome, 2000; Kamphaus, Petoskey & Rowe, 2000) and self report measures may be excluded from a significant portion of current assessments of emotional functioning (Shapiro & Heick, 2004). Therefore, the identification of an objective personality measures that could be used in this setting would be beneficial.

MMPI-A and EBD

One self-report measure that may be a useful part of an assessment battery is the MMPI-A. It is an objective personality measure that is widely accepted in the field because of its heavy research base, adolescent specific norms and good psychometric properties (Archer & Newsome, 2000). Presently, there is no published research specifically addressing the use of the MMPI-A in EBD assessment. However, Miller-Frye (1998) examined this issue in her doctoral dissertation. The study examined how well 12 MMPI-A scales discriminated between regular education students, EBD students, and adolescents in a clinical inpatient setting. The results indicated significant differences between the

regular education group and the EBD group on the Psychopathic Deviate (4), the Paranoia (6), Schizophrenia (8), Hypomania (9), and Immaturity scales. These same scale differences, with the exception of the Hypomania (9) scale, were observed between the regular education groups and the clinical inpatient group. Additionally, the Depression (2), Adolescent Depression, and Adolescent Low Self-Esteem scales were significantly different between the regular education group and the clinical inpatient group. No differences were observed between the EBD and the clinical inpatient group. A discriminant analysis correctly classified 55.86 percent of the participants into the appropriate group. The author concluded that the MMPI-A could be of use by school psychologists when identifying students with EBD. She reported that the lack of differences observed between the EBD group and the clinical inpatient group suggested that the two groups were very similar and that factors outside emotional condition, such as an ability to pay for services, may differentiate the groups. This mirrored previous EBD findings that suggested that EBD students tended to have wide variability in the types of disturbances they exhibited but generally showed more severe symptoms of their respective disorders (Alexon and Sinclair, 1986; Forness and Cantwell, 1982; Mattison et al., 1986; McBurnett, 1996; Sattler, 1983; Sinclair, Forness, & Alexon ,1985). As such, it was recommended that future research consider the EBD group a clinical sample. It was also concluded that the MMPI-A had relevance in the assessment of EBD. The Pyschopathic Deviate (4), Schizophrenia (8), Hypomania (9), Immaturity, and Paranoia (6) scales were

considered to be particularly relevant because they exerted the most influence when predicting group membership.

While these results are promising, the lack of published research is concerning and probably reflects limited MMPI-A use in the school setting. Given the reported time constraints in the school setting (Clarizio & Higgins,1989; Reynolds & Kamphaus, 2003), it is suspected that the length of the instrument probably restricts use in school systems. However, a MMPI-A short form has been identified as a measure that may have potential utility for assessments in the schools (Archer, Tirrell, & Elkins, 2000). No published research exists to date on the validity of the short form aside from the initial study. Nevertheless, should the MMPI-A short form prove to be similarly effective in detecting a range of psychopathology as the parent instrument, it could be a tool that has value when conducting EBD assessments.

MMPI

Both the most current editions of the MMPI, the MMPI-A and the MMPI-2, are constructed in the same format and use most of the original test items from the first MMPI developed in 1943. Further, the MMPI-A short form is a derivative of the MMPI-A. Therefore, in order to adequately describe the MMPI-A short form, it is important to detail the original MMPI as well as the development of the modern versions of the instrument.

The Minnesota Multiphasic Personality Inventory (MMPI, Hathaway & McKinley, 1943) is one of the most researched and utilized personality instruments in psychology today (Archer & Newsome, 2000; Lees-Haley, Smith;

Lubin, Larsen & Metarazzo, 1984; Piotrowski and Keller, 1992; Williams & Dunn,1996). Originally, the instrument was developed to classify patients and monitor the severity of psychiatric conditions in a psychiatric in-patient facility (Archer, 1997). The test developers believed that the construction of a personality inventory could provide a more effective method for classifying patients than traditional techniques such as psychiatric interviews. In addition, they intended to create an instrument that could be routinely used to estimate the severity of clinical symptoms and therefore assist in monitoring change over time and therapeutic effects of treatments. The instrument has proven to be useful for these purposes and its use has expanded beyond psychiatric settings. Today the MMPI has been used in correctional facilities, schools, drug and alcohol rehabilitation centers, and for personnel selection in corporate settings.

Innovation in the Construction of the MMPI

Personality inventories had been in use prior to the development of the MMPI. However, the MMPI differed from most of these instruments in two essential ways. First, the authors employed an empirical keying approach when constructing the MMPI scales (Graham, 1990). The predominant method utilized when constructing personality inventories before the development of the MMPI was a logical keying approach. In the logical keying approach, items were subjectively selected based on their face validity. In other words, items were selected if, in the authors' opinion, they were likely to be endorsed by subjects who exhibited the symptoms or characteristics that was being measured. In the empirical keying approach, also called the criterion keying approach, items are

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selected based on the rate of endorsement by a criterion subject group. The criterion subject group is comprised of individuals that exhibit the symptoms or characteristics being measured (Archer, 1997). In addition, one or more control subject groups comprised of individuals who do not manifest the characteristics being measured are used. The response rates are compared and items that are endorsed at a significantly higher rate in the criterion group than in the control group are selected for inclusion on the inventory. For example, if researchers were interested in developing a scale that would identify symptoms of schizophrenia, the criterion group should consist of individuals who carry this diagnosis. Items that are endorsed more frequently by individuals in the criterion group would then be selected for inclusion on the scale. Items that were endorsed at similar rates in the control and criterion groups would be excluded from this scale. Many personality inventories that were constructed via the logical keying approach were criticized because they often did not produce profiles that distinguished between clinical groups and non-clinical groups. The empirical keying method of test construction was an attempt to combat this problem, subsequently improving the validity of personality inventories.

Second, the MMPI differed from traditional personality inventories in that the authors placed heavy emphasis on the use of validity scales incorporated into the instrument (Archer, 1997). A frequent criticism of many of the personality inventories being developed at that time was that test subjects might respond in a dishonest or inaccurate manner. That is, test subjects might choose to deny symptomology that is clinically relevant or attempt to present themselves in an

overly favorable light. Such a pattern is commonly called "faking good." (Butcher & Williams, 2000). On the opposite end of the spectrum, exaggerated responses or malingering could also pose a threat to validity on personality inventories. In addition, test subjects may not take care to accurately complete test protocols by creating random response patterns with little meaningful clinical data. Previous personality inventories had no established methods for combating these problems. Based on these known problems, McKinley and Hathaway took care to create validity scales designed to detect deviant test taking behaviors (Graham, 1990).

Development of the MMPI

The authors began work on the development of the MMPI by collecting over 1000 statements that they believed were potential items for the various scales on the instrument (Archer, 1997). These items were gathered from a variety of sources such as psychiatric interview forms, textbooks, and some were developed based on their own experiences. Roughly half of those items were eliminated because they were deemed too similar to other items, or the authors determined that they had little significance. The final 504 items were judged to be clinically relevant and significantly independent from each other (Graham, 1990).

The normal criterion group consisted of 724 friends and relatives of patients at the University of Minnesota Hospital, 265 high school graduates receiving college counseling at the University of Minnesota Testing Bureau, and 264 individuals considered to be "white collar workers." (Archer, 1997 about

Dalstrom, and Wellsh, 1960). The clinical subject groups were comprised of

psychiatric patients at the University of Minnesota Hospital (Graham, 1990). The

patients were divided into discrete groups that represented psychiatric

diagnostic categories commonly used at that time. In situations where patients

were dually diagnosed or diagnosis was not considered to be clear, patients were

excluded from the study. The diagnostic categorical groups and subsequent

scales on the instrument were Hypochondriasis (scale 1: Hs), Depression (scale 2:

D), Hysteria (scale 3: Hy), Psychopathic Deviant (scale 4: Pd), Paranoia (scale 6:

Pa), Psychasthenia (scale 7:Pt), Schizophrenia (scale 8: Sc), and Hypomania (scale

9: Ma) (Archer, 1997). Also, a group of homosexual males was used to develop

scale 5, the Masculinity-Femininity scale (Mf). Drake (1946) developed scale 0

(Si), the Social Introversion-Extraversion scale from a subject group outside the

original Hathaway group.   Table A1 provides a reference to the MMPI scale

names.

Four validity scales were developed to address the criticisms previously

noted regarding personality inventories and were designed to detect aberrant

test taking behaviors (Graham, 1990). The first scale, called the Cannot Say scale,

consisted of the number of omitted items on the instrument and the number of

items that were endorsed as both true and false by the test taker. Too many

omitted items were considered a threat to validity because these omissions

reduced the number of items on the clinical scales, making an accurate

interpretation difficult.

The Lie scale (L scale) was created to detect attempts to present oneself in an excessively positive way (Archer, 1997). The L scale contained 15 items that reflected common faults or weaknesses and it was meant to evaluate the patients' unwillingness to admit even minor character imperfections (Graham, 1990). One example illustrated by Graham (1990) was the L scale test item "I read an editorial in the newspaper every day." He argued that "most people would be quite willing to admit that they do not read every editorial every day, but persons determined to present themselves in a favorable light might not be willing to admit such a perceived shortcoming." (Graham, 1990, p.31)

The F scale, sometimes referred to as the frequency or infrequency scale, was comprised of 64 items that were endorsed in a particular direction by less than 10% of the normal subject group (Archer & Krishnamurthy, 2000). The developers theorized that since such a small number of individuals endorsed these items, it reflected deviant behavior. A large number of F scale endorsements might reflect a failure to comply with directions, carelessness, or a lack of understanding of instructions.

Finally, the K scale, sometimes called the defensiveness scale, was developed by Meehl and Hathaway (1946) to reduce the number of false negative responses (Archer, 1997). Fifty psychiatric patients from the clinical sample who produced normal clinical scale scores were selected to develop the K scale. Items that differentiated these subjects from normal subjects were selected for inclusion on the K scale. It was suspected that high K scores reflected defensiveness and therefore might invalidate the findings (Graham, 1990). A K correction

procedure was developed as a method of countering extreme defensiveness. The process of K correction involves adding various portions of K scale raw scores to scales 1, 4, 7, 8 and 9 (Archer, 1997).

Use of the MMPI

The original intent of the MMPI was to produce individual scale elevations that would correlate with the diagnostic classification of that time period (Graham, 1990). However, it was observed that individuals who manifested characteristics of certain clinical category often also obtained high scores on other clinical scales. In addition, many individuals with no known psychopathology obtained high scores on one or more of the clinical scales. Therefore, it seems that the scales were not discrete measures of the conditions the scales attempted to assess. One proposed reason for the failure of the MMPI to differentiate was a high degree of scale intercorrelation. In addition, the psychiatric groups used in the original MMPI sample reportedly did not have reliable specific diagnoses, which may have impacted the scales' ability to discretely measure specific constructs.

Because the MMPI did not demonstrate that it could consistently identify specific psychiatric diagnoses based on single scale elevations, its clinical use shifted (Archer, 1997). Clinicians placed less importance on the scale names and began to refer to scales by their corresponding numbers. Thus, practitioners would refer to scale 2 instead of the depression scale. The clinical meaning of scale evaluations has been determined through years of correlational research.

In fact, over 10,000 research articles have been published on the MMPI (Graham, 1990). Instead of providing a diagnosis based on a specific scale elevation, MMPI interpreters can now use a more descriptive approach, backed by the vast research base. That is, interpreters can make inferences or provide descriptive information about a client that is based on research that has examined similar MMPI configurations.

MMPI-2

The MMPI became the most widely used personality instrument in the United States (Lubin, Larsen, & Matarazzo, 1984) and was not revised until 1989, more than 40 years after its publication (Butcher & Williams, 2000). Despite the popularity of the instrument, there were many criticisms that highlighted the need for a revision. The normative sample was considered by many to not be representative of the United States population (Graham, 1990). The sample was believed to be one of convenience and consisted of an all-Caucasian population predominantly from rural areas in Minnesota collected in the 1930s. In fact, Butcher (1972) described the lack of comparability of the MMPI norms and several other researchers (Colligan, Osborne, Swenson, & Offord, 1983; Parkinson & Fishburne, 1984) presented research concluding that the original norms were not comparable to modern day normative groups. Further, many of the items were considered outdated or no longer meaningful (Butcher & Tellegen, 1966). For example, some items made references to streetcars, sleeping powders, and a game called "drop the handkerchief," all of which were less appropriate with modern day subjects (Graham, 1990). In addition, changes in

psychiatric diagnosis standards with the development of the Statistical Manual of Mental Disorders (DSM: American Psychiatric Association, 1952, 1968, 1980, 1987, 1994, 2000) made scale categories less meaningful. Finally, some items were poorly worded or included incorrect punctuation and required revision.

With these criticisms in mind, the MMPI-2 was developed. The normative sample consisted of 1462 women and 1138 men, ages 18 to 85 years old (Butcher, Dallstrom, Graham, Tellegen & Kaemer, 1989). Data were collected from seven regions across the United States including California, Minnesota, North Carolina, Pennsylvania, Virginia, and Washington. Census data from 1980 was used to guide subject selection. Racial make up of the sample was more diverse than the original sample and included 81% Caucasian, 12% African American, 3% Hispanic, 3% American Indian, and 1% Asian American subjects. Educational levels ranged from 3 years of formal education to over 20 years with a mean of 14.72 years of formal education. The authors ceded that the sample was somewhat skewed towards higher educational levels and that individuals without a high school diploma were "underrepresented," but it was believed that the sample still was representative when considering the individuals most likely to take the MMPI-2. Approximately 21% of the females and 32% of the males reported having managerial or professional positions and about 12% of the males and 5% of the females reported working as laborers. Roughly 6% of the females and 3% of the males in the sample reported being treated for mental health issues at the time of the study. Overall, the sample was generally

considered representative of the national population (Archer, 1997) and appears to be a marked improvement from the original MMPI sample.

The new test booklet developed for the MMPI-2 contained 567 items, most of which were items retained from the original instrument (Butcher, Dallstrom, Graham, Tellegen & Kaemer, 1989). Several items were removed because they were deemed inappropriate. Content on the deleted items included questions regarding sexual preferences, bladder and bowel functioning, and religious practices (Graham, 1990). Eighty-seven items were modified to improve the wording, modernize the language, correct grammar, or to simplify the item.

Overall, the MMPI-2 is very similar to the original MMPI in that the clinical scale format was unaltered (Butcher & Williams, 2000). As such, the existing research base is considered directly applicable to the newer instrument (Butcher et al. 1989). However, the improvements in items, and the more representative standardization sample allow for more meaningful comparisons to modern day test takers.

MMPI-A

Until the development of the MMPI-A (Butcher, Williams, Graham, Archer, Tellegen, Ben-Porath, & Kaemmer, 1992), many professionals adapted the original MMPI for use with Adolescents (Archer, 1997; Archer, Maruish, Imhof, & Petrowski, 1991; Butcher & Williams, 2000). Although this was a common practice, there were concerns regarding the use of the MMPI in the adolescent population. For example, issues involving the normative data were identified. The MMPI was normed on individuals 16 years of age or older, thus

not fully encompassing the adolescent population. In addition, the norms from the original MMPI were considered outdated by many professionals. Adolescent normative data sets that were later developed by Hathaway and Monachesi (1963) and Marks and Briggs (1972) were not nationwide samples and therefore critics did not consider them representative of the population as a whole. Further, there were problems with test items and scales. Terminology and phrases were deemed out of date and not easily understandable by modern youth. For example, Archer (1997, p 45.) noted that one item contained the term, "drop the handkerchief," a phrase not commonly used by adolescents today. The number of items was considered excessive by many, so a need for a shorter instrument existed. Also, specific adolescent problems such as drug use and eating disorders were not addressed by items on the original instrument (Butcher & Williams, 2000). In that same vein, scales specifically for adolescents were not yet available. Finally, problems with interpretation were described. Code types varied when using adolescent norms compared to adult norms and predictive and descriptive accuracy were lower in adolescent testing. Overall, a variety of issues and concerns were identified regarding the use of the MMPI with adolescents, illustrating the need for an adolescent specific instrument.

The MMPI-A was developed to better assess personality in adolescents (Archer, 1997). The normative sample for the MMPI-A consisted of 805 boys and 815 girls between 7th and 12th grade, ranging from 14 to 16 years of age (Butcher et al. 1997). In an effort to provide geographic, ethnic and rural/urban residency balance, data collection was conducted in seven regions of the United States

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including California, Minnesota, New York, North Carolina, Ohio, Pennsylvania, Virginia and Washington State. As was done in the MMPI-2 project, the developers attempted to secure a racial distribution similar to US Census figures. Racial make up of the normative sample reported by gender is illustrated on Table A2. The racial composition of the sample appears to be much more representative of the national population than the original MMPI norms, although the authors acknowledged that the Hispanic population may be underrepresented.

Occupation information and educational levels of the parents are presented in Table A3, Table A4, Table A5, and Table A6. The data generally reflect a skew towards higher educational levels and professional and managerial positions. In terms of family characteristics, roughly two third of the participants lived with both their mother and father, Approximately 30% of the subjects lived with one parent and almost 4% described their living situation as "other." The normative sample for the MMPI-A reflected a skew towards higher SES and educational levels, but is considered to be an acceptable match against US Census figures. In short, the sample appears to be a much better representation of modern adolescents than the normative data used for the original MMPI.

The MMPI-A test booklet contains 478 items, most of which are taken directly from the original MMPI. Eighty-two of the original MMPI items were altered to improve wording. In addition to original MMPI items, 85 adolescent specific items intended to assess issues such as peer and family relationships,

school attitudes, sexuality and identity formation were added to the final booklet.

Similar to the development of the MMPI-2, the MMPI-A was designed to maintain continuity with the original instrument (Archer, 1997). Therefore, the three validity scales and 10 clinical scales used on the MMPI and the MMPI-2 are also included in the MMPI-A. As such, the research base that has accumulated on the MMPI is believed to be applicable for the MMPI-A. In addition to the content scales, the MMPI-A has four new validity scales, 6 supplementary subscales, 28 Harris-Lingoes scales, and 15 content scales and 3 Si subscales.

In summary, the development of the MMPI-A considerably enhanced adolescent personality assessment with the MMPI. Butcher and Williams (2000) cited several advantageous features of the MMPI-A that illustrate this improvement. Items with problematic wording were corrected or removed. Thus, problems with outdated terminology, ambiguous statements and irrelevant or inappropriate questions were eliminated. Also, scale continuity was maintained between the MMPI and the MMPI-A, making general comparisons of psychopathology easier and preserving the archive of MMPI research that has been amassed over the years. Further, specific items addressing "adolescent-specific themes" were developed allowing for the development of specific scales addressing adolescent issues. Finally, the normative data included a current nationwide sample that included minority youth. Therefore, the results could be compared to a more representative population.

MMPI-A Validity and Clinical Correlates.

