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By
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Criterion Validity of the Mini-Mental State Examination in Individuals with Schizophrenia
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Chapter 1

Review of the Literature

Issues of civil competency often bring severely mentally ill individuals to the state's attention (Grisso, 2003). Questions arise regarding their capacity to give informed consent and manage their personal affairs. Persons with disabling mental disorders, such as schizophrenia and schizoaffective disorder, often manifest marked areas of dysfunction in employment, relationships, and management of household and finances (Harding, 2003). Their impaired functional abilities may last over a lifetime. However, not all severely mentally ill are doomed to functional disability (Harding, 2003; Liberman, Kopelowicz, Ventura, & Gutkind, 2002; Palmer, Heaton, Gladsjo, Evans, Patterson, Golashan, et al., 2002). Some recover and live a relatively normal life with a reportedly favorable quality of life (Liberman et al., 2002). Taken together, the legal system is often faced with determining which severely mentally ill (SMI) are incompetent to make decisions or manage financial matters.

Prior to reaching a legal decision of incompetence, the court system often relies on clinical professionals' assessment of individuals' functional abilities (Gutheil & Appelbaum, 2000). In the past, a diagnosis of mental illness was grounds for incompetence. Today, the diagnosis alone is
insufficient to establish incompetence (Guilmette & Krupp, 1999). Instead, many states focus on individuals’ specific functional abilities such as managing their medications and money (Gutheil & Applebaum). In fact, individuals’ ability to manage their finances has been a critical factor in states’ decision of incompetence and to assign a court appointed guardian (Melton, Petrila, Poythress, & Sloboedin, 1997).

While judgment about individuals’ functional capacities is often an integral part of clinical practice, mental health professionals have no “gold standard” for assessing functional abilities of the severely mentally ill. Because functional impairment in individuals with a severe mental illness such as schizophrenia has been related to cognitive deficits (Harvey & Friedman, 2003; Kelly, Sharkey, Morrison, Allardyc, & McCready, 2000), many professionals use brief neurocognitive screens to assess for cognitive deficits and then infer functional ability (Kapp & Mossman, 1996). One neurocognitive screen used by many health professionals to infer competence of the severely mentally ill is the Mini-Mental Status Examination (MMSE) (Folstein, Folstein, & McHugh, 1975). Unfortunately, there is little empirical support to substantiate the inferences made from the MMSE to functional competence, particularly in the area of financial capacity. Few have looked at the MMSE’s ability to accurately classify those who are competent versus those who are not. The purpose of this study will be to examine the criterion validity of the MMSE (Folstein et al.). More specifically, this study will evaluate the accuracy of the MMSE in discriminating those
patients with schizophrenia who can manage their finances independently from those who cannot independently manage their finances.

This chapter reviews the literature pertinent to this study's focus. It is organized into four sections: (1) competency; (2) measuring functional abilities; (3) functional abilities of individuals with schizophrenia; and (4) an overview of the MMSE and its relationship to competency.

**Competency**

Competency is a legal term and therefore, can only be officially established by court process (Gutheil & Applebaum, 2000). Adults are assumed competent to voluntarily make and implement informed decisions independently unless proven otherwise (Kapp & Mossman, 1996). Legal competency can be viewed as an abstract construct, which presumably encompasses many capacities (Grisso, 2003). For example, individuals' competence to make decisions has been related to the following capacities: communication of choices, appreciation of circumstance and its consequences, and rational manipulation of facts (Applebaum & Grisso, 1988). Unlike the court's competency rulings, which can be a yes-no judgment, the term "capacity" refers to an ability or abilities in which individuals may have varying levels (Kapp & Mossman). For example, individuals in the beginning stage of Alzheimer's may have questionable capacity to manage their financial affairs but may retain the capacity to choose treatment interventions. Nonetheless, considerable impairment of
any set of capacities may result in noticeably impaired decisional processes and may raise the suspicion of incompetence (Grisso).

Competency is defined in broad legal phrases (Grisso, 2003). For example, competence to stand trial is defined in most states by the Dusky vs. United State (1960) case law, which states that individuals must be able to understand the legal process and consult with their attorney on their own behalf (Grisso). The law's definition provides the court with broad discretion in determining whether a set of case facts satisfies the criteria for competence or incompetence (Grisso). Analogous to the real world, courts do not demand demonstration of flawless decisions. Instead, they focus on behavior that is significantly deviant from the norm (Gutheil & Applebaum, 2000).

The court's decision regarding competency ideally reflects a balance between legal actions that seek to protect individuals from the potentially dire consequence related to poor choices and sustaining autonomy (Applebaum & Grisso, 1988). Selecting specific criteria is difficult because no one single standard exists that fits every situation. Suggestions of using a sliding scale according to the subjective value of risk versus benefit have been made (Gutheil & Applebaum, 2000). While initially using a sliding scale makes sense in protecting the individual from over zealous restriction, it is vulnerable to the bias of the evaluator (Gutheil & Applebaum).

Competency has been delineated in various ways. First, general competence refers to the right and capacity of individuals to make and execute autonomous decisions and adequately manage their affairs (Gutheil
& Applebaum, 2000). Competency has been further defined in terms of specific competencies, which refer to specific acts (Grisso, 2003). Moreover, there are two different legal areas of competence: criminal and civil (Grisso). In a criminal situation, competence to proceed refers to the individual’s ability to collaborate with his attorney, understand the charges, and meaningfully participate in the legal process (Melton et al., 1997). Competency in a civil court encompasses capacities in various areas such as parental responsibility, consent to treatment and research, entering into legal contracts, creation of a will, and self-care or property management (Grisso). Financial competence is one of the most commonly questioned civil competencies (Grisso; Willis, 1996).

Financial competence has been hypothesized to encompass several domains (Marson, 2001): basic monetary skills (i.e., naming, counting and understanding relationships of coins/currency), financial conceptual knowledge (i.e., define and apply financial concepts), cash transactions (i.e., one item grocery purchase, three item grocery purchase, change/vending machine, and tipping), checkbook management (i.e., understanding and using checkbook/ register), bank statement management (i.e., understanding and using bank statement), financial judgment (i.e., make investment decision and detect mail and telephone fraud risk) bill payment (i.e., understand, prioritize, and prepare bills for mailing), and knowledge of personal assets/estate arrangements. These abilities related to financial capacity are often affected
in disorders such as Alzheimer's disease (Marson, 2001; Marson, Sawrei, Snyder, McInturff, Stalvey, Boothe et al., 2000).

The loss of financial capacity has broad consequences ranging from psychological to economical (Marson, 2001). Questions of financial competence not only affect the individual in question but also their formal and informal caregivers (Marson; Marson et al., 2000). Insight or lack of insight into their impairment can have various consequences. If individuals are aware of their impaired financial abilities and the possibility of restriction to their financial independence, they may be at risk for depression (Marson). If individuals are unaware of their impairment and no intervention is made to protect them, then they and their family members may be vulnerable to financial exploitation (Marson). Moreover, family members may have to assume the new responsibility of managing their loved one's financial affairs, which can be a stressor.

The decision regarding financial competency is legally made by the courts based upon case law and standards specific to jurisdictions (Melton et al., 1997). The court ultimately decides an individual's competence in self-care and asset management (Gutheil & Appelbaum, 2000). If an individual's competence is suspect, a petition may be brought to the court (Gutheil & Appelbaum; Melton et al., 1997). Before the court reaches a decision regarding competence, the court may seek the assistance in the form of professional opinion (Gutheil & Appelbaum). Assessment includes investigation into the etiology of deficit, intervention, and treatment.
recommendations specific to restoration of capacity (Applebaum & Grisso, 1988). Without an empirically sound and state of the art "gold standard" for measuring financial capacity, mental health practitioners often make inferences from their assessment about an individual's financial capacity. Their opinion is rendered to the court in written form and may include expert witness testimony (Melton et al., 1997).

