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A VALIDITY STUDY OF THE MMPI-2:

THE NON-GENERALIZABILITY OF THE ILLUSION OF MENTAL HEALTH

STUDY

By

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ABSTRACT

A VALIDITY STUDY OF THE MMPI-2: THE NON-GENERALIZABILITY OF THE ILLUSION OF MENTAL HEALTH STUDY

By

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The intent of this study was to extend the findings of the Illusion of Mental Health study by Shedler, Mayman and Manis (1993), by examining the validity of various MMPI-2 scales regarding their ability to measure psychopathology. The Shedler et al. study cast doubt on self-report measures to detect distress because they are susceptible to the processes of denial. Thus, a distressed person using denial may appear healthy on self-report measures. In that study they compared self-report assessments to both a clinical impression of psychological health based on early memories, as well as physiological indices. In the present study, to extend the results of Shedler et al.'s findings, 57 participants were administered the MMPI-2, the Defense Mechanism Inventory (DMI), several cards from the Thematic Apperception Test (TAT) which were scored by Westen's (1990) Social Cognition and Object Relations Scale (SCORS), and heart rate and blood pressure were recorded while undergoing various stressor tasks. There was modest evidence that the MMPI-2 Welsh (1956) Anxiety scale can provide an accurate assessment of psychological health when scores from the MMPI-2 Little and Fisher (1958) Denial scale are taken into account. This Denial scale, as well as the K scale were correlated with an independent measure of denial on the DMI. Unexpectedly, the SCORS data did not correlate with the physiological data of heart rate and blood pressure reactivity to stress. The results indicated that the SCORS scales are susceptible to denial.

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Introduction and Study Overview

The validity of the MMPI-2, the most widely utilized personality test in the United States (Lubin, Larsen, & Matarazzo, 1984), is in question as a result of a recent study by Shedler, Mayman, and Manis (1993). Shedler et al. found that the assessment results of self-report measures may be moderated by defensive denial. Denial, which is often a significant part of a person's psychological defense system, is defined as the disavowal of a thought, feeling, or situation (Levitt, 1980). Relevant to this study, denial is believed to prevent a person from recognizing distress in their life, thus they are not likely to endorse items on self-report measures that indicate distress.

Shedler et al.'s (1993) study found that a significant portion of people "appeared" psychologically healthy on self-report measures (i.e., Eysenck's Neuroticism scale, Beck's Depression Inventory). However, when this group was assessed with physiological criterion measures (heart rate and blood pressure reactivity) several people were considered to be in psychological distress. They also evaluated these participants (i.e., those who looked healthy on self-report, and distressed on physiological indices) with a sensitive clinical measure (the Mayman [1967] Early Memory Test, scored by Mayman) and again found that several people were considered to be in psychological distress. The early memory interpretations were considered mostly impervious to denial, and Shedler et al. argued that these measurements provided a more accurate or realistic assessment of distress than self-report. When the self-report measure indicated psychological distress, this was also indicated by the physiological measures and by the clinical measure. When

the self-report measure indicated low psychological distress and the early memory interpretations indicated high psychological distress, then the physiological criterion measures also indicated a high level of distress. Consequently, the self-report measure was said to display an "illusion" of mental health in such cases. It should be noted that Shedler et al. do not state that self-report measures such as the MMPI-2 are necessarily invalid, but instead suggest that such measures are probably valid if a person's score falls in the distressed range, but the results are ambiguous if the score falls in the healthy range--where they are likely to be moderated by denial.

Shedler et al. (1993) did not utilize the MMPI-2 in their study, however, they believe that their results apply to it because many of the MMPI items are transparent, like the self-report measures that they used in their study. Thus a person using denial is not likely to endorse such items that may indicate psychological distress or pathology. Shedler et al. also pointed out that the original MMPI healthy criterion group used to establish norms was chosen without using adequate screening or assessment methods to fully validate psychological health. As a result, many people in that criterion group likely reported illusory health, as defined above. However, when the MMPI was revised in 1989 a new criterion group was used to develop norms, and this group was subjected to more rigorous screening. This included the collection of biographical information and data from the Life Events Form and the Marital Adjustment Forms (Butcher, Graham, Williams, & Ben-Porath 1990). Although the screening for the MMPI-2 was better than the original MMPI screening, these data were nonetheless mostly self-report forms and therefore can still be considered questionable.

These criticisms of the MMPI-2 and the results of Shedler et al.'s (1993) study combine to cast serious doubt on the MMPI-2's ability to detect distress when the person the person self-reports as healthy (i.e., the test may not reveal all of those people who are truly distressed). However, Shedler et al. did not address the fact that the MMPI-2 has a number of elements in it's inherent design that suggest that it should be able to detect distress, even if a test-taker uses denial.

To begin with, although some MMPI-2 items are transparent in content, the clinical scales on the MMPI-2 were derived from an empirical keying approach, in which items were chosen based on how groups of people with known diagnoses responded to them. As a result, the empirical keying approach reveals subtle items that discriminate between different groups. As discussed by Meehl (1945), the significance of such items would not have been guessed by the test-maker and are subsequently equally mysterious to the test-taker.

Also, Meehl and Hathaway (1946/1956) acknowledged that some people will undoubtedly try to answer MMPI items to look socially desirable. However, by including such items, you give people a good chance to distort their answers, which allows the examiner to observe the extent to which this process occurs, which is the function of the MMPI-2 validity scales. More specifically, the MMPI-2 contains 3 validity scales, one of which--the K scale--is often considered a measure of defensiveness. The K scale was specifically designed for the MMPI to detect when someone may be underreporting distress, which would result in illusory health (Meehl & Hathaway, 1946/1956). The K scale score is used to make corrections to a number of the clinical scales so that they will more accurately reflect distress (Graham, 1993). Another MMPI-2 validity scale, the L

scale, was designed to pick up more blatant attempts to deny pathology. In addition to the validity scales the MMPI-2 also contains a number of subscales that were developed to assess denial (e.g., Haan 1977; Little & Fisher, 1958) and repression (e.g., Welsh, 1956), one of which will be examined in this study.

Unfortunately, the MMPI-2 validity, clinical, and subscales all have equivocal validity in the literature. This is partially due to the fact that many of the validity studies are difficult to interpret because the MMPI was compared against other self-report measures. As established by Shedler et al. (1993), if defensive denial moderates self-report measure assessments, comparing two such measures with one another does not establish their validity. Finding a good criterion measure has historically plagued validity studies (e.g., Garb, 1998).

Despite the MMPI-2's inconsistent validity findings and the criticisms levied against it by Shedler et al. (1993), the number of studies that do support the MMPI-2's validity, the built-in validity and clinical scales, as well as its extensive use, suggest that it is a potentially sound instrument--though one that could benefit from further validation with suitable criterion instruments. To this end, the goal of this study is to assess the MMPI-2's validity by determining its ability to detect psychological distress, even when the test-taker may be relying on denial as a defensive style.

Specifically, MMPI-2 measures of global psychological health\distress and defensiveness\denial, will be compared to both a clinical impression (based on Thematic Apperception Test stories scored with Westen's SCORS) and physiological indices (heart rate and blood pressure) of psychological health\distress. This is similar to the methodology that was used in the Shedler et al. (1993) study. Additionally, the

relationship between the MMPI-2 K scale and a denial scale will be compared with a structured projective measure of defense mechanisms (the Defense Mechanisms Inventory) to provide external support for their validity. These measures, and the rational for their use, are described in greater detail below.

The Thematic Apperception Test will be reliably scored with a measure that incorporates a clinical impression of health\distress. This assessment, as well as the physiological assessments, will provide an index of psychological health\distress that is mostly free of the processes of denial. These assessments will will be used in correlational analyses with the MMPI-2 assessments of psychological health\distress.

Hypotheses

1. It is hypothesized that the MMPI-2 K scale and an MMPI-2 derived measure of denial (i.e., the Little & Fisher, 1958, Denial scale) will be meaningfully and significantly correlated (positively) to an independent measure of defensiveness/denial on the Defense Mechanism Inventory.
2. Based on the finding of the lack of specificity of self-report measures of health in the Shedler et al. (1993) study, it is predicted that the MMPI-2 will not provide an accurate assessment of global psychological health\distress for those particpants that appear healthy. This lack of specificity should be reflected in a lowered overall correlation with two criterion indices of psychological health\distress (i.e., a clinical impression and physiological measures of heart rate and blood pressure), unless defensive denial is taken into account. This hypothesis will be confirmed if the effect of partialling out denial--as assessed by the MMPI-2 K scale or an MMPI-2 derived scale of denial—significantly increase the correlation between the MMPI-2 assessments of psychological health\distress and the criterion measures of physiological reactivity as well as increase the correlation with scores on the Westen SCORS scales.
3. It is hypothesized that as the measure of denial increases, the physiological reactivity will increase, and the clinical impression of health based on the SCORS will decrease.

Literature Review

The following review will discuss defense mechanisms in general, and denial in particular, followed by assessment techniques used to measure defense mechanisms. This section is followed by a review of the MMPI, including the clinical, validity, and other miscellaneous scales. Next, the review will focus on the assessment of psychological health\distress using a TAT derived measure. The review will conclude with a discussion on the use of physiological measures as indices of psychological health\distress.

Defense Mechanisms and the Role of Denial

In a review of psychoanalytic defense mechanisms, Sjoback (1973) reported that Sigmund Freud began theorizing and writing about defensive processes in 1894 in an essay titled "The Neuropsychoses of Defense". In these early writings, there were no specific defense mechanisms and the concept of defense was primarily in relation to drives. It was not until 1926, when S. Freud (1926/1959) published his monograph Inhibitions, Symptoms and Anxiety, that his revised propositions about defense mechanisms gained acceptance and recognition that have survived until today (e.g., Eagle, 1984; Sjoback, 1973, 1991).

According to Freud (1926\1959), the defensive process serves to protect the ego from instinctual demands. In a chain-like sequence, a person experiences a forbidden instinctual impulse which leads to a notion of danger, followed by painful affect and subsequently defense. As a danger situation is experienced and anxiety is produced, the objective of the defensive processes is to perform one or more of the following: block or inhibit the mental content; distort the mental content; or screen and cover the mental content by using opposite contents.

Thus, by the above actions a morally repugnant idea can be removed from consciousness and the anxiety subsides. However, as discussed by Eagle (1984), most defenses, except repression, allow a degree of discharge or gratification of the instinctual demand and thereby deflates part of the accumulated anxiety.

As discussed by Sjoback (1991), the concept of danger is central to S. Freud's theory of defense, in that a forbidden or unruly impulse arouses a defense only if it activates a notion of danger. Apart from an infantile experience of helplessness due to an easily overwhelmed ego, S. Freud (1926/1959) defined four danger situations common in early life: the loss of the object; the loss of the object's love; castration, and; punishment from the superego.

Additionally, as the ego develops, the basic determinants of danger can undergo modifications, thus infantile anxieties can retain an influence on adults (Sjoback, 1973). Also noteworthy, the four basic dangers, and their modifications, have been found to be frequent occurrences in any sample in any population (Sjoback,1993).

The concept of defense has been extensively expanded and written about since S. Freud (e.g., Fairbairn, 1952/1994; Fenichel, 1945/1996; A. Freud, 1946; Kernberg, 1976), and presently there is no agreed upon list of defense mechanisms (Plutchik, 1995). In fact, Cramer (1991) reported more than 37 different defense mechanisms in the literature.

Of particular relevance to this study is the defense mechanism of denial. Denial is generally agreed upon as being a central, common defense as evidenced by the number of works that deal solely with this topic (e.g., Dorpat, 1985; Edelstein, Nathanson, & Stone, 1989). Additionally, Sjoback (1973) listed denial as one of the seven defense mechanisms discussed by all early theorists, and it is relatively uncontested.

According to psychoanalytic thought, denial, often referred to and defined as disavowal (Levitt, 1980), is one of the earliest defense mechanisms available to a child. As discussed by Cramer (1991), S. Freud's earliest theories on defense stated that, in conjunction with repression, denial allows the warding off of upsetting perceptions of the external world. Later theorists (e.g., Fenichel, 1945/1996) expanded the concept of denial to include a warding off of internal stimuli as well. This process involved a covering over, or a screen that substituted for painful thoughts.

Theoretically, denial is used to defend against unwanted and painful thoughts or fantasies that are in the preconscious mind, whereas repression buries the thought or feelings outside of awareness, in the unconscious (Cramer, 1991). Additionally, given that denial involves a disavowal of external reality, in the extreme it has been considered a forerunner, or possibly a manifestation of psychosis (Fine, 1975).

In a less extreme form, denial may be manifested by physically or psychologically ignoring--or withdrawing attention from--a painful situation. In this circumstance, denial is less absolute and it may be possible to lead a person in such a state to recognize what is being ignored through sensitive questioning. In a less extreme form yet, denial may operate through minimizing an event or ridiculing its importance (Cramer, 1991).

Eagle (1984) theorized about denial from a slightly different perspective. He discussed the development of selfhood as an enabling to acknowledge thoughts, memories, experiences, and wishes (i.e., one's engagement in the world) as one's own. There is also the ability to fail to acknowledge, or disavowal, those engagements which are inimical to the maintenance of selfhood and self-esteem (e.g., sexual and aggressive thoughts and wishes). According to Eagle, such disavowal is considered the essence of

the psychoanalytic concept of defense, and he believes that this description is more meaningful than describing the ensuing conflict that takes place when instinctual impulses are pressing for discharge and ego structures are working to repress and control them.

Problems in Defining Denial

A common finding in much of the writing about defense mechanisms is that a clear distinction is not made between denial and repression or suppression. Holmes (1990) differentiated denial from repression as follows. Repression has 3 elements: (1) selective forgetting of painful material; (2) it is not under voluntary control: and (3) repressed material is not lost but stored in the unconscious and could be recalled if the associated anxiety was resolved. The assertion that repressed material can not be voluntary recalled is what differentiates repression from suppression and denial.

Singer and Sincoff (1990) discussed that defining repression and defense is an ongoing problem. Regarding repression, most writers use the term on one of 2 levels--as a specific defense, or as a class of related defenses (which would include denial). Singer and Sincoff, in their concluding chapter of Repression and Dissociation (edited by Singer) have a subheading labeled "The Problem of Denial," which opens with the line "It is intriguing that most of our contributors do not systematically address the distinction between repression and denial." (p.483).

To further complicate matters, Dorpat (1985), in his book Denial and Defense, uses the term denial as a general term for any reality-repudiating aspect of defensive operations rather than as a discrete defense mechanism. Wegner and Pennebaker (1993) uses the term "mental control" instead of denial, and their definition is as follows:

> Psychological defenses are mechanisms of mental control that people use in avoiding or manipulating mental states that they are strongly motivated to influence. Mental control, in this view, is seen less as a willful choice and more as an inevitable option toward which people are driven in the pursuit of relief from anxiety, ego threat, or other psychic pain. (p. 4)

Vaillant (1990) provides an illustrative example which, from his perspective, differentiates denial from suppression and repression, as well as a few other defense mechanisms:

> If a man were weeping in a cemetery but could not recall for whom he wept, this would be repression. If he denied the existence of his tears, that would represent psychotic denial. If he got the giggles or got drunk at the wake, that would be dissociation (neurotic denial). If he said he wept from happiness, that would be reaction formation. If he brushed aside his tears, said he would think about his father's death tomorrow, and indeed remembered to grieve the next day, that would be suppression. (pp. 262-263)

Fenichel (1945/1996) differentiated denial from repression using a developmental perspective. He stated that repression becomes possible in a more developed ego than was present when denial was used, however, repression is certainly a derivative of denial. He further stated that the tendency to deny becomes weakened with the gradual development of the ego and the strengthening of the reality principle with conjoint memories and experiences.

According to Cramer (1991) many theorists agree that a major difference between denial and repression is best understood from a developmental perspective, and there is a

body of research to support this perspective. For example, Cramer reviewed a numbered of studies that found denial decreased with age, especially from about age 3 or 4 through preadolescence. Thereafter, the use of denial, and other defense mechanisms, may wax and wane throughout the life-span for a variety of reasons.

Shanan (1989) discussed that the use of denial, which may have tapered off over the lifespan, may begin anew, or increase in older persons. He stated that older persons are often required to disengage themselves from values and activities (e.g., driving, increased social-isolation, impending death) due to physical or cognitive constraints. In a similar manner akin to how regression may operate in the service of the ego, Shanan stated that denial may enable a gradual disengagement from former commitments while safeguarding the integrity of the ego. Shanan also discussed that as the use of denial increases and more of reality is ignored, there is an increase in rigid and goal-directed thinking, as well as an increase in fantasy activity--all of which have been empirically shown to increase as a person ages.