Because the MMPI-A maintained a parallel scale structure and made only minor changes and modifications on test items, the developers contend that the massive body of literature on the MMPI and adolescents is also applicable to the MMPI-A (Archer & Krishnamurthy, 2002). As such, much of the interpretive data on the scales that has been reported is actually based on previous MMPI research. However, a few MMPI-A studies have emerged in recent years that have provided some data on the clinical correlates with the new instrument. Based on the collective research, inferences can be made on specific scale elevations. Relevant data on each scale are provided below.

Scale 1 (HS): Hypochondriasis.

This scale was originally developed as a method of identifying individuals who showed signs of hypochondriasis including somatic complaints, and an excessive concern with disease and bodily functioning (Archer & Krishnamurthy, 2003). Not surprisingly, the test takers' actual physical condition can impact this scale (Archer, 1997). Elevations on scale 1 have been observed in adolescents with medical concerns such as epilepsy (Dodrill & Clemmons, 1984), muscular dystrophy (Harper, 1983), Tourette's Syndrome (Grossman, Mostofsky, & Harrison, 1986), physical impairments (Harper & Richmond, 1978) and sleep disorders (Monroe & Marks, 1977). Further, a study involving 1193 adolescents who received a medical evaluation at the Mayo clinic revealed that these adolescents tended to score higher on scales 1, 2, and 3 (Colligan & Osborne, 1977). Butcher et al. (1992) reported that males and females

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in the clinical standardization sample of the MMPI-A who scored higher on scale 1, also tended to score higher on the somatic complaints scale of the Child Behavior Checklist (Achenbach & Edelbrock, 1983). Boys in clinical settings were more likely to exhibit internalizing concerns such as fearfulness, worrying, or withdrawal (Butcher et al. 1992). Girls in clinical settings were more likely to have an eating disorder. In school settings, high scorers on scale 1 of the MMPI-A tended to report more academic difficulties and high scoring girls were more likely to report family relational and financial problems. Cashel, Rogers, Sewell, and Holliman, (1998) examined clinical correlates of incarcerated juvenile boys and reported that scale 1 elevations were associated with boys' reports of the fear of dying or losing control, concentration difficulties, and cruelty to others. Table A7 highlights the descriptors for elevated scale 1 scores as outlined by Archer & Krishnamurthy, 2003.

Scale 2 (D): Depression.

Scale 2 is described as a measure of general dissatisfaction with one's life, including feelings of hopelessness, and low morale (Butcher et al. 1992). Archer, Gordon, Giannetti, and Singles (1988) reported that high scorers on scale 2 were described as ashamed, guilty, introspective and self-critical. In addition, these individuals were deemed more motivated to engage in therapy and more amenable to the therapeutic process as they were more willing to discuss their feelings. Butcher et al. (1992) and Wrobel & Lacher (1992) found that elevated scale 2 scores were associated with indicators of depressed mood, although more significant correlations were reported in girls. Specifically, high scale 2

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elevations were associated with low self-esteem, poor peer relationships, and social withdrawal. However, another study found that both boys and girls with high scale 2 scores tended to be more self-critical and had difficulty making decisions (Galluci, 1994). Cashel et al. (1998) reported that descriptors of incarcerated boys with scale 2 elevations exhibited depressed mood, restlessness, self-pity, nightmares, obsessions and compulsions, concentration problems, anorexia and cruelty towards others. Scale 2 has also been associated with eating disorders (Cumella, Wall, & Kerr-Alemeida, 1999), learning problems (Greenway, 1999) and suicidal ideation (Archer, 1999). Table A8 lists the major descriptors of scale 2 as reported by Archer and Krishnamurthy (2002).

Scale 3 (Hy): Hysteria.

According to the MMPI-A manual (Butcher et al, 1992), scale 3 measures two major content areas. First, scale 3 measures somatic concerns and the denial of problems. Second, it detects the need for social acceptance and approval. In the standardization sample of the MMPI-A, boys in the normative sample were observed to have more school related problems when they scored high on scale 3. In the clinical sample, high scoring boys had histories of suicidal gestures and girls reported more somatic complaints. Archer et al. (1988) found that adolescents with high scale 3 scores were reported to be dependent, non-assertive, had limited friendships, responded to stress with somatic complaints, and were able to quickly alter their behavior to conform to social expectations. Cashel et al. (1998) reported significant correlations between scale 3 elevations and depressed mood, anorexia, concentration problems, suicidal ideation, and

cruelty towards other. Scale 3 elevations have been observed in individuals with

eating disorders, (Cumella, Wall, & Kerr-Almeida, 1999), substance abusers

(Galluci, 1997), and victims of sexual abuse (Roland, Zelhart, Cochran, &

Funderburk, 1985; Knisely, Barker, Ingersoll, & Dawson, 2000). Further,

moderate elevation on scale 3 may indicate social extroversion, exhibitionistic

behavior, superficial relationships, and a self-centered mentality (Archer &

Krishnamurthy, 2002). Table A9 summarizes the major characteristics associated

with scale 3 elevations

     Scale 4 (Pd) Psychopathic Deviate.

     Scale 4 was originally designed to identify individuals with "psychopathic

personality," which is now referred to as antisocial personality disorder (Archer,

1997). This scale covers a variety of content areas that are associated with

delinquent behaviors (Archer and Krishnamurthy, 2002). These include, conflict

with authority figures and family, social isolation, and dissatisfaction with

everyday life. This was the most commonly elevated scale in the clinical sample

of the MMPI-A standardization group, with over 30% of the subjects achieving

clinically elevated scores. Butcher et al. (1992) reported numerous clinical

correlates including low school achievement, school suspensions, drug use, a

variety of behavioral difficulties, and sexual abuse. Archer et al. (1988) found

that high scoring scale 4 individuals tended to be described as hostile, rebellious,

disinterested in psychological treatment and more apt to use drugs. Others have

reported that scale 4 elevations were associated with increased risk of suicide in

psychiatric inpatients (Kopper, Osman, Osman, & Hoffman, 1998). Butcher and

Williams (2000) indicated that adolescent high scorers on scale 4 often engaged in lying, stealing, cheating, and exhibit signs aggression and temper outbursts. Cashel et al. (1998) reported similar findings with incarcerated youth but also noted impulsivity, a tendency to blame others, sleep disturbances, and depressed mood. Additional recent studies that have examined MMPI-A scale 4 elevations have reported associations with delinquency (Pena, Megargee, & Brody, 1996), Suicidal ideation (Archer & Slesinger, 1999), sex offenses (Losada-Paisey, 1998), learning problems (Greenway, 1999), sexual abuse (Knisely et al., 2000) and substance abuse (Gallucci, 1997). Given the diversity of findings, Butcher and Williams (2000) recommend care when interpreting this scale as a variety of descriptors could apply. Table A10 provides a summary of descriptors associated with scale 4 elevations as described by Archer and Krishnamurthy (2002).

Scale 5 (Mf): Masculinity/Femininity.

This scale was originally developed using a sample of males described as "sexual introverts" (Butcher et al., 1992). The scale was believed to be a measure of prototypically masculine or feminine interests in an effort to identify homosexual males (Archer, 1997). This scale has been criticized for being a weak or irrelevant construct and some researchers have argued that its exclusion would not result in a significant loss of information (Butcher & Williams, 2000; Williams & Butcher, 1989). As such, it is recommended that this scale be used as a personality measure as opposed to an indicator of psychopathology (Butcher & Williams, 2000). Elevated scale scores in boys indicate interests in more

traditionally feminine activities while elevations in girls reflect an interest in more traditionally masculine activities. Correlates in the MMPI-A standardization sample suggested that high scores for boys and low scores for girls were associated with less acting out behaviors. High scoring boys and low scoring females reportedly tended to be more intellectual, according to research completed on the original MMPI (Hathaway & Monechesi, 1963). High scoring girls were likely to be described by therapists as oppositional, easily upset, moody and having poor anger control. In addition, Archer and Krishnamurthy (2002) reported that high scoring boys may be more fearful and high scoring females may be more aggressive. Wrobel and Lacher (1992) found that high scale 5 scores for outpatient girls in a clinical setting were associated with parents' reports of violence against others, agitating others, and being in trouble. Overall, the data supporting the use of this scale are sparse but Table A11 and Table A12 outlines Archer and Krishnmurthy's (2002) summary of scale 5 correlates.

Scale 6 (Pa): Paranoia.

Scale 6 was intended to assess typical symptomology of paranoia, including ideas of reference, feelings of persecution, feelings of self-righteousness, and rigidity (Archer, 1997). While many of the items specifically address these concerns, other items on the scale deal with issues such as cynicism, and interpersonal sensitivity that are not necessarily indicative of psychosis. Thus, individuals who exhibit no psychotic symptoms often produce elevated scale 6 T-scores. Butcher et al. (1992) reported that scale 6 is related to

acting out behaviors and school failure. In the clinical sample, scale 6 correlated with ratings of hostility, withdrawal and dependent behavior in boys and correlated with increased conflict with parents in girls. In a psychiatric inpatient sample, adolescents who scored high on scale 6 were often perfectionistic, often planed their behavior or activities, and expressed guilt after bad behavior (Gallucci, 1997). Boys with high scores reportedly had difficulty making decisions, were emotionally involved with others, and expressed an interest in doing frightening things. Girls who scored high on scale 6 were reportedly insightful and could anticipate consequences for their behaviors, considered how their behavior affected others, and were self-critical. In a juvenile detention setting, high scores on this scale were associated with depressed mood, heightened activity levels, suicidal ideation and attempts, fear of dying or losing control, concentration difficulties, and cruelty towards others (Cashel et al., 1998). Archer & Krishnamurthy (2002) describe the relevant correlates to scale 6 in Table A13.

Scale 7 (Pt): Psychasthenia.

This scale was developed to measure the condition now conceptualized as Obsessive-Compulsive Disorder (Archer, 1997). The content on the scale involves various areas such as concentration, obsessive thoughts, anxiety and tension, depressed mood, emotional distress, and physical complaints. Butcher et al. (1992) reported few clinical correlates with scale 7 in the MMPI-A standardization sample. However, Scale 7 was associated with a history of depression, and an increase in parental discord in the clinical sample of girls.

High scoring scale 7 boys in the clinical sample were more likely to have been

sexually abused. One study reported limited self-confidence in boys and higher

incidence rates of suicidal threats and stealing in girls when scores were elevated

on this scale (Wrobel & Lacher, 1992).   Galluci (1997) found that high scores

were associated with difficulties in making decisions, self-criticism and doubt,

and feelings of guilt after wrongdoings. Boys in a juvenile correctional facility

who scored high on scale 7 were reportedly described as having depressed

mood, concentration difficulties, generalized anxiety, panic symptoms, fears

related to issues such as dying, losing control, and public speaking, and excessive

activity. Generally speaking, the scale appears to be lacking somewhat in

empirical support for its use with adolescents. However, based on the available

body of research, high scoring individuals are generally described as anxious,

indecisive, self critical and perfectionistic (Archer & Krishnamurthy, 2002).

Extreme elevations may be reflective of more significant pathology such as

obsessions and ruminative thoughts. Table A14 illustrates the characteristics that

are related to elevated scale 7 scores.

    Scale 8 (Sc): Schizophrenia.

    Scale 8 covers a number of content areas including unusual thoughts,

social withdrawal, concentration problems, difficulties monitoring impulses, and

behavioral and mood disturbances (Archer & Krishnamurthy, 2002). High scores

could indicate severe psychosis but could also suggest personality disorders,

brain injury, sensory impairments, or unconventional or rebellious personalities

(Butcher & Williams, 2002). Butcher et al. (1992) reported that this scale was

related to multiple negative features and behavioral concerns. In the clinical sample, boys with high scale 8 scores tended to exhibit increased behavioral difficulties, internalizing and schizoid behaviors, psychotic symptoms, somatic symptoms, and were reported to have low self-esteem and increased likelihood of sexual abuse history. Girls in the clinical sample had increased conflict with parents and more incidents of sexual abuse. In the normative sample, higher scale 8 scores were associated with poor academic performance, increased disagreements with parents, weight gain, and poor personal achievement. In an adolescent inpatient setting, scale 8 high scorers were described as withdrawn, mistrustful, stress prone, and interpersonally isolated (Archer et al., 1988). In addition, these individuals often exhibited disturbances in reality testing. One study reported a link between a schizophrenic diagnoses and elevated scale 8 scores in an adolescent inpatient setting (Archer & Gordon, 1988). Archer et al. (1988) also reported poor therapeutic prognosis with high scoring scale 8 individuals because they were generally distrustful of their therapists, resistant to engage in therapy and discuss their feelings, and did not establish a good relationship with their therapists. In a correctional setting, scale 8 descriptors included depressed mood, suicidal ideation and gestures, concentration problems, fear of dying and losing control, obsessions and compulsions, blame towards others, concentration deficits, excessive activity levels, difficulty completing things, and cruelty towards others (Cashel et al., 1998). In an outpatient setting individuals with high scale scores were viewed as different from their peers (Wrobel & Lacher, 1992). Gender differences were noted as girls

exhibited a variety of externalizing concerns while boys were more withdrawn, shy and had low self-confidence. Table A15 provides an overview of characteristics associated with scale 8 elevations

Scale 9 (Ma) Hypomania.

Scale 9 was an attempt to identify individuals who exhibited hypomanic symptoms (Butcher et al., 1992). Content areas addressed on this scale include flight of ideas, grandiosity, irritability, egocentricity, elevated mood, and behavioral and cognitive over activity. The MMPI-A manual reported that girls with elevated scale 9 scores tended to have school related problems. Girls in the normal sample reportedly engaged in more conflict with their parents and girls in the clinical sample were rated to have poor social skills. The only correlate observed in boys was increased reports of amphetamine use. Adolescent high scorers on scale 9 of the original MMPI were found to be involved with drugs more frequently and they were described as being disinterested in therapy, unwilling to discuss their feelings, and being insensitive to criticism (Archer et al., 1988). Galluci (1997) also found a relationship between scale 9 and drug use. Archer and Slesinger (1999), (Cashel et al. (1998), and Koppel et al. (1998) all reported that scale 9 was associated with suicide attempts. In addition, scale 9 was observed to correlate with descriptors such as resistance to depression, elation, duration of manic behavior, irritability or anger, overactivity, complaining, self-pity, generalized anxiety, blaming of others, concentration difficulties, and cruelty towards animals (Cashel et al., 1998). Further, delinquent behavior has been reported to be associated with scale 9 elevations (Archer &

Krisnamurthy, 2002; Cashel et al., 1998; Pena, Megargree, & Brody, 1996). Table

A 16 contains a summary of correlates with scale 9.

Scale 0 (Si): Social introversion.

Scale 0 was originally developed using a sample of introverted and

extroverted college students. Similar to scale 5, this scale is considered a "non-

clinical" indicator of personality (Archer & Krishnamurthy, 2002). Even so,

research has indicated that scale 0 is a good indicator of difficulties in social

relationships in clinical samples (Butcher & Williams, 2000). Butcher et al. (1992)

and Wrobel and Lachar (1992) reported that high scale 0 scores were associated

with low self-esteem and social withdrawal in both genders. Females in clinical

settings who scored high on scale 9 were found to be depressed, have suicidal

thoughts or attempts, manifest eating problems, and have few friends (Butcher et

al., 1992). High scoring females tended to be described by their therapists as

withdrawn, shy, timid, physically weak, fearful and depressed. In addition, this

scale reportedly has an inhibitory effect on some behaviors (Butcher & Williams,

2000). For example, there is a negative relationship between scale 0 and acting

out behaviors, drug use, and delinquent activity. Table A17 outlines the salient

features associated with scale 0 elevations as summarized by Archer &

Krishnamurthy (2002).

MMPI Short Forms

Some researchers have examined the reasons for the popularity of the

MMPI (Archer, Marush, Imhof, & Pitrowski, 1991; Archer & Newsome, 2000; Ben

Porath & Davis, 1996, Klump & Butcher, 1997). The most frequently cited

reasons for the use of the MMPI-A and the MMPI-2 as personality instruments is that they provide an objective, accurate, comprehensive measure with clinically useful information, they are easily administered and scored, and they are backed by an extensive research base (Archer & Newsome, 2000). Thus, practitioners appear to have considerable faith in the ability of the MMPI to provide valid, pertinent psychological data. In addition, some practitioners appear the favor the MMPI because it is an objective measure, as opposed to other personality inventories that use projective techniques. Several features that were not always cited in survey studies may also contribute to the frequent use of the MMPI. Hatthaway (1965) believed that the validity scales built into the MMPI contributed to the test's popularity. That is, the MMPI offered a statistical method of detecting invalid records caused by malingering, carelessness or nonreaders. He also cited ease of administration, simplistic language on test items, availability of comparison norms and clinical groups based on research. Graham (2000) outlined several other advantageous features that have not often been cited, but may also contribute to frequent use of the test. He noted that reliability data for the MMPI-2 and the MMPI-A are good (Butcher et al., 1989; Butcher et al. 1992) which make these instruments an option in forensic assessments. Also, both instruments have been translated and produced in languages other than English. Finally, Graham (2000) suggested that the profiles produced on the MMPI-2 and the MMPI-A are useful in providing feedback to clients regarding symptoms or personality characteristics. Clearly, the MMPI has a variety of features that make it a viable option for assessing personality

characteristics. As such, it is understandable that the MMPI is regularly used by practitioners in the field.

While the MMPI has many positive attributes, it is not without criticism. The most frequently cited disadvantage of the MMPI-2 and the MMPI-A is the length of the test and the time involved in administration (Archer et al., 1991; Archer & Newsome, 2000; Ball, Archer, & Imhof, 1994). Time requirements for the administration of the MMPI-A are not published in the manual for administration (Butcher et al. 1992) but some researchers (Archer, Tirrell & Elkins 2001) have estimated that a full administration takes approximately 1 hour. Further, a survey study involving clinical practitioners reported a mean administration time of 66 minutes and a modal value of 90 minutes (Ball, Archer & Imhof, 1994). The only instrument reported to require more time to administer was the Halstead Reitan neuropsychological test battery. Test time has become such an issue that some authors have suggested strategies for ensuring compliance and completion. For example, Butcher and Williams (2000) suggested administering the test in 20 or 30-minute sessions if it is suspected that the subject may not complete the instrument. The issues of time and compliance are especially salient when considering that certain individuals may lack the desire or stamina to complete such a lengthy instrument. For example, McDaniel (1999) cited test length and complicated terminology as a barricade in using the MMPI on individuals with mental retardation. Patients with physical disabilities or individuals who have undergone stressful surgical procedures have been identified by some researchers as individuals that are less likely to

complete a lengthy questionnaire (Butcher & Hostetler, 1990). Further,

Faschingbauer (1976) noted that some psychiatric patients exhibit high levels of

irritability and restlessness and have poor concentration. He further explained

that the process of obtaining a complete MMPI was virtually impossible on some

individuals with severe psychopathology. Thus, there are a variety of

circumstances that preclude the use of the MMPI. Obviously, in such instances, a

briefer instrument would be beneficial.