If a court of law makes the judgment that an individual is not competent to manage his or her affairs, then a legal guardian or substitute decision maker is assigned (Gutheil & Applebaum, 2000). In a nonjudicial setting, a representative payee is allowed as a part of many federal and state agency disability programs (Gutheil & Applebaum). The Veterans Benefits Administration (VBA) is one example of a payee system authorized to act in a protective fashion on behalf of impaired veterans (Title 38, U.S. Code, Section 5502, 1997). Some community mental health patients are referred by their case managers or health care provider and voluntarily enter a payee program (Andrea Baumann, personal communication, May 18, 2003).

*Measuring functional ability*

Judgment about individuals' functional capacities is often an integral part of clinical practice for mental health professionals. Without an accepted gold standard for measuring functional capacity, clinicians must estimate the functional abilities of the severely mentally ill. Their clinical judgment may be informed by various assessment methods including informant-based or self-
Clinicians may rely upon self-report and informant-based measures. While this method can yield important information, it can be problematic. Older patients' self-report may underestimate their ability to perform activities of daily living (ADL) (Sager et al., 1992). Furthermore, informants' assessment can be inaccurate (Beck, Heacock, Mercer, Walton, & Shook, 1991). Moreover, the lack of available caregivers for the severely mentally ill can be an additional limitation of informant-based measures (Patterson et al., 1998). These measures are affected by motivation to influence outcome as well as quality and availability of informants (Putzke, Williams, Daniel, Bourge, & Boll, 2000).

Another method for assessing functional abilities is performance-based assessment. Performance-based assessments strengthen our knowledge of what the individual "can do", which aids in predicting independence (Twamley, Doshi, Nayak, Palmer, Golshan, Heaton, et al., 2002). However, this assessment method is subject to the patient's motivation and effort (Putzke et al., 2000). Furthermore, behavioral assessments of daily functioning have been criticized for creating artificial or irrelevant tasks, having inconsistent inter-rater reliability (Putzke et al.), and neglecting severely mentally ill populations (Klapow, Evans, Patterson, and Heaton, 1997; Wallace, 1986).
Clinicians often use brief, neurocognitive screens to assess cognitive deficits (Kapp & Mossman, 1996). Because of the relationship between cognitive deficits and functional impairment (Green, 1996), clinicians often infer functional ability based upon individuals' performance on these measures (Guilmette & Krupp, 1999). Mental status exams are designed to assess orientation, memory, and attention as well as the ability to name, follow verbal and written commands, spontaneously write a sentence, and copy a complex figure (Folstein, et al., 1975). These measures are used because they are quick and efficient (Pruchno, Smyer, Rose, Hartman-Stein, & Henderson-Laribee, 1995). However, they may not be sensitive to mild cognitive impairment (Guilmette & Krupp, 1999). They also may lack ecological validity (Putzke et al., 2000). Nevertheless, given the constraints that managed care places on time spent with patients, simple and concise measures are often used to make inferences about functional capacity (Pruchno et al.). However, clinicians run the risk of making false positive and false negative errors due to the influence of other influential factors as level of education.

**Functional abilities of individuals with schizophrenia**

Schizophrenia is a severe mental illness with a heterogeneous course. The *Diagnostic and Statistical Manual of Mental Disorders-Text Revision* (*DSM-IV-TR*) (American Psychiatric Association, 2000) indicates that complete remission is uncommon and the course of schizophrenia can be variable with remissions and exacerbation of symptomatology. While remission
of symptoms is possible with continuous treatment (Liberman et al., 2002), its course may be chronic with varied levels of impaired functioning (Palmer et al., 2002). Conversely, others who have done longitudinal studies hold out hope for partial or full recovery (Harding, 2003). Individuals with schizophrenia are known to have cognitive deficits in attention, concentration and complex information processing (Goldman, Axelrod, & Taylor, 1996; Naugle, Cullum, & Bigler, 1998.) Moreover, these cognitive deficits have been associated with functional deficits in various areas (Terkelsen & Menikoff, 1995; Palmer et al., 2002).

Individuals with schizophrenia can be impaired in ADLs, instrumental activities of daily living (IADLs), social functioning, and work. They have been found to have difficulties with basic ADLS such as hygienic self-care, eating, and housekeeping (Terkelsen & Menikoff, 1995). In addition, they also have shown impairment in IADLS such as managing medications, shopping and paying bills (Genduso & Haley, 1997; Terkelsen & Menikoff, 1995). Furthermore, impaired financial capacities were found to be associated with the diagnosis of schizophrenia (Patterson et al., 1998). Because many of these general ADL’s and IADL’s are more difficult for individuals with schizophrenia (Patterson et al.), they often report needing help with daily activities and household management (Bengtsson-Tops & Hansson, 1999). The severely mentally ill often rely upon caregivers such as their parents to help with their instrumental activities of daily living (Lefley, 2003).
In the interpersonal realm, individuals with severe mental illness (SMI) can have difficulty establishing and maintaining relationships (Lefley, 2003). These individuals also have difficulty learning the social skills necessary to develop and maintain interpersonal relationships, which may be related to deficits in processing social cues and emotions (Trumbetta & Mueser, 2001). That is, individuals with schizophrenia have shown deficits in identifying, interpreting, and distinguishing others' emotional expressions (Bryson, Bell, Kaplan, Greig, & Lysaker, 1998; Hooker & Park, 2002; Mueser, Doonan, Penn, Blanchard, Bellack, Nishith et al., 1996). Such poor basic social and interpersonal skills likely affect many areas of the individual's life such as acquiring needed services and support in daily life.

Finally, in the world of work, individuals with schizophrenia tend to have difficulty maintaining full time employment (Palmer et al., 2002). Research reveals terminations related to poor performance or interpersonal difficulties on the job (Becker, Drake, Bonde Xie, Dain, & Harrison, 1998). This difficulty maintaining employment contributes to their oftentimes-substandard living conditions (Pinikahana, Happell, Hope & Keks, 2002). Often assistance is needed to maintain quality of life (Lefley, 2002; Pinikahana et al., 2002).

**Mini-Mental Status Exam**

One neurocognitive screen used by many health professionals to infer functional capacity of the severely mentally ill is the Mini-Mental Status Examination (MMSE) (Tombaugh & McIntyre, 1992). The MMSE is a widely
used brief objective screen of cognitive functioning. It can be administered almost anywhere necessary in a matter of 5-10 minutes (Tombaugh & McIntyre). The MMSE is designed to assess seven cognitive domains or functions: orientation to time; orientation to place; registration of three words; attention and calculation; recall of three words; language; and visual construction (Folstein, et al., 1975; Tombaugh & McIntyre). A perfect score consists of 30 points and a score less than 24 is an accepted cutoff score, suggesting cognitive impairment (Folstein, et al.; Tombaugh & McIntyre).

In general, the MMSE has demonstrated reliability. Over the years adequate levels of test re-test reliability for the MMSE have been found at intervals of less than two months (.56 to .96) with different populations (Tombaugh & McIntyre, 1992). Internal consistency was moderate in community samples with primary education but high with clinical populations who have greater variability (Tombaugh & McIntyre). To summarize, the MMSE is reliable (Folstein, et al., 1975; Tombaugh & McIntyre).

The MMSE’s validity has been examined in numerous studies. Studies of the MMSE have demonstrated moderate to high correlations between cognitive deficits as measured by the MMSE and independent functioning in ADL’s (from .40 to .75) (Tombaugh & McIntyre, 1992). That is, decreased independence as measured by ADL’s was related to lower MMSE scores, and conversely higher scores related to increased functional independence (Tombaugh & McIntyre). Several studies of the MMSE and IADL’s found high correlations, independent of physical health and mobility, reflecting the
MMSE's ability to detect impaired IADLs (such as management of finances) that rely upon higher cortical processes (Tombaugh & McIntyre). Because the function of a specific task (e.g., managing finances) is inferred by performance on the test, Sbordone and Long (1996) state that prediction of cognitive functioning is modest at best (i.e., ecological validity).