In contrast to the developmental concept of various defense mechanisms, which is often referred to as a horizontal approach, is the vertical or hierarchical approach to defenses. From this second approach defenses are often classified according to some dimension such as their degree of complexity or how much they distort reality (Cramer, 1991).

When conceptualizing defenses hierarchically, the issue is raised as to whether denial, and defenses in general, are pathological or adaptive. As discussed in Cramer (1991) and Sjoback (1973), S. Freud held to the view that all defense was pathological and that neurosis and neurotic symptoms are related to the manifestations of different

defense mechanisms. (While S. Freud did not, in fact, think all uses of defense were pathological, such a view is frequently attributed to him, since he mainly discussed psychopathology rather than development). In contrast to this view, some contemporary researchers believe that some defenses may lead to positive benefits. For example, Taylor & Brown (1988) suggest that certain "illusions" may be adaptive for mental health and well-being. The middle ground in this debate is that defenses may serve a dual function. For example, denial may hinder perception but it may also protect the ego from being overwhelmed (Cramer, 1993)

Lazarus and Folkman (1991) discussed the issue of whether certain defensive processes, which they refer to as "coping," are adaptive or destructive. They dismiss the hierarchical view that is often discussed in the psychoanalytic literature, and instead stated that:

> Definitions of coping must include *efforts* to manage stressful demands, regardless of outcome. This means that no one strategy is considered inherently better than any other. The goodness (efficacy, appropriateness) of a strategy is determined only by its effects in a given encounter and its effects in the long term. . . . Predetermined ideas as to the inherent quality of ego processes prejudice us against the possibilities of strategies ranked high in a hierarchy being maladaptive and low-ranked strategies being adaptive. (p. 201)

Lazarus and Folkman (1991) used denial as an example to highlight how a low-ranking defense may be viewed as adaptive. They acknowledge that the general psychodynamic view of denial ranks it toward the bottom of a hierarchy, and it is considered inherently maladaptive because of it's distortion of reality. Further, according

to this view, although the use of denial in a stressful encounter may result in initial emotional ease, over time there will be increased vulnerability to some deleterious outcome.

For example, Schwartz (1990) found that denial in cardiac patients may enable them to perceive or interpret their situation as safe, which has the effect of reducing stress. However, if denial continues, the patient may ignore the seriousness of their condition, which may impact their treatment or they may not engage in health promoting behaviors. Thus, Schwartz stated that "Denial of illness becomes a gift in the short term and a curse in the long term." (p.426).

However, a number of studies regarding the efficacy of denial have found it to be beneficial. For example Shanan (1989) discussed the positive benefits of denial in situations of extreme, unalterable stress, such as a concentration camp or when facing a life threatening illness.

Lazarus and Folkman (1991, p. 202) stated that " One can now speak of a box score of studies with contradictory result, some showing that those who deny or avoid threats are worse off than those who address them, and other studies in which denial is associated with positive outcomes." (See Lazarus and Folkman, 1991, pp. 205-206, for a listing of these studies; see also Edelstein, Nathanson, & Stone, 1989, for several more examples of positive and negative aspects of denial).

As an aside, these contradictory findings discussed in Lazarus and Folkman (1991), regarding whether denial is beneficial or not, raises two important issues, one of which they addressed. First, as mentioned above, there is a definitional problem in studies that are purportedly assessing denial--usually defined as the disavowal of reality.

Lazarus and Folkman stated that several studies on denial may actually be better conceptualized as avoidance, or I would add suppression. For example, an advanced cancer patient may not talk about his condition and keep it out of mind as much as possible, but he may readily acknowledge his reality and distress if confronted. Further, other coping processes that have been classified as denial may be better conceptualized as positive thinking, or minimization, which allows sustained motivation, morale, and constructive efforts to cope--not necessarily a disavowal of reality (Lazarus & Folkman, 1991).

The second issue, not addressed by Lazarus and Folkman (1991), which may shed light on some of the contradictory findings of studies on denial is a point made by Shedler et al. (1993). That is, the results of many studies that relied solely on self-report instruments to assess health\distress may be suspect because, as discussed at the outset of this study, their validity has been called into question. A case in point was discussed by Temoshok (1993), who discovered apparently contradictory results in two of her own studies that looked at emotional expression and distress in patients when they were informed they had malignant cancers, and how that affected their long-term outcome. Temoshok was able to resolve the contradiction when she realized that one study used clinical interviews to rate expression and distress, whereas the second study used self-report measures, such as the Beck Depression Inventory. (It would be interesting to review the contradictory studies listed in Lazarus and Folkman, 1991, pp. 205-206 to see what sort of outcome measures were used and how that may have influenced the results).

Returning now to Lazarus and Folkman's (1991) proposition that denial should not be viewed as an inherently low level defense mechanism or coping strategy, they

offered several principles that they believe are a better method by which to evaluate denial as being either adaptive or destructive. For example, denial may be adaptive to alleviate stress when a person is faced with a threatening situation in which there is no action they can take. Also, denial may be adaptive in the early stages of a crisis, when the entirety of the situation would be too overwhelming to deal with all at once. Thus, according to Lazarus and Folkman, a defense mechanism must be evaluated in context to determine whether or not it is adaptive. Breznitz (1983) also discussed that denial is not inherently maladaptive, and that to get an accurate assessment of it's efficacy one must look at what other alternatives are available to the individual (see also a relevant discussion by Haan, 1977, pp. 175-179).

Regarding the definitional problem of denial as discussed by Lazarus and Folkman (1991, see above), recognizing that denial may be either adaptive or maladaptive depending on the situation or context in which it is used may help explain the controversy between "positive illusions" described by Taylor (Taylor & Brown, 1988, 1994) and the "illusion of mental health" (Shedler et al., 1993, 1994). In this controversy Taylor maintains that a distortion of reality that results in overly positive self-evaluations and unrealistic optimism promote mental health, whereas Shedler et al. maintain that underlying this self-deception, a careful clinical assessment will often find distress.

In summary, denial is one of many defense mechanisms and is closely related to suppression and repression. The main difference being whether or not the unwanted thought, feeling, or fantasy can be easily acknowledged, as in suppression, or can not be acknowledged or recalled, as in repression, with denial falling between the two. Thus, the unwanted thought, feeling, or fantasy may be conscious, preconscious, or unconscious

and the corresponding defense would then be labeled suppression, denial, or repression, respectively. However, given the current lack of specificity in the literature regarding these defensive processes and their realm of operation, it seems necessary to view the processes more on a continuum than as discrete functions. This is consistent with a current trend to also view the unconscious, preconscious, and conscious along a continuum (Weinberger, 1990).

For the purposes of this study, denial shall be defined from a general perspective, not as a discreet, independent defense mechanism. That is, denial includes to some extent what would be thought of as defensiveness at one end of the continuum, and reaches into the area of repression on the other end. This is necessary because, as discussed below, there is no valid assessment technique to solely measure denial. Rather, the best current assessment techniques can only tap if a person is using a cluster of defenses which resembles denial. Unfortunately, more fine grained differentiations must remain in the theoretical realm. Additionally, denial in this study is viewed as a low-level defense, with deleterious physiological consequences. These consequences are discussed later in this review.

The Measurement of Defense Mechanisms

After a review of the literature Cramer (1991) reported encountering 58 different measures for defense mechanisms. The Rorschach has been one of the more common tests used to assess defenses and is presently flourishing, and to a much lesser extent the Thematic Apperception Test (Sjoback, 1991). However, the majority of tests used to assess defenses have been self-report measures--few of which survive for any length of time (Sjoback, 1991). Apart from projective and self-report measures, two other common

modes of assessing defenses are (1) via vignettes that then require the test-taker to report or chose how he would respond, and (2) via an interview method.

After reviewing a number of measures discussed in review articles and books specific to defense mechanism assessment (Conte & Plutchik, 1995; Cramer 1988, 1991; and Sjoback, 1991), as well as an independent review of the literature in the area of defenses, the Defense Mechanisms Inventory (DMI; Gleser & Ihilevich, 1969; Ihilevich & Gleser, 1986) appears to have the best reliability and validity and thus was chosen for the this study. The DMI has been frequently used (Ihilevich & Gleser, 1986, contains a bibliography of nearly 200 studies using the DMI), it assesses a cluster of defenses akin to denial, it is easy to use and score, and it has acceptable psychometric properties. These issues are further addressed below, after a description of the DMI.

The DMI consists of ten vignettes that assess 5 defense clusters. After each story the test-taker is asked to chose from five responses which one most likely (scored 2), and least likely scored 0), resembles how they "actually" would respond to the situation. The remaining 3 choices are each scored 1. This format is repeated 3 more times for each story except that the test-taker is subsequently asked how he would "impulsively" respond, what "thought" might occur to him, and how he "feels" about it. The rational for beginning with overt behavior was that by allowing the test-taker to express actual behavior, the effects of socially desirable responding might be reduced for the following 3 responses. An example of a DMI story and subsequent responses is contained in Appendix A. There are male and female story versions for adults, children, and older persons. The following information on the DMI is taken from Ihilevich and Gleser (1986), unless otherwise noted.

The 10 vignettes were conceptualized to represent 5 areas of conflict, with 2 vignettes for each of the 5 areas. The conflicts represented are: situational conflicts (e.g., physical safety needs pitted against unpredictable events), authority conflicts (e.g., self-assertion may result in punishment), independence conflicts (e.g., satisfaction of needs is pitted against the risk of deprivation of needs), competition conflicts (e.g., ambition and status seeking are threatened by failure or humiliation), and either masculinity (for males) or femininity (for females) (e.g., assertion of sexuality is threatened by sexual rejection).

To ascertain if the vignettes reflected the conflict situations, 5 judges with clinical experience were asked to match the stories with the appropriate conflicts. Four of 5 judges successfully matched all the stories (the fifth judge misread the instructions for rating the stories which may explain his or her lack of agreement).

From the vignettes, 5 defense clusters are assessed: Turning Against the Object (TAO); Projection (PRO); Principalization (PRN); Turning against the Self (TAS), and; Reversal (REV). Theses are described below.

Turning Against the Object (TAO)

TAO involves the expression of direct or indirect aggression as a means to control a perceived external threat. This cluster best represents the defenses of identification with the aggressor and displacement.

Projection (PRO)

PRO is the strategy of attributing negative intent or characteristics to others, without evidence for doing so. Then the person who uses this strategy feels justified in the expression of hostile thoughts, behavior, and feelings toward the other person.

Principalization (PRN)

PRN entails a falsification of reality by reinterpreting it through truisms, platitudes, or sophistry. There is a sense that genuine understanding is replaced by empty truth. This cluster best represents the defenses of intellectualization, rationalization, and isolation.

Turning Against the Self (TAS)

TAS includes intrapunitive maneuvers that are deployed to falsify reality and reduce perceived threats to self-esteem. The maneuvers include exaggerated self-criticism, negative expectations, and depressed affect that work to preserve self-esteem in a paradoxical fashion. No traditional defenses are mentioned under this cluster.

Reversal (REV)

REV entails a minimization of the severity of perceived threats or conflicts and\or a failure to acknowledge the existence of obvious dangers. This cluster includes the defenses of denial, negation, repression, and reaction-formation.

Psychometric Properties of the DMI

Ihilevich and Gleser (1986, 1995) reported that 3 of the defense clusters showed good content validity when each of the 240 DMI responses were examined by 10 clinical judges unaware of the DMI clusters. The judges were asked to name a classical defense mechanism represented by each response and their answers were compared to the DMI defense clusters. For PRN, TAS, and REV clusters there was 60%, 80%, and 70% matching agreement, respectively. PRO and TAO fared less well, showing only 45% and 43%, matching agreement, respectively, and several of PRO and TAO responses were not

considered defensive. Ihilevich and Gleser reported that subsequent studies replicated these findings.

A weakness of the DMI reported in several studies is intercorrelations on some of the defense clusters. Specifically, TAO and PRO reveal an average r = .45, and REV and PRN reveal an average r= .48 (reported in Cramer, 1991). Cramer (1991) offered as an explanation of these findings that either some of the DMI items have poor content validity, or that defense clusters may overlap in reality. However, despite these intercorrelations, both Ihilevich and Gleser (1995), and Cramer (1991), note that there is considerable evidence that the scales are assessing independent dimensions. For example, even though REV and PRN are intercorrelated, research has revealed that while REV was related to denial, low dream recall, few postoperative complaints and successful therapy, PRN was not related to these variables (Cramer, 1991). Other examples of independence between REV and PRN can be found in the literature (e.g., Peglar & Borgen, 1984).

Cramer (1991) reported that it is difficult to establish concurrent validity because there is a lack of other comparable defense measures to use as a criterion (this issue will also be discussed below as it applies to certain MMPI subscales). However, when using what measures were available, Cramer reported that REV consistently showed the expected relationships with criterion measures of denial, primitive defense, repression, and avoidance (no specific detail or analyses were reported). He further reported that there was moderate criterion validity support for PRO, TAO and TAS, and poor support for PRN.

Sjoback (1991) also reviewed the DMI, and his major contention was that the vignettes are not adequate to evoke anxiety and thus elicit defenses as defined in the psychoanalytic tradition. However, at least one study (Gleser & Sacks, 1973) has shown that a person's DMI profile is predictive of their defenses used in an actual threatening situation. Cooper and Kline (1982) also conducted a validation study of the DMI and reported that it was consistent with profiles on the 16PF, which were generated based on Freudian theory.

As discussed earlier, denial may have short term benefits but be detrimental in the long run. A study that lends validity to the REV scale that is consistent with this view was conducted by Peglar and Borgen (1984). They followed 73 male patients that were admitted to a coronary care unit and followed for five years, at which time 25 of the subjects had died. A cluster analysis of distinctive DMI patterns revealed that those subjects who scored high on PRN and low on REV were most likely to be alive at the end of the five year period (high REV alone was associated with a positive perception of health). Those subjects who scored high on both PRN and REV were least likely to be alive at the end of the study. Other studies are consistent with the notion that denial, in the long run, has detrimental results. For example, Minsky (cited in Ihilevich & Gleser, 1986) found that excessive reliance on denial (i.e., high REV score) was associated with increased blood pressure.

Some studies are more difficult to interpret because they relied on self-report methods of assessment, which as discussed above, may be questionable (Shedler et al., 1993). For example, Clum and Clum (1973) reported that subjects who used denial as a defense mechanism self-reported less depression than those who used other defense

mechanisms. A study by Wilson (1982) reported that female postoperative patients who had scored high on the REV scale fared better after surgery than those who scored low. However, this study relied on a mixture of self-assessment and objective measures (e.g., amount of pain medicine requested) that make it more difficult to interpret.

The DMI REV scale will be used in this study despite the shortcomings addressed above, because it appears to be one of the best measures of denial available in an area where valid measures are consistently difficult to establish. This is important to note because REV will be used as one of the criterion measures of denial against which certain MMPI-2 scales will be compared. As a reminder, one purpose of this study is to ascertain the ability of various scales on MMPI-2 to measure denial. As will be discussed in the next section, the MMPI-2 K scale and the MMPI-2 derived Denial scale (Little & Fisher, 1958) are two promising scales that are under investigation in this study. These scales are mentioned now to note that REV is significantly correlated with the K scale in a group of college students for both males and females. In that same sample, REV is also significantly correlated to the MMPI-2 Hysteria scale for males (but not for females), which is the scale from which Little and Fisher derived their MMPI-2 Denial scale (Gordon & Brackney, 1979; see also Ihilevich and Gleser, 1986 for similar results).

An Overview of the MMPI and MMPI-2

In the late 1930's Starke Hathaway and John McKinley, while working at the University of Minnesota Hospitals, were aware that 30 to 70 percent of patients seeing a doctor for medical problems had what turned out to be psychoneurotic problems. Subsequently, they set out to devise a test that could be used for routine diagnostic assessments, and their efforts resulted in the MMPI, first published in 1943. McKinley

and Hathaway hoped that their paper-and-pencil test would be a more efficient and reliable way of diagnosis--eliminating the need for individual interviews, mental status exams, and individual psychological testing (Colligan, 1985; Graham, 1993).

The MMPI and its various scales were developed with an empirical keying approach. Specifically, items that distinguished different groups of subjects with known diagnoses became keyed as representative of each respective group. Most tests used at that time were based on logical keying and questions that seemed to have face validity based on the developer's subjective judgment of items reflecting whatever attributes were being measured. The logical keying approach became increasingly unsatisfactory because it was apparent that subjects could falsify or distort their responses to present themselves however they desired. Further, research began accumulating on the logically keyed tests which revealed inconsistencies between the self-report data and what was actually observed between different groups of subjects. It was because of this research, and the observations mentioned above, that the MMPI empirical keying approach was developed (Graham, 1993).