Types of Shortened Forms

Over the years, researchers have addressed this concern through the

development of shortened forms of the MMPI. Three basic strategies have been

employed when developing shorter MMPI forms. The first strategy, developing

an "abbreviated form," includes only the test items that are used to obtain scores

on desired scales (Butcher & Hostetler, 1990). For example, the researchers may

only be interested in the clinical scales and the validity scales on the MMPI and

not the supplemental scales (i.e., Harris-Lingoes scales). The MMPI, the MMPI-2,

and the MMPI-A all have procedures for an abbreviated administration. The

first 399 items on the original MMPI, the first 370 items on the MMPI-2, and first

349 items on the MMPI-A contain all the items used to score the standard scales

(1,2,3,4,5,6,7,8,9,0) and the Validity Scales (L,F,K). The advantage to this

procedure is that there is no loss of items. All the items necessary to score the

scales remain on the abbreviated instrument. However, the administration time

is only marginally reduced and the supplementary scale information cannot be

gathered.

A second strategy for condensing the number of items is an experimental technique called computer-adapted administration (Butcher & Williams 2000). With this approach, a computer test format is utilized and the items administered can be individually tailored based on the subject's previous responses, such that the subjects are administered only the items that are necessary to adequately describe the subject's psychological state. The approach is comparable to a clinical interview in that the interviewer omits questions deemed unnecessary. Butcher and Hostetler (1990) explain, " the subject is asked only the questions that will have a bearing on his or her overall clinical picture, namely, only if an item can add to information making up the total score on the scale or profile code" (p. 18). Current research has suggested that this technique can gather a high degree of clinically relevant information while including minimal test items (Handel, Ben Porath, & Watt, 1999). The empirical evidence has provided support for the computer adaptive strategies to reduce the administration time of the MMPI (Ben-Porath, Slutske, & Butcher, 1989; Butcher, Keller, & Bacon, 1985; Clavelle & Butcher, 1977; Handel, Ben-Porath, & Watt, 1999; Roper, Ben-Porath, & Butcher;1995). However, this format is still being developed and there is no product currently available for clinical use (Williams & Butcher, 2000).

A final method of reducing administration time involves the creation of a "short form." A short form is defined by Butcher and Hostetler (1990) as an instrument in which some or all of the scales from the parent MMPI have been retained but the items that weight towards those scales have been reduced. The

raw scores obtained on these measures are prorated to estimate a T-score that

hypothetically would have been obtained had the full MMPI been administered

(Archer, Tirrell, & Elkins, 2001). At least 15 short forms have been developed

over the past few decades (Archer, Tirrell & Elkins 2001; Dahlstrom & Archer,

2000; Dean, 1972; Faschingbauer, 1974; Ferguson, 1946; Grant, 1946; Holzberg &

Alessi, 1949, Hugo, 1970/1971, Jorgenson, 1958; Kincannon, 1968, MacDonald,

1952; McLaughlin, 1974; Olsen, 1954; Overall & Gomez-Mont, 1974; Spera &

Robertson, 1974; Ward & Selby, 1980). All these forms have generated some

validity data but questions regarding comparability of short and long forms have

impeded widespread acceptance of short forms (Green, 1982). Subsequently,

interest in short form research appears to have waned after the 1980s. However,

researchers continue to acknowledge that short forms may be necessary in many

instances and that continued study to determine their clinical utility would be

beneficial (Archer, Tirrel, & Elkins, 2001, Dahlstrom & Archer, 2000).

   To summarize, three major approaches to shortened forms have been

studied and reported. Abbreviated forms are available and can be readily scored

by simply completing the first 370 and 350 items on the MMPI-2 and the MMPI-

A respectively. Because the abbreviated form is comprised of all the items

necessary to score the traditional clinical and validity scales, all MMPI research

that focuses on these scales, and not the supplementary scales, is directly

applicable to the abbreviated form. Thus, there is no reason for future research

to focus on this topic. Based on solid initial validity data, computerized adaptive

scoring appears to have much promise and it is the focus of some current

research. However, it remains under development and not yet available to clinicians. Also, the complexity of the format prohibits widespread investigations on the subject. Researchers have also developed multiple MMPI short forms over the past 50 years, but no short form has proven to be an alternative to the long form. Even so, the need for a briefer instrument continues to drive the development of new short forms (Archer, Tirrel, & Elkins, 2001; Dahlstrom & Archer, 2000) and warrants further research.

Historical Overview of Short Forms

The earliest documented short forms appear to have been a completed in 1946, just a few years after the original MMPI was published. Grant (1946) developed a hybrid short form based on selected items from the MMPI and the Cornell Selectee Index. Later, Ferguson (1946) produced a 200-item form that contained only the items necessary to score the standard clinical scales. However, scales K, 5(Mf), and 0(Si) were later introduced, diminishing the scale's potential usefulness (Streiner & Miller, 1986). While the dearth of empirical studies on these forms suggests that early short forms did not gain popularity, a number of new short forms were developed over the next few decades. Holzberg and Alessi's work (1949) foreshadowed a movement towards short forms that were composed of a reduced number of MMPI items with accompanying formulas for estimated full administration scores. In the 1950's, Mcdonald (1952), Olsen (1954) and Jorgenson (1958) proposed new short forms but none of these forms achieved much recognition. This was probably due to the failure of these early forms to demonstrate high correlations with the MMPI

(Edinger, Kendall, Hook, & Bogan, 1976). In the late 1960's and early 1970's, however, several prominent short forms emerged and the zeitgeist of the short form took shape, sparking a flurry of evaluative studies on the subject. The Mini-Mult, developed by Kincannon (1968) proposed that a 71-item questionnaire could estimate MMPI scale scores. The initial data indicated that Mini-Mult correlated well with the MMPI and resulted in minimal reliability loss. Dean (1972), McLachlan (1974), and Spera and Robertson (1974) constructed short forms that were direct derivatives of the Mini-Mult. The first was an 86-item instrument that simply added 15 additional items to the Mini-Mult in an effort to improve correlations on three of the scales. The later two, both called the Maxi-Mult, also added items under the premise that the additional items would improve the short form and resulted in 94 and 104 items respectively. The Hugo short form was developed in 1971 and consisted of 173 items. This form scored all 13 of the standard scales, unlike the Mini-Mult, which omitted scales 5 and 0 (Hugo, 1971). Fachingbauer (1974) applied a factor analysis procedure to derive a 166 item short form that he compared favorably to the full MMPI in a sample of psychiatric patients and college students. This form is referred to as the Faschingbauer Abbreviated MMPI, or FAM. Overall & Gomez-Mont (1974) used a clinically practical approach to short form development by simply selecting the first 168 items on the MMPI. This form, called the MMPI-168, estimated scales scores based on similar regression techniques used in previous forms. Identifying a need to evaluate patients with little or no reading skills, Ward and Selby (1980) created a 167-item short form,

called the Improved Readability Form (IRF), that eliminated items that were perceived to have problematic or complicated wording. Follow up studies (Jarmusik & Ward, 1988; Ward & Dillon, 1986; Ward & Myers, 1984; Ward, Wright & Taulbee, 1981) showed moderate correspondence with the MMPI and comparable results with other short forms. However, the applicability of the IRF was described as limited due to the time constraints of orally administering the instrument. In 1995, Swanson and his colleagues devised a 60-item, three scale short form, called the MMPI-TRI. The three scales were the subjective distress, acting out, and psychosis scales. The authors relayed that the MMPI-TRI correlated well with the MMPI and was able to provide adequate differential diagnostic information. Most recently, Dahlstrom and Archer (2000) and Archer, Tirell and Elkins (2001) described short forms based on the model used in the development of the MMPI-168 (Overall & Gomez-Mont, 1974). Using the normative data from the MMPI-2, researchers evaluated the use of the first 180 items of the MMPI-2 as an alternative to the full instrument (Dahlstrom & Archer, 2000). In a similar vein, a MMPI-A short form comprised of the first 150 items was assessed Archer, Tirrell and Elkins, (2001). In both cases, good scale correlations were reported and profile congruence to full MMPI profiles were shown to be similar to previous MMPI short forms. Additional validity research on these new short forms was recommended before the authors would advocate their use in clinical settings.

Several short forms have been researched more extensively and have gained some degree of acceptance in the field and therefore warrant additional

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comment. The three short forms that are most commonly cited are the Mini-Mult, the FAM, and the MMPI-168. In addition, the most recently developed short forms of the MMPI-A and the MMPI-2 are unlike previous short forms in that they have been developed using the normative data from their respective parent instruments. Thus, the two short forms were validated with the same sample as the long forms, which theoretically should improve the comparability between the long and short forms. The initial results of the evaluation studies suggest positive results but external validation has been suggested to determine clinical applicability (Archer, Tirrell, & Elkins 2001). As such, they represent the most likely candidates for future study on MMPI short forms and they will be discussed in greater detail below.

Mini-Mult.

Kincannon (1968) recognized that short forms developed at that time could not reliably predict the standard scale elevations. Therefore, he selected items based on cluster analysis procedures that identified the items with the strongest predictive values in an effort to improve full scale score estimates. The resulting instrument, called the Mini-Mult, contained 71 items from 11 of the 13 standard MMPI scales. Correlations between short form scales and full scale scores ranged from .70 to .96. In addition, the Mini-Mult was deemed more reliable than expected because scales only averaged a 9% test-retest reliability loss despite having scales that were 50% to 75% shorter than the MMPI scales. These finding inspired multiple validation studies that sought to evaluate the utility of this new instrument.

While the Mini-Mult precipitated a trend toward increased short-form research, few studies were able to produce data to support the use of this instrument. Correlations between scales were sometimes lower than expected and estimated full scale scores were often significantly different than the actual full scale scores (Gayton & Wilson, 1971; Harford, Lubetkin, & Alpert, 1972; Huisman, 1974; Platt & Scurra, 1972; Rybolt & Lambert, 1975; Scott, Mount & Kosters, 1976; Simono, 1975; Trybus & Hewitt,1972; Tsushima, 1975). Typically, these studies also failed to produce similar code-type profiles as the full scale MMPI. That is, clinical elevations on scales of the short form often did not match clinical elevations on the full administration. This was viewed as a significant flaw because it could result in inaccurate clinical interpretation (Edinger, 1981). The Midi-Mult (Dean, 1972) and two forms called the Maxi-Mult (Maclaughlin, 1974; Spera & Robertson, 1974) added additional items to the Mini-Mult in an effort to improve correlations with the MMPI scales. However, none of the above mentioned instruments ever gained widespread acceptance (Butcher & Hostetler, 1990). Even so, some have argued that the Mini-Mult has utility in some specific settings, especially when the goal is simply to detect gross psychopathology (Bieliauskus, & Glanz, 1987; Franco, 1986; Mlott, 1976).

FAM.

The FAM was developed by using a factor cluster technique to efficiently shorten the scales (Faschingbauer, 1974). The resulting test consisted of 166 items that contributed to the 13 estimated standard MMPI scales. Correlational data between the FAM scale scores and the full MMPI scores ranged from .83 to .96

with a median correlation of .91. Test-retest reliabilities ranged from .53 to .95, similar to test-retest reliabilities on the full MMPI administration, which were between .49 and .96. Code type congruence was examined to demonstrate how well the FAM estimated the actual MMPI profiles. This was done by comparing the highest scales on the profiles of both the long and short forms that produced at least one clinically elevated score. If both forms had the same highest T score, then they were judged to have one-point congruence. If the two forms matched the same two highest point elevations, regardless of order (i.e. 2/4, 4/2, or 6/8. 8/6), they were judged to have two-point congruence. High point code type congruence was reported at 63%, while two-point and three-point congruence rates were 38% and 43% respectively. Comparative data on other established short forms were also included. The FAM proved superior in terms of congruence rates when compared to the Mini-Mult, the Midi-Mult, and the Hugo short form. Faschingbauer also examined error rates on the validity scales. The FAM labeled 22% of the profiles valid that were labeled invalid by the MMPI. The FAM also invalidated only 14% of the profiles labeled valid by the MMPI. In this respect, the other short forms in the study performed more accurately and this was described as the significant weakness observed. Faschinbauer concluded that the FAM compared well with the MMPI in most respects and performed better than other short forms in the study.

Validity research on the FAM was more favorable than the Mini-Mult. Several reports indicated not only high correlations between scales, but reasonable congruence rates (Newmark & Glenn, 1974; Newmark, Newmark &

Faschingbauer, 1974; Newmark, Owen, Newmark, & Faschingbauer; 1975; Poythress, 1978; Poythress, & Blaney, 1978). However, other findings suggested the FAM did not produce similar profiles and advised against using it, or any short form, in a clinical setting (Edinger, Kendell, Hook & Bogan 1976; Finch, Kendall, Nelson & Newmark 1975; Hoffman & Butcher, 1975). This was viewed as a critical flaw by many researchers (Butcher & Hostetler, 1990; Newby Schroader & Hallenbeck, 1982; Streiner & Miller, 1986) and this form did not gain wide spread acceptance.

MMPI-168.

Overall and Gomez-Mont (1974) developed the MMPI-168 as they saw a need for a brief screening instrument for psychiatric patients. They obtained poor validation results with the Mini-Mult and thus sought to devise a more appropriate screening tool. Three hundred thirty nine MMPI protocols from a psychiatric hospital and medical school were reviewed. The protocols were scored using the all the items necessary to score the standard scaled (373) and then again scored using just the first 168 items on the test. The raw scores were transformed to estimate full scale T-scores using least square regression methods. Correlations between estimated T-scores and full-scale T-scores ranged from .79 (Ma) to .96 (Hs). The investigators compared this to results achieved by scoring the Mini-Mult, which ranged from .23 to .83 with an average correlation of .65. It was concluded that the study established "general equivalence" (p. 318) with the full scale instrument and claimed that the first 168 items could adequately represent the MMPI. Two advantages were described in the study. First, the

estimated time involved in completing an MMPI-168 was estimated to be 40% of the established 373-item abbreviated form. Second, the items were delivered in the same order as the full scale MMPI, eliminating the need for a new test form. This not only provided a convenient form for practical use, but the authors indicated that data already collected on conventional MMPI protocols could be used for post hoc analysis to validate the procedure.

Subsequent research suggested that the MMPI-168 demonstrated more clinical utility than most short forms and has been cited in over 100 research articles. Replication studies generally produced favorable correlations between the MMPI-168 and the MMPI and provided evidence that the MMPI-168 yielded similar or higher diagnostic validity values than the full MMPI administration (Edinger & Vosk, 1984; Erickson & Freeman, 1976; McDaniel, 1997; Newmark, Newmark & Cook, 1975; Newmark & Raft; Newmark, Ziff, Finch & Kendall, 1979; Overall, Butcher & Hunter, 1975; Vincent, 1979; Ward & Meyers; 1984). Several researchers advocated its use in specific populations or situations such as adolescents (Lueger, 1983; Macbeth & Cadow, 1984), medically fragile patients (Wilcockson, Bolton, & Dana, 1984), and individuals with mental retardation (McDaniel & Harris, 1999). Further, the MMPI-168 compared well with other established measures such as the Manifest Anxiety Scale (King & Campbell, 1987), the Millon Clinical Multaxial Inventory (Sexton, McIlwraith, Barnes, & Dunn, 1988), and the Reiss Screen for Maladaptive Behavior (Johns, & McDaniel, 1999). Recent literature suggests that some investigators have accepted the MMPI-168 as a screening tool as it has been utilized as an outcome measure for

several contemporary studies (i.e., Sobatnik, Neuchterlein & Ventura, 2000;Valliant, Gristey, Pottier, & Kosmyna, 1999).

While positive results have been reported, other researchers have argued against the use of the MMPI-168 (i.e., Graham, 1987). Similar to the other short forms, some researchers reported poor profile congruence (Erickson & Oleary 1977; Evans, 1984; Hoffman & Butcher, 1975; Newby, Schroeder & Hallenbeck, 1982). Still others have reported a lack of clinical accuracy (King & Cambell, 1984; Moreland, 1984; Newmark, Gentry & Whitt, 1982). Thus, despite being one of the most successful attempts at an MMPI short form, the criticisms appear to have hampered universal acceptance of the instrument.

MMPI-2 Short Form.

More recently, efforts to develop a short form have been derived from the most current editions of the MMPI instruments. Tapping the restandardization sample of the MMPI-2, Dahlstrom and Archer (2000) examined MMPI profiles of the 2600 men and women involved in the study and profiles obtained on 632 patients in a clinical setting. MMPI-2 scores were compared to scores obtained on a short form containing the first 180 items on the MMPI-2. A prorated scoring method was utilized to estimate full scale T scores. Scale correlations were reported to range from .78 on the Pa scale to .94 on the L scale in the normative sample and ranged from .82 on the Mf scale to .99 on the Hs scale in the clinical sample. In addition to reviewing scale correlations, the investigators evaluated profile similarity by analyzing congruence rates. Single point congruence rates

were reported as 50.9 in the normal profiles and 54.6 in clinical profiles. Two-point congruence rates were 30.5 in normal profiles and 36.9 in clinical profiles.

The authors provided little analysis regarding the results other than to illustrate "what descriptive information may be retained and what may be lost" (p. 136) when using the short form. These results were similar to previous results on MMPI short forms (Butcher & Hostetler, 1990; Streiner & Miller, 1986) and comparable to the results on a MMPI-A short form using similar methodology (Archer, Tirrell, & Elkins, 2001). Further research on special populations was recommended.

MMPI-A Short Form.

Archer, Tirrell and Elkins (2001) examined the test scores of all 1620 adolescents in the MMPI-A normative sample and a clinical sample of 565 adolescents in various treatment settings, and compared the scores obtained on a short form comprised of the first 150 items on the MMPI-A. The short form incorporated a prorated scoring method to estimate scale scores that would have been obtained had a full administration been completed. The results indicated that the scale correlations ranged from .75 on the Mf scale to .95 on the L scale. While single scale correlations were impressive, the relationships between the short form scores and the original MMPI-A scores were not as strong when comparing profile congruence. Single point congruence rates were reported as 48.1% in the clinical sample, and 50.0 % in the normative sample. Two point congruence rates were 32.2% for the clinical sample and 30.2% for profile samples in the normative group.

Archer, Tirrell and Elkins (2001) noted that the MMPI-A short form resulted in considerable time savings. In fact, it was estimated that administration time could be reduced to 20 minutes from approximately 1 hour. However, they also described concerns regarding the applicability of the short form due to the relatively low congruence rates. Lower congruence rates suggest that the final profiles on short forms are generally dissimilar to full administration profiles and therefore not as clinically useful. Again, these results are similar to other MMPI short forms that have been developed (Butcher & Hostetler, 1990; Streiner & Miller, 1986). While initial scale correlations are often high, code type congruence has generally fallen between 30%-60% (Archer, Tirrell, & Elkins, 2001).