While original reports on the sensitivity and specificity of the MMSE were promising (Folstein, et al., 1975), subsequent studies have raised doubt (Tombaugh & McIntyre, 1992). Sensitivity and specificity refer to the correct classification of individuals. The basic measure of sensitivity is the probability of having a positive test result among those with a positive diagnosis (Kraemer, 1992). Research reviewed by Tombaugh and McIntyre reveals sensitivity in evaluating patients with neurological and psychiatric diagnosis to range from 21 to 76%. Sensitivity increased with the severity of impairment. These results lead to speculation that the simplicity of language items in the MMSE may not detect mild impairment (Pruchno et al., 1995). Specificity refers to the MMSE's rate of negative results among patients without impairment (Tombaugh & McIntyre). The same review article by Tombaugh and McIntyre reported that the MMSE had moderate to high specificity in identifying those without cognitive impairment. In general research has shown the MMSE to have relatively good specificity and sensitivity (Folstein, et al.; Guilmette & Krupp, 1999; Tombaugh & McIntyre). However, the MMSE is influenced by level of education, social and economic class (Tombaugh and McIntyre).
Few studies have investigated the relationship between the MMSE and competency. In a recent review of the literature, Guilmette and Krupp (1999) reported that there were 12 studies pertaining to the role of mental status instruments in determining civil competence. Nine of these studies used the MMSE for various purposes related to competency. The following review of these nine studies will describe studies which focus on (1) the convergent validity of a competency measure in relation to the MMSE (Fitten, Lusky, & Hamann, 1990; Janofsky, McCarthy, & Folstein, 1992; Levine, Byrne, Wilets, Fraser, Leal, & Kato, 1994; Billick, Naylor, Majeske, Burgert, & Davis, 1996); (2) the relationship between patient performance on the MMSE and clinical judgment regarding decision-making capacity (Cohen, McCue, & Green, 1993; Pruchno, et al., 1995; Schindler, Ramchandani, Matthews, & Podell, 1995; and (3) the relationship between the MMSE and financial capacity (Rutman, & Silberfeld, 1992; Silberfeld & Corber, 1996).

**Convergent Validity**

Fitten et al. (1990) examined the validity of a vignette-based instrument of decision-making capacity by using the cut-off of the MMSE (<24) as a predictor. Fitten et al. reported that MMSE had a sensitivity of 53% and a specificity of 81% in predicting impaired decision making capacity as measured by their vignette-based instrument. Based upon their findings the authors concluded that incorrect assumptions regarding decision-making capacity are likely in geriatric patients when utilizing bedside mental status exams such as the MMSE (Fitten et al.).
In a validation study of the Hopkins Competency Assessment Test (HCAT), Janofsky et al. (1992) operationalized competence to consent to treatment by means of the clinical judgment of a forensic psychiatrist. The judgment of the forensic psychiatrist was informed by a clinical interview, which included a mental status exam. Janofsky et al. found that the MMSE correctly identified patients with cognitive impairment as incompetent to give informed consent 100% of the time, but correctly identify patients without cognitive impairment as competent 74% of the time. Thus, using the standard cut-off score for the MMSE resulted in a sizable proportion of false positives. A possible confound in this study was that the criterion measure of competency was informed by a mental status exam, and the MMSE, a mental status measure, served as the independent variable.

Levine et al. (1994) examined factors related to inpatient decision-making capacity. The authors developed a questionnaire about consent to psychiatric hospitalization. Levine et al. reported that the MMSE was one of the strongest predictors of outcome on their questionnaire. While psychiatric patients' MMSE scores were not strongly related to their understanding of the legal issues related to their release from the hospital, it was predictive of their understanding of the need for hospitalization (Levine et. al.). Findings are not generalizable, as this instrument has not been independently validated.

Billick et al. (1996) examined the convergent validity of The Competency Questionnaire (CQ; 15 items), a brief screening tool developed by Applebaum, Mirkin, and Bateman, in 1981. Billick et al. administered the
CQ as well as a battery of tests to twenty psychiatric inpatients. The battery consisted of the Brief Psychiatric Rating Scale (PBRS) (Overall and Gorman, 1962), MMSE, and the vocabulary subtest from the Weschler Adult Intelligence Scale—Revised (WAIS-R; Weschler, 1987). A blind forensic interviewer determined competence to consent to psychiatric hospitalization (Billick et al.). The MMSE total score did not significantly correlate with the CQ. However, scores tended to be higher in the competent group and lower in the incompetent group (Billick et al.). The average MMSE score for competence was 29.4 ± 1.4, while those judged as incompetent was 26.2 ± 4.9. Although sensitivity and specificity were not calculated, clearly some who scored above the cutoff were deemed incompetent by the forensic psychiatrist demonstrating a limitation of the MMSE (Billick et al.).

Clinical Judgment and Decision-Making Capacity

Cohen et al. (1993) studied the agreement between health care professionals’ (i.e., physicians and nurses) intuitive judgment of patient’s capability to consent to treatment and the patient’s performance on the MMSE. The health care professionals were blind to the ventilator status of the patients. Practitioners were asked to assess the patient’s mental status and judgment (Cohen et al.). Ratings were based on a 4-point scale: 0 = unable to understand or communicate information; 1 = severely impaired; 2 = moderately impaired; and 3 = normal (Cohen et al.). Finally, to indicate capability in making medical decisions, the practitioner was asked if they would obtain informed consent from the patient or family (Cohen et al.). Using the
standard cut-off (<24), the MMSE agreed with 70% of the physicians' and 73.6% of the nurses' decisions. The intuitive judgment resulted in 21% of physicians and 19% of nurses misclassifying individuals as normal when according to the MMSE they were deemed “impaired” with a score less than 24. In a review of this study, Guilmette and Kapp (1999) calculated the MMSE's sensitivity as 96% and Specificity as 66%. As a result the MMSE in this study would have misclassified many individuals as incapable due to extremely low MMSE scores, while practitioners deemed them capable to make medical decisions and several with high scores as capable when judged incapable by the practitioner (Cohen et al.; Guilmette & Kapp). As stated by the authors, results are confounded by the fact that questions found in the MMSE are part of routine neurological examination and any other criteria used to formulate their judgment is unknown (Cohen et al.).

Pruchno et al. (1995) examined the correlation between clinicians' ratings of the competence of elderly individuals with their performance on a battery of tests, including the MMSE. Clinicians rated the competence of elderly residents in a long-term care facility across six domains, using a six point Likert scale where six was “excellent capacity” and one represented “extremely poor capacity.” When competence was treated as a dichotomous variable, competence was determined by a score of four or higher on five of the six domains. According to this criterion, 22 individuals were deemed competent and 28 not competent. The MMSE correlated significantly (.70)
with this measure; scores from 18-26 were less precise according to the author (Pruchno et al.).

In a small case study by Schindler et al. (1995) the MMSE completely failed to predict incompetence to make general decisions in six patients with frontal lobe dementia. While each of the six obtained a MMSE score above the cutoff, the authors purported each to be incompetent (Schindler et al.). However, no statistical analysis was presented in this case study.

**Financial Capacity**

Rutman and Silberfeld (1992) conducted a retrospective analysis of thirty-five competency assessments given to twenty-four individuals during a capacity evaluation in Canada. The three most commonly assessed capacities were financial, choice of residence, and power of attorney. A multidisciplinary panel comprised of the disciplines of law, ethics, psychiatry, and psychology ranked the usefulness of the following material in their determination of capacity: clinical interview, significant others, the patient self-report, medical history, assessments conducted by social workers and occupational therapists, the Cognitive Competency Test (CCT) (Wang & Ennis, 1986) and the MMSE (Rutman & Silberfeld). Each member of the panel gave their feedback regarding competency. However, the process for reaching a final competency decision was not reported (Rutman & Silberfeld). Individuals judged to be competent in financial matters (n=5) tended to score higher on the MMSE than incompetent individuals (n=8) (Rutman & Silberfeld). In a review of this study Guilmette and Krupp (1999) calculated
the MMSE's sensitivity at 83% and specificity at 63%. This is problematic as one incompetent individual obtained a score higher than the cut off and three competent people were misclassified as incompetent (Guilmette & Krupp). The generalizability of this study is limited by its small sample size (n=13), and by the fact that it was based upon Canadian procedures.