To develop the MMPI items, Hathaway and McKinley collected approximately 1,000 personality-type statements from existing psychological tests, textbooks, research publications, and clinical case history experience. After deleting repeated items and subsequent review and modifications, the MMPI consisted of 550 items that covered 26 different symptom categories. Originally, the items were printed on cards that the test-taker would place into piles of true, false, or cannot say, as they applied to his or her self-assessment (Colligan, 1985).

After item selection, criterion groups were chosen so that individual scores could be meaningful compared and interpreted. The normal group consisted of relatives and visitors of patients in the Minnesota University hospitals, as well as other groups that the university had access to (e.g., high school graduates attending precollege conferences, Graham, 1993). People in these groups were assumed normal and were not screened with any other psychological instruments or interviews.

The second criterion group was made up of patients at the university hospital diagnosed with a broad range of psychiatric problems. Discrete groups were formed based on diagnostic labels used at that time, and if there was doubt at to the correct diagnosis or if multiple diagnosis were present, the patient was not included. Eight criterion groups were formed representing: hypochondriasis, depression, hysteria, psychopathic deviation, paranoia, psychasthenia, schizophrenia, and hypomania. These groups represented 8 clinical scales used on the MMPI (two categories--Masculinity-Femininity, Social Introversion--were added later) (Graham, 1993).

To construct the scales, each criterion group's responses to the MMPI were analyzed to identify the items that significantly differentiated the specific criterion group, other clinical groups, and the group of normals. Those items that resulted in discrimination were then included in the resulting MMPI scale for that group. Additionally, other steps were taken to cross-validate the clinical scales, and an attempt was made to differentially weight some the items which did not pan out. (see Colligan, 1985; Graham, 1993).

The major criticisms levied against the MMPI included high intercorrelations of many of the clinical scales, serious concerns about the original standardization sample,

offensive and\or archaic content in some items, and questionable diagnostic accuracy and breadth of psychological problems assessed in the criterion groups (e.g., Anastasi, 1988; Graham, 1993). These concerns, with the exception of interscale correlations, have been mostly resolved when the MMPI was revised in 1989 to the MMPI-2 (Graham, 1993; Hathaway and McKinley, 1989). Fortunately, by design, there are major similarities between the two versions, thus it has been suggested that most of the research carried out on the MMPI is applicable to the MMPI-2 (e.g., Graham, 1993; Hathaway & McKinley, 1989; Levitt, 1989).

Development of the MMPI Validity Scales

Because self-report measures at the time of the MMPI's introduction were developed by intuitive methods and were shown to be susceptible to faking, Hathaway and McKinley included four validity scales to detect deviant test-taking attitudes. First, the Cannot Say scale provides the number of items not completed by a test-taker. If too many items are omitted, the clinical scale scores will be lower, and the overall interpretability of the test is questionable (Colligan, 1985).

Second, the L scale, also referred to as the Lie scale, was designed to detect unsophisticated or naive attempts of test-takers to present themselves in a favorable light. This is achieved by including items that require an admission to minor weaknesses in character or personality common to most people (Colligan, 1983; Graham, 1993).

The next validity scale designed was the F scale to detect random endorsement of items. A group of items was selected that was always answered in the same direction by 90 percent of the normal reference group. Thus if a person endorses a high number of deviant responses on the items that make up this scale, the test profile is considered

suspect (Colligan, 1983; Graham, 1993).

Finally, the K-scale, constructed by Meehl and Hathaway (1946/1956) was considered the most complex validity scale, and was intended as a measure of defensiveness. In their classic paper, Meehl and Hathaway began their discussion by stating:

> One of the most important failings of almost all structured personality tests is their susceptibility to "faking" or "lying" in one way or another, as well as their even greater susceptibility to unconscious self-deception and role-playing on the part of individuals who may be consciously quite honest and sincere in their responses. (p.12)

The K scale was developed to address this issue, which echoes the concerns discussed by Shedler et al. (1993) regarding self-report instruments, including the MMPI.

Meehl and Hathaway (1946/1956) discussed different attempts used on personality measures to reckon with the problem of faking. One idea was to use "subtle" items whose significance are not apparent to the test-maker or the test-taker, yet the items are for some reason able to discriminate criterion groups. Another way of dealing with the problem is to acknowledge faking as a source of error, then attempt to correct for it. More specific to the development of the K scale, test profiles that revealed no marked pathology from individuals with known psychiatric problems (referred to as test "misses") were compared to test profiles from psychiatric patients that did reveal pathology.

Meehl and Hathaway (1946/1956) reported undergoing several attempts comparing test profiles as just discussed. They summarized that "the resultant scales were about equally effective and about equally unsatisfactory regardless of the approach

and of the particular item content" (p.23). They worked an additional two years testing various scales on different criterion groups which resulted in a scale for tentative adoption originally referred to as L_6.

According to Meehl and Hathaway (1946/1956), the content of the items in this scale reflect "an attitude of denying worries, inferiority feelings, and psychiatrically unhealthy symptoms, together with a disposition to see only good in others as well as oneself. The over-all impression is one of 'impunitiveness'" (p.24). Additionally, whereas a high score suggests defensiveness, a low score suggests plus-getting or malingering (i.e., false positives).

Additional testing with the L_6 scale on depressed and schizophrenic patients resulted in the inclusion of 8 additional items, for a total of 30, and subsequently the new scale was named K. Although Meehl and Hathaway (1946/1956) hinted that the K scale score might be interpreted itself as a clinical scale, its real function was to provide correction of the other scores. Eventually, the K scale was used to differentially correct the scores of some scales (i.e., Hypochondriasis, Psychopathic Deviate, Psychasthenia, Schizophrenia, Hypomania), while leaving the others uncorrected, which seemed to provided the most accurate prediction of a person's clinical status (McKinley, Hathaway, & Meehl, 1956).

Meehl and Hathaway (1946/1956) provided validity support for the new K scale when they used a simple cutting score on the K scale to arbitrarily predict 44 randomly selected MMPI profiles as either coming from normal subjects (if $K \leq 49$) or psychiatric subjects (if $K \geq 50$). The 44 profiles came from 22 subjects previously classified as psychologically healthy, and 22 psychiatric hospitalized patients. Based on the K score

alone, 37 of the MMPI profiles were correctly classified as coming from either the healthy or abnormal group--an 85% hit rate. Six of the 7 errors resulted in classifying the truly healthy as abnormal (i.e., false positives). This last finding is inconsistent to what would be expected from Shedler et al.'s (1993) work, discussed in the introduction.

A shortcoming of the K scale is uncertainty regarding if and when correction scores should be applied to a test profile. That is, it is unknown when correcting for K enhances, or is detrimental to, clinical accuracy or prediction. This was true on the original MMPI (Dahlstrom, Welsh, and Dahlstrom, 1972; Heilbrun, 1961), and continues to be an issue on the MMPI-2 (Graham, 1993).

Graham (1993) recommended that K-corrected scores be routinely used, given that interpretations on the clinical scales are based on corrected scores. However, he acknowledged that there were no empirical studies on the MMPI-2 to support the efficacy of using k-correction. As alluded to by Meehl and Hathaway (1956), beyond being used solely for correction, the K scale has routinely become clinically interpreted as a measure of defensiveness (e.g., Graham, 1993; Heilbrun, 1961; Smith, 1959). However, Graham (1993, p. 30) pointed out that although high K scores typically indicate defensiveness, moderate elevations sometimes reflect ego strength and psychological resources. He continued to state that there is no definitive way to differentiate the two, and suggested that if the test-taker appears psychologically healthy and functions reasonably well, then the K score is probably reflecting more positive characteristics than defensiveness.

At least two studies (Heilbrun, 1961; Smith, 1959) that used the K scale as a measure of defensiveness concluded that the K scale does an adequate job of measuring defensiveness in abnormal populations, but both studies suggested that high K scores in

normal populations reflect psychological health (Heilbrun's finding was specific to females). However, the methodology and determination of healthy versus not healthy is highly suspect. For example, in the Heilbrun (1961) study, subjects considered not healthy were students that requested vocational or educational counseling. It is unclear how health was rated in the Smith (1959) study, but it appears to be based on how the subjects fared on a task that was supposed to reflect insight.

More recently, a meta-analysis was conducted by Baer, Wetter, and Berry (1992) to assess the effectiveness of the MMPI K scale (as well as other scales) in detecting underreporting of psychopathology. Their results revealed that, for underreporters, the K scale was elevated by an effect size of nearly 1 standard deviation. However, their definition of "underreporting" included defensiveness, as well as faking-good, and socially desirable responding. In fact, of 25 studies included in the analysis, the methodology of 17 studies simply gave normal subjects the instruction to try to appear as well-adjusted as possible and these profiles were compared to normal subjects instructed to respond honestly.

The major difficulty in properly examining the K scale for defensiveness is the lack of an external criterion standard (recall that this issue was also raised in regard to measuring defense mechanisms). Nearly every study of defensiveness, as assessed by the K scale, involved subjects given instructions to fake good, or, subjects were used that were assumed to have real-life reasons to fake-good (e.g., child custody hearings), but no independent criterion confirmation of defensiveness was carried out (Dahlstrom, Welsh, & Dahlstrom, 1975).

To address this specific problem Lanyon and Lutz (1984) designed a study that they believed included subjects that were likely to be in denial. In their study they investigated 90 males arrested for felonious sexual offenses (mostly child molestation). Based on police investigations which almost always resulted in conviction, the men arrested were assumed guilty and the researchers classified the men as: no denial if the subject account is the same as police account (n = 48), part denial if there was some admission to sexually deviant behavior (n = 24) and, full denial if there was no admission to sexually deviant behavior (n = 18). Each subject completed the MMPI as part of an assessment to determine rehabilitation potential or insanity/competency. The study revealed few differences between the full denial group and the part denial group, thus they were combined and compared to the no denial group. This analysis revealed significant differences beyond the .01 level on the L, F, and K scales as well as 3 derived validity indexes being tested: L + K, L + K - F, and F - K. A subsequent multiple regression revealed L + K - F to be the best predictor variable for denial versus no denial group status.

Another avenue to be explored to help determine if the MMPI contains adequate measures to assess denial or defensiveness is research which used physiological measures or other health variables. Dahlstrom, Welsh, and Dahlstrom (1975, pp. 91-93) summarized several studies of MMPI investigations using autonomic measures. Early investigations unsuccessfully tried to determine if responses to certain test items tapped test distortion (i.e., nonverdical answers), by monitoring subjects on a lie detector (using GSR measures) while they took the MMPI. The results tended to show large variations on different items.

Another unsuccessful method to determine if certain items might be indicative of distortion is reported in Dahlstrom et al. (1975) that involved monitoring the test-takers response time (RT) to MMPI items, hoping to find items that evoked long RT's which would be inferred as defensiveness. Again, there was considerable intersubject variation.

Blumberg, West, and Ellis (1956) studied personality characteristics of individuals with established malignant diseases hoping to find individual differences when following disease activity and survival. Several instruments were administered to these individuals including the MMPI, the Rorschach, the TAT, and an intelligence measure. They found the MMPI showed the most striking differences between the slow versus rapid disease progressing groups. Specifically, those with rapid progression of disease tended to have highly negative F-K values, which was considered indicative of high defensiveness.

In contrast to the above study, Persky, Kempthorne-Rawson, and Shekelle (1987) reported that the only MMPI scale associated with cancer incidence and mortality in 2018 men was the depression scale. Their data did not support their hypothesis that repression, as measured by the Welsh R scale, was associated with cancer risk.

There are a number of studies in the literature that attempted to find MMPI differences in survival rates for heart patients after surgery. Lair and King (1976) reported conflicting findings in these studies (e.g., one study they cited found survivors had significantly higher denial based on L and K scores, while another study found female nonsurvivors to have increased denial). In their own study Lair and King found no significant differences on the MMPI between male survivors and nonsurvivors, but in

the female nonsurvival group they reported higher MMPI scores on a scales of Hypochondriasis and Hysteria.

In a separate study, Pancheri et al. (1978) reported MMPI data on 58 male intensive care heart patients. Their findings revealed that the group judged least improved (based on medical parameters such as the occurrence of serious cardiac arrhythmia) 7-10 days after admission had higher scores on almost all the MMPI scales. However, the L and K scores were lower in the less improved group (L significantly lower, K not significant). This finding may be interpreted such that increased defensiveness and/or denial (based on higher L and K scores) leads to salutary effects, at least initially.

However, as discussed earlier, Schwartz (1990), while reviewing data on cardiac patient survival factors, pointed out that denial may be beneficial in the short term but deleterious in the long run. The studies reviewed so far focused on cardiac patient survival or status shortly after hospitalization.

Tappan and Weybrew (1982) conducted a study that compared MMPI profiles of 1015 male submariners with their calculated coronary heart disease (CHD) risk (based on 7 parameters such as blood pressure, cholesterol level, electrocardiographic abnormalities). The CHD risk data were compared with the 13 MMPI scales as well as all possible combinations of subtests in pairs, triads, or tetrads. The results revealed 6 MMPI combinations (1 dyad, 3 triads, and 2 tetrads) of MMPI profiles that were correlated with increased risk for CHD, all of which contained the K scale. The Hy and Hs scale were also included in several of the MMPI combinations. Thirty-eight MMPI combinations were associated with the low CHD risk group--none of which contained the

K, Hysteria, or Hypochondriasis scales. Unfortunately, this study did not include any follow up data.

Another study was conducted by Gillum, Leon, Kamp, and Becerra-Aldama (1980) to determine if personality factors as measured from the MMPI would be associated with CHD. This study followed 281 men over a 30 year period and tested them at 4 points. At the end of the 30 years, 62 men died from some type of cardiac disease. Several different analysis were performed on the MMPI data which did not reveal any predictive power for the age of onset of CHD or life expectancy.

Another issue that has surrounded the K scale, as well as the MMPI in general, is that some researchers (e.g., Edwards, 1957; Fordyce, 1956; Fricke, 1956, Hanley, 1957) claimed that people responded to personality tests with certain "response styles" or "sets." One of these sets especially relevant to the present investigation was a social desirability response set (SDRS). The researchers that adhered to the SDRS hypothesis interpreted test results in a manner that assumed that a large proportion of people evaluated and responded to questions on the MMPI to appear as socially desirable as possible.

To support this hypothesis, Edwards (1957) revealed that measures of social desirability (based on his MMPI derived scale) correlated extremely high with many scales on the MMPI (Approximately .70 for the K scale). Fordyce (1956) reported that Edwards' social desirability scale correlated highly with the MMPI F and K scales, and higher with each of them than they do each other. He interpreted this finding as an indication that the common factor in the validity scales is best conceptualized as social desirability.

To refute the SDRS hypothesis, Block (1965) discussed that Edwards' (1957) social desirability scale contained items that, if agreed with, would reflect a susceptibility to anxiety (e.g., bodily tension, personal vulnerability). In fact, Edwards' 39 item scale contains 22 items from the Taylor Manifest Anxiety (TMA) scale (Taylor, cited in Block, 1965), though keyed in the opposite direction. Block pointed out that, given this item overlap, the two scales have to be correlated at about -.7, and the TMA is known to correlate with several MMPI scales.

Block (1965) also discussed that it is nearly impossible to conceive of any manifestations of neuroticism that would not be evaluated as socially undesirable. Therefore there has to be an intrinsic relationship between expressions of personality dimensions and social desirability. From an empirical standpoint, Block pointed out that MMPI variables are related in a meaningful way with extratest behaviors (e.g., Q sort evaluations; see Block 1965, pp. 97-116).

Finally, Block (1965) derived an MMPI measure of anxiety (based on Welsh's A factor--see Graham, 1993 for a discussion) that was "desirability free" and found that this scale correlated with the various MMPI scales essentially the same as when the scale was not "desirability free."

The SDRS hypothesis was also refuted by Taylor, Carithers, and Coyne (1976). They suggested that the MMPI acts as a medium through which people can convey "self-concepts," as opposed to the more narrowly defined construct of social desirability. Self-concepts were defined as discreet, abstract categories people use to view their behavior (e.g., moral goodness or badness, controlling or victimized), and people may hold a number of these concepts to be self relevant. According to this self-concept hypothesis,

items on the MMPI are interpreted and answered to reflect the individual's self-concept. This hypothesis was supported in their research.