These results provided initial evidence of the validity of the MMPI-A short form but determining the usefulness of the instrument, "probably requires independent demonstration of meaningful relationships of short form scales to appropriate external criteria." (Archer, Tirrell, & Elkins, 2001, p. 88). This recommendation was based on the suggestions from Green (1982) who argued that MMPI short forms should be considered new instruments as opposed to an alternative form of the parent instrument. Therefore, demonstrations of validity are necessary to determine the overall usefulness of the instrument.

In summary, numerous short forms have been developed to address the need for a comprehensive personality measure that is less time consuming than the MMPI. Short form construction began almost immediately after the MMPI was introduced but it was not until the late 1960s that a viable short form was

introduced (Edinger, Jendall, Hook, & Bogan, 1976). The 1970s were marked by steady research on short forms and several forms demonstrated validity. The most frequently researched short forms were the Mini-Mult, the FAM, and the MMPI-168. However, no short form was ever identified as a superior model nor was one universally accepted as an adequate replacement for the full instrument. The short form movement lost much momentum after the 1980s but several new forms continue to emerge. Most recently, short forms have been developed based on the latest editions of the MMPI. These are the MMPI-2 short form (Dahlstrom & Archer, 2000) and the MMPI-A short form (Archer, Tirrell & Elkins, 2001). Both these short forms differ from any previous short forms because they were developed using the normative sample from the parent instrument. While using the standardization sample from the MMPI should improve the psychometrics of the short form, no validity studies are available on these instruments at this time.

Analysis of Short Forms

The research on MMPI short forms has been mixed. Considerable research has provided evidence of the validity of various short forms (Archer, Tirell & Elkins, 2001; Bieliauskus, & Glanz, 1987; Dahlstrom & Archer, 2000; Dean, 1972; Edinger & Vosk, 1984; Erickson & Freeman, 1976; Fashingbauer, 1974; Franco, 1986; Jarmusic & Ward, 1988; Kincannon, 1968; McDaniel, 1997; Mclaughlin, 1974; Mlott, 1976; Newmark, Newmark & Cook, 1975; Newmark & Glenn, 1974; Newmark, Newmark & Faschingbauer, 1974; Newmark, Owen, Newmark, & Faschingbauer; 1975; Newmark & Raft; Newmark, Ziff, Finch &

Kendall, 1979; Poythress, 1978; Poythress, & Blaney, 1978; Overall, Butcher & Hunter, 1975; Overall & Gomez-Mont, 1974; Spera & Robertson, 1974 Ward, Wright & Taulbee, 1981; Ward & Meyers, 1984; Ward & Dillon, 1986; Vincent, 1979; Ward & Meyers; 1984), but the criticisms have inhibited the use of these short forms in clinical settings. Some argue that the need for a short form is not warranted (Butcher & Williams, 2000; Graham, 1987). That is, most individuals who are administered the MMPI have the capabilities and the time to tolerate a full administration. In fact, Butcher and Hostetler (1990) claim that it would be a clinical rarity for a subject to object to the testing, given that the purpose is adequately explained. Further, the nature of short forms inherently reduces the reliability of the new measure (Streiner & Miller, 1986). That is, according to the Spearman Brown prophecy formula, there is a direct relationship between the number of items and the reliability of the test. Therefore, when the number of items is reduced, the reliability is subsequently impacted as well. It has been postulated that this lessening of the reliability also creates a less valid instrument (Butcher & Hostetler, 1990). Finally, the most prevalent criticism of short forms is that they have generally shown poor profile congruence when compared to conventional MMPI scores. Most short forms have demonstrated high correlations between scale scores and their corresponding scales on the full MMPI (Streiner & Miller, 1986). In this respect, they usually demonstrate solid validity data. However, when evaluating how well the short form and long forms compare, they often do not produce the same profile. Reports have varied, but studies have resulted in concordance rates between 30% and 60% depending

on the type of analysis used (Archer, Tirrell, & Elkins, 2001). Therefore, short

forms may not be true substitutes for a full-scale administration as they may

actually measure slightly different constructs (Green, 1982). This problem has

represented such a concern among investigators that many have indicated that

short forms are fundamentally flawed, not clinically applicable, and in some

instances, it has been recommended that the quest for a valid short form should

be abandoned all together (Butcher & Hostetler, 1990; Graham, 1997; Greene,

1982; Hart, McNeil, Lutz, & Atkins, 1986; Helmes & McLaughlin, 1983; Streiner &

Miller, 1986).

While these criticisms reflect legitimate obstacles for the application of

short forms in the clinical setting, the concerns may be overstated. For example,

many researchers have contested the notion that short forms are simply

unnecessary. The need for shorter personality assessment procedures has been

identified for specific populations such as the elderly or those with emotional or

physical disabilities (Dahlstrom & Archer, 2000), persons suffering from chronic

pain (Prokop, 1988), individuals with severe psychosis (Faschinbauer, 1976),

individuals with mental retardation (McDaniel, 1999) and individuals with

reading difficulties (Jarmusik & Ward, 1988). In addition, survey studies report

that the most common disadvantage cited by clinicians who use the MMPI is the

length of administration time (Archer, Maruish, Imhof, & Piotrowski, 1990;

Archer & Newsome, 2000). Thus, despite the claims of some researchers

(Butcher & Hostetler, Graham, 1987), the need for a shortened instrument is well

documented.

Regarding diminishing reliability and validity when administering short forms, the criticisms are reasonable. After all, based on published profile congruence rates, the short forms generally do not reproduce full administration score profiles. As such, one might conclude that the short forms are invalid. However, Streiner and Miller (1986) pointed out that profile congruence is problematic even when comparing two full-scale administrations. For example, Faschingbauer (1976) found that two-point code congruence rates were only 41% when looking at repeated full scale MMPI scores over a one-day interval. Poythress and Blaney (1978, p. 143) argued that, "This suggests the degree of slippage between long and short forms may not be markedly greater than the difference between two long forms administered in close succession." When considering this argument, some short forms compare very favorably to full MMPI forms. In addition, neither the MMPI-2 manual (Butcher et al., 1989) nor the MMPI-A manual (Butcher et al., 1992) published congruence rates as a measure of retest reliability. Instead, the authors deemed simple scale correlations to be a sufficient measure of reliability.

Poythress and Blaney's (1978) argument is somewhat flawed in that they compare short form validity to original form test-retest reliability, which are not directly comparable. However, it does illustrate that congruence rates are not necessarily the critical factor for determining the value of a test. A more appropriate comparison might be to evaluate the congruence rates when comparing the original MMPI to the MMPI-A. Butcher et al. (1992) claim that the previous MMPI research generalizes to the new instrument because the scales

have essentially remained intact. Two-point congruence rates were reported to be between approximately 56% and 68%, only slightly higher than some short form/original form congruence rates (Archer, 1997). If congruence rates were crucial for validity, this would not be an acceptable rate, especially considering the entire research base is believed to be directly applicable to the MMPI-A. Therefore, congruence rates are not considered the benchmark for MMPI/MMPI-A validity and should not be considered the standard for short form validity.

Overall, the issue of profile congruence appears to have hampered the search for a valid short form. Some researchers have argued that the criticisms are too great and that short form research should be discontinued, suggesting that researchers should focus on developing new measures unrelated to the MMPI (Streiner & Miller, 1986). However, the criticisms may be overstated. This is especially true regarding profile congruence, which appears to be a flawed measure of short form validity. There also continues be a need for short forms in special circumstance when a full administration cannot be obtained (Archer & Dahlstrom, 2000). Therefore, research will likely continue until a practical and psychometrically sound procedure is identified.

Future research for MMPI short forms

In response to the growing number of criticisms on short form research, Greene (1980) suggested that researchers place less emphasis on profile congruence of predicted full-scale scores. Instead, he argued that MMPI short forms should be viewed as new tests that require appropriate demonstrations of validity. Edinger (1981, p. 627) expressed similar concerns, stating, "…studies in

which short forms are evaluated purely in terms of how well they predict the standard form are of rather limited utility. If we are to employ short forms with any degree of confidence, then it is important to document their efficacy *in clinical situations*." This requires researchers to establish external correlates to MMPI short form scale elevations (Edinger, Kendall, Hooke & Bogan, 1976). Further, demonstrations of concurrent validity and predictive validity have been recommended (Archer, Tirrel, & Elkins, 2001). Thus, in order for a suitable short form to be developed, researchers must look beyond full-scale comparisons. Evidence that the short form can predict clinical placement in special populations is critical.

Virtually all researchers agree that short forms should be used only when full-scale scores cannot be obtained (Dahlstrom & Archer, 2000). Certain short form formats are inherently more practical and therefore increase the likelihood that a full-scale score will be obtained on any given administration. Short forms that utilize the first set of items on the parent instrument, such as the MMPI-168, the MMPI-A short form, and the MMPI-2 short form, allow the clinician to attempt a full-scale administration. The short form is then scored in cases when the full scale could not be completed. Other short forms, such as the MMPI-TRI, the FAM, and the Mini-Mult, require a different test protocol from the long form so a full-scale administration cannot be attempted. These forms have been altered because it was theorized that the best items could be selected based on their correlations to specific scale. While selecting items based on statistical correlations is a logical technique, previous research suggests that it does not

significantly improve the short form. In fact, the MMPI-168, a practically derived

short form, has similar or better applicability than other short forms (Edinger,

Kendall, Hooke & Bogan, 1976; Erickson & Freeman, 1976; Griffan & Danahy,

1982; Hedlund, Cho & Powell, 1975; Hoffman & Butcher, 1975; Newby,

Schroeder, & Hallenbeck, 1982; Newmark, Newmark, & Cook, 1975, Newmark &

Raft, 1976; Newmark, Ziff, Finch & Kendall, 1978; Ward & Meyers, 1984;

Wilcockson, Bolton & Dana, 1983). Therefore, the most reasonable approach to

for future research is to analyze the instruments that retain the original test

format and allow the option for a full-scale administration if the test-taker can

tolerate it. The MMPI-A short form fits those parameters and is therefore an

ideal candidate for short form research.

Why the MMPI-A Short form for Assessment in Schools?

As stated earlier, the MMPI-A is the most widely used objective

personality instrument with adolescents in the United States (Archer &

Newsome, 2000). Practitioners appear to have considerable faith in the

instrument because of its thoroughness, appropriate adolescent norms,

comprehensive research base and solid psychometric properties. The exact

extent of its use in the school setting is not known. However, the evidence

suggests that its use in the schools is uncommon (Shapiro & Heick, 2004)

probably due to the length of the instrument (Kamphaus, Petoskey & Rowe,

2000). This is unfortunate because the MMPI-A addresses some of the concerns

that have been identified as problems in evaluations for students with possible

Emotional or Behavioral Disorders (EBD). For example, affective assessment

using data gathered directly from the child has been identified by school psychologists as the most valuable data obtained in these assessments (Clarizio & Higgins 1989; McGinnes, Kiraly, & Smith, 1984; Smith, Frank, & Snider, 1984). Yet, these same researchers have found that these data are often not gathered and they reported that this might be a weak area for many school psychologists. In addition, the available literature on EBD suggests that severity of the emotional condition is a good indicator of the need for special education services (Alexon & Sinclair, 1986; Mattison et al., 1986). Further, school psychologists must be prepared to distinguish a true emotional condition from a child who is "socially maladjusted," exhibiting behavioral difficulties without an associated emotional concern. The MMPI-A can be a useful tool in addressing all these concerns. The instrument allows the evaluator to gather data via direct self-report and considered to be a good estimate of emotional functioning across a variety of constructs (Archer, 1997; Archer & Krisnamurthy, 20002; Archer & Newsome, 2001). As such, the instrument is a powerful tool for assisting with the determination of the nature of the emotional condition and the severity of the disorder.

While the value of the MMPI-A in EBD assessments is clear, the length of the instrument poses a serious stumbling block for its use in the schools. Time is especially critical for school-based assessment due to the current trends towards increasing caseloads for many school psychologists (Kamphaus, Petoskey & Rowe, 2000). Kamphaus and Reynolds (2003, p.6) summarize the need for time efficient instruments:

In schools, clinics, and private practice, the amount of time that can be devoted to individual psychological assessment of students and patients has dwindled. Congress has broadened the criteria used to establish the eligibility for special education services in the schools since the initial national special education law mandated special education services—The Education for All Handicapped Children Act (1975). The school-aged population continues to grow, but school budgets have not kept pace, and proportionately fewer school psychologists and diagnosticians are being trained and hired. Newer revisions to the special education law (notably the IDEA amendments of the late 1990s) allow parents of special education students to request more frequent reevaluations. All of these factors and more have created an increased need for more efficacious evaluations in the schools.

The need for brief measures is not new and not exclusive to school settings (Clarizio & Higgins, 1989; Goh & Fuller, 1983; Goh, Teslow & Fuller, 1981; Kamphaus, Petoskey & Rowe, 2000; Prout, 1983; Reynolds & Kamphaus, 2003). However, given the current climate of increasing workloads for school psychologists, the need for shorter, more efficient instruments is especially critical. Despite the many positive attributes of the MMPI-A, its length will likely prevent widespread use in the schools. The MMPI-A short form offers a potential format for evaluators to quickly administer only some of the MMPI-A items and still obtain a comprehensive snapshot of the student's emotional condition. Due to the brevity of the instrument, its use in the school setting is

much more likely than the full instrument. Also, the construction of the short-form also offers a practical advantage that has not always been possible in other MMPI short forms. Because it is comprised of the first 150 items on the MMPI-A, it does not require a new test form or alternate administration. Instead, the administrator may attempt to obtain a full MMPI-A, which is regarded by virtually all researchers as a much better representation of the child's functioning. If the adolescent proves not to be tolerant of a full administration, the short form can be scored. Thus, the format is more versatile than many other MMPI short forms that have been developed in the past.

The purpose of this study is to investigate the value of the MMPI-A short form in the assessment of adolescents. In order to demonstrate the MMPI-A short form utility, it is first necessary to provide evidence of validity. Based on the criteria outlined by Green (1982) and Archer, Tirrell and Elkins (2001), the MMPI-A short form will be treated as a new instrument, separate from the full MMPI-A, and predictive validity will be examined. Predictive validity will be determined by the MMPI-A short form's ability to discriminate clinical and non-clinical populations. For purposes of this study, students who obtained elevated scores on an established, frequently used, self-report instrument will serve as the clinical groups and students who obtain normal profiles on the established instrument will serve as the control or non-clinical group.   If the MMPI-A short form can discriminate between clinical groups and non-clinical groups, predictive validity can be established.

This research has implications for clinicians in a variety of settings. Traditional MMPI personality measures are lengthy and time consuming. In many instances, individuals may not be capable or willing to take a standard MMPI (Vincent, Castillo, Hauser, Zapata, Stuart, Cohn, & O'Shananick, 1984.) Adolescent compliance can be particularly problematic as some adolescents may lack reading skills, or be too distractible, hyperactive, oppositional or impulsive to complete a full administration (Butcher et al. 1992). Thus, the availability of a viable alternative to personality measurement would be of benefit to clinicians. Positive indications of predictive validity would be of particular interest to school psychologists who are called upon to evaluate the emotional condition of students who may require special education services. The brevity of the MMPI-A may make its use more likely in school settings should it prove to be a valid measure.

Research Questions

The primary goal of the study is to determine if the MMPI-A short form can identify individuals with identified emotionality. The following research question was posed: Do scores on specific MMPI-A short form clinical scales significantly differ in individuals with clinical or adjustment concerns on the BASC-2 than individuals without these concerns? An additional question was posed: Can a discriminant analysis identify a function that correctly classifies a large portion of these individuals? Additional analysis of MMPI-A short form elevations was also investigated. Specifically, frequency data on scale elevations

across the groups as well as single point and two point elevations were examined.

Chapter Two: Methodology

The study investigated the predictive validity of the MMPI-A short form. This was accomplished by comparing scores on the MMPI-A short form across several groups. Since the MMPI-A purports to measure a range of psychological features, this project attempted to assign subjects to groups that represent different aspects of psychological function and dysfunctions. This was done in a broad sense by assigning students to a Clinical condition, an Adjustment condition, or Non-clinical (control) condition. Each individual was selected for one of the three groups based on his or her scores on an established self-report personality inventory, the Behavior Assessment System for Children -2, Self Report (BASC-2). Predictive validity was examined by comparing the scores on each of the 10 clinical scales on the MMPI-A short form across the three groups and examining patterns.

Participants

A total of 237 high school students participated in the study. All participants were between 14 and 20 years of age and enrolled in grades 9 through 12. Students were recruited from two different high schools in the Atlanta area. Validity checks were conducted on each protocol by examining the validity scales on both the BASC-2 and the MMPI-A short form. Scores that were designated in the "Extreme Caution" or "Caution-High" range on the BASC-2 were eliminated from the study. On the MMPI-A short form, scores above 90 on the F scale and Scores above 65 on the L and K scales were considered invalid and eliminated. After removing protocols that had validity concern or were

incomplete, 211 students were deemed acceptable for statistical analysis.

Another two cases were removed because their profiles were too similar to

differentiate between the clinical and adjustment group criteria. Thus, the final

sample size for analysis was 209. Validity criteria and group selection criteria are

explained in greater detail below.

Participation was voluntary and a raffle prize was offered as an incentive

for participation. Each participant was required to return a parent consent form.

Individuals who were 18 years of age were permitted to sign their own consent

forms. A copy of the consent form is included in Appendix B. 118 females and

91 males were included in the study. Other demographic data are presented in

Table 1, Table 2, and Table 3.

Table 1

Subject Racial Composition

Measure	Black	White	Hispanic	Asian	Multi-Racial
#	73	97	10	16	13
%	34.9%	46.4%	4.8%	7.7%	6.2%

Table 2

Student Age Frequency

Measure	14	15	16	17	18	19	20
#	16	27	32	69	56	8	1
%	7.6	12.9	15.3	33.0	26.8	3.8	.5

Table 3

Student Grade Information

Grade	Frequency	Percent
9	35	16.7
10	22	10.5
11	56	26.8
12	96	45.9

Instruments

Two standardized instruments were utilized for this study. The first was the MMPI-A short form, which was the subject of the validation study. The second was the BASC-2, a widely used and established measure that was used to select the groups. The MMPI-A short form is a derivative of the MMPI-A, and is simply composed of the first 150 items on the MMPI-A. Scores on the scales are generated using a prorated scoring method that estimates full-scale scores. It is suspected that scores on the scales of the MMPI-A short form reflect similar behavioral correlates as the parent instrument. However, no research to date has examined the validity of the short form, so it is uncertain if they measure the same constructs. The behavioral correlates of each scale have been described in detail earlier in this manuscript. Thus, only a brief descriptor of the scales is provided below.

MMPI-A Short Form Validity and Clinical Scales

The scale structure of the short form is identical to the core scale structure of the MMPI-A, which is also identical to the original MMPI and the MMPI-2. Three validity scales and ten clinical scales comprise this core group.