In a Canadian competency clinic where capability in managing property was determined, Silberfeld and Corber (1996) conducted a retrospective analysis of elderly patient's charts. They examined errors on the MMSE to see if individual items were associated with the threshold of capacity and predicted competence. In the first fifty cases the authors examined, twelve individuals who were deemed financially capable. Their average MMSE score was 26.5. Those deemed incapable had an average MMSE of 20 (Silberfeld & Corber). Because the authors judged the number of capable cases too few, twelve more cases who were deemed capable were added. The average MMSE for these twelve was 23.5 (Silberfeld & Corber). Furthermore, the standard deviation and means for each group were not reported in this article nor was educational attainment. While no single item was significant in predicting judgment, those judged incapable had more MMSE errors overall (Silberfeld & Corber).

Summary

The aforementioned studies of competency involving the MMSE suffer from the following limitations. First, the basis for the determination of competency was generally not clearly articulated. In many instances, it was
made by a single mental health professional (Billick et al., 1996; Cohen et al., 1993; Fitten et al., 1990; Janofsky et al., 1992; Levine et al., 1994; Pruchno, et al., 1995; Schindler et al., 1995) and the criteria used to reach the decision were not articulated. One study by Janofsky et al. had a potential confound insofar as the dependent measure of competency and the independent measure (i.e., MMSE) included a mental status exam. Only one study (Pruchno et al.) articulated the basis by which a decision of competency or incompetence was reached. Because a single rater generally made the determination of competence, the reliability of the rater's judgment is questionable. Even where a multidisciplinary panel was used (Rutman & Silberfeld; Silberfeld & Corber), the authors did not describe the criteria and process used to determine competence. Without common standards, judgments of incapacity by mental health professionals can suffer from subjectivity. Only two studies investigated the MMSE and its relation to determination of financial capacity (Rutman & Silberfeld; Silberfeld & Corber). However, the generalizability of the findings from these two studies is limited by small samples and Canadian criteria.
Chapter II

Rationale and Hypotheses

While research demonstrates the wide use of the MMSE as a measure of competency in individuals with a severe mental illness, little is known about the accuracy with which it can classify individuals who manage their finances independently from those who cannot. Most studies examined the relation between performance on the MMSE and a judgment of competency (Janofsky et al., 1992; Cohen et al., 1993; Levine et al., 1994; Pruchno, et al., 1995; Schindler et al., 1995; and Billick et al., 1996). Unfortunately, the criteria for competency were oftentimes not clearly stated and a single rater made the judgment. Without common standards and inter-rater reliability, the reliability and validity of these judgments are unknown. Only two Canadian studies examined the MMSE and its relation to financial capacity (Rutman & Silberfeld, 1992; Silberfeld & Corber, 1996). However, the generalizability of their findings is limited by small sample size from Canada, omission of measures of central tendency and standard deviation, and lack of clearly articulated procedures used to determine competence. The present study will evaluate the accuracy of the MMSE to classify individuals with schizophrenia who independently manage their finances from those with schizophrenia who have a Veteran’s Administration-appointed or court-appointed fiduciary.
The following null hypotheses will be examined:

**Ho1:** There are no significant differences on scores of the MMSE between the fiduciary/guardian group and those who manage their own finances.

**Ho2:** Scores on the MMSE will not distinguish between those who belong in the fiduciary/guardian group and those who manage their own finances independently.
Participants

Participants (n=50) for this study represent a sub-sample of a larger study (n=75) (Schmerler, 2003), which examined predictors of financial capacity and was approved by the Institutional Review Boards of the University of Cincinnati Medical Center, Cincinnati Veterans Affair Medical center (CVAMC) and Xavier University (see Appendix B, C and D). Participants were recruited from the local community and the CVAMC over a period of time from 2001 to 2002. Demographic characteristics of the sample can be found in Table 1. Participants in the present study consist of two groups: fiduciary and without fiduciary. According to a review of the participants’ charts, the fiduciary group comprised twenty-five individuals who were both diagnosed with a mental illness and received the services of a fiduciary. This was established either by legal appointment or by voluntarily signing over responsibilities to a representative payee. Twenty-two of these individuals were diagnosed with schizophrenia and three were diagnosed with schizoaffective disorder. The mean age of the fiduciary group was 47.16 years (SD= 7.8), mean education level of 12 years (SD=1.38), mean Mini-Mental State Examination (MMSE) (Folstein et al., 1975) score of 27.44 (SD=...
2.38), and a mean IQ equivalent score of 85.76 (SD= 14.18), as measured by the WRAT-R Reading Subtest (Jastak & Wilkinson, 1984). The fiduciary group was predominantly single (92%), Caucasian (56%), males (96%), who were unemployed (100%) and resided in a supervised environment (56%). The non-fiduciary group consisted of twenty-five outpatients who met the criteria for schizophrenia or schizoaffective disorder and reported managing their finances independently. Further evidence of independent financial management was supported by a review of their medical chart, which revealed an absence of documentation of a court-appointed-or-representative payee status. Thirteen of these individuals were diagnosed with schizophrenia and twelve with schizoaffective disorder. The mean age of the participants in this group was 46.4 years (SD= 5.28), mean education level of 12.8 years (SD=1.96), mean Mini-Mental State Examination (MMSE) (Folstein et al) score of 28.44 (SD= 1.87), and a mean IQ equivalent score of 96.08 (SD= 11.82) as measured by the WRAT-R Reading Subtest (Jastak & Wilkinson). The non-fiduciary group was also predominantly single (64%), Caucasian (72%), male (92%), who were unemployed (84%). This group, unlike the fiduciary group, mainly lived independently (88%). The exclusionary criteria for both groups were: older than 55 years of age; having a diagnosis of dementia; having a premorbid diagnosis of mental retardation; an IQ < 70; current suicidal risk; and a reporting a history of head trauma including a loss of consciousness for longer than 30 minutes.
**Power Analysis**

Statistical power analysis for logistic regression is not available (D. Dwyer, personal communication SPSS support service, September 14, 2000). However, Stevens (1992) recommends a minimum of twenty participants per discriminant function. Furthermore, in a recent study Schmerler (2003) found significant differences between two groups of equal number utilizing the same number of participants as the present study. Relying upon Stevens’ (1992) recommendation and evidence provided by Schmerler (2003), sufficient power for one logistic regression is expected in this study’s sample of 50 participants.

**Measures**

*Mini-Mental State Examination (MMSE).*

Cognitive functioning was assessed using the MMSE (Folstein et al., 1975). A copy of the standard questions can be found in appendix A. This thirty-point measure assesses orientation, immediate recall, short-term memory, concentration, constructional abilities, and the ability to follow written and verbal instruction. The authors (Folstein et al., 1975) report high test-retest and inter-rater reliability, Pearson’s r >.80, p<. 0001). In a review study of the MMSE research demonstrated adequate test re-test reliability, moderate to high internal consistency, concurrent and construct validity (Tombaugh & McIntyre, 1992). While Folstein et al. originally found good sensitivity and specificity recent research is mixed with sensitivity reports ranging from mild to moderate (21-76%) and specificity in the moderate to high range.
Criterion Validity 26

(Tombaugh & McIntyre). In general research as demonstrated the MMSE to be reliable and valid (Folstein et al.; Tombaugh & McIntyre).