Apart from issues surrounding what the MMPI K scale actually assesses, another issue regarding the K scale is a reliable finding that elevated scores on the K scale are associated with a higher socioeconomic status (SES) (Dahlstrom, Welsh, & Dahlstrom, 1975; Graham, 1993; Hathaway & McKinley, 1989). Hathaway and McKinley (1989) suggested that this finding might be due to people with higher SES being reluctant to admit to or disclose emotional concerns, doubts, and insecurities as reflected in the MMPI. Conversely, they suggested that lower SES people may believe they have less to lose by admitting faults or weaknesses. As a related issue, Graham (1993) reported that on the original MMPI there was a positive relationship between education and K scale scores. However, on the MMPI-2, Graham stated that the data thus far showed a very minimal positive relationship between education and K scale scores.

When Graham (1993) summarized the data on the F,L, and K scales he stated that the MMPI has the ability to detect defensiveness (referred to as faking-good), though the accuracy is not as good as it's ability to detect the fake-bad profile. He further stated that based on the fake-good profile (i.e., high K low F scores) "One should not infer that the person is covering up serious psychological problems" (p.53).

In Summary, The K scale has a long and complex history. It is unclear whether or not the K scale is a measure of defensiveness, psychological health, social desirability, self-concept, or some other dimension. Further, it is unclear under what circumstances correcting the clinical scales based on K scores leads to improved clinical discrimination or a more accurate interpretation. Concerning the K score as a measure of defensiveness,

the results are clouded because the vast majority of research conducted with the K scale used the methodology of asking test-takers to purposely fake good (see Baer et al. 1992).

Thus, although early studies by Meehl and Hathaway (1946/1956) showed promising results with the K scale as a suppressor variable, the continued use of K as a corrective score, validity indicator, or measure of defensiveness seems to rely more on historical precedence than solid research. Dahlstrom, Welsh, and Dahlstrom (1972, pp. 129-130) stated that:

> The published research . . . to cross-validate K applications and variations on K weighting is scanty and inconclusive. Obviously, many agencies within which the MMPI is used cannot provide ideal criterion information for this kind of cross-validational work: dependable clinical criteria that are completely independent of the test-based information or decisions.

It appears that little has changed in the subsequent 25 years of research with the MMPI.

An MMPI Derived Denial Scale

Apart from the validity and clinical scales, a large number of other scales have been derived from MMPI items (see Dahlstrom et al. 1975 for a listing), one of which purportedly measures denial. The Denial scale (Dn) was developed by Little and Fisher (1958) from 26 items on the MMPI conversion hysteria (Hy) scale after they made the observation that the Hy score was often the highest profile point for both psychiatric and medical patients. Little and Fisher assumed that the elevated scores may have different meanings for the two groups so they initiated a cluster analysis of the 60 item Hy scale with data from 60 psychiatric patients and 90 medical patients. The analysis resulted in 9

clusters, 5 of which were intercorrelated with each other but not the other 4 clusters--and vice versa, thus resulting in 2 primary clusters. Eighteen items were left over and they were added to the cluster with which they were most highly correlated, except 2 items that were not related to either cluster and thus dropped.

Subsequently, one primary cluster of 32 items was comprised of statements largely dealing with physiological symptoms that subjects admitted to and was subsequently called the Admission (Ad) scale. The other primary cluster contained 26 items with statements about poor interpersonal relations, feelings of hostility, suspicion, and the like, and was named the Denial (Dn) scale. All of the items on the Dn scale remain on the MMPI-2, though some of the items have been slightly modified. These items are reproduced in Appendix B.

Little and Fisher (1958) reported the correlations between the new scales and other MMPI scales for a medical patient group and a psychiatric patient group, with 100 participants in each. Based on the 200 cases, the Kuder-Richardson reliability coefficients were .83 for Ad and .75 for Dn. Ad was most highly correlated with the MMPI Hypchondriasis scale ($r = .89$ and .90 for medical and psychiatric patients, respectively), with which it has an 18 item overlap. Dn was most highly correlated with the K scale ($r = .78$ and .88 for medical and psychiatric patients, respectively), with which it has 9 items in common.

In describing the clinical applications of the Dn scale, Little and Fisher (1958, p.306) found that "high scores on the Dn scale generally describe the uninsightful, the anti-intraceptive, the morally virtuous individual; high scores on Dn are also seen with 'muted' or pseudo-normal profiles."

As mentioned above, the Dn scale is derived from items on the Hy scale. Trimboli and Kilgore (1983), in an article that supported a psychodynamic approach to the MMPI (see the introduction of this paper), conceptualized the Hy scale as reflecting the defense mechanism of repression. This conceptualization adds further support to the notion that the Dn scale is an assessment of denial.

Subsequent research with the Dn scale also adds support to its validity. Watson et al. (1987) compared the Dn scale with 5 other MMPI derived measures of denial or repression, as well as with an independently derived measure of repression--the Projective Repression Instrument (PRI). Watson et al. developed the PRI and described it as consisting of 22 TAT or TAT like pictures that 5 of 6 judges agreed contained sexual or aggressive themes. Each picture included a multiple choice question that included choices appropriate to the sexual or aggressive theme of the picture and an additional choice that ignored the theme--this response, if endorsed, would be considered indicative of repression. Before being used in the study being described, Watson et al. tested the PRI in a pilot study and reported that it is an adequate measure of repression.

Of the 6 MMPI derived measures tested in the Watson et al. (1987) study, the Little and Fisher (1958) Denial (Dn) scale surfaced as the best measure of repression. The Dn scale was highly correlated with 2 of the other MMPI measures of denial, and together these 3 scales were the only ones correlated to the PRI, with the Dn scale being the most highly correlated.

Jorgensen, Schreer, Baskin, and Kolodziej (1992) used the Dn scale in a study that looked at heart-rate discrepancy scores (HRDS). This study operated from the premise that defensive operations such as denial inhibit awareness of threatening affective stimuli,

however, the stimuli will affect physiological systems such as heart rate (i.e., as denial increases in response to threatening stimuli, awareness decreases, and heart rate would increase). The HRDS was derived by taking a participants average report of distress and anxiety during a rest and stress induced period and subtract those scores from the average heart rate during the same rest and stress induced period--thus resulting in a discrepancy score. The results of this study revealed that HRDS was significantly correlated with the Dn scale, as predicted.

Lazarus and Alfert (1964) conducted a study to determine whether priming subjects (i.e., making commentary statements that may increase or decrease anxiety) before and\or during a disturbing "subincision" film (i.e., the depiction of primitive tribes performing genital cutting) would affect the subjects' cognitive appraisal and physiological reaction to the film. They predicted that the subjects general tendency to use denial would impact how they reacted to the film. Specifically, they predicted that high deniers would verbally report less distress but be more physiologically aroused (using heart rate and skin conductance monitored every 15 seconds) than those subjects low in denial, who should show the opposite results. The Dn scale and the MMPI K scale were among several measures used to assess the trait of denial. Regardless of whether the subjects were primed for the film or not, those that were classified as high deniers (via Dn and K) responded as hypothesized--with decreased verbal report of distress and increased physiological arousal.

McGrath and O'Malley (1986) investigated the Dn scale as well as the Ad (i.e., the Little & Fisher Admission scale) and the MMPI Hy (conversion hysteria) and Hs (hypochondriasis) scales on samples of psychiatric, medical, and chronic pain patients.

Their results found that the scores on the Dn and Ad scales were positively and negatively related, respectively, to the presence of denial associated with physical disorders in their samples.

Two other studies used the Dn scale with results opposite to what has generally been predicted regarding denial (i.e., increased denial results in decreased self-report of negative affect and increased physiological reactivity). In the first of these studies, Houston (1973) used the Dn scale to classify his subjects into high or low denial groups. He subsequently placed the subjects into different experimental groups. In one of these groups subjects were told that they may receive random shocks during the experiment (i.e., performing the WAIS Digit Span Task), and another group was told that they would only be shocked if they performed poorly. There was also a no shock control group and all subjects were monitored throughout the experiment and were given self-report inventories of affect before and immediately after the experiment. The results revealed that those subjects in the high-trait denial group were less physiological aroused and performed better on the digit-span task. However, it should be noted that Houston (1973) adjusted each subject's Dn score based on their scores on an anxiety measure. It is unclear how this adjustment affected the results.

The second study (Mead, 1970) also used the Dn scale to place subjects into low or high denial groups and looked at the differences between these groups before undergoing a dental examination. The main intent of the study looked at priming passages upon the subjects, similar to the Lazarus and Alfert [1974] study reviewed above. Regardless of which priming passage was used, subjects in the high denial group self-reported less distress and also had lower EKG's and GSR's. It is of interest to note

that subjects in this study had a mean basal EKG heart rate of 92 beats per minute, compared to 78 in a study that used the "subincision" film. One explanation of these results may be that denial serves a more adaptational role in cases of more extreme threat (e.g., shock and dentistry) than in less threatening situations (e.g., vicariously experiencing threat via a film). However, it should be noted that the subjects in Mead's study were assessed only in anticipation of a dental examination. It would have been interesting to learn how low and high deniers compared during an actual exam.

Contemporary reviews of the Dn scale are mixed (e.g., Connor, 1986) or avoid evaluative commentary (e.g., Cramer, 1991). Unfortunately, many of the studies that have used the Dn scale are older and they do not appear when doing literature reviews with modern database services, which only access articles back to 1972. For example, a review by Connor (1986) reported only finding 1 study that used the Dn scale, whereas this study review found more than ten.

Levitt (1989) recommended against the use of the Dn scale in clinical applications. It is unclear if the rejection was made because of a lack of validity studies, or because of poor or equivocal findings. However, he positively endorsed the use of two Harris & Lingoes subscales (Hy1 and Hy2, Denial of Social Anxiety and Need for Affection, respectively) as useful indices of maladjustment or denial. For both of these scales, all their items (combined N= 18) are contained in the Little and Fisher (1958) Dn scale.

In summary, the majority of studies that used the Dn scale found significant results in the predicted directions. Further, the Dn scale has been validated by comparing it to criterion measures that consisted of more than just other similar self-report measures

(e.g., physiological data). Given its performance to date, the Dn scale seems a worthwhile measure to investigate in this study.

MMPI-2 Measures of Global Psychological Health

In addition to the validity, clinical, and denial scales mentioned above, the MMPI-2 contains several various subscales. Relevant to this study, three MMPI-2 scales of global psychological health will be investigated: the Welsh Anxiety Scale, the Ego Strength Scale, and the College maladjustment. All three scales are commonly used in research and clinical settings for an overall assessment of psychological health (versus the clinical scales, which are more specific in what they assess; Graham, 1993).

The MMPI-2 Welsh Anxiety Scale (A scale; Welsh, 1956), which consists of 39 items, is considered a good index of general psychological distress. In fact the A scale consists of items based on factor analytic studies, and this first-factor cluster has consistently been labeled as the general distress factor by most researchers (Greene, 1999; Graham, 1993).

Barron's (1953) Ego Strength scale (Es scale) is one of the most commonly used MMPI research scales, and "has been used extensively in both clinical assessment and research and as an indicator of health, intactness, resilience, psychological and physical well-being, and as a discriminator between healthy and pathological groups" (Schuldberg, 1992, p. 500). The Es scale was slightly modified when the MMPI was revised (16 items were dropped and there were slight word changes on some items), however Schuldberg's (1992) research on the scale revealed that the modifications made little difference. The MMPI-2 Es items are listed in Graham (1993, p. 375). Graham (1993, pp. 137-141) provides a detailed description of the Es scale, as well as interpretive suggestions (see

also Butcher et al., 1990, pp. 69-73; and Levitt, 1989, pp. 74-77, for reviews).

The Mt scale has been used less widely, though a few studies cited in Graham (1993, pp. 158-159) have found that high Mt scores are associated with therapist rated distress, and the likelihood of seeking psychological help in college students (though subsequent research suggested that the scale is more accurate in identifying current distress). Most of the research with this scale is unpublished; the items are listed in Graham, p. 376.

Discussion of Marlowe-Crowne-Social-Desirability-Scale

In this study, the 33 item Marlowe-Crowne-Social-Desirability-Scale (MCSD) will also be used. The MCSD is considered an indirect measure of the need for social approval, as well as a measure of defensiveness and protection of self-esteem (Crowne & Marlowe, 1964). The score on this measure will allow this factor to be partialled out of subsequent correlational analyses in the same manner as defensiveness/denial.

The MCSD has been used to discriminate between a truly low-anxious person from a repressor (Weinberger, Schwartz, & Davidson, 1979), and is considered to be unrelated to a person's tendency to answer questionnaires in a socially desirable direction (Wiesenthal, cited in Weinberger et al.). About half of the items on the MCSD were chosen because they reflected culturally acceptable behavior, though probably untrue for most individuals, the other half of the items are considered undesirable, but probably true (Crowne & Marlowe, 1964).

The Assessment of Psychological Health versus Distress

The assessment of object relations as an indicator of psychological health has become increasingly accepted as researchers and clinicians have recognized the

importance of object relations that occur both intrapsychically and interpersonally (e.g., Kissen, 1986; Smith, 1993). There has also been work that related object relations to physical health and various somatic problems (e.g., Taylor, 1987). Early on, Mayman (1967) reported that patients' general level of psychopathology could be inferred by their content responses to the Rorschach as they revealed the quality of underlying object relationships. More recently, certain changes in object relations have been used as an indicator of successful change during psychotherapy (e.g., Kavanagh, 1985; Luborsky, 1984).

In the Shedler et al. (1993) study, an experienced clinician (i.e., Mayman) made a dichotomous rating of subjects as relatively "healthy" or "distressed" based on responses to the participants' early memory reports (using his Early Memory Test [EMT]). However, 17 of 58 subjects were unable to be classified. Though Shedler et al. reported that interrater agreement regarding the healthy\distressed classification on the EMT ranges from 72 to 80 percent when using very experienced psychoanalytic clinicians, a review of studies that used the EMT reported poor interrater reliability (Smith, 1993). In fact, in the Shedler et al. study, they had 2 groups of students score the EMT and compared these scores to those made by Mayman. The comparison resulted in only a .25 and .37 correlation between each respective group and Mayman's rating.

Another method used in the Shedler et al. (1993) study to determine whether subjects were healthy or distressed was a Q-sort. After watching a 60-to-90 minute taped interview, a clinician performed a Q-sort and based on his response on a single item the subjects were judged healthy or distressed. Both of these methods of assessment dichotomized the participants into a health or distressed category, which results in a loss

of information and statistical power (see Cohen, 1990, 1992; Van Egeren 1989).

Because neither of these methods appears psychometrically sound, this study will use the Social Cognition and Object Relations Scale (SCORS; Westen, 1990) to provide a global rating of psychological health based on responses to several Thematic Apperception Test cards. This scale was developed from psychoanalytic object relations theory and social cognition research (Barends, Westen, Leigh, Silbert, & Byers, 1990; Westen, 1991a). The SCORS assesses 4 independent dimensions of object relations (Westen, 1991b):

Complexity of Representation of People

> This dimension assesses the extent to which the subject clearly differentiates the perspectives of self and others and recognizes the complexity of the personality dispositions and subjective experience of the self and others (p. 58).

Affect-Tone of Relationship Paradigms

> This dimension assesses the affective coloring of the object world, ranging from malevolent to benevolent. It determines the extent to which the person expects relationships to be destructive and threatening or safe and enriching.

Capacity for Emotional Investment in Relationships and Moral Standards

> This dimension assesses the extent to which others are treated as ends rather than means, events are regarded in terms other than need gratification, and moral standards are developed and considered (p. 60).

Understanding of Social Causality

> This dimension assesses the extent to which attributions about the causes of people's actions, thoughts, and feelings are logical, accurate, complex, and psychologically minded (p.60).

Relevant to this study, the SCORS system for the TAT (the system can also be used with early memories and other data), has been used in research with normal samples, and the scales have demonstrated their validity with data from interviews, early memories, and psychotherapy transcripts--all of which also assessed object relations (Westen, 1991a, 1991b). The Affect-Tone and the Capacity for Emotional Investments scales on the SCORS were also shown to be correlated with the Sentence Completion Test for Ego Development (Barends et al., 1990; Westen, 1991b).

Hibbard, Hilsenroth, Hibbard, and Nash (1995) established construct validity of the SCORS by comparing it to the Concept of the Object on the Rorschach scale (see Blatt, Brenneis, Schimek, & Glick, 1976). Both of these instruments, as well as others, were used to assess the same client population from a university clinic. There were significant correlations between relevant subscales on each measure which led the researchers to conclude that these instruments are assessing what appears to be a cognitive-structural aspect of human object representation.

