COMPETENCE THROUGH COGNITION: COGNITIVE REMEDIATION
AND RESTORATION OF TRIAL COMPETENCE

by

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ABSTRACT

A new and promising avenue for research into competency restoration treatment is cognitive remediation, which is an empirically-supported set of treatment techniques designed to facilitate cognitive skills development (Medalia, Revheim, & Herlands, 2009). Working with 33 male patients from an inpatient forensic hospital, this randomized control trial was a pilot study to explore the effectiveness of cognitive remediation to improve competence to stand trial. Compared to a control group receiving standard hospital treatment, the treatment group received a supplement of five weeks of cognitive remediation using the NEAR model (Neuropsychological Educational Approach to Cognitive Remediation; Medalia, Revheim, & Herlands, 2009). The researcher compared pre- and post-treatment data for changes in verbal memory, problem-solving, and competence to stand trial, as measured by the MacArthur Competence Assessment Tool-Criminal Adjudication (MacCAT-CA).

Results indicated that cognitive remediation significantly improved the Reasoning ability measured by the MacCAT-CA. Changes on the two other factors of the MacCAT-CA were not significant. No significant changes were found on measures of verbal memory or problem solving. Patients who benefitted most from cognitive remediation were those exhibiting greater need for treatment. Successful treatment participants tended to be more mentally ill, have diagnoses of schizophrenia or another psychosis, and exhibited poor performance on a pre-test measure of competence to stand trial. This pilot investigation provided initial support for the use of cognitive remediation to improve competence to stand trial in individuals with severe mental illness and impaired legal reasoning.
LIST OF ABBREVIATIONS AND SYMBOLS

\( M \)  Mean (arithmetic average)
\( n \)  Number of cases in a subsample
\( N \)  Total sample size
\( p \)  Probability
\( p. \)  Page number
\( r \)  Measure of Pearson Correlation
\( SD \)  Standard deviation
\( U \)  The Mann-Whitney test statistic
\( \chi^2 \)  Chi-Square test statistic
\( z \)  Standardized score for the Mann-Whitney \( U \)
\( < \)  Less than
\( > \)  Greater than
\( = \)  Equal to
\( \pm \)  Plus or minus
ACKNOWLEDGEMENTS

To my mentor, Stan Brodsky, I am grateful for an extensive assortment of gifts. When I was an undergraduate student wanting to conduct research, he happily took me under his wing. He chiseled away at the rough form of a student with forensic interests to help develop the graduate student and future professional I would become. He challenged me and pushed me in the best way possible, out of my comfort zone and toward new and scary things. He promoted my self-confidence, helping me to see myself in a whole new light. He was supportive during the most challenging of times, like when I lost my mother. Lastly, I am thankful to know a successful kindred spirit of a clinical psychologist with a wide array of interests, who is thoughtful and empathic yet intellectually challenged to analyze just about everything.

I would like to thank my dissertation committee, who I feel has been so much more than a committee. In particular, Dr. Amber Simpler encouraged my interest in competency restoration and the application of neuropsychology to forensic assessment and treatment. She was instrumental in helping to develop the kernel of an idea that would become the full-fledged dissertation. I am thoroughly grateful that Dr. Forrest Scogin gave me the crash course in running empirical treatment studies and how to assess for the effects of treatment benefit. I am enormously thankful that my entire committee agreed to meet with me again to make changes to my study when I ran into trouble getting enough participants.

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1. Introduction

Competency to stand trial remains a singularly compelling topic within the psycholegal literature and has become “the most significant criminal issue in forensic mental health” (Melton, Petrila, Poythress, & Slobogin, 2007, p. 141). Adjudicative competence appears to be the number one assessment referral question for forensic practitioners, with an estimated 60,000 evaluations performed every year (Bonnie & Grisso, 2000). The courts abide by a jurisdictional version of the *Dusky* standard to determine whether a defendant has the capacity to participate in the legal process. From *Dusky v. United States* (1960), the standard requires that “the defendant has sufficient present ability to consult with his attorney with a reasonable degree of rational understanding and a rational as well as factual understanding of proceedings against him.” Researchers have devoted much less attention to competency restoration treatment than to its related assessment issues and the analysis of the broad construct of adjudicative competence (Noffsinger, 2001; Zapf & Roesch, 2011).