*Wide Range Achievement Test-Revised (WRAT-R) Reading Subtest.*

Psychosis can interfere with cognitive functioning emphasizing the need for a robust measure of premorbid intellectual ability (Weikert & Goldberg, 2000). The Wide Range Achievement Test-Revised (WRAT-R) Reading Test (Jastak & Wilkinson, 1984) is less sensitive to interference from this negative impact on cognitive functioning by providing a measure of rote, automatized knowledge (Weikert & Goldberg). The WRAT-R has been correlated \( r = .87 \) with a widely used estimate of premorbid intelligence, the National American Adult Reading Test (NAART) (Johnstone, Callahan, Kapila & Bouman, 1996). Moderate correlations are reported with verbal IQ measures on the Wechsler Adult Intelligence Scale–Revised (WAIS-R, 1987) \( r = .62 \) (Johnstone et al., 1996).

*Mini-International Neuropsychiatric Interview (MINI).*

To provide current diagnosis of psychiatric disorders the MINI was utilized (Lecrubier, Sheehan, Weiller, Amorim, Bornora, Harnett-Sheehan, et al., 1997). This short structured diagnostic interview was designed to evaluate Axis one disorders as described by the *DSM-IV-TR* and its earlier versions (Lecrubier, et al.). The MINI has produced specificity that ranges from .72 to .97 for all diagnosis in concordance with the SCID-P (Spitzer, Williams, Gibbon, & First, 1990), with the exception of drug dependence. Furthermore, high inter-rater reliability, and kappa coefficients ranging from .88 to 1.0.
(Sheehan, Lecrubier, Sheehan, Janavs, Weiller, Keskiner, et al., 1997) have been found.

_Technique_

The study from which these data were gathered was approved by the institutional review boards (IRB) of the Cincinnati Veterans Administration Research and Development Department, the University of Cincinnati Medical Center and Xavier University. A copy of the IRB approval can be found in appendix B, C, and D. Individuals with Schizophrenia, both with a fiduciary and without a fiduciary were identified through a review of case management records and recruited in waiting rooms. Thirty-one members of the fiduciary group and twenty-five from the non-fiduciary group were approached for participation in this study. Six of the thirty-one members of the fiduciary group refused to participate. In accordance with IRB approval signed consent was obtained from all participants and their guardians. The experimenter escorted each participant to an interview room and evaluation took from 60 to 90 minutes to complete. After a brief interview to obtain demographic information, three screening tests were administered in the following order to ensure all participants met the inclusionary criteria of this study: the Wide Range Achievement Test – Revised (WRAT-R) Reading Subtest (Jastak & Wilkinson, 1984), the Mini-Mental State Examination (MMSE) (Folstein et al., 1975), and the Mini-International Neuropsychiatric Interview (MINI) (Lecrubier et al., 1997). None of the participants were disqualified by the exclusionary criteria. All measures were administered and scored according to the
instructions in the standardized administration manuals. Three (12%) of the protocols were independently scored by a second examiner to establish inter-rater reliability. Compensation for participation in the study consisted of a $5.00 gift certificate to a fast food restaurant.
Chapter IV
Proposed Analysis

Demographic characteristics will be analyzed for equivalence between groups. Categorical data (i.e., gender, race, marital status, and living situation) will be analyzed using Chi-square ($\chi^2$). Analysis of variance (ANOVA) will be performed on interval data (i.e., age, years of education, and estimated IQ). The total score on the MMSE for the fiduciary group and the non-fiduciary group will be compared by a t-test for two independent samples. An alpha level of .05 will be utilized in analysis. In order to determine the classification accuracy of the MMSE, a logistic regression, will be conducted to examine the ability of the cutoff score of <24 on the MMSE to accurately classify those individuals with schizophrenia who have a fiduciary from those who manage their finances independently.
References


Billick, S. B., Naylor, P. W., Majeske, M. F., Burgert, W., & Davis, G. P.

Cohen, L. M., McCue, J. D., & Green, G. M. (1993). Do clinical and formal assessments of the capacity of patients in the intensive care unit to make decisions agree? *Archives of Internal Medicine, 153*, 2481-2485.


Green, M. F. (1996). What are the functional consequences of neurocognitive


Journal of Psychiatry, 37, 634-639.


### Table 1

**Demographic and Clinical comparison of the two groups of participants**

<table>
<thead>
<tr>
<th>Measure</th>
<th>Schizophrenic Group/ Fiduciary (n = 25)</th>
<th>Schizophrenic Group/ NonFiduciary (n = 25)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (S.D.)</td>
<td>Mean (S.D.)</td>
</tr>
<tr>
<td>Age in years</td>
<td>47.16 (7.8)</td>
<td>46.4 (5.82)</td>
</tr>
<tr>
<td>Education in years</td>
<td>12 (1.38)</td>
<td>12.8 (1.96)</td>
</tr>
<tr>
<td>WRAT-R IQ</td>
<td>85.76 (14.18)</td>
<td>96.08 (11.82)</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>24 (96)</td>
<td>23 (92)</td>
</tr>
<tr>
<td>Female</td>
<td>1 (4)</td>
<td>2 (8)</td>
</tr>
<tr>
<td>Marital Status</td>
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<td></td>
</tr>
<tr>
<td>Married</td>
<td>2 (8)</td>
<td>9 (36)</td>
</tr>
<tr>
<td>Single</td>
<td>15 (60)</td>
<td>10 (40)</td>
</tr>
<tr>
<td>Divorced</td>
<td>5 (20)</td>
<td>5 (20)</td>
</tr>
<tr>
<td>Separated</td>
<td>3 (12)</td>
<td>1 (4)</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caucasian</td>
<td>14 (56)</td>
<td>18 (72)</td>
</tr>
<tr>
<td>African American</td>
<td>11 (44)</td>
<td>7 (28)</td>
</tr>
<tr>
<td>Living Situation</td>
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<td></td>
</tr>
<tr>
<td>Independent</td>
<td>11 (44)</td>
<td>22 (88)</td>
</tr>
<tr>
<td>Supervised-Environment</td>
<td>14 (56)</td>
<td>3 (12)</td>
</tr>
</tbody>
</table>
Appendix A

Mini-Mental State Examination
MINI-MENTAL STATE EXAMINATION

M. F. Folstein, S. E. Folstein, and P. R. McHugh

Patient's Name ____________________________

Date Administered __________________________

<table>
<thead>
<tr>
<th>Maximum Score</th>
<th>Patient Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>____________</td>
</tr>
<tr>
<td>5</td>
<td>____________</td>
</tr>
<tr>
<td>3</td>
<td>____________</td>
</tr>
</tbody>
</table>

Orientation

What is the (year) (season) (date) (day) (month)?

Where are we: (state) (county) (town) (hospital) (floor)?

Registration

Name three objects - 1 second to say each. Then ask the patient all three after you have said them.

Give one point for each correct answer. Then repeat them until patient learns all three. Count trials and record.

Number of Trials __________

Attention and Calculation

Serial sevens. One point for each correct. Stop after five answers. If subject refuses, spell "WORLD" backwards.

Recall

Ask for three objects repeated above. Give one point for each correct.

Language

Name a pencil and watch. (2 points)

Repeat the following: "No ifs, ands, or buts." (1 point)

Follow a three-stage command: "Take a paper in your right hand, fold it in half, and put it on the floor." (3 points)

Read and obey the following: "Close your eyes." (1 point)

Write a sentence. (1 point)

Copy design. (1 point)

ASSESS level of consciousness along a continuum.

Alert  Drowsy  Stupor  Coma

309

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MEMORANDUM

TO: Somaia Mohamed, M.D., Ph.D.
Veterans Medical Center
Mental Health Services
3200 Vine Street
Cincinnati, OH 45220

FROM: James Mulchahey, Ph.D., Vice Chairperson
University of Cincinnati Medical Center
Institutional Review Board

DATE: October 24, 2001

RE: #01-05-30-05-EE — “Predictors of Financial Capacity of Patients with Schizophrenia”

Please be advised that the University of Cincinnati Medical Center Institutional Review Board reviewed and approved the modification to the above referenced study as outlined in your letter of October 15, 2001. We have attached a copy of the revised informed consent documents stamped with the IRB date of approval and date the approval expires. To avoid confusion, the expiration date corresponds to the end of the current IRB approval period. Please use a copy of this stapled and dated version of the consent when new subjects are enrolled in the protocol. This amendment received expedited approval.