This study will use the Affect-Tone (AT) dimension on the SCORS (in conjunction with Emotional Investment) because it is very similar to the scoring that was used in the Shedler et al. (1993) study to assess global psychological health from the early memories. In fact, Westen (1990) reported that he incorporated the theory and ideas of Mayman--who scored the early memories in the Shedler study--into his SCORS Affect-

Tone scale. Additionally, after reviewing a description of this study, D. Westen (personal communication, March 3, 1997) recommended the use of the Affect-Tone scale. He based this recommendation on his more recent experience with the SCORS that is currently unpublished. He also reported finding ample variance on the Affect-Tone dimension within a normal college sample to allow for discrimination, which is relevant to this study.

Regarding the validity of Affect-Tone to assess psychopathology, Barends et al. (1990, p.330) reported that, "in an adult clinical sample, [it] was significantly correlated with the hostility, interpersonal sensitivity, and paranoia subscales of the revised Symptoms Checklist-90, with [a] Social Adjustment Scale, and with clinician ratings of interpersonal pathology and nonpsychotic paranoid ideation." A study by Westen, Lohr, Silk, Gold, & Kerber (1990) revealed that Affect-Tone, as measured on the SCORS, could distinguish between a non-clinical group, a group with Major Depression, and a group with Borderline Personality Disorder (from least malevolent to most malevolent, respectively). Nigg, Lohr, Westen, Gold, and Silk (1992) also found that Affect-Tone, as assessed from early memories, could distinguish between a Borderline group and a depressed group. Finally, Fowler, Hilsenroth and Handler (1995), also using Affect-Tone assessed on early memories, distinguished a university clinic sample from a non-clinical sample.

In addition to the Affect-Tone scale, the Emotional Investment scale will also be used to determine if adding EI scores to the AT scale scores increases the overall criterion validity of the SCORS as evidenced by an increased relationship to the physiological measures. The use of the EI score in this study is considered exploratory, given that there

is no direct research that supports its validity as a measure of psychopathology. However, there is growing evidence that emotional intelligence is an important developmental personality factor, that may greatly impact several broad areas of a person's life (e.g., Goleman, 1995).

Overall, although the SCORS is a relatively new measure and the majority of research has been conducted by Westen and his research group, it appears to have adequate psychometric properties and a comprehensive training manual. Additionally, two independent reviews of assessment instruments\methods of object relations endorsed the SCORS as a promising measure (Smith, 1993; Stricker & Healey, 1990). The SCORS AT scale, in combination with the EI scale, will be used in this study as a criterion assessment of psychological health which relies on projective techniques and clinical inference, not on self-report assessment. Finally, the SCORS is one of the few measures that provides a reliable system of assessment necessary for research.

The Use of Heart Rate and Blood Pressure as Indices of Defense and Distress

The value of physiological measurements, including heart rate (HR) and blood pressure (BP), to assess psychological states, have long been recognized in stress research (Katkin, Dermit, & Wine, 1993). An economic approach is often used to explain how dealing with stressors over a protracted period will likely result in an increased strain on the body, which is documented by the physiological measurements (e.g., Wegner & Pennebaker, 1993; Schonpflug, 1986; Selye, 1991).

As discussed in Shedler et al. (1993), people may report being free of distress, though clinical impressions and physiological measurements indicated otherwise. It is ironic that a person's attempt to appear more in control of his or her life by ignoring or

denying distressing information may put that person at a higher risk for negative mental and physical health outcomes. A fair amount of research has been conducted which links this repressive personality trait to a number of negative outcomes, including increased anxiety and depression (Larson & Chastain, 1990), as well as elevated blood pressure, higher rates of cancer, and decreased immune system functioning (Pennebaker, 1985; Pennebaker & O'Heeron, 1984).

Pennebaker and his associates have moved beyond correlational studies and have documented that confronting painful affect and distressing information resulted in decreased autonomic arousal, improved immune system functioning, and a subsequent decrease in health care visits (Pennebaker & Beal, 1986; Pennebaker, Kiecolt-Glaser, & Glaser, 1988).

Thus, as demonstrated by Pennebaker's work, as well as Shedler et al.'s (1993) study, it has become clear that there is often a discrepancy between a person's self-report of distress vs. the clinical impression, physiological indices, and long-term health outcomes (see also Bonanno & Singer, 1990; Schwartz, 1990; Weinberger, Schwartz, & Davidson, 1979; Weinstein, Averill, Opton, & Lazarus, 1968). Because of this discrepancy, researchers have suggested using physiological measurements to supplement self-report measures (Temoshok, 1993; Carver, & Matthews, 1989). Given that this study is a direct attempt to validate a self-report measure, the MMPI-2, as well as building on Shedler et al.'s work, the use of physiological criterion measures seems imperative. Further, the choice in using heart rate (HR) and blood pressure (BP) readings will allow the results of this study to be compared to those of Shedler et al. (1993), as well as several other studies that have looked at denial and repression.

In addition to HR and BP, mean arterial pressure (MAP) will also be assessed. MAP has been used in several studies in the stress literature in a manner similar to HR (e.g., Bruehl et al., 1994; Delistraty, Greene, Carlberg, & Raver, 1992; Haythornthwaite, Pratley, & Anderson, 1992) and was included here as an adjunct physiological assessment.

In Sum, physiological measures have been recognized as a valuable addition to research which allows for an indirect assessment of mental states. The physiological measures will be used as the second criterion measure to provide an assessment of psychological health/distress against which the MMPI-2 will be compared.

Method

Participants

Twenty-six male and 31 female volunteers were solicited through the Michigan State University psychology undergraduate participant pool. The average age of the participants was 19.76 (SD=2.60), and the range was 18 to 36. Two male subjects were dropped from the study because one admitted to being drunk during the MMPI-2 administration, the other had an arm so large that the blood pressure cuff would not fit and BP readings were not possible. The participants received 6 extra-credit points for approximately 3.0 hours of their time, spread out over the two sessions. Participants with a self-reported history of cardiovascular problems were asked not to participate in the study during the first testing session.

Instruments

Psychological Measures

Participants completed the first 472 items of the MMPI-2 (which allowed for the scoring of all the scales used in this study), as well as the Defense Mechanism Inventory (DMI) prior to being assessed physiologically. Immediately prior to physiological monitoring, participants completed the 33 item Marlowe-Crowne-Social-Desirability-Scale (MCSD).

The MMPI-2 validity and clinical scales were administered and scored in accord with standard protocol (Hathaway & McKinley, 1989). In addition, the MMPI-2 derived Denial (Dn) scale (Little & Fisher, 1958) was scored, as well as the Ego Strength (Es) scale (Barron, 1953, N=52 items), Kleinmuntz's College Maladjustment scale (cited in Graham, 1993; Mt, N=41 items), and the Welsh Anxiety scale (Welsh, 1956, A scale, N=

39). These last three MMPI-2 subscales were used to provide MMPI-2 derived indices of global health\distress.

The DMI was administered and scored in accordance with the directions (Ihilevich & Gleser, 1986), which yielded 5 defense cluster scores (described earlier). Of relevance to this study is the Reversal (REV) score, which provides an assessment of a person's tendency to use denial\repressive defense strategies. The REV score ranges from 0-to-80 with a higher score representing an increase reliance on denial as a means of defense. The REV scale will be used as a criterion measure of defensiveness against which MMPI-2 scales of denial and defensiveness will be compared.

During the physiological monitoring portion of this study, the participants were administered the following 8 TAT cards: 1, 3BM, 4, 6GF to females, 6BM to males, 7, 10, 13MF, 15 (Westen, 1990 recommends a minimum of 6 cards and 8-to-10 if possible). The cards were chosen based on those previously used in research with Westen's Social Cognition and Object-Relations Scale (SCORS, described earlier, e.g., Barends et al., 1990; Westen et al., 1990), as well as recommendations made by Karon (1968) and Thompson (1986). The TAT responses were subsequently scored on 2 of the SCORS scales (i.e., Affect-Tone of Relationship Paradigms, and Emotional Investment) and these scores were used as an index of global psychological health\distress. For each participant, the 8 TAT stories were each scored from one through five, and an average score was calculated for each participant that was used in the analyses.

To eliminate experimenter bias, the TAT stories were scored by clinical graduate students and one undergraduate psychology major research assistant, and they achieved the following interrater reliability scores. On the Affect Tone scale, two graduate-level

raters who were previously trained in scoring this instrument achieved very good interrater reliability (Pearson's correlation=.847, p<.001). On the Emotional Investment scale, a clinical psychology graduate student and a senior undergraduate psychology student (who was relatively unfamiliar with object-relations theory) achieved only fair interrater reliability (Pearson's correlation = .60, p.<.001). Interrater reliability was based on 248 data points, that is 8 TAT scores for each of the first 31 participants. Both raters scored the first 31 protocols, then each rater scored 12 participants individually.

Also, during physiological monitoring, participants were given a mental arithmetic task consisting of items 3-to-14 of the Arithmetic section of the Wechsler Adult Intelligence Scale-Revised (WAIS-R). A phrase association test was also administered, which required participants to say the first thing that came to their mind regarding a stimulus phrase. This task consisted of 7 phrases in 5 theme blocks (the theme blocks included 2 neutral theme blocks, an aggressive theme, a dependency theme, and a sexual theme). The phrases were adapted from research in this area by Mandler, Mandler, Kremen, and Sholiton, (1961), and are listed in Appendix C.

The TAT, math and phrase tasks were used in this study to elicit performance anxiety, and participant's physiological reactivity was recorded during the administration of these tasks. The relative increase in heart rate and blood pressure during these tasks is being used in this study as an indication of increased defensiveness/denial, and subsequently decreased psychological health (as assessed by the SCORS).

Demographic data was gathered during the second session, prior to physiological monitoring. Participants provided information regarding their age, gender, education, occupation, marital status, number, ages and gender of children and siblings (as

applicable), and who lived in their household during childhood. This information is recommended by Karon (1963) for the interpretation of the TAT.

Information about the occupation and education of the participants' parents was also gathered to determine the family's socio-economic status (SES). Hollingshead's Two Factor Index, cited in Myers and Bean (1968), was used for this calculation (the specific procedures for this calculation are described in Appendix D). This factor was calculated because there has been some association between the MMPI K-scale and SES (see the literature review). However, SES was not significantly correlated with the MMPI-2 K or Dn scale ($r=.06$ and $r=-.01$, $p>.05$, respectively). Given this result, it was not necessary to partial out the effect of SES when examining the K scale.

Physiological Measures

The measurement of heart rate (HR), systolic blood pressure (SBP), diastolic blood pressure (DBP) and mean arterial pressure (MAP) was obtained using a Critikon DINAMAP Vital Signs Monitor, Model 1846. This instrument has built-in programming which compensates for error variance, such as participant movement during readings. It also measures actual peripheral pulses vs. electrical signals or contractions from the heart (electrical signals at the heart do not necessarily produce a peripheral pulse). The physiological data from this instrument were obtained through the use of pressure cuff (inflated automatically) placed on the participant's non-dominant upper-arm. The measurements were digitally displayed on the monitor for easy recording, and did not require any user intervention or calculation. The assessments made with the DINAMAP were taken in accordance with the operation manual. The physiological readings were recorded by an assistant and were not visible to the experimenter during the session.

Procedure

Session 1

The first session was a group meeting of the participants who volunteered to be in this study. The participants were seated in a large room with ample surrounding space to insure privacy while filling out assessment instruments. The participants were informed that they were going to fill out personality questionnaires during the session, and that they would be physiologically monitored while performing various mental tasks during a second session.

Following the introduction, the participants read and signed an informed consent form, and they were verbally advised that they could stop their participation at any time without negative consequences. The participants were also informed, both verbally and on the consent form, that their names would not be used, and each participant was randomly assigned a number that could only be matched to their name by the experimenter. Participants were asked to exclude themselves from this study if they had a history of cardiovascular problems.

Next, after brief directions, the MMPI-2 and the DMI were administered. Upon completion of the instruments, each participant was scheduled for a follow-up appointment.

Session 2

Upon arrival for the second session, the participants were reminded that they could terminate testing at any time. To establish rapport, a brief interview was conducted which allowed for the collection of the demographic data. Next, the Marlowe-Crowne-Social-Desirability scale was administered. The participant's were then seated in a

comfortable chair and the DINAMAP pressure cuff was placed for physiological monitoring. All participants were then asked to relax for 7 minutes to establish a physiological baseline. The DINAMAP was triggered to take a reading after 1, 3, 5, and 7 minutes.

Following the relaxation period, participants were administered the TAT, the mental arithmetic task, and the phrase association task. The order of the 3 tasks was rotated to provide a counterbalanced design. After each task was administered there was a 2-minute rest period which concluded with a physiological reading.

TAT Administration

> The following directions were read immediately prior to beginning the TAT task: I'm going to show you a set of [8] pictures, one at a time. I want you to tell me what's going on, what the characters might be feeling and thinking, what led up to it, and what the outcome might be. In other words tell me a good story (Karon, 1968, p. 89).

These directions were consistent with those made by Westen (1990) in the SCORS manual. The participants' stories were tape-recorded and subsequently transcribed and scored using the SCORS. The DINAMAP was triggered to take a reading as the participant was handed the 2nd, 4th, 6th, and 8th card.

Mental Arithmetic Administration

The mental arithmetic section was introduced with the following directions taken from Shedler et al. (1993):

> [This] test is a test of mental ability, an IQ test. It is important to try to do well, because we are going to compare your performance with the performance of

others like you. I'll ask you some questions involving mental arithmetic and you give the answers. To do well, you must give the correct answer as quickly as you can. I'll time you with a stopwatch (p. 1120).

The DINAMAP was triggered to take a reading as the 3rd, 6th, 9th, and 12th problems were read to the participant.

Phrase Association Administration

The phrase association task was introduced with the following directions taken from Shedler et al. (1993):

> For this [task] I am going to read you some phrases. After each phrase, I want you to say the first thing that comes to mind, as quickly as possible. Give me a complete sentence or idea, no just a word. Anything you say as a response is fine, there are no right or wrong answers, but be sure to say the first thing that comes to mind. (p. 1120)

The phrase association task began and ended with a neutral block of 7 phrases. The DINAMAP was triggered to take a reading at the beginning of each of the 5 blocks. The responses to the phrases were tape recorded, but were not used in this study.

Scoring

Physiological Data

The physiological data was used to determine the rate-pressure product (RPP) for each independent reading taken. The RPP is derived by (HR x SBP)/100 (i.e., heart rate X systolic blood pressure divided by 100). According to Shedler et al. (1993), the heart is conceptualized as a pump, and the RPP score captures the heart's rate and force of strokes. Mean arterial pressure (MAP) is a noncalculated index provided directly by the

blood-pressure monitor. Nineteen physiological readings were taken for each participant. Eleven of the readings were taken during stressor tasks (4 during the TAT, 4 during the arithmetic task, and 3 during the non-neutral phrase association task). The last two readings during the initial rest phrase were averaged together for a baseline reading (the other readings were taken during rest periods and during the 2 neutral blocks of the phrase association task).

The RPP was calculated for each observation, and the baseline RPP was subtracted from each observation during the stressor tasks. Subsequently, RPP change scores (i.e., from baseline to stressor readings) were aggregated across the 11 observation points, and resulted in an "average stress change" score which will be used for analyses. In addition to the average stress change, each participant's "most extreme change" score--which consisted of the single observation that yielded the greatest change over the baseline--will be used for analyses. Given that both of these RPP indices already include a baseline subtraction, there is no need to statistically control for baseline differences (however, any significant group baseline differences will be noted in text).
Regarding the Mean Arterial Pressure (MAP) indices used in this study, an "average under stress" score was calculated for each participant by determining their mean MAP based on the 11 observation points during the stressor tasks. (Note: this index is sensitive to baseline differences, and the baseline difference must be controlled for statistically if significant group differences exist). The "change from baseline" index was calculated by subtracting the MAP baseline from each physiological observation point during the stressor tasks, then the observations during stressor tasks were averaged together for each participant.

Higher scores on all these indices are interpreted as a stress reactivity score. It was assumed that the higher this score was, the lower the subject's psychological health would be (as assessed by the SCORS scales). This suggests that the individual had inadequate psychological resources for managing stress when their reactivity score was high.

Results

Hypothesis 1

It was hypothesized that the MMPI-2 K scale and an MMPI-2 derived measure of denial (i.e., the Little & Fisher, 1958, Denial scale) would be meaningfully and significantly correlated (positively) to an independent measure of defensiveness/denial on the Defense Mechanism Inventory (DMI).