Research into treatment to restore legal competency has been limited to a small number of published treatment studies (Anderson & Hewitt, 2002; Bertman et al., 2003; Brown, 1992; Davis, 1985; Montgomery & Brooks, 2005; Mueller & Wylie, 2007; Nelson, 1989; Pendleton, 1980; Siegel & Elwork, 1990). Thus, the search for successful competency restoration treatments has not been exhausted. More research is needed to determine the most effective treatments to rehabilitate defendants so that they can stand trial or otherwise work with their attorney(s) to proceed through the criminal justice system. Typically, individuals who are determined to be incompetent to stand trial by the courts are hospitalized for treatment until they are restored. In
addition to restoring competence to stand trial, treatment may be considered effective if it reduces symptomatic presentation, increases adaptive functioning, and reduces the length of time that a patient is held in a facility receiving treatment. The U. S. Supreme Court has underscored the importance of timely and effective treatment for those deemed incompetent to stand trial through its ruling in *Jackson v. Indiana* (1972). The court determined that indefinite commitment for competency restoration is a violation of due process as well as civil liberties. The ruling allowed confinement only for a reasonable period of time to determine whether an individual could be restored through treatment in the foreseeable future.

In the search for effective, new competency restoration treatment, perhaps a cognitive approach is warranted. After all, the nature of competency and the wording of the *Dusky* standard hint at cognitive deficits as the nature of the impairment. An assessment of competence should focus on the ability to understand, reason, and participate, with less focus on possessing factual knowledge (Melton et al., 2007). The development of the MacArthur Competence Assessment Tool-Criminal Adjudication (MacCAT-CA; Hoge, Bonnie, Poythress, & Monahan, 1999) was based on the concept of adjudicative competence suggested by the *Dusky* standard, in which three quantifiable factors were derived: Understanding, Reasoning, and Appreciation. Understanding may be seen as the ability to conduct basic information processing, to encode, store, and retrieve factual information that is relevant to a defendant’s situation, while Reasoning represents the fluid abilities to comprehend, reason, and problem-solve in the context of the adjudicative process. Lastly, Appreciation may represent the basic social abilities necessary to consult with one’s attorney (Nestor, Daggett, Haycock, & Price, 1999).

While individuals may be incompetent to stand trial due to a number of reasons, research consistently links legal impairment (and possible unrestorability) with psychotic disorders and
psychotic symptoms (Viljoen, Zapf, & Roesch, 2003), particularly the symptoms of hallucinations, delusions, disorientation, disturbed behavior, impaired memory, and impaired thought and communication (Nicholson & Kugler, 1991). In recent years, research on schizophrenia and other psychotic disorders has begun to focus on impairment in cognitive skills (Medalia & Thysen, 2008; Ting et al., 2010), deficits which may persist despite stabilization on psychotropic medications (Medalia, Gold, & Merriam, 1988; Schwalbe & Medalia, 2007; Silverstein, 2000). In fact, a number of psychotropic medications, while they are often effective in reducing the positive symptoms like hallucinations and delusions, do not adequately treat cognitive impairment in patients with schizophrenia (Medalia, Revheim, & Herlands, 2009). On cognitive tests, patients diagnosed with psychotic illnesses tend to score below 85% of the general population (Medalia et al., 2009). Problems in cognitive skills and executive functioning can cause significant impairments in managing everyday activities as well as handling unique challenges as they arise, like legal problems. Deficits in cognitive domains may also lead to poor judgment, medication noncompliance, and eventually psychiatric decompensation (Medalia et al., 2009). Considering the importance of treating cognitive deficits related to adjudicative incompetence, some have suggested that a new and promising avenue for research into competency restoration treatment should be cognitive remediation (Schwalbe & Medalia, 2007; Zapf & Roesch, 2011).

Cognitive remediation was first developed to assist patients with traumatic brain injury (TBI) who demonstrated deficits in various cognitive domains, such as attention, working memory, processing speed, and problem-solving skills (Medalia & Friehlich, 2008; Medalia et al., 2009; Schwalbe & Medalia, 2007). Cognitive remediation is a behaviorally-based set of treatment techniques and focused learning activities that are intended to improve the underlying
cognitive skills that will help individuals function better in daily tasks. This set of techniques has progressed from hand-written tasks to utilizing computers and educational software to facilitate development of cognitive skills. In addition to effectively treating TBI patients, cognitive remediation has been shown to effectively treat patients with schizophrenia and other psychiatric disorders, with medium to large effect sizes across several cognitive domains (McGurk, Twamley, Sitzer, McHugo, & Mueser, 2007; Medalia & Freilich, 2008; Medalia et al., 2009). Treatment effects also persist over time, with studies demonstrating an average retention of eight months (McGurk et al., 2007). Treatment studies have supported efficacy in outpatient settings (Hodge et al., 2010; Ikezawa et al., 2012; Medalia, Herlands, & Baginsky, 2003), and empirical studies have progressed to more challenging and severely ill populations in inpatient settings, where cognitive remediation generated significant improvement in various areas of cognitive and executive functioning (Hodge et al., 2010; Ikezawa et al., 2012; Medalia, Aluma, Tryon, & Merriam, 1998; Medalia, Revheim & Casey, 2001, 2002). In these inpatient settings, pharmacological treatments effectively addressed psychosis and other psychiatric symptoms, while cognitive remediation treated the remaining cognitive impairments in domains such as executive functioning, memory, learning, and problem-solving (Bark et al., 2003).