Thank you for your continued cooperation with the Board’s regulations with regard to changes in your research activities.

[Signature]

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DEPARTMENT OF VETERANS AFFAIRS

MEMORANDUM

Date: November 14, 2001

From: Chairman, R&D Committee

Subj: Research Protocol

To: Somaia Mohamed, M.D., Ph.D.

1. Your protocol entitled "Predictors of Financial Capacity of Patients with Schizophrenia" was reviewed by the Research and Development Committee on November 13, 2001 and was Approved pending receipt of IRB approval letter. You have fulfilled requirement requested; you now have full committee approval.

2. If your protocol involves human subjects, VA policy requires that signed information consent statements be made a permanent part of their medical records. Furthermore, it is required that if investigational drugs are used these drugs and a list of the principal investigator's authorized designees prescribing the drug be placed in the Pharmacy prior to the initiation of your study (this requires the completion of form VA 10-9012).

3. In the case of human subjects, it is your responsibility to provide this office with a copy of the approval from the University of Cincinnati Committee on Human Research (if you have already done so, please disregard). Upon receipt of this approval, you may initiate your proposal.

4. The approval of this protocol is contingent on the related activity or activities not adversely affecting, displacing, or otherwise occupying priorities that would exclude the developing of VA-funded and approved activities.

5. Suggestions/comments from the reviewers may be attached.

If you may be of any further assistance to you, please feel free to call the Research Office at 473-6528.

[Signature]

[Signature]

[Signature]

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January 16, 2002

Jeanne T. Schmerler
8973 Terwilligers Trail
Cincinnati, OH 45249

Dear Ms. Schmerler,

Your satisfactory response to my letter of December 17 on your protocol #0177-4, *Criterion Validity of the Financial Skills Subscale of The Direct Assessment of Financial Status*, was received on January 16, 2002. Your protocol is approved by the Xavier University IRB on this date.

Please fill out and return the enclosed Final/Status Report at the conclusion of your study or one year from this date. This form will be available on the XU web site shortly.

If there are adverse events or modifications, please notify the IRB immediately.

We wish you every success with your research.

Sincerely,

Robert C. Baumiller, S.J
IRB Chair and Administrator:

RCE:nn

Enc: Final/Status Report

CC: John Barrett, Ph.D
Mental health professionals are called upon to assess the ability of the severely mentally ill to function independently. Clinicians may base their judgment on the individual's performance on the Mini-Mental State Examination (MMSE). Little research supports the criterion validity of the MMSE for this purpose. The present study examined the criterion validity of the MMSE. Participants were 25 individuals diagnosed with a mental illness (schizophrenia and schizoaffective disorders) who received the services of a fiduciary and 25 individuals with a mental illness who managed their finances independently. Logistic regression analysis revealed lower classification accuracy for those individuals with schizophrenia who managed their finances independently versus those individuals with schizophrenia who cannot independently manage their finances.
Criterion Validity of the Mini-Mental State Examination in Individuals with Schizophrenia

Issues of civil competency often bring severely mentally ill (SMI) individuals to the state's attention (Grisso, 2003). Questions arise regarding their capacity to give informed consent and manage their personal affairs. Persons with disabling mental disorders, such as schizophrenia and schizoaffective disorder, often manifest marked areas of dysfunction in employment, relationships, and management of household and finances (Harding, 2003). While some do recover functioning (Liberman, Kopelowicz, Ventura, & Gutkind, 2002), impaired functioning may last over a lifetime (Harding) introducing the need for legal determination of which individuals with SMI are incompetent to make decisions or manage financial matters.

The court system often relies on clinical professionals' assessment of individuals' functional abilities (Gutheil & Appelbaum, 2000), as diagnosis alone is currently insufficient to establish incompetence (Guilmette & Krupp, 1999). Many states focus on individuals' specific functional abilities such as managing their medications and money (Gutheil & Applebaum). In fact, individual's ability to manage finances has been a critical factor in states'
decision of incompetence and assignment of a court appointed guardian (Melton, Petri la, Poythress, & Slobogin, 1997).

While judgment about individuals' functional capacities is often an integral part of clinical practice, mental health professionals have no "gold standard" for assessing the functional abilities of the severely mentally ill. Because functional impairment in individuals with a severe mental illness such as schizophrenia has been related to cognitive deficits (Harvey & Friedman, 2003; Kelly, Sharkey, Morrison, Allardyce, & McCreadie, 2000), many professionals use brief neurocognitive screens to assess for these cognitive deficits and then infer functional ability (Kapp & Mossman, 1996).

One neurocognitive screen used by many health professionals to infer competence of the severely mentally ill is the Mini-Mental State Examination (MMSE) (Folstein, Folstein, & McHugh, 1975) (see Appendix A). In general, the MMSE has demonstrated reliability and validity with different populations, moderate to high correlations between cognitive deficits and independent functioning in activities of daily living (ADL), and high correlations independent of physical health and mobility, reflecting the MMSE's ability to detect impaired independent activities of daily living (IADL) that rely upon higher cortical processes (Tombaugh & McIntyre, 1992). However, ecological validity of the MMSE is modest at best (Sbordone & Long 1996). While original reports on the sensitivity and specificity of the MMSE to detect cognitive impairment were promising (Folstein, et al., 1975), subsequent studies have raised doubt (Pruchno, Smyer, Rose, Hartman-Stein, &
Henderson-Laribee, 1995; Tombaugh & McIntyre, 1992). Research reviewed by Tombaugh and McIntyre revealed sensitivity in evaluating patients with neurological and psychiatric diagnosis to vary widely (range from 21 to 76%). Others speculate that the simplicity of language items in the MMSE may not detect mild impairment as sensitivity increased with the severity of impairment (Pruchno et al., 1995). Tombaugh and McIntyre reported that the MMSE had moderate to high specificity in identifying individuals without cognitive impairment. In general, research has shown the MMSE to have relatively good specificity, while its sensitivity may be less than optimal, especially among individuals with mild cognitive impairment (Folstein, et al.; Guilmette & Krupp, 1999; Tombaugh & McIntyre). The MMSE is influenced by level of education, social class, and economic class (Tombaugh & McIntyre).

Relatively few studies have investigated the relationship between the MMSE and competency. In a recent review of the literature, Guilmette and Krupp (1999) reported that there were 12 studies pertaining to the role of mental status instruments in determining civil competence. Nine of these studies used the MMSE for various purposes related to competency. Four of these studies examined the convergent validity between various measures of competency and the MMSE (Fitten, Lusky, & Hamann, 1990; Janofsky, McCarthy, & Folstein, 1992; Levine, Byrne, Wilets, Fraser, Leal, & Kato, 1994; Billick, Naylor, Majeske, Burgert, & Davis, 1996). Three other studies examined the agreement between clinicians' ratings of an individual's
competency and an individual's performance on the MMSE (Cohen, McCue, & Green, 1993; Pruchno, et al., 1995; Schindler, Ramchandani, Matthews, & Podell, 1995). Using the standard cut-off (<24), Cohen et al., reported that the MMSE was in agreement 70% of the time with physicians' judgment regarding competency and 73.6% of the time with nurses' decisions. In a review of this study, Guilmette and Krupp calculated the MMSE's sensitivity as 96% and specificity as 66%. Pruchno et al., reported that the MMSE was significantly correlated with clinician's ratings (r= .70), although scores from 18-26 were less precise. Schindler et al., (1995) reported that the MMSE failed to predict incompetence in six individuals with frontal lobe dementia. Only two of the nine studies (Rutman & Silberfeld, 1992; Silberfeld & Corber, 1996) addressed the relationship between the MMSE and financial capacity. These two retrospective studies reported that individuals judged to be competent in financial matters (n=5) tended to score higher on the MMSE than incompetent individuals (n=8) (Rutman & Silberfeld) and that those judged incapable had more overall errors on the MMSE (Silberfeld & Corber).