On the DMI, Reversal (REV) was significantly correlated with the MMPI-2 Denial (Dn) scale ($r=.25$, $p.<.05$), and the correlation of REV with the MMPI-2 K scale approached significance ($r=.20$, $p.=.07$). These results provide modest support for the hypothesis that two of the MMPI-2 scales designed to assess defensiveness/denial are valid as indicated by their relationship with an independent assessment of these defenses. Additionally, it should be noted that K and Dn were correlated more with the REV scale than any of the other four DMI defense cluster scales. (Note: All correlations reported are one-tailed, and the alpha level was set at .05).

Findings regarding the Social Cognition and Object Relations Scale and the Physiological Reactivity Scales

In contrast to study expectations, as shown in Table 1, the Affect Tone (AT) scale, and the AT scale in combination with the Emotional Investment (EI) scale, were

nonsignificantly correlated with the four physiological indices that were described earlier (results for the EI scale alone are also shown). The AT and EI scales, which are part of the Social Cognition and Object Relations Scale (SCORS), were used in this study to provide a global index of psychological health/distress. It was anticipated that there would be a meaningful correlation between these indices and physiological reactivity scores, whereby those participants with more positive affective tone in their relationships (i.e., displayed in their TAT stories) would display less physiological reactivity under stressed conditions.

This finding will make it necessary to do separate analyses by comparing the MMPI-2 assessments of psychological health independently to both the physiological reactivity scores, as well as the SCORS assessment of psychological health. For reasons that will become clear later (discussed below), of the two indices of psychological health--the SCORS assessment and the physiological reactivity scores--the physiological indices are considered to be more valid, and will be used as the main study criterion measure of psychological health (i.e., the capacity to cope with stress).

Hypothesis 2

Based on the finding of the lack of specificity of self-report measures of health in the Shedler et al. (1993) study, it was predicted that the MMPI-2 would not provide an accurate assessment of global psychological health\distress for those participants that appear healthy. This lack of specificity should be reflected in a lowered overall correlation with two indices of psychological health\distress (i.e., a clinical impression and physiological measures of heart rate and blood pressure), unless defensive denial is taken into account. This hypothesis would be confirmed if the effect of partialling out

denial--as assessed by the MMPI-2 K scale or an MMPI-2 derived scale of denial—significantly increased the correlation between the MMPI-2 assessments of psychological health\distress and the criterion measures of physiological reactivity, as well as increased the correlation with scores on the Westen SCORS scales.

MMPI-2 and Physiological Reactivity Scores

As shown in Table 2, the three MMPI-2 measures of global psychological health/distress were not significantly correlated with the physiological reactivity indices used in this study as criterion measures of psychological health. However, it should be noted that the College Maladjustment Scale approached significance with the RPP most extreme change index (r=.20, p.=.07), and the Welsh Anxiety Scale approached significance with the MAP change from baseline index (r=.20, p.=.08). (Note: These correlations are decreased by error variance due to over-estimating and under-estimating the psychological health of participants. Obviously, a decrease in errors due to over-estimating psychological health will be reflected in a decrease in total error variance, which will increase the correlation. Therefore, the Pearson Product Moment Correlation provides an "efficient" [in the statistical sense] statistical index of increases or decreases in these types of errors).

Table 3 shows the correlations between the three MMPI-2 measures of global psychological health and the physiological reactivity scores while statistically controlling for denial by partialling out the MMPI-2 Dn scale of the correlational analyses. The results from these analyses generally supported the hypothesis that the correlation between the MMPI-2 assessments of psychological health and the physiological indices would significantly increase when denial was taken into account. More specifically, the

MMPI-2 Anxiety and College Maladjustment scales were significantly and positively correlated (while denial was partialled out) with several of the physiological indices.

Although not shown, the above set of partial correlational analyses between the MMPI-2 psychological health assessments and the physiological reactivity scores were also run while independently partialling out the effects of the MMPI-2 K scale and L scale, the Marlowe-Crown scale, and the DMI REV scale--all of which are considered measures of defensiveness/denial. The most consistent and significant results that supported the study hypotheses were found with the MMPI-2 Denial scale, which is most consistent with the study hypothesis. The results from partialling out the various other denial scales generally followed the results above, but to a lesser degree.

MMPI-2 and Social Cognition and Object Relations Scales

As predicted, the three MMPI-2 measures of global psychological health/distress (i.e., the Ego Strength Scale, College Maladjustment Scale, and Welsh Anxiety Scale) were not significantly correlated with the SCORS Affect Tone (AT) or AT+EI (Emotional Investment) scores (see Table 4). However, even when denial was controlled for, the partial correlations (controlling for denial with the MMPI-2 Dn scale, as well as the K and L scales) between the MMPI-2 and the SCORS AT and AT+EI scales remained nonsignificant (see Table 5) except for the Ego Strength scale, which was significantly correlated with the AT+EI scale in the opposite direction of the study prediction (recall that lower ES scores indicate increased distress).

Hypothesis 3

It was hypothesized that as the measure of denial increased, the physiological reactivity scores would increase, and the clinical impression of health based on the SCORS would decrease.

MMPI-2 Denial and Physiological Reactivity Scores

As shown in Table 2, there were no significant correlations between the MMPI-2 measures of defensiveness and denial (i.e., the K and Dn scales) and the physiological reactivity indices. These findings do not confirm this hypothesis.

MMPI-2 Denial and SCORS

Shown in Table 4, the MMPI-2 measures of defensiveness and denial were significantly and positively correlated with the AT scale, and the Dn scale was significantly and positively correlated with the AT and EI scale combination. These findings are in fact in the *opposite* direction of the hypothesis. This finding indicates that as defensiveness and denial increase (as assessed on the MMPI-2), the participants look more psychologically healthy on the SCORS scales, a finding which may help explain the unexpected results in this study with respect to the SCORS scales.

Summary

The results supported the validity of the MMPI-2 Denial scale (and to a lesser extent the K-scale) as a measure of defensiveness/denial. This finding confirmed the first hypothesis. The second hypothesis was confirmed with respect to the physiological data, but not the SCORS data. The third hypothesis was not confirmed with the physiological data, and there were actually opposite finding with respect to the SCORS data.

Exploratory Analyses of the Study Measures of Psychological Health

Given the unexpected finding that there was no relationship between the SCORS assessment of psychological health and the physiological reactivity scores, exploratory analyses were conducted to better understand the relationship between these variables.

A mean split was performed on the participants' Affect Tone (AT) scores, and the average physiological reactivity scores were calculated for each group. Individual scores on the AT scale ranged from 2.19 to 3.63, and the overall mean score was 2.79 (SD=.31) which was the dividing point. As would be expected given the correlational findings, as shown in Table 6, there was a nonsignificant difference (a slight trend in the wrong direction) between the average physiological reactivity score (i.e., the RPP average stress change score) for the distressed group (those with AT scores below 2.79; n=30) versus the healthy group (those with AT scores above 2.79; n=25), t(41)=-.49, p=.63, two-tailed.

The two groups above (i.e., high and low AT scores) were also analyzed on their most extreme physiological reactivity score achieved during the various stressor tasks (see the Scoring section for more information). This analysis also revealed a nonsignificant difference between the two groups t(53)=.10, p=.92, two-tailed (see Table 6).

The mean arterial pressure (MAP) was also calculated for the high and low AT groups. To begin with, the low AT group had an overall lower baseline MAP mean score M=83.05 (SD=6.08) than the high AT group M=87.60 (SD=9.01), t(53)=-2.23, p=.03, two-tailed. Because there was a significant baseline difference, an ANOVA was performed to determine the main effect of the AT group difference while using the baseline as a covariate. This analysis revealed a nonsignificant AT group effect F(2,

54)=.008, MSE=.306, p=.93. Finally, there was a nonsignificant MAP change from baseline score between the healthy and distressed AT groups (p=.44, two-tailed; see Table 6).

To widen the gap between the participants that looked healthy versus distressed on the Affect Tone scale, the participant's with AT scores around the mean were removed and analyzed separately, and were viewed as "undetermined" regarding their psychological health status. As shown in Table 7, there was still no significant difference between the high AT group and the low AT group on any of the physiological indices. An interesting finding was that the undetermined group (i.e., those with AT scores around the study mean) had significantly lower reactivity scores on several indices than both the high and low AT groups.

To determine if the findings above were due to outliers, the participants individual AT scores and psychophysiological data were examined, and the results were clearly not due to a small number of outliers. For example, of the 14 participants in the AT healthy group, 10 participants RPP average stress change scores exceeded the study mean on this index--and 4 of these 10 were approximately 2 or more standard deviations above the mean. These findings are opposite than what was anticipated--that is, they reveal that the participants with higher AT scores have greater physiological reactivity while stressed than the participants with lower AT scores.

As mentioned in the Method section, another index from the SCORS TAT instrument would be used in conjunction with the AT scores to determine if the combined scores added criterion validity. The Emotional Investment (EI) scores were averaged with the AT scores into a combined scale and analyses were performed identically to

those conducted above with the AT scores alone. The results were nearly identical. That is, there were no significant results. Thus, adding EI to the AT scores did not increase the criterion validity of these scales when compared with the physiological indices.

Thus, all the analyses failed to show any relationship between the SCORS scales and the physiological reactivity reactions to stress (with the exception of the "undetermined" group).

Unstructured Impressions of Global Psychological Health

Given the unanticipated finding regarding the lack of relationship between the SCORS assessment of psychological health and the physiological reactivity scores, a decision was made to rate global psychological health/distress based on the participant's responses to the TAT cards using a method similar to the one used in the Shedler et al. (1993) study. That is, in addition to using the Social Cognition and Object Relations Scale to assess the TAT responses, an unstructured clinical assessment was based on the affective tone of the responses. In the Shedler et al. study, psychological health was based on clinical impressions of early memories gathered from study participants. Mayman (one of the study authors) then assessed the memories:

> [By attending] . . . to the qualitative factors such as how the self was represented, how the interpersonal world was represented, the affective tone of the material, whether the memories were narratively coherent or contained inner contradictions (suggesting omissions and distortions), and so on. (p. 1121)

In this study, after becoming familiar with Mayman's work (e.g., Mayman, 1967) a similar technique was applied to the TAT responses by the experimenter (Heim). While making the assessments, the experimenter was blind to all other data, and it should be

noted that he did not participate in scoring the TAT responses using the SCORS. It should be further noted that the assessments made in this study were not cross-checked by an independent rater, and no attempt was made to validate the experimenter impressions. The assessment was simply done as an additional exploratory process to better understand the data.

An example of stories that were rated healthy versus unhealthy are contained in Appendix E, with an explanation of how they were rated. Basically, each of the 8 TAT responses from each participant were read and judged as healthy, distressed, or neutral (i.e., unable to draw a conclusion). Based on how the 8 stories were rated, an overall assessment was made which classified the participant as psychologically healthy, distressed, or undetermined. Of the 55 participants, 10 were judged as healthy, 26 were judged as distressed, and 19 were undetermined. This breakdown of global assessments was similar to the Shedler et al. (1993) study. In that study, of 58 participants, 12 were judged as healthy, 29 were judged as distressed, and 17 were left unclassified.

After the classifications were made, the different groups were compared on their RPP average stress change scores during the stressed periods. The group that was judged healthy had a mean reactivity score of M=10.51 (SD=9.64), the group judged distressed had a mean score of M=14.36 (SD=13.09), and the undetermined group's score was M=14.78 (SD=10.69). A t-test between the groups judged healthy versus distressed was non-significant: $t(34)=-.84$, $p=.41$. However, in contrast to the results based on the SCORS AT assessment, the current findings displayed a trend in the expected direction, though not statistically significant (i.e., less physiological reactivity while under stressed conditions in the group judged healthy than the group judged distressed).

Summary of Exploratory Analyses Between the SCORS and the Physiological Indices

In summary, there were nonsignificant differences in physiological reactivity between "healthy" versus "distressed" groups based on AT scores. Even when more extreme groups were examined by removing those participants with AT scores around the mean, there were still no significant group differences between the AT assessed healthy versus distressed groups. One interesting finding was that the undetermined group (those with AT scores around the mean) had significantly lower reactivity scores than the both the low and high AT scoring groups. When the TAT stories were scored using an unstructured clinical impression by the experimenter, the results, though nonsignificant, showed a trend in the anticipated direction (i.e., those judged healthy had less physiological reactivity). Possible explanations for these results will be presented in the Discussion section below.

Exploratory Analyses Based on Group Classifications by MMPI-2 Scores in Conjunction with Affect Tone Scores

Although there was not the anticipated relationship between the two indices of psychological health used in this study (i.e., the SCORS and physiological indices), additional analyses (outlined below) were conducted in the same manner as what was described in the Shedler et al. (1993) study. Given the lack of relationship between the two study indices of psychological health, these analyses were performed for illustrative purposes only, and the results were not expected to be significant--and in fact none were significant.

The following analyses focused on the MMPI-2 Welsh Anxiety Scale (A scale), which is considered a good index of general psychological distress, and showed the most

significant results in this study in the preceding analyses. These analyses were originally designed to combine the assessment of psychological health based on the MMPI-2 A scale in combination with the SCORS AT assessment to try and predict the participants'physiological reactivity scores while under stressed conditions.

Participants were divided into 4 groups based on their SCORS Affect Tone scores in combination with their MMPI-2 Welsh Anxiety scale (A scale) scores. Three of these groups were examined as relevant to the hypotheses. On the A scale the study mean was 55, but 58 was used as a cut score to distinguish healthy versus not healthy groups based on a natural break in the data (scores above 60 are generally interpreted as falling in the distressed range, e.g., Greene, 1990). If the participant looked healthy on both measures (MMPI-2 A scale<58 and SCORS AT>2.85), they were considered "truly healthy". If the participants looked healthy on the MMPI-2 A scale (A<58), but distressed on the AT score (AT<=2.85) they were considered to have "illusory health" as coined in the Shedler et al. (1993) study (i.e., the person looks healthy on a self-report measure, but distressed on a more sensitive, clinically judged impression). Finally, the third "truly distressed" group was comprised of those participants that appeared distressed on both the MMPI-2 A scale and the AT scale (A>=58 and AT<=2.85). The RPP average stress change was compared between the 3 groups. (Note: the terms "truly healthy", "illusory healthy", and "truly distressed" are based on the combination of MMPI-2 A scale scores and the SCORS AT scores. These terms will be used in this section, but are not meant to convey the participants' actual real-world psychological health).

Based on findings from the Shedler et al. (1993) study, it was originally predicted (before the realization that there was no relationship between the SCORS and

physiological measures) that there would be significantly greater average physiological reactivity during stressor periods for the "illusion" group (because they are more likely to be distressed) than the "truly healthy" group. However, as shown in Table 8, there were no significant differences in the mean physiological reactivity between any of the three groups.

Additional analyses were performed with the other 3 physiological indices (see discussion in the Scoring section for an explanation of these scores) that examined the differences between the healthy, illusion, and distressed groups. The results for these analyses are also shown in Table 8, and again no significant group differences were revealed. Finally, analysis were conducted that used different SCORS Affect Tone cut points to distinguish healthy versus distressed participants (see Table 9), and further, the combination of the SCORS AT and EI scores were used to distinguish healthy versus distressed groups (see Table 10).

Overall the results from these analysis regarding the combination assessment of psychological health based on both the MMPI-2 Anxiety scale and the SCORS AT scale can be summed up as follows. There were no significant results. Further, the trend of the data (based on nonsignificant results) were often in the opposite direction of what was anticipated (i.e., the group that scored healthy on the combination assessment of the MMPI-2 A scale and AT scale showed a trend toward greater physiological reactivity under stressed conditions than the group that was assessed distressed on those two measures. Finally, all of these analyses were run with other MMPI-2 measures of psychological health/distress (i.e., the Ego Strength scale, College Maladjustment scale, and the average of 9 MMPI-2 clinical scales)--similar nonsignificant results were found.

Discussion

The intent of this study was to extend and generalize the findings of the Shedler et al. (1993) Illusion of Mental Health study by examining MMPI-2 global measures of psychological health/distress. This would be accomplished by comparing various MMPI-2 measures of psychological health against both a clinical impression of psychological health (based on TAT stories scored by Westen's Social Cognition and Object Relations Scale), and a criterion measure of physiological reactivity scores (heart rate and blood pressure reactivity scores under stressed conditions). The validity of the MMPI-2 measures are in question because they rely on self-report, and, as shown in the Shedler et al. (1993), such measures are susceptible to the effects of denial that may moderate their results—particularly when the results indicate psychological health. This study was designed to extend the results of the Shedler study, by actually testing the MMPI-2, using methodology very similar to that used in the Shedler et al. study. However, the present study contained some important differences (i.e., the use of the SCORS to provide a clinical impression of psychological health, and the MMPI-2 was used as the self-report measure) which will be explored below. The problems that were found with the SCORS measure limited the ability of the present study to examine the validity of the MMPI-2. However, some results were significant and are worth noting.