Validity scales were incorporated into all the MMPI tests in order to detect deviant test taking patterns (Archer, 1992). This is especially important in the case of adolescent response sets since they may be more likely to produce invalid protocols than adults. The three core validity scales are Scales F, L, and K.

Scale F, often called the Infrequency or Frequency scale, deals with items related to strange and unusual experiences, thoughts, sensations, antisocial attitudes, and paranoid ideation. All the items on this scale were endorsed in less than 20% of the adolescents in the standardization sample. Since deviant responses to these items are statistically infrequent, a protocol that endorses an excessive number of F items is thought to be an indicator of "faking bad," and may invalidate the instrument. The MMPI-A contains 66 items on the F scale and scores above 90 are considered invalid. The short form retained 22 items on the F scale.

Scale L, Lie, is composed of 14 items that were originally intended to identify attempts to avoid answering the items in an honest fashion. Items are generally suggestive of themes such as the denial of common human faults, or aggressive impulses. Elevated scores suggest an attempt to portray oneself in an overly favorable light. Thus, a T-score above 65 is thought to indicate a need for caution in interpretation. The MMPI-A short form retained 11 of the original 14 items.

Scale K, Defensiveness, consist of 30 items that were designed to identify individuals that produced normal scale scores on the MMPI despite demonstrating significant psychopathology. Content areas of this scale include issues with self-control, and family and social relationships. A K-correction procedure was developed for adult MMPI scores that adjusted some of the clinical scales when the K scale was elevated. This process was not adopted for the MMPI-A but extremely low scores suggest "faking bad" while high scores

suggest defensiveness or "faking good." The MMPI-A short form preserved 13 of the original K scale items.

The clinical scales are numbered from 1 to 10 with the tenth scale being identified as scale 0. Scale 1, Hypochondriasis (Hs), is comprised of 32 items that suggest somatic concerns or a preoccupation with bodily functions or disease. Behavioral correlates include excessive somatic concerns, somatic response to stress, a tendency to be viewed by others as self-centered, dissatisfied, pessimistic, demanding, selfish, critical in interpersonal relationships, and as having academic and adjustment difficulties in school. The MMPI-A short form includes 22 of the 33 original items.

Scale 2, Depression (D), consists of 57 items that relate to social withdrawal, general apathy, sleep disturbances, social sensitivity, and gastrointestinal complaints. Research has indicated that high scores correlate with feelings of hopelessness and unhappiness, lack of confidence, a sense of inadequacy, and general apathy. The short form contains 38 of the original 57 items.

Scale 3, Hysteria (Hy), contains 60 items that were originally used to characterize individuals with extreme reactions to stressful situations. Relevant correlates to EBD criteria include somatic concerns, and an overreaction to stress. The short from contains 22 items.

Scale 4, Psychopathic Deviate (Pd), has 49 items that suggest conflict with authority and family, delinquency, social isolation, and an absence of satisfaction in everyday life. High scoring individuals typically include features of intense

anger, externalizing and aggressive behaviors, impulsivity, and low frustration tolerance. The MMPI-A retained 28 of the original items.

Scale 5, Masculinity-Femininity (Mf), consists of 44 items that involve work and recreational interests, relationships with family, sensitivity and fears. The original intent of the scale was to identify homosexual males but current research suggests that a variety of other factors influence this scale. Further, clinically elevated scores are likely not to result in a corresponding psychiatric diagnosis. Low scores on this scale are associated with school conduct problems and aggressive behaviors in boys. High scores in girls may indicate similar behavioral concerns. The MMPI-A short for contains 27 Mf items. This scale is generally considered the weakest of the MMPI-A scales (Archer & Krishnamurthy, 2002) and many of the clinical correlates are not related to psychiatric characteristics. Because of the lack of correspondence with psychiatric diagnoses and the relative weakness of the scale compared to the other MMPI-A scales, this scale will not be a focus of this investigation.

Scale 6, Paranoia (Pa), is comprised of 40 items that relate to clear psychotic symptoms, such as ideas of reference, feelings of persecution, and extreme suspiciousness. It also includes less psychotically oriented items such as cynicism, rigidity and interpersonal sensitivity. High scores on this scale are associated with anger and resentment, disturbances in reality testing, delusions of grandeur or persecution, and thought disorders. Eighteen items are included on the MMPI-A short form.

Scale 7, Psychasthenia (Pt), is composed of 48 items that were designed to measure symptoms of the condition now conceptualized as obsessive-compulsive disorder. Content areas of this scale include feelings of unhappiness, inferiority, and inadequacy, concentration difficulties, anxiety, and obsessive thoughts. High scores on the Pt scale correlate with obsessive thoughts, compulsive behaviors, anxious and apprehensive feelings, a self-critical and perfectionistic approach to life, and feelings of insecurity, inadequacy, and inferiority. The short form retained 18 items for this scale.

Scale 8, Schizophrenia (Sc), is the largest scale on the MMPI-A, incorporating 77 items. The items relates to areas concerning bizarre or peculiar thought processes, difficulties with concentration and impulse control, disturbances in mood and behavior, and social isolation. Characteristics associated with high scores on the Sc scale include the presence of schizoid features, poor reality testing, confused and disorganized thoughts, delusions and hallucinations, socially isolation, rejection by peers, and a reluctance to engage in social relationships. Twenty-five Sc items are on the MMPI-A short form.

Scale 9, Hypomania (Ma) consists of 46 items covering a range of content areas such as grandiosity, elevated mood, irritability, egocentricity, and overactivity. Relevant correlates are impulsivity, restlessness, distractibility, lack of realism, grandiosity, and school conduct problems. Lower scores have been associated with depressed mood. The MMPI-A short form contains 21 Ma items.

Scale 0, Social Introversion (Si) includes 62 items that were originally designed to detect extreme scores on introversion/extroversion measures.

Elevated scores on this scale are associated with low self-esteem, insecurity, interpersonal hypersensitivity, and a lack of social skills. The short form utilizes 15 of the original items.

BASC-2 Validity and Clinical Scales

The Behavioral Assessment System for Children-II, Self Report Inventory, hereafter referred to as the BASC-2, is a self-report personality inventory that is widely used in school settings (Kamphaus, Petoskey & Rowe, 2000). Three versions of the scale are produced. One version, the BASC-2-SRP-C, is designed for children 8 years old to 12 years old. The second version, the BASC-2 SRP-A, which is used in this study, is designed for use with adolescents age 12 to age 18. The third version, BASC-2 SRP-COL is intended for college students ages 18-25.

The BASC-2 is a questionnaire consisting of 176 items that are responded to as either "true" or "false" or in some cases, "never," "sometimes," "often," or "almost always." (Reynolds & Kamphaus, 2004). The inventory is comprised of 16 scales and three validity scales. Each scale contributes to one of four composite scores and the overall composite score. The composite scores are Inattention/Hyperactivity, Internalizing Problems, Personal Adjustment, and School Problems. The Emotional Symptoms Index is the overall composite score. The composites and scales are illustrated in Table A18.

Similar to the MMPI-A, several validity scales are included in the scoring of the test. The F Index is comprised of 15 items that are not commonly endorsed in the general population. An excessive number of positive responses to F items may indicate "faking bad," an attempt to portray oneself as being disturbed.

Raw scores of 4 or higher indicate that caution should be used in interpretation and the examiner is advised to interview the examinee to determining the significance of the elevations.

The L Index is made up of 15 items that reflect overly positive characteristics that are not likely to be endorsed frequently in the general population. Thus, test-takers who score high on this scale may exhibit a tendency to "fake good," an attempt to characterize themselves in an overly favorable manner. Random responding or an inability to read the test items may also influence this scale. L scores above 8 represent the "caution" range and warrant further clarification from the examinee.

The V, or Validity Index is composed of 5 items that have silly or obviously false content. For example, one item states, "I have not seen a car in at least 6 months." Individuals who endorse these items may be careless in there responding, may not understand the questions or may be uncooperative. Thus, endorsement of too many of these items may invalidate the results. Reynolds and Kamphaus (2004) reported that a score of 3 or higher often indicates uncooperativeness of the child, resulting in "highly questionable" interpretation.

The response pattern of the test taker is also evaluated for signs of carelessness in the responses. For example, a disinterested student may respond in a cyclical or repeating pattern(e.g. N-N-N-N-N…. or T-F-T-F-T-F…) Excessive patterns will result in a "Caution-High" rating on the Response Pattern validity indicator.

The BASC-2 also includes a Consistency Index, which compares the test takers responses to paired, similar items. A respondent who answers similar questions in a dissimilar fashion will achieve a higher Consistency score. If too many similar pairs are marked differently, this Index will be elevated. A score of 15 or higher suggests cautious interpretation.

The Anxiety scale is comprised of 13 items that reflect irrational feelings of nervousness, fear, and worry. Characteristics associated with high scores may include a sense of dread, obsessive thoughts, rigid thought processes, perseveration, and generally heightened anxiety levels (Reynolds & Kamphaus, 2004).

The Attention scale contains 9 items that were designed to assist in diagnosing the attention-related symptoms of Attention Deficit Hyperactivity Disorder (ADHD) (Reynolds & Kamphaus, 2004). This scale assesses the student's inability to maintain focus and difficulties ignoring distractions. Clinically significant scores may reflect attention problems that interfere with life functioning, such as learning. However, other factors such as anxiety or Post Traumatic Stress Disorder (PTSD) may also impact this scale.

The Attitude to School scale includes 7 items that represent feelings of alienation, and anger towards school. Individuals who score high on this scale may be dissatisfied with all aspects of school with the possible exception of peer relationships. These individuals may have an increased likelihood of dropping out of school and adolescents who score high on this scale may be more prone to exhibit externalizing behavior problems and antisocial behavior.   While this

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scale is not directly linked to psychiatric symptoms, it does contribute data on the child's adjustment in school and the impact of that adjustment on the child's feelings (Reynolds & Kamphaus, 2002).

The Attitude to Teachers scale has 9 items that involve negative feelings towards teachers such as perceptions of unrealistic demands by teachers or a lack of concern for students or lack of fairness by teachers (Reynolds & Kamphaus, 2004). High scores could be associated with increased likelihood dropping out, severe discontent with teachers or personality conflict with specific teachers. Similar to the Attitudes to School scale, this scale offers more information related to adjustment than specific diagnostic criteria (Reynolds & Kamphaus, 2002).

The Atypicality scale contains 9 items that are related unusual thoughts or perceptions such as those typically associated with psychosis such as paranoid thought processes and hallucinations. Clinically significant range scores may be indicative of severe emotional disturbances or emerging psychotic features (Reynolds & Kamphaus, 2004). The authors also indicate that "social alienation" or "highly individualistic" lifestyles could also elevate this scale. Therefore, examiners are cautioned to examine heightened scores carefully, which includes a thorough analysis of validity measure before making an interpretation.

The Depression scale contains 12 items that assess typical symptoms of depressed mood such as feelings of loneliness, sadness, hopelessness, dread, pessimism, and difficulties enjoying life. High scores may be representative of depression and may be associated with adjustment difficulties that may be

unnoticed by others as many of the symptoms are not externally observable (Reynolds & Kamphaus, 2004).

The Hyperactivity scale includes 7 items relates to behaviors such as being too noisy, fidgety, and interrupting others (Reynolds & Kamphaus, 2004). The items are intended to represent the hyperactive characteristics associated with ADHD. This scale is not expected to be directly related to emotionality and is therefore not a focus of this investigation.

The Locus of Control scale includes 9 items that measure an individual's sense of control and responsibility in his/her own life (Reynolds & Kamphaus, 2004). High scoring individuals may tend to project blame on others, have a sense of helplessness and generally believe that external forces control their fortunes. While heightened scores represent clinically significant findings, there are insufficient data at this time to support the notion that lower scores represent adaptive traits and a internal locus of control (Reynolds & Kamphaus, 2002).

The Sensation Seeking scale has 9 items that gauge an individual's tendency to find excitement from risk-taking behaviors (Reynolds & Kamphaus, 2004). Heightened scores may suggest that the adolescent is easily bored, shows high activity levels, or demonstrates a propensity towards high-risk or delinquents behaviors. Low Anxiety scales scores in conjunction with high Sensation Seeking scores sometimes are linked with conduct disorder diagnoses. There is also a connection between alcohol and drug use and the elevated Sensation Seeking scale scores.

The Sense of Inadequacy scale is composed of 10 items that assess the person's "lack of belief in the ability to achieve at expected levels, a tendency not to persevere, and a perception of being unsuccessful" (p. 61, Reynolds & Kamphaus, 1992). High scoring individuals tend to lack persistence, may have depressed self-confidence and may also indicate signs of depression or anxiety (Reynolds & Kamphaus, 2004). Since much of the item content is related to academic achievement, it might be expected for individuals with neurological impairments, cognitive deficits and learning disabilities to demonstrate elevations on this scale (Reynolds & Kamphaus, 2002).

The Social Stress scale consists of 10 items that assess an adolescent's stress levels associated with peer relationships and interactions with others (Reynolds & Kamphaus, 2004). High scores may suggest anxiety concerns, confusion and somatic issues.

The Somatization scale contains 7 items that assess the adolescent's tendency to report physical complaints as a result of psychological distress (Reynolds & Kamphaus, 2004). The reported problems could be the result of legitimate medical concerns or psychosomatic symptoms but elevated scores are expected to generally reflect a psychological basis to the complaints. Heightened scores may be associated with anxiety, repressed expression of feelings, internalization, or depression. Reynolds & Kamphaus (2002) reported scale elevations associated with separation anxiety, sub-clinical anxiety concerns such as academic worry, and clinical depression.

The BASC-2 Adaptive Composite Scales differ from the other scales in that heightened scores represent positive personal adjustment. Thus, an elevated scale would be considered a positive factor and lower scores are interpreted as problematic.

The Interpersonal Relations scale is comprised of 7 items that assess the individual's ability to easily interact socially with peers and adults (Reynolds & Kamphaus, 2004). Significant scores may be associated with withdrawal behaviors, intrusive socialization skills, or feelings of guilt for social failures. Depression scale elevations may also be associated with elevated Interpersonal Relations scores.

The Relations with Parents scale is comprised of 10 items that assess perceptions of the parent-child relationship, parental trust of the adolescent, and feelings of importance within the family (Reynolds & Kamphaus, 2004). Lower scores could suggest mild to severely dysfunctional relationships in the family or feelings of isolation. Adolescents with such scores may have a tendency towards "acting out" behaviors.

The Self-Esteem scale has 8 items that assess the individual's perceptions of him/herself (Reynolds & Kamphaus, 2004). As the name suggests, high scores may be suggestive of high self-esteem while low scores may indicate discontentment with themselves. Anxiety and depression may also be associated with this scale (Reynolds & Kamphaus, 2002). However, elevated scores can occur in the absence of other self-reported difficulties and may be the only indicator of emotional difficulties (Kamphaus, Distephano, & Lease, 2003).

The Self Reliance scale has 8 items that assess the adolescent's self-assurance in his/her ability to make good decisions (Reynolds & Kamphaus, 2004). Low scores on this scale may reflect shyness, insecurity, and difficulty confronting difficult life events. Recent data suggest that low scores may be indicative of feelings of guilt, irresponsibility, especially with regards to academics (Reynolds & Kamphaus, 2002).

Procedures

Recruitment

Participants were recruited from several regular education and special education classes. The examiner visited classrooms to recruit participants and explain the procedures and incentives for involvement. Consent forms were distributed to teachers of the classrooms visited. Teachers then provided forms to students who expressed an interest in participating. Returned consent forms were collected by the teachers and returned to the examiner. To encourage participation, students who returned consent forms were entered in a raffle drawing for prizes. The prizes were 15 gift certificates for local fast food restaurants worth $10.

In an effort to increase the likelihood of capturing an adequate number of students with significant emotionality, all students who were identified as having an Emotional and Behavioral Disturbance (EBD) were invited to participate. Students were recruited from special education classes if they were receiving resource class support; a classroom designated solely for special education students. Students who were mainstreamed or were served under a

"consult" basis were recruited individually. Students who wished to participate were given consent forms.

Groups

The participants were divided into three groups based on their scores on the BASC-2. The groups were the Clinical group, the Adjustment group, and the Non-clinical group. The BASC-2 scales that were believed to best represent more severe clinical symptoms such as thought disturbance, anxiety and depression represented the clinical group. Thus, the scales from the Internalizing Problems Composite were used to identify individuals for the Clinical group. These included the Atypicality, Locus of Control, Social Stress, Anxiety, Depression, Sense of Inadequacy, and Somatization scales. The remaining scales from the School Problems Composite and the Personal Adjustment Composite were used to identify the Adjustment group. These included the Attitude to School, Attitude to Teacher, Sensation Seeking, Relations with Parents, Interpersonal Relations, Self-Esteem, and Self-Reliance scales. The Inattention/Hyperactivity Composite was not used for determining group selection as this composite was believed to be the least likely to involve emotional indicators that the MMPI-A purports to measure.

Any individual who achieved a T-score at or above 65 on any of the scales within the Internalizing Composite was placed in the Clinical group. Similarly, any student that scored 65 or higher on any of the scales within the School Problems Composite was placed in the Adjustment group. Higher scores on the Personal Adjustment Composite of the BASC-2 are considered adaptive while

lower scores are considered problematic. Therefore, students who achieved a T-score at or below 35 on any of the scales in the Personal Adjustment Composite were also placed in the Adjustment group. Students who did not achieve significant scores (T score of 65 or higher) on any of the scales were placed in the Non-clinical or control group. Some students achieved elevated scores across multiple scales that represent both the Clinical and Adjustment groups. In such cases, the students' highest clinical elevation determined group placement. For example, if the student receives a T score of 65 on the Attitude to School scale and a 71 on the Anxiety scale, then that student would be placed in the Clinical group because the highest clinical score was found on a scale in the Internalizing Composite. In two cases, student BASC-2 protocols had exactly the same high point elevation on both an Internalizing Composite Scale and Personal Adjustment Composite scale. These two cases were considered a "tie" and omitted from the data analysis.

Administration

A seventh grade reading level was required for participation in the standard administration of the study in order to ensure understanding of MMPI-A short form items and BASC-2 items. Students were not formally assessed for reading levels but students with reading difficulties were identified via teacher reports. Students were also instructed to indicate if an oral administration was preferred on their consent form. Four students were identified as having reading problems or requested the alternate assessment procedures. In these cases, both

the BASC-2 and the MMPI-A short form were administered orally in a one to one session.

Each participant was administered both instruments in a single session. Test order was counterbalanced to reduce the likelihood of an order effect with half the participants taking the BASC-2 first and half taking the MMPI-A short form first.

The MMPI-A short form and the BASC-2 were administered in groups of 1-24 students. Total testing and administration time was approximately 60 minutes. In some cases, teachers substituted this activity for the normal daily activity and the class was allowed to take the test as a group. In such cases, teachers were sometimes present in the room but were not involved with the administration or collection of the protocols. In other cases, students were invited to attend one of several sessions that were conducted during school hours. The administration followed the normal procedures outlined in the MMPI-A manual and the BASC-2 manual. The BASC-2 was completed in its entirety but only the items that comprised the MMPI-A short form (first 150 items) were completed by the participants.