The aforementioned studies of competency involving the MMSE suffer from the following limitations. First, the basis for the determination of competency was generally not clearly articulated. In many instances, it was made by a single mental health professional (Billick et al., 1996; Cohen et al., 1993; Fitten et al., 1990; Janofsky et al., 1992; Levine et al., 1994; Pruchno, et al., 1995; Schindler et al., 1995), and the criteria used to reach the decision were not articulated. Because a single rater generally made the
determination of competency, the reliability of the rater’s judgment is questionable. Even where a multidisciplinary panel was used (Rutman & Silberfeld, 1992; Silberfeld & Corber, 1996), the authors did not describe the criteria and process used to determine competence. Without common standards, judgments of incapacity by mental health professionals can suffer from subjectivity. Furthermore, one study (Janofsky et al., 1992) had a potential confound insofar as the dependent measure of competency and the independent measure (i.e., MMSE) included a mental status exam. Only two studies investigated the MMSE and its relation to determination of financial capacity (Rutman & Silberfeld; Silberfeld & Corber). However, the generalizability of the findings from these two studies is limited by small samples and Canadian legal criteria.

Unfortunately, there is little empirical support to substantiate the inferences made from the MMSE, particularly in the area of financial capacity. Few have looked at the MMSE’s ability to accurately classify those who are competent versus those who are not. The current study examined the criterion validity of the MMSE (Folstein et al., 1975). More specifically, this study evaluated the accuracy of the MMSE in discriminating individuals with schizophrenia who manage their finances independently from those who have a Veteran’s Administration-appointed or court-appointed fiduciary. The following hypotheses were tested: (1) There are no significant differences on scores of the MMSE between the fiduciary/guardian group and those who manage their own finances and (2) Scores on the MMSE will not distinguish
between those who belong in the fiduciary/guardian group and those who manage their own finances independently.

Method

Participants

Participants (n=50) for this study represent a sub-sample of a larger study (n=75) (Schmerler, 2003), which examined predictors of financial capacity and was approved by the Institutional Review Boards of the University of Cincinnati Medical Center, Cincinnati Veterans Affair Medical center (CVAMC) and Xavier University (see Appendices B, C, and D). Participants were recruited from the local community and the CVAMC over ten months in 2001 and 2002. Demographic characteristics of the sample can be found in Table 1 and 2.

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To provide current diagnosis of psychiatric disorders, the MINI was utilized (Lecrubier, Sheehan, Weiller, Amorim, Bornora, Harnett-Sheehan, et al.). This short structured diagnostic interview was designed to evaluate Axis I
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**Procedure**

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Subtest (Jastak & Wilkinson, 1984), the MMSE (Folstein et al., 1975), and the Mini-International Neuropsychiatric Interview (MINI) (Lecrubier et al., 1997). None of the participants were disqualified by the exclusionary criteria. All measures were administered and scored according to the instructions in the standardized administration manuals. Three (12%) of the protocols were independently scored by a second examiner revealing excellent inter-rater reliability (Pearson's r=1.00, p=.014). Compensation for participation in the study consisted of a $5.00 gift certificate to a fast food restaurant.

Results

A summary of the two groups' demographics is shown in Table 1 and 2. Chi-Square and Fisher's Exact Test were conducted on categorical data, and analyses of variance (ANOVA) were conducted on interval data to determine demographic differences that may affect functional abilities. The two groups did not significantly differ in demographics of gender, age, race, employment, and years of education. However, individuals with schizophrenia who did not have a fiduciary/guardian were more likely to be married, live independently, and have significantly higher estimated IQ's (M=96.08, SD=11.82) as measured by the WRAT-R than were those with a fiduciary/guardian (M=85.76, SD=14.18) F (1, 48) =7.810, p=.007. Comparison of the average MMSE score of the fiduciary group (M=27.44, SD=2.38) and non-fiduciary group (M=28.44, SD=1.87) by a t-test for two independent samples revealed no difference, F (1, 48) =.86, p=.359. The
MMSE scores of the fiduciary group ranged from 22-30 (SD 2.38), and the non-fiduciary group scores ranged from 23-30 (SD 1.87).

In a logistic regression, the cut off score (<24) of the MMSE was entered as the sole predictor, and the resultant model was not statistically reliable $\chi^2 (1, N=50) =1.13, p=.29$, indicating that the cut off score (<24) on the MMSE was not statistically reliable in distinguishing between groups. Indeed, only 3% of the variance in fiduciary status was accounted for by this model ($\text{Nagelkerke } R^2 = .03$). The MMSE correctly classified 12% of the Fiduciary/guardian group and 96% of the non-fiduciary group, with an overall classification rate of 54%.

Discussion

Psychologists are often asked to assess an individual’s ability to care for self and manage independent living tasks, such as finances. This is often the case with formal thought disorders such as schizophrenia, which impair day-to-day functioning and cognition (Harding, 2003). Results of these evaluations can influence a court’s legal determination of incompetence and appointment of a guardian (Velligan et al., 1997). Unfortunately, no accepted “gold standard” exists for assessing functional abilities of individuals with schizophrenia. One brief neurocognitive screen used to assess for cognitive deficits is the MMSE (Folstein et al., 1975). Results are then often used to infer functional ability. Little evidence exists to support inferences made from the MMSE regarding functional competence, especially in the area of financial capacity. The present study examined the criterion validity of the MMSE.
(Folstein et al.). More specifically, the present study evaluated the accuracy of the MMSE in discriminating those patients with schizophrenia who can manage their finances independently from those who cannot independently manage their finances.

As hypothesized, there were no significant differences in MMSE scores between the fiduciary/guardian group and those who independently manage their finances. Unlike our findings, Silberfeld and Corber (1996) reported a difference between mean MMSE scores in elderly individuals judged to be incompetent ($M = 20$) and those judged to be competent ($M = 26.5$) to manage property. However, they did not report if this difference was significant. Similarly Billick et al. (1996) reported mean MMSE scores to be higher in their group deemed competent to consent to psychiatric hospitalization (28-30) and lower in their incompetent group (21-31). However, we do not know if the difference was statistically significant because they treated interval data as categorical data, applying the incorrect statistical analysis (i.e., Chi Square). One reason the present study did not find a difference between groups might be due to the restricted range of cognitive functioning in the sample. Thus, the sample did not represent the full spectrum of the MMSE scores, specifically the lower spectrum of MMSE scores.

As hypothesized, using a cut off score of $<24$ on the MMSE was not statistically reliable in distinguishing between individuals who belonged in the fiduciary/guardian group and those who managed their own finances. The
MMSE correctly classified 12% of the Fiduciary/guardian group and 96% of the non-fiduciary group, with an overall classification rate of 54%.

Regarding the ability to identify individuals who are competent, the present study's rate of specificity was fairly consistent with previous studies range of findings (63-81%) in a variety of capacities (e.g., geriatric decision making capacity, informed consent, and psychiatric hospitalization) (Fitten et al., 1990; Guilmette & Krupp 1999; Janofsky et al., 1992). However, the present study's rate of sensitivity was much lower than previous studies involving the MMSE and competence, which ranged from 53-100% (Fitten et al.; Guilmette & Krupp; Janofsky et al.). One reason the sensitivity rate for the MMSE was low in the present study may be the relatively high functioning individuals in our sample as represented by the restricted range of MMSE scores (22-30). As noted by Tombaugh and McIntyre (1992), the MMSE is not sensitive to mild cognitive impairment. The poor classification rate of the MMSE suggests that individuals with mild cognitive impairment may fall into "grey" areas of capacity and be misclassified.