Major Findings

This study provided some support for the validity of two MMPI-2 measures of defensiveness and denial. The Little and Fisher (1958) Denial scale (Dn) showed better psychometric properties than the K scale as evidenced by correlations with an independent measure of denial on the Defense Mechanism Inventory Reversal (REV)

scale. Further, when these measures were partialled out of subsequent correlational analyses, the results revealed the anticipated increase in the correlation between MMPI-2 global measures of psychological health (i.e., the Anxiety and College Maladjustment scales) and the physiological reactivity scores while under stress--which used as an index of psychological health in this study.

The current results also suggest that the MMPI-2 Anxiety scale (A scale), and to a lesser extent the College Maladjustment scale (MT scale), appear susceptible to the effects of denial. Thus their assessment of psychological health may indeed include an "illusory"component, whereby a truly distressed person may appear healthier than he or she really is on these MMPI-2 scales. However, if denial is taken account (i.e., examining the person's score on the MMPI-2 Dn scale), a more accurate assessment of psychological health can be obtained by realizing that the person's scores on the MMPI-2 Anxiety and Maladjustment scales may be underestimated.

This is the principle used in adjusting several of the MMPI-2 clinical scale scores based on K scale scores. However, according to Graham (1993), few if any studies on the MMPI-2 have been conducted to determine if the K corrected scores increase the validity of the various clinical scales. The results of this study suggest that when using the Anxiety scale or the Maladjustment scale, the assessment of global psychological health/distress can be improved if the Dn scale scores are known and taken into account. (Note: the clinical scales were not used in this study because they are more specific in their assessment of distress, whereas the scales used in this study provide a more global assessment of psychological health/distress. As a result, no conclusion can be made regarding the validity of using the K scale to correct the clinical scale scores).

Findings Regarding the Social Cognition and Object Relations Scale

As mentioned above, the results from this study are limited in their ability to extend the Shedler et al. (1993) findings because the two independent measures of psychological health against which the MMPI-2 was to be compared were not correlated with each other. Possible explanations will be explored.

As reported in the results, there were almost no significant differences in rate pressure product (RPP) changes while under stressed conditions between groups that were assessed "healthy" versus "distressed" by the SCORS AT measure. Even using correlational analyses, which yields more statistical power than a comparison of means, none of the physiological indicators showed the expected relationship to the SCORS AT (or AT+EI) assessment of global health/distress.

A problematic factor of this study seems to have been the use of Westen's (1990) Social Cognition and Object Relations Scale (SCORS) instrument to develop the clinical impression of psychological health used in this study. Whereas Shedler et al. (1993) used an unstructured clinical impression of early memory data to assess global psychological health (the Early Memory Test, scored by Mayman), the present study used TAT responses that were scored by graduate student (and one undergraduate) using the SCORS.

In both this study and the Shedler et al. (1993) study, both sources of data (i.e., early memories and TAT stories) were scored based on the affective quality of the material generated by the participant. In fact, Westen (1990) acknowledged incorporating the theory and rational described by Mayman (who scored the early memories in the Shedler study) into his SCORS instrument. However, although the data were scored

similarly, they were generated from very different sources.

That is, the early memory data is self-generated, and the data in this study was generated in response to visual cues provided by the TAT. Although both sources of data likely contain important information about the participant providing the response, it may be that the self-generated early memories offer more unadulterated insight into the person's psychological functioning. That is, in terms of structure, the TAT provides more structure than early memories, and as structure increases, the projective element decreases.

This difference in the source of data allows for speculative explanations for the nonconvergent findings between this study and the Shedler et al. (1993) study. For example, in this study some of the pictures on the TAT cards may set the stage for responses that contain affective material which represents discord between the story characters (i.e., card pull). This content would subsequently receive a lower score on the SCORS AT scale, indicating less psychological health. Even Westen (1991b) discussed that there is an element of card pull which sets up the story teller to give relatively ordinary malevolent responses.

Participants that ignore the card pull and give responses that "deny" the apparent content (i.e., their response contains a great deal of unity and harmony in what looks like a more tragic scene) will receive higher AT scores on the SCORS. In other words, those participants who engage in denial--and may be pollyannish--receive the highest AT scores and "appear" psychologically healthy.

Following this line of reasoning, high scorers on the AT scale may actually represent a selection of participants that use psychological defense of denial, and who

may be less psychologically healthy than participants who had moderate scores on the AT scale because these participants may have more realistically dealt with the content of the TAT cards.

Evidence for this proposition is shown in Table 11. All of the measures in this study that are designed to assess defensiveness (MMPI-2 K scale), denial (MMPI-2 Dn and the Defense Mechanism Inventory REV scale), and naive attempts to present oneself in a favorable light (MMPI-2 L scale and the Marlowe Crowne scale) are significantly and positively correlated with the AT scale. That is, as a person looks psychologically healthier on the AT scale, they appear to engage in increased defensiveness/denial--according to a wide range of different measures.

Further evidence for this proposition was provided by a post-hoc correlational analysis that was run which did not include the 14 participants who scored "healthy" on the SCORS AT measure. This analysis revealed a moderate negative correlation between the AT measure and the average physiological reactivity while under stressed conditions ($r[41]=-.29$, $p=.03$). This is the finding that was expected for the entire study population (i.e., as global health increases as assessed by the SCORS AT scale, physiological distress decreases).

The physiological data also seems to support the proposition that the AT scale is susceptible to the influence of denial. A review of Table 7 shows that the "undetermined group" (i.e., those with moderate scores on the AT index) had significantly less physiological reactivity while under stressed conditions than the "healthy" group (i.e., those participants with high AT scores).

Other data also seem to confirm that as AT scores increase beyond a certain point, some of the participants (i.e., those who rely on denial) at the high end of the scale may actually be less psychologically healthy (as evidenced by increased physiological indices), and thus washing out any correlational significance between the SCORS AT scale and the physiological reactivity scores. A review of Tables 6 and 7 shows that the variability of the AT "healthy" group is overall greater than that for the "distressed" group and the "undetermined" group (in Table 6, a Levene's Test for Equality of Variances revealed that there is significant difference between the "healthy" and "distressed" groups' standard deviation means for the RPP average stress change: F=4.94, p.=.03). This finding suggests that the those participants who score at the higher end of the AT scale appear to represent a cross-section of people—some who may be healthy, and some likely unhealthy (based on physiological reactivity scores).

Only one previous study could be located that compared the SCORS to the MMPI-2. In this study, the SCORS was significantly and positively correlated with the psychotic triad on the MMPI-2, especially the Schizophrenia scale. This finding was in the opposite direction of the study's expectations (Hibbard et al., 1995). This result lends additional support to the notion that the AT scale seems to be measuring a different construct than psychological health, or that it may be easily manipulated into providing an illusory assessment.

There was one line of evidence that does not support the above proposition. When denial was controlled for statistically (i.e., by partialling out the various measures of defensiveness/denial used in this study) there were still no significant correlations between the AT scale scores and the various physiological measures. This finding

suggests that there may be other constructs besides (or in addition to) denial that moderate the AT scale, or the AT scale may measure a construct not related to psychological health--at least as compared to the physiological measures.

In sum, it appears that the same dilemma can be applied to the SCORS AT measure as was applied to self-report measures by Shedler et al. (1993). That is, as a mental health scale, the AT scale may be valid when it indicates distress, but the results are ambiguous when it indicates health because the person may be truly healthy, or they may be engaging in psychological defense of denial--which is presumed unhealthy. It is ironic that the criterion measure--which was chosen to provide a clinical impression of psychological health free of defensive distortion--seems as susceptible to psychological defense as self-report measures.

It should be stated that the SCORS AT index was not intended by Westen (1990) to be used strictly as a measure of psychological distress. That is, it may be more a measure of maturity or some other personality factor not necessarily equated with distress, even though the research reviewed earlier indicated that it does assess distress. Further, Westen reported that the SCORS represents a continuum of development of object relations which does not necessarily parallel a continuum of pathology (see the review by Smith, 1993).

Apart from the reasons mentioned above, other general factors might account for the discrepant findings between this study and the Shedler et al. (1993) study regarding the nonsignificant relationship between the clinical impression of psychological health and the physiological indices. For example, the participants from either study may have been a non-representative sample of the population. In fact, the participants in this study

ere drawn from the MSU psychology subject pool, and a recent article in The State ews ("Undergrads Used", 1999, September)--the campus newspaper at MSU—raises oncerns about this study's participants. In the paper, an undergraduate student wrote an pinion article stating that he does not like having to participate in university research which is required in several courses at MSU), and as a result, his intention is to give nvalid responses to researchers, and generally be as non-cooperative as possible. He lluded to the fact that several other students beside himself also do not take their roles as esearch participants seriously.

Conclusion

Although this study was limited in its ability to extend the Shedler et al. (1993) tudy, some findings deserve mention, and further discussion of the Shedler et al. study is varranted. The Shedler study reported that self-report mental health measures may be nvalid indicators of psychological distress because psychological defense (i.e., denial) nay lead to an illusion of mental health, whereby a truly distressed person that denies heir distress (either consciously or unconsciously) is able to appear healthy on a self-eport measure. They suggested that their results apply to the MMPI-2, even though they lid not use this measure in their study. Based on the results of the present study, as well is a careful examination of the Shedler et al. study, applying their findings to the MMPI-2 ippears premature or unwarranted at this time.

In the Shedler et al. (1993) study, the Eysenck Neuroticism (N) scores were used ndependent of the built in validity scale (the L scale). Eysenck (1994), in a rejoinder to he Shedler et al. study, reported that "it is *not* permissible to interpret N scores ndependently of L scores" (p. 972), which is what Shedler et al. did in their study.

In fact, Shedler et al. (1994) did acknowledge that mental health scores should not be interpreted in isolation (i.e., without checking validity scales), however, they went on to discuss that researchers frequently do use mental health scale scores at face value, which perpetuates the idea that research findings in psychology should not be trusted. However, it seems that the point being overlooked by Shedler et al. is that the fault with "illusory" findings may be more with the researchers than with the instruments.

Admittedly, there are many mental health scales that are straight-forward, face valid instruments such as the Beck Depression Inventory (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) that make no attempt to check for psychological defense (i.e., include validity scales), and these scales are likely to be susceptible to illusory findings as reported by Shedler et al. (1993).

Compared to the Eysenck Neuroticism scale, the MMPI-2 contains several more validity scales, some of which are quite sophisticated, as well as a much larger research base. It would be unwise, if not unethical, to interpret an MMPI-2 profile without taking into account the overall validity of the test results. Even when using MMPI-2 subscales, as was done in this study, the validity indices should not be ignored. In fact, there was modest support in this study that one of the most widely used MMPI-2 subscales, the Welsh Anxiety scale, appears to have increased validity if denial is taken into account.

Now that many of the more popular psychological instruments are computer scored, it is easier to view a wide range of validity scales and subscales that present a more sophisticated view of the test-taker. For example, Green's computer report for the MMPI-2 includes a number of validity indicators beyond L, F and K, (e.g., % True, %False, VRIN, TRIN, F-Fb) and he strongly endorses the regular use of these scales

efore even looking at the clinical scales or subscales (Green, 1999).

It should be stated that it takes a great deal of training and experience in using the MMPI-2 to be able to accurately interpret the test results. Experience seems to be a key actor in making an accurate assessment of psychopathology--regardless of the data used o make the assessment (i.e., structured or unstructured tests, clinical interviews, etc.). or example, in the Shedler et al. (1993) study, Mayman, an experienced clinician, was eportedly better at rating study participants as healthy versus distressed than student udges.

One of the main conclusions in the Shedler et al. (1993) study was that "clinical udgments provided information about mental health that was, apparently, not available rom 'objective' mental health scales" (p. 1129). I agree that a careful, clinical judgment y an experienced clinician can provide invaluable information about a person, although here was no empirical support for that in the present study.

However, I also believe that a highly trained, experienced person using the MMPI-2 could provide a reasonably accurate and valid assessment of the test-taker. In ases where the test results are not clear--for example there is an indication that the erson may be underreporting--it would only be prudent to acknowledge that fact, and not raw conclusions about the person's psychological health without other sources of data. Recall that in the Shedler et al. (1993) study that nearly one-third of their participants were left unclassified regarding their psychological status because the data were nconclusive.

Finally, an issue apart from the MMPI-2 deserves mention. In the Shedler et al. 1993) study, they reported that of the 41 subjects they were able to classify 29 (71%) of hem fell in the distressed category. Being as conservative as possible, if the 17 nclassified subjects were all placed in the healthy group, that would still leave 50 ercent of their college sample as distressed.

As a comparison to Shedler et al.'s (1993) rate of distress, one of the most omprehensive studies to date of psychiatric disorders in the United States, the pidemiological Catchment Area study (Robins, Locke, & Regier, 1991), reported a 20% nnual prevalence rate for all diagnosable disorders.

In response to this criticism of their study (e.g., Joiner, 1994) Shedler et al. (1994) eplied that they may have a more differentiated and specialized view of mental health han that of most mental health researchers. This specialized view does not rely on ymptomatology, and they stated that they perceive mental health as the capacity to form ntimate relationships, experience a range of affect, to be creative, and the like.

How distress is defined obviously affects how many people will be classified in hat category. Given that Shedler et al. (1993, 1994) have more stringent criteria to be lassified as healthy, this may help explain why the self-report measures they studied eemed inadequate. That is, most self-report measures were not designed to assess the ype of distress they outlined.

In sum, the conclusion of the Shedler et al. (1993) study that self-report measures of psychological health may result in illusory health may have been overstated based on heir data--at least regarding the MMPI-2. Although self-report scales may report illusory ealth at first glance, careful attention to validity scales, an understanding of defensive

rocesses, and significant experience with the test, should help ensure a reasonably ccurate assessment of distress (or at least an acknowledgment of being unsure). lowever, their research did reveal that the process of denial in a test-taker can ignificantly impact their scores, and this point can not be summarily dismissed. The roblem of denial was also present in the SCORS measure used in this study. Given the mited ability of the present study to extend and generalize the findings of Shedler et al., dditional research to check the validity of self-report measures, including the MMPI-2, eems imperative. Finding valid, reliable criterion measures to conduct these studies is ey, and will likely make the endeavor difficult.

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able 1

orrelations between SCORS Assessment and Physiological Indices of Psychological

ealth/Distress

CORS	PHYSIOLOGICAL INDEX Rate Pressure Product Average Stress Change	Most Extreme Change
T Scale	.11 (p=.20)	.00 (p=.50)
T+EI Scale	.10 (p=.23)	-.03 (p=.40)
I Scale	.05 (p=.35)	-.05 (P=.36)

CORS	PHYSIOLOGICAL INDEX Mean Arterial Pressure Average Under Stress	Change From Baseline
T Scale	.14 (p=.15)	.06 (p=.33)
T+EI Scale	.20 (p=.07)	.07 (p=.31)
I Scale	.17 (p=.11)	.05 (p=.37)

able 2

orrelations between MMPI-2 Subscales and Physiological Indices of Psychological

ealth/Distress

MMPI-2	PHYSIOLOGICAL INDEX Rate Pressure Product Average Stress Change	 Most Extreme Change
Welsh Anxiety	.09 (p=.26)	.17 (p=.11)
Ego Strength	-.05(p=.37)	-.07 (p=.30)
College Maladjustment	.11 (p=.22)	.20 (p=.07)
K Scale	-.02 (p=.44)	-.10 (p=.24)
Denial Scale	.09 (p=.25)	.04 (p=.39)

	PHYSIOLOGICAL INDEX Mean Arterial Pressure Average Under Stress	 Change From Baseline
Welsh Anxiety	.12 (p=.20)	.20 (p=.08)
Ego Strength	-.12 (p=.18)	-.16 (p=.12)
College Maladjustment	.17 (p=.11)	.11 (p=.21)
K Scale	-.17 (p=.11)	-.20 (p=.07)
Denial Scale	-.04 (p=.39)	-.03 (p=.42)

Note. None of the MMPI-2 scales were significantly correlated to the baseline measure, herefore it was not necessary to partial out baseline effects.