Students also completed an information form that provided general descriptive data for the study. This form is included in Appendix C. All protocols, consent forms, and student information forms were housed in a locked cabinet at the investigator's residence to ensure confidentiality. Data from the test scores were entered into a spreadsheet and assigned numbers and names were removed to ensure confidentiality.

Scoring the Test Protocols

The MMPI- A may be scored by hand or scored by computer. However, there is no computer option for the short form since the developers did not consider the use of a short form. All of the protocols obtained in this study were therefore hand scored. Raw scores were converted to estimated full scale raw scores using the linear regression procedure outlined by Archer, Terrell, and Elkins (2001). The estimated raw scores were then converted to T scores through the normal scoring procedures in the MMPI-A manual. T scores for the Clinical scales were the basis for the statistical analysis. Validity scale scores were examined to screen out possible invalid protocols. Since no procedure has been identified for short form validity scales, the validity procedures mirrored those of the MMPI-A. Protocols with scores above 65 on the L and K scales and above 90 on the F scale were excluded from the study. This decision was based on recommendations from reviews of other comparative studies (Archer, 1997; Archer & Krishnamurthy, 2002).

BASC-2 protocols were scored using the scoring software provided by the manufacturer. Similar to the MMPI-A short form protocols, the BASC-2 protocols were also screened using the validity indicators. Protocols containing an "Extreme Caution" or "Caution-High" classification on any of the validity indicators were excluded.

Research Design and Analysis

Several analyses were conducted to examine the relationship between the nine MMPI-A short form clinical scales examined in this study and the three

groups. Multivariate Analysis of Variance (MANOVA) tested the scale

differences between the three groups. When differences were observed, single

Analyses of Variance (ANOVAs) were run to determine the diagnostic group

differences of the individual MMPI-A short form scales. Due to the large

number of comparisons, the probability of type I errors increased. Therefore, the

Bonferroni correction for error in significance testing was applied. This divided

the typical p value for significance (p<.05) by the number of comparisons

conducted. This set the alpha level for univariate Fs at .006. The independent

variable was the students' placement in the Clinical group, the Adjustment

group or the Non-clinical group. The dependant variables were the nine scales

on the MMPI-A short form. A general research question was posed: Would

there be differences between the three groups on any of the 9 scales?

A second research questions was as follows: Would any of the nine

clinical scales on the MMPI-A short form will discriminate between the groups?

A discriminant analysis was conducted to determine if any of the scales could

predict membership in a specific group. According to Stevens (1996), when

using this procedure sufficient sample size is necessary to ensure stability of the

correlates and coefficients of the analysis. Otherwise, it is likely that the results

will not replicate when tested in another sample. Therefore, the minimum

number of subjects for this analysis is 20 per variable. In this case, nine variables

were tested requiring at least 180 subjects to have confidence in the results. Since

a relatively large number of subjects were obtained (N=209), the requirements for

this more complex analysis were met.

In addition to formal statistical analyses, several descriptive statistics were generated to assist in determining clinical applicability of MMPI-A short form scores for clinicians. Single-point and two-point scale elevations (code types) were compared across groups to determine if multiple elevations are more often associated with BASC-2 groupings. Percentage rates of clinically elevated scale scores on the MMPI-A short form were reported for each group. This provides data on the likelihood that specific elevations are associated with group membership. Also, mean T-scores of each group were calculated and graphically plotted to present an overall mean profile of each group. Finally, a correlation matrix between MMPI-A short form scales and BASC-2 scales was generated to explore possible areas of convergence.

Chapter Three: Results

The intent of the study was to examine the ability of the nine clinical scales of the MMPI-A short form to discriminate among a non-clinical sample, a sample of students that endorsed characteristics of adjustment issues, and a sample of students who endorsed characteristics of internalizing concerns such as anxiety and depression.

This chapter will present the results of the analyses conducted in this study. The results of the MANOVA analysis, including the basic statistical assumptions involved with this procedure, are presented. In addition, the results of univariate ANOVA analyses revealing the differences between the groups on each of the MMPI-A short form scales are reported. As a secondary analysis, a discriminant function is then reported that demonstrates which scales were able to discriminate between the various groups. Also, correlational data are presented to examine area of convergence between the MMPI-A short form and the BASC-2, as well as providing comparative data from the study and the normative data from the MMPI-A and BASC-2 Manuals. Finally, a series of descriptive statistics were generated to illustrate possible clinical implications of the findings.

Assumptions of Homogeneity of Variance

Box's M test statistic was employed to test the equality of group variances. The Box's M value was 169.89, (p< .001). This indicated a significant difference

in the covariance matrices and constituted a violation of an assumption for the

MANOVA test. However, Box's M is considered to be a very conservative and

sensitive test. Therefore, a visual inspection of the three covariance matrices was

conducted which suggested that the variance was fairly homogenous. In

addition, the MANOVA test is robust against violations of covariance equality

(Rencher, 1998). In fact, given this violation occurred with a relatively large

group size, the MANOVA would be expected to be more conservative (Stevens,

1996). This means that the true alpha level was less than the reported level of

significance providing more confidence in any significant results. Therefore,

despite a significant Box's M statistic, it was appropriate to continue the

MANOVA analysis.

Multivariate Analysis of Variance

A multivariate analysis of Variance (MANOVA) was performed. The

scores from the MMPI-A short form were considered the dependent variable and

the three groups were the independent variables. Results indicated a Wilkes

lambda value of 5.19, $p < .0001$, df =18.

Analysis of Variance

An Analysis of Variance (ANOVA) was performed for each of the MMPI-

A short form scales across the three groups. Since multiple variables were

examined, the likelihood of a type 1 error increased. To combat this problem, the

Bonferonni correction procedure for error in significance testing was applied.

Thus, the alpha level of significance was set at .006. Tukey's Honestly Significant

Difference (HSD) was employed as the post hoc test to evaluate how the groups differed. Because the alpha level of significance generally matches the alpha level used for the ANOVA (Gravetter & Wallnau, 1992), the alpha level of .006 was used for post hoc comparisons.

Each protocol yielded a score for each of the nine clinical scales on the MMPI-A short form. The means and standard deviations of these scores are summarized for each group in Table 4. The Non-clinical sample means ranged from 45.38 on the 0(Si) scale to 47.48 on the 2(D) scale. The Adjustment sample means ranged from 48.20 on the 0(Si) scale to 53.09 on the 4(Pd) scale. The means for the Clinical group ranged from 51.69 on the 0(Si) scale to 57.77 on the 2(D) scale. Effect sizes are presented in Table 4A. Effect size rs above .2 are considered small, above .5 are considered moderate, and above .8 are considered large (Stevens, 1996).

Table 4

Mean T-Scores and ANOVA Results

Scale	Non-clinical	Adjustment	Clinical	F-Value	Difference
1(Hs)	47.18 (6.38)	49.53 (7.93)	53.70 (7.84)	13.70	C>N
2(D)	47.48 (6.73)	52.12 (9.83)	57.77 (9.58)	25.44	C>A>N
3(Hy)	47.43 (7.48)	50.24 (8.88)	51.91 (8.86)	5.50	C>N
4(Pd)	45.93 (6.14)	53.09 (9.90)	56.77 (10.74)	30.93	C, A>N
6(Pa)	45.84 (5.30)	50.42 (7.86)	53.27 (8.51)	21.27	C, A>N
7(Pt)	44.33 (6.67)	49.65 (8.24)	54.60 (9.19)	30.39	C>A>N
8(Sc)	46.09 (5.50)	52.00 (7.72)	56.31 (8.95)	37.61	C>A>N
9(Ma)	47.26 (6.71)	52.67 (7.62)	52.98 (9.22)	13.96	C, A>N
0(Si)	45.38 (6.65)	48.21 (6.99)	51.69 (8.37)	12.96	C>N

Note: significant at the .006 level
Critical value for Tukey HSD = 4.4

Table 4A

Effect Sizes of Mean Scores

Scale	Cohen's d	Effect Size r	Difference
1(Hs)	0.912	.415	C>N
2(D)	1.245	.527	C>N
	0.582	.279	C>A
	0.551	.265	A>N
3(Hy)	0.546	.263	C>N
4(Pd)	1.24	.527	C>N
	0.869	.398	A>N
6(Pa)	1.05	.464	C>N
	0.680	.322	A>N
7(Pt)	1.28	.539	C>N
	0.567	.273	C>A
	0.710	.334	A>N
8(Sc)	1.375	.566	C>N
	0.516	.250	C>A
	0.882	.403	A>N
9(Ma)	0.675	.320	C>N
	0.753	.353	A>N
0(Si)	0.835	.385	C>N

Each of the ANOVA analyses indicated a significant difference among the three groups.   In every case, the MMPI-A short form scales showed a statistically significant difference between the Clinical group and the Non-clinical group with the Clinical group scoring higher. Scales 2(D), 4(Pd), 6(Pa), 7(Pt), 8(Sc), and 9(Ma) were also showed significantly higher scores among the Adjustment group than in the Non-clinical group. Finally, Scales 2(D), 7(Pt), and 8(Sc) showed a significant difference across all three groups.

Discriminant Analysis

A secondary analysis examined whether any of the scales, either individually or in combinations, were able to sort the participants into their respective groups. A step-wise discriminant analysis was utilized to test this hypothesis. Classifying groups based on a discriminant analysis assumes that the groups have the same covariance matrix.   Differences in group sample sizes increase the likelihood of violating these assumptions. The group sample sizes in this study varied. Group membership was based on scores on the BASC-2, which resulted in more Non-clinical profiles than Clinical or Adjustment profiles. As previously stated, the Box's M statistic indicated a violation of this assumption. However, Stevens pointed out that, "…it is very unlikely that the equal covariance matrices assumption will ever literally be satisfied in practice" (1996, p. 251). Sufficient sample size combats this problem. Stevens (1996) recommended 20 subjects per variable in the analysis for reliable results. The 209

subjects in this study exceeded the required 180 to establish sufficient confidence in the results.

A stepwise discriminant function revealed three variables that exerted the most influence on group membership classification. Table 5 shows the results of the analysis.

Table 5
Step-wise Discriminant Analysis

Step	Scale	Partial R Square	F Value	p	Wilks Lambda	p
1	8(Sc)	.2675	37.61	<.0001	.73251	<.0001
2	2(D)	.0412	04.41	<.0133	.70230	<.0001
3	9(Ma)	.0298	03.13	<.0459	.68139	<.0001

The results indicated that Scales 8(Sc), 2(D), and 9(Ma) exerted the most influence in predicting group membership.

Table 6

Discriminant Analysis Classification Results

Group	Non-clinical	Adjustment	Clinical	Total
Non-Clinical	78	18	8	104
	75.0%	17.3%	7.7%	
Adjustment	20	21	16	57
	35.1%	36.8%	28.1%	
Clinical	10	13	25	48
	20.8%	27.1%	52.1%	

Table 6 illustrates the classification results of the discriminant analysis. The analysis correctly classified 75% of the participants in the Non-clinical group, 36.8% in the Adjustment group, and 52.1% in the Clinical group. Collectively, this function classified 124 of the 209 (59%) participants accurately into the correct groups. This was greater than would be expected by chance (33.3%).

A cursory analysis of the results suggested that identification of individuals in the Non-clinical group was much more accurate than classification in the

Clinical or the Adjustment group. Based on a hypothesis that overlap may exist among the Clinical and Adjustment groups, an additional discriminant function was conducted. In this function, the Adjustment and Clinical groups were collapsed into a single group that represented the group with psychological or adjustment concerns. This group, labeled Clinical/Adjustment group, was compared to the Non-clinical group.

Table 7

Additional Step-wise Discriminant Analysis

Step	Scale	Partial R Square	F Value	p	Wilks Lambda	p
1	Sc(8)	.2328	62.80	<.0001	.76723	<.0001
2	Ma(9)	.0132	2.75	<.09	.73959	<.0001
3	D(2)	.0190	3.95	<.0483	.72556	<.0001

The results of the additional discriminant analysis are presented in Table 7. The same three scales were identified as the best predictors of group classification. 72.2 % of the subjects were correctly classified in the overall function. Classification accuracy was improved slightly as the error rate in the

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Non-clinical group dropped from 25% to 20%. The Adjustment/Clinical group

error rate was 35.2% compared to 63.2% and 47.9% in the Adjustment and

Clinical groups respectively in the previous analysis. This function classified

both groups more accurately than would be expected by chance alone.

The results of the discriminant analysis classifications are shown in Table 8.

Table 8

Additional Discriminant Analysis Classification Results

Group	Non-clinical	Adjustment/Clinical	Total
Non-Clinical	83	21	104
	79.8%	20.2%	
Adjustment/	37	68	105
Clinical	35.2%	64.8%	

Correlational Statistics

In addition to the statistical analysis, a variety of descriptive data were

collected. Table A19 includes the scale intercorrelation on the MMPI-A short

form. Table A20 presents intercorrelations reported in the MMPI-A manual.

Table A21 includes a correlation matrix comparing all the BASC-2 scales in the

study while Table A22 presents these same data from the standardization sample

on the BASC-2. Finally, Table A23 presents the correlation data between the

MMPI-A short Form scales and the BASC-2 scales examined in this study.

Scale correlations ranged from .006 between scale 9(Ma) and scale 3(Hy) to

.787 between scale 7(Pt) and scale 8(Sc). This compared to the MMPI-A

standardization sample in that correlations ranged from -.17 between scale 1(Hs)

and scale 9(Ma) in the Male sample and .85 between scale 7(Pt) and scale 8(Sc) in

the female sample. Based on general inspection of the correlations, it appears

that the correlations were similar in the study sample to those reported in the

MMPI-A manual.

BASC-2 intercorrelations ranged from -.597, representing an inverse

relationship between the Self-esteem and the Social Stress scale to .668 between

the Depression and the Sense of Inadequacy scale. In general, these correlations

were similar to those reported in the BASC-2 Manual. Higher correlations in the

standardization sample tended to also be higher in the study sample. The

exception to this rule appeared to be the Locus of Control scale which showed

multiple moderate to high correlations in the standardization sample. However,

correlations were generally small in the sample used in the study.   Also, BASC-2

intercorrelations from the standardization sample sometimes showed greater

correlation coefficients than those obtained in this study.

As shown in the Table A23, correlations ranged from .651 between scale

7(Pt) on the MMPI-A short form and the Depression scale on the BASC-2 to -.562

between scale 2(D) on the MMPI-A short form and the Self-Esteem scale on the

BASC-2. When including the composite scales, the Internalizing problems scale

demonstrated the strongest relationship with a .738 correlation with scale 8(Sc).

Descriptive Statistics

In clinical settings, the MMPI-A is typically interpreted by scale

elevations, or T-scores above 60. Therefore, data were collected on the number of

single point and two point elevations for each group. The results are presented

in Table 9 and Table 10.

Table 9

Single Point elevations on the MMPI-A Short Form Across Groups

	N	# of Elevations	%
Non-Clinical	104	29	27.8
Adjustment	57	39	68.4
Clinical	48	32	66.6

Table 10

Two-Point Elevations on the MMPI-A Short Form Across Groups

	N	# of Elevations	%
Non-Clinical	104	6	05.7
Adjustment	57	17	29.8
Clinical	48	25	52.1

Single point elevations were defined as any MMPI-A short form protocol with at least one T-score of 60 or higher on any of the 10 scales. Because the descriptive analysis was merely an explorative portion of this study, the results included scale 5(Mf), which is traditionally the weakest MMPI-A scale (Archer & Krishnamurthy, 2002), and was not a focus of this study. The analysis revealed approximately a 40% increase in single point elevations when comparing the Non-clinical group to either the Adjustment or the Clinical group. Five of the single point elevations were scale 5(Mf) single point elevations in the Non-clinical group. The Adjustment group included three scale 5(Mf) single point elevations and the Clinical group included two scale 5(Mf) single point elevations.

Two point elevations were defined as any MMPI-A short form protocols that included two or more scales with T-scores of 60 or higher. The clinical group showed the highest rate of occurrence with approximately 22% more two-point elevations than the Adjustment group. The Adjustment group showed approximately 23% more two-point elevations than the Non-clinical group. Two cases in the Non-clinical sample would be excluded if Mf(5) was not included in the analysis. No cases would be excluded in the Adjustment or Clinical group if Mf(5) was included as a factor in the analysis.

Table A24 shows the total number of clinical elevations that were observed on each scale for each group. Despite the large difference in sample size, the Clinical group showed more elevations than the Non-clinical group on all the scales except scale 5(Mf). In most cases, the Clinical group showed more elevations than the Adjustment group, although the gap was typically not as large as seen between the Clinical and Non-clinical group. Scale 3(Hy) was atypical in that the Non-clinical group had more elevations than the Adjustment group. The actual rate of clinical elevations was similar and both the Non-clinical and the Adjustment group had approximately 9% scale 3(Hy) clinical elevations. Figure 1 presents percentage of clinical elevations that were observed on each scale.

Table A25 includes MMPI-A short form scores by racial group and Table A26 includes MMPI-A short form scores by gender.

Figure 1

Clinical Scale Elevations by Group
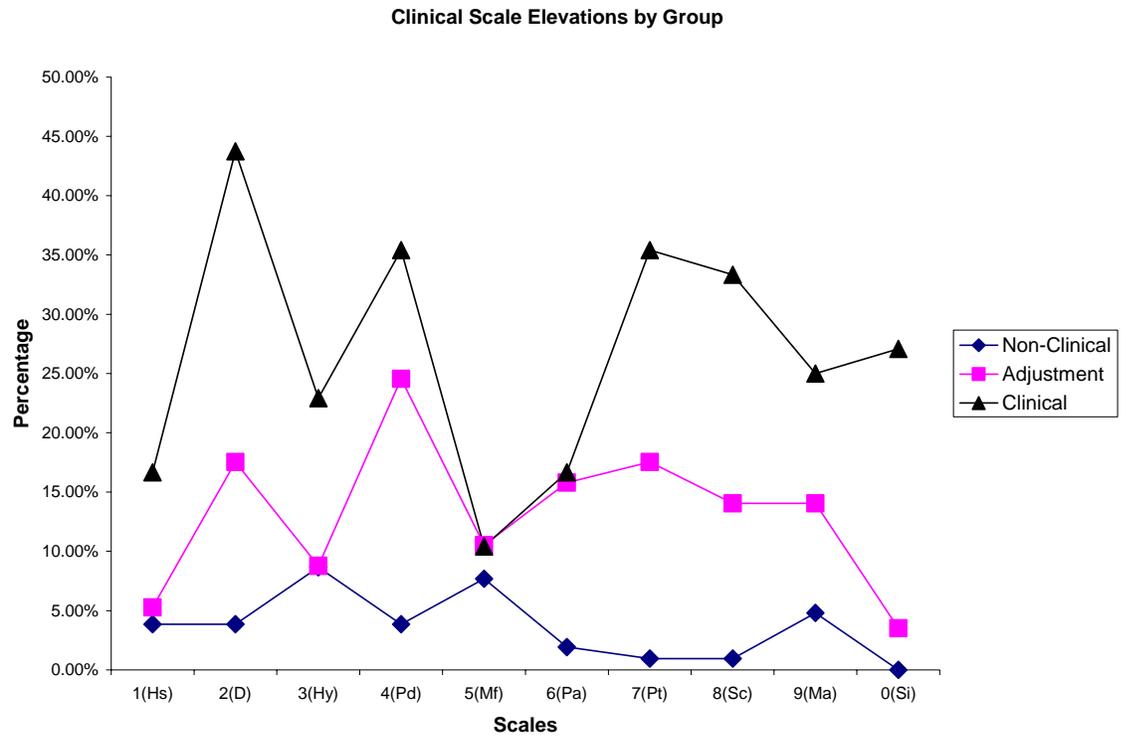
Chapter Four: Discussion

This study investigated the validity of the MMPI-A short form in assessing emotionality in adolescents. Archer, Tirell, and Elkins (2001) developed the short form with the intent of providing an alternative test when a full administration was not possible. The initial research was similar to previous short forms in that the scales correlated well between the short and long forms, but the profile congruence rates were not remarkable. The authors recommended that future studies focus not on congruence rates, but on establishing external sources of validity. They hoped this might illuminate the applicability of the short form in clinical settings.