One of the limitations of the present study is related to the nature of the sample. The range of MMSE scores in the study were restricted (22-30). The study's sample was relatively high functioning, with the lowest MMSE score of 22, representing mild cognitive impairment. As noted in previous studies (Guilmette & Krupp, 1999; Pruchno et al., 1995; Tombaugh & McIntyre, 1992) the MMSE is relatively poor in determining competence in individuals with mild cognitive impairment. Future studies should include
participants who represent a larger range of cognitive functioning as measured by the MMSE than the present sample. Future studies may also examine the MMSE's ability to discriminate between individuals with a diagnosis of schizophrenia and individuals without a psychiatric diagnosis. Another limitation of this study is that the groups are not absolute. Officially members of the non-fiduciary group managed their own finances. However, this group is confounded by the possibility of informal assistance. That is someone such as a family member may help them managing their finances.

Interestingly, of all the measures in the study the WRAT-R Reading Subtest (Jastak & Wilkinson, 1984) distinguished between the groups. One possible reason is that the capacity to read is a part of paying bills and writing checks. This suggests that further research should be done to investigate the WRAT-R as a predictor of capacity, preferably as part of a broad battery of tests used to determine capacity. The findings of the present study underscore the need to use multimodal methods of assessment when evaluating financial capacity, such as clinical interviews, performance-based measures (Twamley, Doshi, Nayak, Palmer, Golshan, Heaton, et al., 2002), and family-report and self-report measures (Marson, 2001).
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Criterion Validity 61

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Table 1

**Demographic and Clinical comparison of the two groups of participants**

<table>
<thead>
<tr>
<th>Measure</th>
<th>Fiduciary Group (n = 25)</th>
<th>Non-Fiduciary Group (n = 25)</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (S.D.)</td>
<td>Mean (S.D.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age in years</td>
<td>47.16 (7.8)</td>
<td>46.4 (5.82)</td>
<td>.148</td>
<td>.702</td>
</tr>
<tr>
<td>Education in years</td>
<td>12 (1.38)</td>
<td>12.8 (1.96)</td>
<td>2.78</td>
<td>.102</td>
</tr>
<tr>
<td>Mini-Mental State Examination (MMSE)</td>
<td>27.44 (2.38)</td>
<td>28.44 (1.87)</td>
<td>.86</td>
<td>.359</td>
</tr>
<tr>
<td>WRAT-R IQ</td>
<td>85.76 (14.18)</td>
<td>96.08 (11.82)</td>
<td>7.81</td>
<td>.007</td>
</tr>
</tbody>
</table>

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### Table 2

**Demographic comparison of the two groups of participants**

<table>
<thead>
<tr>
<th>Measure</th>
<th>Fiduciary Group  (n = 25)</th>
<th>Non-Fiduciary Group (n = 25)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>(%)</td>
<td>N</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>24</td>
<td>(96)</td>
<td>23</td>
</tr>
<tr>
<td>Female</td>
<td>1</td>
<td>(4)</td>
<td>2</td>
</tr>
<tr>
<td><strong>Marital Status</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>2</td>
<td>(8)</td>
<td>9</td>
</tr>
<tr>
<td>Single</td>
<td>15</td>
<td>(60)</td>
<td>10</td>
</tr>
<tr>
<td>Divorced</td>
<td>5</td>
<td>(20)</td>
<td>5</td>
</tr>
<tr>
<td>Separated</td>
<td>3</td>
<td>(12)</td>
<td>1</td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caucasian</td>
<td>14</td>
<td>(56)</td>
<td>18</td>
</tr>
<tr>
<td>African American</td>
<td>11</td>
<td>(44)</td>
<td>7</td>
</tr>
<tr>
<td><strong>Living Situation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Independent</td>
<td>11</td>
<td>(44)</td>
<td>22</td>
</tr>
<tr>
<td>Supervised-Environment</td>
<td>14</td>
<td>(56)</td>
<td>3</td>
</tr>
</tbody>
</table>
Appendix A

Mini-Mental State Examination
MINI-MENTAL STATE EXAMINATION

M. F. Folstein, S. E. Folstein, and P. R. McHugh

Patient's Name__________________________________________

Date Administered______________________________________

<table>
<thead>
<tr>
<th>Maximum Score</th>
<th>Patient Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

Orientation

What is the (year) (season) (date) (day) (month)?

Where are we: (state) (county) (town) (hospital) (floor)?

Registration

Name three objects - 1 second to say each. Then ask the patient all three after you have said them.

Give one point for each correct answer. Then repeat them until patient learns all three. Count trials and record.

Number of Trials __________

Attention and Calculation

Serial sevens. One point for each correct. Stop after five answers. If subject refuses, spell "WORLD" backwards.

Recall

Ask for three objects repeated above. Give one point for each correct.

Language

Name a pencil and watch. (2 points)

Repeat the following: "No ifs, ands, or buts." (1 point)

Follow a three-stage command: "Take a paper in your right hand, fold it in half, and put in on the floor." (3 points)

Read and obey the following: "Close your eyes." (1 point)

Write a sentence. (1 point)

Copy design. (1 point)

30 Maximum Patient Score Total

ASSESS level of consciousness along a continuum.

Alert Drowsy Stupor Coma

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MEMORANDUM

TO: Somaia Mohamed, M.D., Ph.D.
Veterans Medical Center
Mental Health Services
3200 Vine Street
Cincinnati, OH 45220

FROM: James Mulchahey, Ph.D., Vice Chairperson
University of Cincinnati Medical Center
Institutional Review Board

DATE: October 24, 2001

RE: #01-05-30-05-EE – “Predictors of Financial Capacity of Patients with Schizophrenia”

Please be advised that the University of Cincinnati Medical Center Institutional Review Board reviewed and approved the modification to the above referenced study as outlined in your letter of October 15, 2001. We have attached a copy of the revised informed consent documents stamped with the IRB date of approval and date the approval expires. To avoid confusion, the expiration date corresponds to the end of the current IRB approval period. Please use a copy of this stapled and dated version of the consent when new subjects are enrolled in the protocol. This amendment received expedited approval.

Thank you for your continued cooperation with the Board's regulations with regard to changes in your research activities.

[Signature]

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DEPARTMENT OF VETERANS AFFAIRS

MEMORANDUM

Date: November 14, 2001

From: Chairman, R&D Committee

Subj: Research Protocol

To: Somaia Mohamed, M.D., Ph.D.

1. Your protocol entitled "Predictors of Financial Capacity of Patients with Schizophrenia" was reviewed by the Research and Development Committee on November 13, 2001 and was Approved pending receipt of IRB approval letter. You have fulfilled requirement requested; you now have full committee approval.

2. If your protocol involves human subjects, VA policy requires that signed information consent statements be made a permanent part of their medical records. Furthermore, it is required that if investigational drugs are used these drugs and a list of the principal investigator’s authorized designees prescribing the drug be placed in the Pharmacy prior to the initiation of your study (this requires the completion of form VA 10-9012).

3. In the case of human subjects, it is your responsibility to provide this office with a copy of the approval from the University of Cincinnati Committee on Human Research (if you have already done so, please disregard). Upon receipt of this approval, you may initiate your proposal.

4. The approval of this protocol is contingent on the related activity or activities not adversely affecting, displacing, or otherwise occupying priorities that would exclude the developing of VA-funded and approved activities.

5. Suggestions/comments from the reviewers may be attached.

If you may be of any further assistance to you, please feel free to call the Research Office at 475-6528.

SOMAIA MOHAMED, M.D.

Chairman, R&D Committee
January 16, 2002

Jeanne T. Schmerler
8973 Terwilligers Trail
Cincinnati, OH 45249

Dear Ms. Schmerler,

Your satisfactory response to my letter of December 17 on your protocol #0177-4, Criterion Validity of the Financial Skills Subscale of The Direct Assessment of Financial Status, was received on January 16, 2002. Your protocol is approved by the Xavier University IRB on this date.

Please fill out and return the enclosed Final/Status Report at the conclusion of your study or one year from this date. This form will be available on the XU web site shortly.

If there are adverse events or modifications, please notify the IRB immediately.

We wish you every success with your research.

Sincerely,

Robert C. Baumiller, S.J
IRB Chair and Administrator

Enc: Final/Status Report

CC John Barrett, Ph.D