Table 3

Correlations between MMPI-2 Scales of Psychological Health and Physiological Indices of Psychological Health/Distress While Controlling for Denial

MMPI-2	PHYSIOLOGICAL INDEX Rate Pressure Product Average Stress Change	 Most Extreme Change
Welsh Anxiety	.26 (p=.03)	.33 (p=.00)
Ego Strength	-.12 (p=.19)	-.12 (p=.20)
College Maladjustment	.23 (p=.05)	.31 (p=.01)

MMPI-2	PHYSIOLOGICAL INDEX Mean Arterial Pressure Average Under Stress	 Change From Baseline
Welsh Anxiety	.14 (p=.16)	.28 (p=.01)
Ego Strength	-.13 (p=.18)	-.18 (p=.10)
College Maladjustment	.19 (p=.08)	.13 (p=.19)

Table 4

Correlations between MMPI-2 Subscales and SCORS Scales

	SCORS SCALE		
MMPI-2 Scale	Affect Tone	AT and EI	Emotional Investment
Welsh Anxiety	-.18 (p=.09)	-.12 (p=.19)	-.03 (p=.42)
Ego Strength	.12 (p=.19)	-.06 (p=.33)	-.18 (p=.10)
Maladjustment	-.18 (p=.09)	-.11 (p=.21)	-.02 (p=.45)

	SCORS SCALE		
MMPI-2 Scale	Affect Tone	AT and EI	Emotional Investment
K Scale	.28 (p=.02)	.16 (p=.12)	.00 (p=.49)
Denial Scale	.33 (p=.01)	.30 (p=.01)	.17 (p=.12)

Note. The Maladjustment scale refers to the College Maladjustment scale.

Table 5

Correlations between MMPI-2 Scales of Global Psychological Health and SCORS Scales while Controlling for Denial

	SCORS SCALE		
	Affect Tone	AT and EI	Emotional Investment
Welsh Anxiety	.13 (p=.17)	.20 (p=.07)	.17 (p=.11)
Ego Strength	-.09 (p=.25)	-.31 (p=.01)	-.35 (p=.00)
Maladjustment	.05 (p=.35)	.13 (p=.18)	.13 (p=.18)

Note. The Maladjustment scale refers to the College Maladjustment scale. Also, recall that on the Ego Strength scale, low scores indicate more distress.

Table 6

Mean Differences on Physiological Reactivity Scores in Healthy versus Distressed Groups (based on a Mean Split of Affect Tones scores)

	Rate Pressure Product			
	Average Stress Change		Most Extreme Change	
	M	SD	M	SD
Distressed (n=30)	13.07	9.54	29.99	14.18
Healthy (n=25)	14.68	13.90	29.55	20.03

	Mean Arterial Pressure			
	Average Under Stress		Change From Baseline	
	M	SD	M	SD
Distressed (n=30)	*	*	10.49	6.16
Healthy (n=25)	*	*	9.17	6.47

Note. The RPP baseline physiological scores for the two groups were nearly identical and there was a nonsignificant difference between them, $t(53)=-.36$, $p=.717$, two-tailed. Distressed versus Healthy groups were based on a mean split of Affect Tone scores as follows: Distressed = AT<2.79; Healthy = At>2.80.

Table 7

Mean Differences on Physiological Reactivity Scores in Healthy, Distressed, and Undetermined Groups (based on Affect Tones scores)

	Rate Pressure Product			
	Average Stress Change		Most Extreme Change	
	M	SD	M	SD
Distressed (n=24)	14.14	9.81	31.72	15.02
Healthy (n=14)	20.00	14.80	35.28	20.18
Undetermined (n=17)	8.22	8.57	22.56	14.96

	Mean Arterial Pressure			
	Average Under Stress		Change From Baseline	
	M	SD	M	SD
Distressed (n=24)	94.27	8.26	10.47	6.36
Healthy (n=14)	98.52	9.04	12.34	4.59
Undetermined (n=17)	93.16	7.25	7.05	6.56

Note. There were nonsignificant differences between any of the group baseline means. The Undetermined group's RPP Average Stress Change and Most Extreme Change means were significantly different than those mean scores for the Healthy Group ($p<.05$). The Undetermined group's RPP Average Stress Change mean was significantly different than that mean score for the Distressed Group ($p<.05$). The difference between the Extreme Scores approached significance ($p=.06$).

The undetermined group's MAP Change From Baseline mean score was significantly different from the Healthy group's mean score ($p<.05$). None of the means were significantly different between the healthy versus distressed group.

Distressed, Healthy, and Undetermined groups were based on Affect Tone scores as follows: AT<=2.63 Distressed; AT>=2.94=Healthy; At between 2.64 and 2.93 were Undetermined.

Table 8

Mean Differences on Physiological Reactivity Scores in Healthy, Distressed, and Illusory Groups (Based on Affect Tone scores and Welsh Anxiety Scores)

		Rate Pressure Product			
		Average Stress Change		Most Extreme Change	
		M	SD	M	SD
Distressed	(n=12)	10.10	7.74	26.04	14.57
Healthy	(n=16)	14.16	10.72	30.25	13.65
Illusory	(n=22)	12.92	10.69	28.45	15.45

		Mean Arterial Pressure			
		Average Under Stress		Change From Baseline	
		M	SD	M	SD
Distressed	(n=12)	94.83	7.14	11.33	6.32
Healthy	(n=16)	97.15	9.23	9.51	6.15
Illusory	(n=22)	92.67	8.12	9.01	6.13

Note. There were nonsignificant differences between any of the group baseline means. Further, there were no significant differences between any of the group means.

Distressed, Healthy, and Illusory groups were based on Affect Tone scores and Welsh Anxiety scale scores as follows: Distressed: A>=58, AT<=2.85; Healthy: A<58 AT>2.85; Illusory: A<58, AT<=2.85

Table 9

Mean Differences on Physiological Reactivity Scores in Healthy, Distressed, and Illusory Groups (Based on Affect Tone scores and Welsh Anxiety Scores)

		Rate Pressure Product			
		Average Stress Change		Most Extreme Change	
		M	SD	M	SD
Distressed	(n=10)	11.69	7.50	29.44	13.45
Healthy	(n=11)	15.05	11.00	27.88	10.29
Illusory	(n=20)	13.77	10.52	30.27	14.86

		Mean Arterial Pressure			
		Average Under Stress		Change From Baseline	
		M	SD	M	SD
Distressed	(n=10)	93.48	6.69	12.83	5.65
Healthy	(n=11)	97.48	9.95	11.35	3.66
Illusory	(n=20)	93.47	8.34	9.32	6.20

Note. There were nonsignificant differences between any of the group baseline means (however, the difference between the MAP baseline measures for the healthy versus distressed group approached significance, $t(19)=1.85$, $p=.08$). Further, there were no significant differences between any of the group means

Distressed, Healthy, and Illusory groups were based on Affect Tone scores and Welsh Anxiety scale scores as follows: Distressed: A>=59, AT<=2.75; Healthy: A<59 AT>=3.0; Illusory: A<59, AT<=2.75. These results differ from Table 8 by using different cut-off scores on the AT scale. That is, 11 participant's with AT scores around the mean (i.e., AT>2.75 and AT<3.0) were not used in the analysis.

Table 10

Mean Differences on Physiological Reactivity Scores in Healthy, Distressed, and Illusory Groups (Based on the Combination of Affect Tone and Emotional Intelligence scores, as well as Welsh Anxiety Scores)

		Rate Pressure Product			
		Average Stress Change		Most Extreme Change	
		M	SD	M	SD
Distressed	(n=14)	13.49	12.16	22.25	21.82
Healthy	(n=15)	12.74	10.87	27.60	12.45
Illusory	(n=21)	13.63	10.97	29.07	15.96

		Mean Arterial Pressure			
		Average Under Stress		Change From Baseline	
		M	SD	M	SD
Distressed	(n=14)	95.41	7.11	11.16	6.31
Healthy	(n=15)	97.11	9.30	10.61	5.31
Illusory	(n=21)	93.54	8.70	8.87	6.47

Note. Though not shown above, the Illusory group had a significantly lower RPP baseline than the healthy group. There were no other significant differences between any of the group means.

Distressed, Healthy, and Illusory groups were based on the combination of Affect Tone and Emotional Intelligence scores (EI) scores, as well as Welsh Anxiety scale scores as follows: Distressed: A>=59, AT&EI<=2.6; Healthy: A<59 AT&EI>2.6; Illusory: A<59, AT&EI<=2.6.

Table 11

Correlational Analyses of SCORS AT Scores with Various Study Scales

Denial Scales	SCORS AT Scale
MMPI-2 Denial Scale	.33 (p=.01)
MMPI-2 L Scale	.24 (p=.04)
MMPI-2 K Scale	.28 (p=.02)
DMI REV Scale	.26 (p=.03)
Marlowe Crowne Scale	.27 (p=.02)

Appendix A

Defense Mechanism Inventory Example

DMI Story:

You are waiting for the bus at the edge of the road. The streets are wet and muddy after the previous night's rain. A car sweeps through a puddle in front of you, splashing your clothing with mud.

What would your actual response be?

1. I would note the car's license number so that I could track down that careless driver.
2. I'd wipe myself off with a smile.
3. I'd yell curses after the driver!
4. I would scold myself for not having at least worn a raincoat.
5. I'd shrug it off; after all things like that are unavoidable.

Appendix B

Little and Fisher Denial scale

Scored if False:

MMPI-1 #6; MMPI-2 #7: I like to read newspaper articles on crime.

MMPI-1 # 12; MMPI-2 # 14: I enjoy detective or mystery stories.

MMPI-1 and 2 # 26: feel that it is certainly best to keep my mouth shut when I'm in trouble.

MMPI-1 #30; MMPI-2 #29: At times I feel like swearing.

MMPI-1 #71; MMPI-2 #58: I think a great many people exaggerate their misfortunes in order to gain the sympathy and help of others.

MMPI-1 #89; MMPI-2 #76: It takes a lot of argument to convince most people of the truth.

MMPI-1 #93; MMPI-2 #81: I think most people would lie to get ahead.

MMPI-1 #109; MMPI-2 #98: Some people are so bossy that I feel like doing the opposite of what they request, even though I know they are right.

MMPI-1 #124; MMPI-2 #110: Most people will use somewhat unfair means to gain profit or advantage rather than to lose it.

MMPI-1 #129: Often I can't understand why I have been so cross and grouchy.
MMPI-2 #116: Often I can't understand why I have been so irritable and grouchy.

MMPI-1 #136: I commonly wonder what hidden reason another person may have for doing something nice for me.
MMPI-2 #124: I often wonder what hidden reason another person may have for doing something nice for me.

MMPI-1 #141: My conduct is largely controlled by the customs of those about me.
MMPI-2 #129: My conduct is largely controlled by the behavior of those around me.

MMPI-1 #147; MMPI-2 #135: I have often lost out on things because I couldn't make up my mind soon enough.

MMPI-1 #162: I resent having anyone take me in so cleverly that I have had to admit that it was one on me.

Appendix B (cont'd)

MMPI-2 #151: I resent having anyone trick me so cleverly that I have to admit I was fooled.

MMPI-1 #170; MMPI-2 #157: What others think of me does not bother me.
MMPI-1 #172; MMPI-2 #161: I frequently have to fight against showing that I am bashful.

MMPI-1 #180; MMPI-2 #167: I find it hard to make talk when I meet new people.

MMPI-1 #201; MMPI-2 #185: I wish I were not so shy.

MMPI-1 #213; MMPI-2 #193: In walking I am very careful to step over sidewalk cracks.

MMPI-1 #234; MMPI-2 #213: I get mad easily and then get over it soon.

MMPI-1 #265; MMPI-2 #241: It is safer to trust nobody.

MMPI-1 #267; MMPI-2 #243: When in a group of people I have trouble thinking of the right things to talk about.

MMPI-1 #279; MMPI-2 #253: I drink an unusually large amount of water every day.

MMPI-1 #289; MMPI-2 #262: I am always disgusted with the law when a criminal is freed through the arguments of a smart lawyer.

MMPI-1 #292; MMPI-2 #265: I am likely not to speak to people until they speak to me.

Scored if true

MMPI-1 #253; MMPI-2 #230

I can be friendly with people who do things which I consider wrong.

Appendix C

Phrase Association Task

Neutral Theme Block (Set 1):
The horses worked well together
The library purchased more books
The artist finished the painting
The new movie opens this Friday
The plumber repaired the sink
The woman walked her dog
The airline tickets were confirmed
The mailman arrived on time
The flowers blossomed
The waitress was friendly

Aggressive Theme Block:
The father was convicted for torturing his son
The student was attacked by a gang
He suddenly struck his teacher
She shot her boyfriend
The mother scalded her infant in the bath
He spit in his mother's face
The driver ran her off the road
The jury voted on the death penalty
The boy pulled the wings off of the butterfly
The girl threw mud on her friends dress

Dependency Theme Block:
The mother bear deserted the baby cubs
He needed help with his homework
The father neglected the sick child
She pleaded with her mother
The bank refused to lend the couple money
The mother sent her daughter to bed hungry
His brother refused to help
The family had to beg for food
The puppy was unable to suckle his mother
The woman was so exhausted she needed help walking home

Appendix C (cont'd)

Sexual Theme Block:
Prostitutes do anything men desire
He enjoys sleeping with men
She propositioned the waiter
After the operation he was impotent
The two women embraced and kissed in public
His roommate made a pass at him
She purchased the condoms yesterday
The couple conceived their first child
The results came back from the HIV test
He took off her clothes

Neutral Theme Block (Set 2):
The new car gets good gas mileage
The builder completed the house
The museum opens at noon
The weather was pleasant
The team finished practice early
The radio gave free passes to the concert
The new shoes fit comfortably
The picture hung on the wall
The new carpeting accented the furniture
The air smelled sweet

Appendix D

The Calculation of Socio-Economic Status

The participant's socio-economic status (SES) was calculated using Hollingshead's Two Factor Index cited in Myers and Bean (1968). Hollingshead originally used a three factor index to calculate SES which included the occupation, education, and residential setting of the head of household. The residential setting was dropped from the index because it was determined that a detailed knowledge about the residential setting within the city or suburb was necessary for this factor to be accurate. Subsequently, the education (measured in years of completed schooling) and occupation (divided into 7 categories to represent earning power) of the head of household became the common factors used to assign an SES.

In this study, if the participant was married and lived independent from the parents, either the participant or the participant's spouse, whichever would result in the highest SES, was used in the calculation of SES. If the participant lived with his or her parents or was dependent upon them for support (as in the case of most college students), the parent that placed the participant in the highest SES category was used as the head of the household for calculations.

Both the education and occupation indexes are multiplied by weighting factors then the two scores are summed. The range of scores run along a continuum from 11 to 77, with the lowest score equating to the highest SES. The range of scores are then subdivided into five social class categories as follows:

Range of Computed Scores	Social Class
11 - 17	I
18 - 27	II
28 - 43	III
44 - 60	IV
61 - 77	V

In this study the participant score (from 11 to 77) was used in statistical calculations to eliminate the use of a categorical variable, and subsequently improve statistical inferences.

Appendix E

Global health Assessment Based on TAT Responses: Explanatory Examples

Both of the stories below came from actual study participants and are in response to TAT card 6BM.

Healthy Example

Um, this son came and told his mother that she should move out of her house and perhaps into a nursing home--she kinda looks scared and confused, and he looks like this isn't something that he wants to have her do, but thinks that she should. I think that she'll go, because her son thinks that she should, and uh she'll move out. (outcome?) I think he feels guilty about having her move out, but he thinks it's the best thing for her and so he'll help her move, perhaps she'll move into his house or even the nursing home or something like that. She looks like she'll go along with it, not really willingly, but her son knows what's best for her at this point.

Unhealthy Example

Um, it looks like the old lady is his mother--he just took her to a nursing home because he can't care for her anymore, and she's not too happy about it. He feels bad, but he leaves her there (what is the woman thinking?) She doesn't want to be there, she wants to be on her own still. (outcome) Um, she ends up dying in the nursing home, and she was lonely--she died of old age.

Discussion

In both stories the son was faced with putting his mother in a nursing home. The first story was judged healthy because the son's conflict was made apparent, but it was clear that he was making the choice in the best interest of the mother. Further, his mother, though apprehensive, appears to have basic trust in her son and more readily goes along with the decision.

In the second story, the same decision is made by a son to place his mother ("the old lady") in a nursing home. However, instead of developing an internal conflict about the decision, the son "feels bad, but leaves her there." There is an element of coldness, or lack of caring that seems to come through in the story. We further see that the mother was lonely and died, followed with what seemed like an afterthought that she died "of old age". This last statement seems to have been made to distance the son from possible guilty feelings and deny responsibility for the mother's death.

Additionally in the healthy story, it seemed clear that the decision was made in the mother's best interest. In the second story, the decision was made for the son's interest because "he can't care for her anymore". The first story conveyed more warmth, compassion, caring, and trust between the characters, whereas in the second story the characters seemed to lack affective and emotional development.