The Neuropsychological Educational Approach to Cognitive Remediation (NEAR) model represents one type of cognitive remediation, deemed one of several “Treatments That Work” due to its demonstrated effectiveness in improving functioning for patients (Medalia et al., 2009). The NEAR model is informed by self-determination theory (Ryan & Deci, 2000), learning theory and concepts for effective teaching with disabled students (Lieber & Semmel, 1985), Rogerian client-centered therapy and positive regard, by rehabilitation psychology and a neuropsychological focus on targeted cognitive deficits, and treatment outcomes research.
(Medalia et al., 2009). NEAR also utilizes positive reinforcement and frequent feedback to promote success and build confidence, in part through the careful selection of educational software adhering to these principles (Medalia & Revheim, 1999).

Several key aspects of the NEAR model of cognitive remediation are based on principles of learning theory (Medalia & Freilich, 2008; Medalia & Revheim, 1999; Medalia et al., 2009). Errorless learning is a key principle governing the particular choice of educational software that is appropriate for cognitive remediation. The activity’s difficulty level is gradually increased to maximize successful experiences, which keeps it challenging without being frustrating (Kern, Liberman, Kopelowicz, Mintz, & Green, 2002; Medalia & Freilich, 2008; O’Carroll, Russell, Lawrie, & Johnstone, 1999). When tasks are frustrating, students tend to quit the activity and move on to something else that is more enjoyable. Shaping is also a useful concept from learning theory, in which learners are guided gradually by increasingly difficult stages of activities to meet a final goal (for example, finally catching Carmen Sandiego in Where in the USA is Carmen Sandiego?). Learners also benefit from positive feedback on their performance. Learning theory provides the general concept of prompting to minimally aid the learner in remembering a strategy or making decisions. When prompts fail to guide the learner’s behavior, demonstrating the correct solution, known as modeling, may be necessary and helpful to the learner. Cognitive remediation, like many other learning endeavors, aim to achieve generalization, or transfer of learned behavior to other situations. The process of generalizing cognitive skills from the computer activities to everyday functioning occurs through bridging groups. Bridging refers to a process of generalization in which group discussions facilitate explicit connections between skills practiced on remediation tasks and the application of those skills in everyday life.
Educational psychology has contributed a number of concepts to the design of NEAR (Medalia & Freilich, 2008; Medalia & Revheim, 1999; Medalia et al., 2009). Educational materials are easier to grasp and appeal to students more when they are presented in a contextualized fashion, rather than in the abstract. For example, trying to memorize a list of unrelated words is not as effective and enjoyable as a task of virtual grocery shopping where the learner must recall all the items on the forgotten shopping list. The learner also benefits from the presentation of educational material that is stimulating to multiple senses (visual through attractive or entertaining graphics and auditory through voices and music). The various learning activities can be personalized through recording the learner’s name and tracking individual progress, as well as tailoring material to keep it interesting to the learner. A focus on intrinsic motivation maximizes a learner’s engagement and commitment. Intrinsic motivation and commitment to broad goals are increased through the learner’s perception of control over the process. The learner, for example, may be given great latitude in his or her choice of activities and modality of tasks (math versus grammar, or visual versus auditory). Thus, the perception of control over the learning process engenders a sense of self-determination to reach personal goals.

As evidenced by the numerous theoretical sources for the development of NEAR, the goals of this treatment reflect varied influences. As described in the treatment manual (Medalia et al., 2009), one goal is to improve the neuropsychological/cognitive functions that had been deemed an impairment to normative functional outcomes. Another goal is to provide a positive learning experience for all clients. NEAR cognitive remediation is also intended to promote skills for learning independently and promote a positive attitude toward learning. The treatment is designed to engender client awareness of personal learning style and individual strengths and weaknesses that may affect learning. In addition, clients become more aware of the degree to
which social contexts can impact learning and cognitive functioning. Toward this end, the
treatment is intended to promote successful cognitive functioning in various social contexts.
Lastly, the authors of NEAR want to promote the client’s sense of competence and confidence in
one’s ability to acquire skills and learn in the future.