This investigation established three groups that represented differing degrees of psychological functioning. Subjects were divided into either a Clinical, Adjustment, or Non-clinical group based on their responses to an established and widely used personality self report measure, the Behavior Assessment Scale for Children-II Self Report of Personality-Adolescent version (BASC-2). The Clinical group consisted of individuals who rated themselves within an elevated range on one or more of the BASC-2 scales that generally measure internalizing concerns including depression, anxiety, and psychotic features. The Adjustment group included individuals who rated themselves in the elevated range on scales that were related to maladaptive attitudes or behaviors, adjustment difficulties and adaptive skills deficits such as

socialization problems or poor self concept. The Non-clinical group consisted of individuals that reported no elevations on any of the scales that were used to classify subjects.

This chapter is organized into six sections. The Scale Differences section reviews the results of the MANOVA and ANOVA findings. The Discriminant Capacity section interprets the findings of the discriminant analysis. The Additional Analyses section examines frequency data on MMPI-A short form scale elevations and reviews correlational data from the BASC-2 and the MMPI-A short form. The Limitations section discussions potential limitations in this study. Finally, the Interpreting the Findings section summarizes the relevant findings, offers a global analysis of the results, discusses clinical implications, and offers recommendations for future research.

Scale Differences

The first research question examined whether there would significant differences on scores of any of the nine scales of the MMPI-A that were examined in this study. Clearly, the results show that the MMPI-A short form detected a marked difference between the Clinical group and the Non-clinical group. Every MMPI-A short form scale was significantly higher in the Clinical group than in the Non-clinical group. In addition, the Adjustment group was observed to have significantly higher means than the Non-clinical group across all the scales except 1(Hs) and 3(Hy) and 0(Si). Every scale followed a tier-type pattern with the Non-clinical group producing the lowest mean scores, the Adjustment group

producing mean scores between the two groups ,and the Clinical group producing the highest mean scores. This pattern was not always statistically significant but it did suggest that the MMPI-A short form scales may be more sensitive to the Clinical group than the Adjustment group. It may also suggest that the clinical group may express more severe symptoms of psychological distress than the Adjustment group. A brief examination of the results on Table 4 illustrates this tier-type effect.

These results are promising because it suggests that the MMPI-A had good diagnostic capabilities in terms of separating general emotionality from those expressing no emotional concerns. However, only three scales demonstrated significant differences between the Clinical and Adjustment groups. Those were scales 2(D), 7(Pt), and 8(Sc). It may be that those scales have the best diagnostic power as they appeared to separate groups well. The remaining scales, however, may not be as useful in separating various groups with emotional difficulties.

Discriminant Capacity

The second research question examined whether any of the scales, or group of scales, could be useful in predicting group membership. A step-wise discriminant function identified three scales (8(Sc), 2(D), and 9(Ma)) that exerted the most influence on group membership. The equation derived was able to classify 59% of the participants into the correct group. This is greater than the 33% that would be expected by chance. Analysis of error rates across the groups

indicated that the discriminant function best predicted the Non-clinical group correctly. Seventy-five percent of the individuals in the Non-clinical group were correctly classified. In addition, 52% of the individuals in the Clinical group were correctly classified. However, the Adjustment group error rate was similar to what could be expected by random assignment.

The results from the Non-clinical group are encouraging from a clinical standpoint as it could provide considerable faith in identifying typical or "normal" emotional functioning simply based on the MMPI-A short form results. To a lesser extent, the clinical group classification rate was encouraging as well. However, the error rate in the Adjustment group appeared problematic.

It was postulated that there may be some degree of overlap between the Clinical and Adjustment group that could impact the ability of the discriminant analysis to accurately identify the Adjustment group. Therefore, an additional discriminant analysis was conducted after combining both the Adjustment and Clinical groups into one group. The resulting function added power to the overall classification rate as the new function correctly classified 72.2% of the individuals. Adjustment classification rate increased, but the power of the Clinical classification rate decreased. The Clinical classification rate moved from approximately 19% above chance to approximately 14% above chance in the Adjustment/Clinical condition. Adjustment classification rates shifted from approximately 3% above chance to 14% in the combined group. The Non-Clinical group improved very little as the classification rate moved from 75% to

almost 80%. When comparing that to chance across two groups instead of three groups, the Non-Clinical group dropped from 42% above chance to 30% above chance. In either case, the functions appeared to detect the Non-Clinical group very well. Combining the Clinical and Adjustments groups into one group did not appear to add a great deal of predictive power when compared to chance. However, the combined group did provide a better overall classification rate.

In general, these results appeared to support the findings of the MANOVA analysis. The discriminant analysis identified a function that predicted Non-Clinical group membership very well and Clinical group membership better than chance. Similarly, the MANOVA results suggested a clear differentiation between the Non-clinical and Clinical group. The Adjustment group, however, was not as easily identified through the use of a discriminant function.

<div align="center">Additional Analyses</div>

Correlation data

While these results are useful, additional data were necessary to clearly understand the clinical implications of these findings. Several correlation matrices were constructed to examine the relationships between the various scales in this study. The MMPI-A short form scales were compared to themselves. Intercorrelations showed a range of relationships that were similar to those reported in the MMPI-A manual. Scale 8(Sc) showed the highest degree of overlap among the scales with four correlations of .60 or higher. This may

indicate that Scale 8(Sc) is multidimensional, measuring a range of constructs. BASC-2 intercorrelations were also similar to the standardization sample, although intercorrelations tended to be slightly weaker in the study sample. In addition, the Locus of Control scale showed much weaker intercorrelations than those reported in the standardization sample.

The correlational data between the two instruments provided some additional information on areas of convergence among the two instruments. The scales on the two instruments showed a range of correlation coefficients. In general BASC-2 Internalizing Problems (Clinical) scales demonstrated the strongest relationships with the MMPI-A short form scales with correlations reaching as high as .651 between the Depression and scale 7(Pt). BASC-2 scales representing the Adjustment group demonstrated much lower correlations. Only one comparison (Relations with Parents and 4(Pd)) had a value above .50. The BASC-2 Depression showed the most convergence with MMPI-A short form scales with three correlations that could be considered high. This scale correlated with Pd(4), Pt(7), and Sc(8) with coefficients of .64 or higher. Interestingly, the BASC-2 Depression scale correlated less well with MMPI-A short form scale 2(D) (.586) than the aforementioned scales. This was somewhat surprising as it could be argued that Depression is a fairly "clean" construct. That is, scales designed to measure these features might be expected to be fairly universal, without much variation in content. This suggests that the two instruments had some degree of overlap, but may have measured constructs somewhat differently.

The Composite scale correlations probably provided the most relevant correlational data because the group selection was based on these scales. In general, the Internalizing Composite, which was used to select the Clinical group, correlated very well with the MMPI-A short form scales. Scales 2(D), 4(Pd), 7(Pt), and 8(Sc) demonstrated strong correlations. These same scales demonstrated the highest F values in the MANOVA analysis so this may not be surprising. It did, however, further illustrate the strength of the relationship between these scales and the clinical group.

Correlational data on the School Problems and the Personal Adjustment composites provided additional insight to the previous statistical analysis. The School Problems composite showed mostly weak and some moderate correlations with the MMPI-A short form scales. The Personal Adjustment composite showed mostly moderate correlations with the MMPI-A short form scales. This suggests that there was most likely not a strong relationship between reported school issues and the MMPI-A short form scales. The relationship appeared stronger on the Personal Adjustment composite but still was much weaker than the Internalizing composite. The Adjustment group in this study was comprised of these two composites, both of which were weaker in their relationship with the MMPI-A short form scales than the Internalizing Composite that was used to select the Clinical group. Therefore, it is easy to see why the tier-type effect was observed across the scales. This will be discussed in more depth below but these data suggested that MMPI-A short form scales

clearly showed a higher degree of concordance with scales associated with the Clinical group.

Scale Elevation Frequency Data

The correlation data provided some information on the relationship between the scales but it is difficult to infer a great deal based on this alone. In practice, MMPI-A protocols are interpreted based on scale elevations. Scales that reach T-scores of 60 or higher are believed to have clinical meaning because research has confirmed certain clinical correlates with such elevations. Statistical analysis that examines just the mean scores does not provide the entire picture. Therefore, data were gathered on clinical level elevations across each group. Table 9 and Table 10 show the number of single point and multiple-point elevations in each group.

These data illustrate the clinical difference across the groups. Regarding single point elevations, approximately two-thirds of the Adjustment and Clinical group participants were observed to have at least one clinical elevation on at least one scale. Yet, only about one-fourth of the Non-clinical group participants' protocols yielded a clinically significant elevation on one of the scales. Thus, not only were the scores generally higher in the Clinical and Adjustment groups than in the Non-clinical group, but the Non-clinical group was much less likely to report a clinically significant score on the MMPI-A short form.

The two-point elevation data were even more striking from a clinical perspective. Excluding scale 5(Mf), less than 4% of the Non-clinical group

resulted in two-point elevations on the MMPI-A short form. Adjustment group

protocols dropped in rate compared to single-point rates, but about 30% of

individuals showed two-point elevations. Finally, the Clinical group had more

than 50% of the participants reach clinical significance on two or more of their

scales. The differentiation across the three groups could be clearly seen. It

would be a clinical rarity for a Non-clinical group individual to have two MMPI-

A short form clinical elevations. A clinician interpreting MMPI-A short form

results in practice could be fairly certain that two clinical elevations are not

reflective of a Non-clinical response pattern. In addition, the tier-effect across the

three groups was again seen with progressively more two-point elevations

observed across each group. Therefore, two-point elevations did not appear to

be exclusive to one particular group, but the frequency counts suggested a high

probability that either the Adjustment or Clinical group was represented.

Table A24 shows the number of clinically significant elevations found on

each scale across each group. The Clinical group generally showed the most

clinical elevations and the Non-clinical group generally showed the least. Only

three scales included in the study did not follow an increasing Non-

Clinical/Adjustment/Clinical tier-type pattern. These were the 1(Hs), 3(Hy),

and the 6(Pa) scales. These differences are observed despite a much larger

sample size in the Non-clinical group. Figure 1 provides the same data but

reports percentage of clinical-level protocols instead of frequency. This illustrates

the strength of the scales from a clinical perspective as the gaps between groups

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were remarkable. Visual inspection suggested that the Clinical group separated from the Non-clinical group well on all scales except 5(Mf). Separation across all three groups was observed on the 2(D), 4(Pd), 7(Pt), 8(Sc), 9(Ma) and the 0(Si) scales. These scales may be the most meaningful for clinicians because clinical elevations drive interpretation on the MMPI-A. Rates such as these, combined with the significant statistical results, were strong indications of scale predictive validity.

<div align="center">Limitations</div>

Several limitations in this study should be noted. First, the sample was primarily a sample of convenience. Subjects were volunteers from two high schools in the Metro Atlanta area. As such, the sample is probably not representative of the population as whole. Sample demographics probably underrepresented the Asian and Hispanic population. Also, the sample tended to over represent older adolescents. An effort was made to recruit students with known emotional difficulty by recruiting students identified in Special Education under the Emotional Behavior Disturbed (EBD) classification. However, this population proved difficult to recruit because many students were unable or unwilling to have their guardians complete the necessary consent form. Therefore, few EBD students were actually included in the study. Ideally, using students with known psychopathology, such as students who receive counseling or inpatient or outpatient treatment would be useful. While some of the students

in the sample likely fall into that classification, it is unknown how many were actually included in this study.

The nature of the analysis may have limited the ability to detect specific differences among the MMPI-A scales. The subjects were clustered into groups based on their performance on the BASC-2 scales. These groupings were very global indicator of emotional dysfunction. As such, all MMPI-A short form scales showed some degree of differentiation among the groups. This is useful information, but these data do not appear to provide a great deal of specificity as to which scales may be associated with more specific clinical correlates.

Interpreting the Findings

Three types of analysis were conducted during the study. First, a MANOVA analysis was conducted to determine MMPI-A short form scale mean differences across the three groups. Second, a discriminant analysis was utilized to derive a function that could correctly classify the groups based on scale scores. Last, an informal examination of clinically meaningful data was conducted to help clarify the findings.

The findings were generally consistent across all three analyses. All MMPI scales appeared to generally score higher when comparing the Clinical group to the Non-clinical group. The differences did not appear to be as clear among the Adjustment group and the other two groups but a general pattern of severity, albeit not always significant, emerged among the three groups. This pattern suggested that the Adjustment group scored higher than the Non-clinical

group and the Clinical group scored higher than the Adjustment group. This may be clinically relevant in that higher scores may represent higher degrees of emotional irregularities. More research would be necessary to verify this hypothesis, but the pattern suggested this is the case.

Some scales appeared to have more power in discriminating between the groups. Scales 8(sc), 9(Ma) and 2(D) were identified as primary scales in a function that could correctly identify 59% of the individuals in the study into the correct group. The function had very good predictive power for the Non-clinical group and moderate power in the Clinical group. However, the Adjustment group did not appear to discriminate well. This was similar to the MANOVA findings in that the MMPI-A short form scales appeared to distinguish between the Clinical and Non-clinical groups. The MMPI-A short form may have better value when distinguishing Non-clinical adolescents from adolescents with global emotional issues. Combining the two experimental groups (Clinical and Adjustment) resulted in a better classification rate (72.2%). While this was not an improvement in relation chance, it does represent a reasonable rate in terms of applied use in the field. An instrument with such an accuracy rate would be a useful component of an assessment battery when emotionality is being assessed.

Other scales appeared to be more powerful when examining clinically relevant data, at least in terms of identifying the Clinical group. Scales 2(D), 7(Pt), 8(Sc), and 0(Si) produced the largest differences in the number of clinical elevations between the Clinical and Non-clinical groups. Percentage rates

revealed the magnitude of differences between the Clinical and Non-clinical group. In addition, they suggested that the 2(D), 4(Pd), 7(Pt), 8(Sc), 9(Ma) and 0(Si) scales separated all three groups well. This is similar to the Discriminant analysis results in that scales 2(D), 8(Sc), and 9(Ma) were influential scales. Collectively, this provides a great deal of evidence that clinicians can have confidence in virtually all these scales when detecting internalizing concerns. In addition, both the 2(D) and 8(Sc) scales were indicated on every type of analysis suggesting that they possibly have the best predictive validity of the MMPI-A short form scales.

Frequency data on single-point and two-point elevations, a critical component of interpreting the full scale MMPI-A protocols, revealed additional important information. One point elevations were seen much more frequently in the Adjustment and the Clinical group than in the Non-clinical group. This suggests that elevations alone, regardless of the scale, may be an indicator of emotional or adjustment issues. Two-point elevations were remarkable in that less than 4% of Non-clinical protocols resulted in a two-point elevation while more than 50% of the clinical protocols did include a two-point elevation. This is very persuasive evidence that a two-point elevation is likely indicative of some degree of dysfunction.

In summary, the overall results suggested that the MMPI-A short form showed some degree of predictive validity across all the scales assessed in terms of distinguishing between the Non-clinical and the Clinical group. Adjustment

group scores tended to lie between Non-clinical scores and Clinical scores, but the picture is much less clear in terms of identifying the Adjustment group through the use of the MMPI-A short form. Scales 2(D) and 8(Sc) demonstrated the most powerful evidence of predictive validity in that they were observed to have large F values on the individual ANOVAs, they were identified as predictive factors by a discriminant analysis, and they both had extremely large differences in frequency of occurrence of clinically elevated scores.

Implications

To date, no research has been published examining the validity of the MMPI-A short form. This study provided evidence that the MMPI-A short form has a global ability to demonstrate increased scores when you would likely see increased scores on the BASC-2. This is important because the BASC-2 is recognized as a valid instrument that it is widely used in school settings while the MMPI-A short form is a relatively unknown instrument. This correspondence with the BASC-2 was encouraging as it provides evidence supporting the use of MMPI-A short form.

Further, the MMPI-A short form appeared to be able to discriminate between samples of Clinical and Non-clinical adolescents. This has implications to clinicians across a variety of settings that may be facing increasing time demands or working with populations that may be less likely to tolerate a full scale administration. The MMPI-A short form may prove to be a viable personality instrument with similar descriptive power as the MMPI-A without

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the considerable length. These results may be of particular interest to school psychologists because the current climate in the school setting suggests that the available time for assessments is becoming more limited and the need for concise instruments is increasing (Kamphaus, Petoskey, & Rowe, 2000). The MMPI-A short form may be a helpful tool for psychologists to use when a full administration is not possible.

There are several practical problems with the use of MMPI-A short form in applied settings that may hamper future use. First, the issue of congruence rates has essentially invalidated short form comparisons to full scale administrations. While this study suggests that the MMPI-A short form relates well to BASC-2 classifications, much more research would be necessary to fully understand the clinical correlates of MMPI-A short form elevations. Thus, the descriptive ability of the short form cannot match the full administration at this time. Second, scoring the short form is cumbersome. Clinicians interested in saving time will likely not see considerable savings in time after hand scoring the protocol. Third, and most importantly, other validated and shorter instruments are readily available decreasing the need for an MMPI-A short form. The BASC-2, for instance, is approximately the same length as the short form and is supported by good normative data and research.

With those drawbacks noted, there are some important clinical possibilities for the MMPI-A short form. First, clinicians who wish to use the MMPI-A short form as a screening instrument can have confidence that elevated

scores are indicative of general dysfunction. Second, the availability of the

MMPI-A short form provides a tremendous advantage to clinicians working

with populations who may not complete a full administration. For example, a

school psychologist working with an oppositional adolescent can attempt a full

administration. However, if the full administration cannot be completed, the

data and time invested are not necessarily lost. This is probably the most

important application for the MMPI-A short form because it provides an

alternative procedure when this situation occurs.

Future Research

Further research is necessary in order to fully understand the applicability

of the MMPI-A short form.

1. This study should be replicated or similar studies should be conducted to
   establish if the results generalize across settings and geographical areas.
   While the sample size may have been sufficient, incorporating more
   individuals with known psychopathology may be helpful.

2. Specific clinical populations should be compared with the MMPI-A short
   form to establish behavioral correlates with specific scale elevations.
   Much of what is known about the full scale administration is based on
   research that has done this. This would likely provide greater diagnostic
   clarity.

3. Research that includes comparative analysis with other ratings scales may
   wish to consider more specific diagnostic criteria. For example, future

researchers may wish to consider examining specific constructs such as Depression or Anxiety. These were areas that were clustered into one group in this analysis.

Summary

This study investigated the validity of the MMPI-A short form through three types of analyses. First, a MANOVA and subsequent ANOVAs demonstrated that the MMPI-A short form had higher mean scores on all 9 scales examined for individuals within the Clinical group than individuals in the Non-clinical group. Scores from individuals in the Adjustment group generally were higher than the Non-clinical group, although not all scales showed a significant difference. A discriminant analysis revealed that Scales 8(Sc), 2(D), and 9(Ma) exerted the most influence on group selection. The resulting function was able to classify individuals into the correct groups with 59% accuracy rate. Non-clinical and clinical group classification accuracy rates were good but the adjustment group classification rates were similar to what might be expected by chance. Finally, a series of clinically relevant data were analyzed to add applied meaning to the results. Single point and Two-point elevation frequencies revealed that clinical elevations were much more likely to be indicative of a Clinical or Adjustment profile suggesting that elevations alone, regardless of the scale, were likely indicators of some dysfunction. While there are some limitations to this study and future

research is recommended, the results to provide evidence of the use of the

MMPI-A short form as a general measure of overall pathology.

APPENDIX: A
TABLES

Table A1.

MMPI Standard Scale Reference Table

Scale number and abbreviation	Scale Name
Lie (L)	Validity Scale
Frequency (F)	Validity Scale
Defensiveness (K)	Validity Scale
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

Table A2

Ethnicity of Normative Sample of the MMPI-A

	Boys		Girls	
	N	%	N	%
White	616	76.5	619	75.9
Black	100	12.4	100	12.3
Asian	23	2.9	23	2.8
American Indian	21	2.6	26	3.2
Hispanic	18	2.2	16	2.0
Other	20	2.5	21	2.6
Not Reported	7	0.9	10	1.2

Table A3.

Mother's Occupation for Subjects in the MMPI-A Normative Sample

	Boys		Girls	
	N	%	N	%
High-Level Professional	28	3.5	22	2.7
Professional	231	28.7	248	30.4
Managerial	194	24.1	193	23.7
Skilled Labor	51	6.3	34	4.2
Unskilled Labor	38	4.7	22	2.7
Homemaker	139	17.3	130	16
Unemployed	15	1.9	16	2.0
Retired	3	0.4	0	0.0
Other	92	11.4	120	14.7
None Reported	14	1.7	30	3.7

Table A4.

Father's Occupation for Subjects in the MMPI-A Normative Sample

	Boys		Girls	
	N	%	N	%
High-Level Professional	139	17.3	125	15.3
Professional	269	33.4	267	32.8
Managerial	112	13.9	105	12.9
Skilled Labor	68	8.4	70	8.6
Unskilled Labor	23	2.9	23	2.8
Homemaker	1	0.1	2	0.3
Unemployed	6	0.7	8	1.0
Retired	12	1.5	17	2.1
Other	157	19.5	174	21.3
None Reported	18	2.2	23	2.8

Table A5.

Mother's Education Reported by MMPI-A Normative Sample

| | Boys | | Girls | |
	N	%	N	%
Less Than High School	9	1.1	11	1.3
Some High School	38	4.7	54	6.6
High School Graduate	250	31.1	230	28.2
Some College	145	18.0	183	22.5
College Graduate	260	32.3	244	30
Graduate School	91	11.3	68	8.3
None Reported	12	1.5	25	3.0

Table A6.

Father's Education Reported by MMPI-A Normative Sample

| | Boys | | Girls | |
	N	%	N	%
Less Than High School	17	2.1	15	1.8
Some High School	59	7.3	88	10.8
High School Graduate	173	21.5	191	23.4
Some College	114	14.2	108	13.3
College Graduate	272	33.8	262	32.1
Graduate School	152	18.9	122	15.0
None Reported	18	2.2	29	3.6

Table A7

Scale 1 (Hs) Summary of Descriptors

Excessive Bodily and Somatic Concerns that are often vague in nature

Greater likelihood of internalizing problems such as guilt, fears, social

withdrawal, perfectionism, anxiety and dependency

Greater likelihood of reporting school problems, including academic and

adjustment difficulties.

Lesser likelihood of displaying delinquent behaviors

Clinging and dependent interpersonal relationships

Table A8.

Scale 2 (D) Summary of Descriptors

Feelings of unhappiness, dissatisfaction, and hopelessness

Apathy and lack of interest in activities

Feelings of guilt, shame, and despondency

Social isolation and withdrawal

Feelings of inadequacy, pessimism and low self esteem

Table A9.

Scale 3 (Hy) Summary of Descriptors

Somatic preoccupations and concerns

Social involvement and achievement orientation

Pattern of overreaction to stress that involves the development of physical

symptoms

Self-Centered, egocentric, and immature actions

Strong need for attention, affection and social approval

Table A10.

Scale 4 (Pd) Summary of Descriptors

Increased probability of delinquency, oppositional and aggressive behaviors, and overall externalizing problems.

Hostility and rebellion towards authority figures

Poor school adjustment

Greater likelihood of a conduct disorder diagnosis

Poor planning ability, low frustration tolerance, and impulsivity

Use of acting out as a primary defense mechanism

Higher incidence of risk taking behaviors

Higher incidence of use and abuse of drugs and alcohol

Relative absence of guilt or remorse concerning wrong-doing

Table A11.

Scale 5 (Mf) Summary of Descriptors in Boys

Intelligence with aesthetic interests

Higher levels of academic achievement

Passivity and submissiveness in interpersonal relationships

Lower likelihood of delinquent and antisocial behaviors

Table A12.

Scale 5 (Mf) Summary of Descriptors in Girls

Assertiveness or competitiveness

Aggressiveness with a greater likelihood of school conduct problems

Possibility of masculine interests in academic areas and sports

Table A13.

Scale 6 (Pa) Summary of Descriptors

T Scores above 70

Use of projection as a primary defense mechanism

Hostility, anger and resentment

Possible disturbances in reality testing

Delusions of persecutions and grandeur

Ideas of reference

T Scores from 60-69

Excessive interpersonal sensitivity

Distrust and suspiciousness in interpersonal relationships

Tendency towards argumentativeness

Increased disagreements with parents

Difficulties in establishing trust relationships with therapists

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Table A14.

Scale 7 (Pt) Summary of Descriptors

Perfectionistic and self-critical tendencies

Tension, apprehension, and anxiety

Feelings of inadequacy, inferiority, and insecurity

Tendency to be introspective, ruminative, and lacking in self-confidence

At marked elevations (T > 69), obsessive and ruminative thought patterns

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Table A15.

Scale 8 (Sc) Summary of Descriptors

Confused or Disorganized thinking

Withdrawn or seclusive behavior

Feelings of inferiority, low self-esteem, and incompetence

Feelings of unhappiness and frustration

Social rejection and history of teasing by peers

Vulnerability to stress and a tendency to get easily upset

Possible impairment in reality testing

Perception by peers as being odd, unconventional, and socially deviant

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Table A16.

Scale 9 (Ma) Summary of Descriptors

Talkative, energetic, and outgoing manner

Rapid personal tempo and tendency to engage in excessive activity

Preference for action rather than thought or reflection

Restlessness, distractibility, and impulsiveness

Grandiosity and unrealistic goal setting

Egocentric, self-centered, and self-indulgent actions

Possibility of flight of ideas, grandiosity and euphoric mood

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Table A17.

Scale 0 (Si) Summary of Descriptors

Social introversion and social discomfort

Low self-esteem

Timid, withdrawn, and reserved presentation

Decreased probability of delinquency and acting out

Submissive, passive and compliant demeanor

Low self-confidence and high levels of insecurity

Table A18.

BASC-2 Composites and Scales

School Problems

    Attitude to School

    Attitude to Teachers

    Sensation Seeking

Internalizing Problems

    Atypicality

    Locus of Control

    Social Stress

    Anxiety

    Depression

    Sense of Inadequacy

    Somatization

Inattention/Hyperactivity

    Attention Problems

    Hyperactivity

Personal Adjustment

    Relations with Parents

    Interpersonal Relations

    Self-Esteem

    Self Reliance

Table A19

MMPI-A Short Form Scale correlations

	1(Hs)	2(D)	3(Hy)	4(Pd)	6(Pa)	7(Pt)	8(Sc)	9(Ma)	0(Si)
1(Hs)	1.000	0.563	0.558	0.541	0.381	0.500	0.539	0.223	0.337
2(D)		1.000	0.552	0.584	0.423	0.697	0.604	0.194	0.557
3(Hy)			1.000	0.426	0.330	0.391	0.334	0.006	0.175
4(Pd)				1.000	0.660	0.11	0.784	0.485	0.410
6(Pa)					1.000	0.547	0.630	0.474	0.189
7(Pt)						1.000	0.787	0.394	0.531
8(Sc)							1.000	0.497	0.483
9(Ma)								1.000	0.117
0(Si)									1.000

Table A20

MMPI-A Intercorrelations from the Standardization Sample

	Hs)	2(D)	3(Hy)	4(Pd)	6(Pa)	7(Pt)	8(Sc)	9(Ma)	0(Si)
				Males					
1(Hs)	1.00	0.59	0.68	0.51	0.55	0.2	0.63	0.17	0.42
2(D)	.60	1.00	0.57	0.46	0.46	0.45	0.47	-0.17	0.49
3(Hy)	.64	.49	1.00	0.41	0.40	0.15	0.29	-0.13	0.07
4(Pd)	.52	.56	.43	1.00	0.61	0.56	0.67	0.37	0.32
6(Pa)	.53	.49	.41	.60	1.00	0.56	0.71	0.27	0.36
7(Pt)	.63	.60	.27	.60	.60	1.00	0.83	0.43	0.66
8(Sc)	.66	.56	.31	.69	.71	.85	1.00	0.50	0.48
9(Ma)	.30	.01	.10	.46	.36	.45	.57	1.00	0.12
0(Si)	.42	.57	.01	.30	.31	.65	.56	.00	1.00
				Females					

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Table A21

BASC-2 Intercorrelations in the study

	A2S	A2T	Anx	Aty	Dep	IR	Loc	RWP	Som	SE	SR	Sen	SOI	Soc
Att to School	1.00	0.57	0.18	0.27	0.42	-0.21	0.18	-0.29	0.21	-0.22	-0.23	0.04	0.49	0.34
Att to Teacher		1.00	0.26	0.43	0.43	-0.21	0.23	-0.33	0.27	-0.25	-0.35	0.17	0.54	0.40
Anxiety			1.00	0.30	0.55	-0.18	0.32	-0.28	0.34	-0.49	-0.24	-0.08	0.47	0.53
Atypicality				1.00	0.42	-0.29	-0.23	-0.25	0.24	-0.24	-0.22	0.17	0.31	0.49
Depression					1.00	-0.32	0.31	-0.47	0.33	-0.59	-0.40	-0.01	0.66	0.64
Intrpsl Relations						1.00	-0.17	0.19	-0.14	0.41	0.28	0.23	-0.26	-0.58
Locus of Control							1.00	-0.28	0.27	-0.22	-0.15	0.06	0.31	0.34
Relatn parents								1.00	-0.27	0.32	0.31	-0.10	-0.38	-0.38
Somatization									1.00	-0.34	-0.20	-0.02	0.35	0.31
Self Esteem										1.00	0.29	0.14	-0.50	-0.59
Self Reliance											1.00	0.14	-0.42	-0.33
Sensation Seek												1.00	0.03	-0.04
Sense Inadequcy													1.00	0.55
Social Stress														1.00

Table A22
BASC-2 Intercorrelations in the Standardization Sample

	A2S	A2T	Anx	Aty	Dep	IR	Loc	RWP	Som	SE	SR	Sen	SOI	Soc
Att to School	1.00	0.60	0.24	0.25	0.40	-0.27	0.40	-0.38	0.24	-0.29	-0.20	0.28	0.44	0.39
Att to Teacher		1.00	0.31	0.36	0.46	-0.31	0.52	-0.45	0.29	-0.30	-0.26	0.31	0.48	0.45
Anxiety			1.00	0.57	0.64	-0.48	0.48	-0.23	0.55	-0.51	-0.20	0.03	0.61	0.60
Atypicality				1.00	0.57	-0.47	0.56	-0.26	0.46	-0.37	-0.21	0.22	0.50	0.61
Depression					1.00	-0.58	0.72	-0.48	0.52	-0.65	-0.29	0.08	0.69	0.73
Intrpsl Relations						1.00	-0.58	0.33	-0.36	0.53	0.43	0.06	-0.37	-0.68
Locus of Control							1.00	-0.54	0.44	-0.48	-0.20	0.26	0.60	0.66
Relatn parents								1.00	-0.26	0.39	0.34	-0.07	-0.34	-0.40
Somatization									1.00	-0.41	-0.17	0.10	0.46	0.43
Self Esteem										1.00	0.26	0.05	-0.49	-0.58
Self Reliance											1.00	0.10	-0.37	-0.26
Sensation Seek												1.00	0.12	0.14
Sense Inadequcy													1.00	0.58
Social Stress														1.00

Table A23

BASC-2 and MMPI-A Short form Correlations

	Hs(1)	D(2)	Hy(3)	Pd(4)	Pa(6)	Pt(7)	Sc(8)	Ma(9)	Si(0)
A2School	0.292	0.321	0.246	0.410	0.239	0.395	0.390	0.188	0.337
A2Teacher	0.330	0.297	0.150	0.426	0.351	0.418	0.477	0.294	0.229
Anxiety	0.407	0.490	0.204	0.389	0.320	0.490	0.441	0.230	0.444
Atypicality	0.293	0.301	0.096	0.528	0.551	0.499	0.590	0.378	0.218
Depression	0.482	0.586	0.399	0.649	0.450	0.651	0.643	0.329	0.526
Interpersonal Relations	-0.238	-0.370	0.227	0.346	0.265	0.367	-0.295	-0.132	-0.344
Locus of Control	0.348	0.380	0.200	0.540	0.475	0.489	0.556	0.462	0.372
Relations with Parents	-0.329	-0.287	-0.291	-0.535	-0.361	-0.384	-0.477	-0.405	-0.248
Somatization	0.457	0.332	0.253	0.289	0.213	0.341	0.381	0.068	0.306
Self Esteem	-0.404	-0.562	-0.404	-0.485	-0.455	-0.516	-0.452	-0.170	-0.414
Self Reliance	-0.309	-0.354	-0.203	-0.371	-0.211	-0.326	-0.370	-0.130	-0.396
Sensation Seeking	-0.002	-0.149	-0.221	0.097	0.139	0.045	0.169	0.353	-0.133
Sense of Inadequacy	0.436	0.536	0.291	0.529	0.370	0.598	0.609	0.293	0.464
Social Stress	0.403	0.534	0.278	0.596	0.465	0.604	0.566	0.337	0.446
School Problems	0.295	0.225	0.087	0.436	0.343	0.405	0.488	0.393	0.201
Internalizing Problems	0.551	0.625	0.339	0.689	0.554	0.721	0.738	0.408	0.553
Personal Adjustment	-0.477	-0.577	-0.424	-0.641	-0.480	-0.587	-0.595	-0.310	-0.509
ESI	0.535	0.679	0.394	0.665	0.504	0.703	0.682	0.323	0.601

Table A24

Number of Clinical Elevations on the MMPI-A Short form

	Non-Clinical (N=104)	Adjustment (N=57)	Clinical (N=48)
1(Hs)	4	3	8
2(D)	4	10	21
3(Hy)	9	5	11
4(Pd)	4	14	17
5(Mf)	8	6	5
6(Pa)	2	9	8
7(Pt)	1	10	17
8(Sc)	1	8	16
9(Ma)	5	8	12
0(Si)	0	2	13
Total	38	75	128

Table A25

MMPI-A Short Form Means by Racial Group

Race	1(Hs)	2(D)	3(Hy)	4(Pd)	5(Mf)	6(Pa)	7(Pt)	8(Sc)	9(Ma)	0(Si)
Asian N=16	49.73	48.92	52.38	49.29	48.85	44.82	47.33	48.98	48.26	46.60
Black N=73	47.34	48.06	48.59	47.00	50.68	46.13	45.59	46.97	47.45	45.88
Multiracial N=13	49.64	50.61	49.95	50.42	50.53	47.85	47.90	49.92	49.85	47.53
Hispanic N=10	50.40	54.90	50.20	52.60	50.00	50.40	51.10	53.80	45.10	48.60
White N=97	48.33	50.87	49.24	48.63	49.70	48.16	48.09	49.16	48.70	46.71

Table A26

MMPI-A Short Form Means by Gender

Gender	1(Hs)	2(D)	3(Hy)	4(Pd)	5(Mf)	6(Pa)	7(Pt)	8(Sc)	9(Ma)	0(Si)
Females N=118	48.80	50.40	49.08	51.02	48.93	49.03	48.01	49.95	51.36	46.65
Males N=91	49.25	50.49	49.06	52.01	47.79	49.85	48.76	50.61	52.45	47.37

PARENT PERMISSION

Dear Parent/Guardian:

I am a doctoral candidate in the School Psychology department at the University of Kentucky. I am conducting a study on a new personality test for adolescents. The purpose of this study is to examine the validity of this new personality questionnaire and to determine if this test can be used in the schools.

In order to learn about this new questionnaire, I will be asking students to participate in my study. Students who participate will fill out two questionnaires about their feelings, likes and dislikes, and behaviors. This will be done during normal school hours and the students will miss approximately 60 minutes of class time. I am asking your permission for your child to participate in this study by signing this form below.

If you have any questions regarding this study, feel free to call me at (770) 413-9931. Thank for you for helping me complete my study.

Sincerely,

Matthew Turner

_____

_____ **I do give my consent** for my child to participated in this study

_____ **I do not give my consent** for my child to participate in this study

Signed _____

Relationship to Child _____

Student Name _____

APPENDIX: C
Information Sheet

All data is **CONFIDENTIAL**. This means that I will not share this information with anyone.

Name_____

Age_____

Grade_____

Race_____

I would like an appointment to speak with Mr. Turner (School Psychologist)

____ Yes   ____ No

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