In the model’s treatment manual, Medalia and colleagues (2009) describe the
characteristics of a typical NEAR model treatment program, called a Learning Center. A
program consists of groups comprised of six to eight clients who attend a Learning Center
(generally as outpatient treatment), which is equipped with computer stations and a selection of
carefully chosen educational software. Admission to a group is on a continuous basis for
practical purposes (e.g., to avoid waiting for adequate numbers to begin), as well as to purposely
create a group environment of veteran participants and new clients. Prior to beginning treatment,
clients would be assessed formally and informally to determine areas of cognitive impairment,
and a focused treatment plan is developed, where computer and other activities are recommended
that focus on the relevant cognitive domains (e.g., for problems with sustained attention, the
game Frippletration and gradually increasing time on a cognitive exercise from 10 minutes to 30
minutes). Clients attend at least twice per week for sessions of 60 to 90 minutes. Two-thirds of
session time is devoted to clients working with varying levels of independence on computer
activities at individual stations. The remaining third is reserved for Bridging groups, which meet
either during the last 30 minutes of a 90-minute session or on a separate occasion. Newer clients
will generally work less independently, will require more assistance, and will work at activities
for shorter periods. With time, these clients will progress to more challenging activities, where
working on one activity may last a full hour. Clients participate actively in the process of
choosing software to practice and logging their daily activities in their folders. However, the
therapist will periodically introduce a new computer activity for the clients to practice for 30 minutes, for example, and allow the remaining 30 minutes of a session to be the clients’ choice of activities.

The numerous therapeutic and confidence-building principles built into the NEAR model provide the foundations for its utility as an effective treatment for cognitive dysfunction in psychiatrically-disordered, inpatient populations. The significant treatment effects demonstrated in various research studies in a variety of settings with different diagnostic groups of patients supports the notion that the NEAR model may also successfully treat patients who are incompetent to stand trial (Schwalbe & Medalia, 2007; Zapf & Roesch, 2011).

The Current Study

A review of extant research supports the idea that more research is needed regarding competency restoration treatments. Schwalbe and Medalia (2007) suggested the possibility that the NEAR treatment model of cognitive remediation, having demonstrated efficacy in severely mentally ill inpatient populations, may also be useful as an additional module of treatment for restoring patients who are incompetent to stand trial. Thus, the current study is intended to be a pilot investigation to assess the effectiveness of using cognitive remediation as an additional module to add to standard hospital treatment, in order to more quickly and effectively restore patients’ competency to stand trial. The NEAR model of cognitive remediation has been selected for use in this study due to existing evidence for its success in improving cognitive functions and life skills in patients with schizophrenia and other psychiatric disorders. The outline of the NEAR model provided by the 2009 treatment manual lends stability to the treatment and assists in reliable treatment delivery.
In addition to competency to stand trial, the current study also focused on outcome variables related to verbal memory and problem-solving, as these two areas of cognitive functioning have been implicated as most relevant to adjudicative competence (Nestor et al., 1999). Research has shown cognitive remediation treatment effectively improves these two areas of cognitive ability. Studies on the NEAR model have demonstrated significant treatment effects on problem-solving measures (Medalia, Dorn, & Watras-Gans, 2000; Medalia et al., 2000, 2001). NEAR model treatment studies have also demonstrated significantly greater performance on measures of verbal memory after treatment (Hodge et al., 2010; Izekawa, 2012).

The research questions generated for this study include the following: Does the NEAR model of cognitive remediation, added to treatment as usual, make a difference on a patient’s competency to stand trial? Also, does this treatment make a difference on a forensic patient’s verbal memory? Lastly, does cognitive remediation produce any treatment effects on a forensic patient’s ability to solve problems? This project has been designed as the first pilot study to employ cognitive remediation in a forensic population to address these research questions. The current study adds to the empirical literature on the differential effectiveness of treatments to restore competency to stand trial. Although many studies have examined treatment effects resulting from cognitive remediation techniques, no known study has yet attempted to apply cognitive remediation for the purposes of restoring competence to stand trial in an inpatient, forensic setting.

**Hypotheses**

Primary Hypotheses: Competency to Stand Trial

1. Comparing change from Time 1 to Time 2, the treatment group will demonstrate more improvement on understanding the legal process, an aspect of competency to stand trial,
by obtaining significantly greater positive change scores on MacCAT-CA Understanding than the control group.

2. Comparing change from Time 1 to Time 2, the treatment group will demonstrate more improvement on reasoning through legal questions, another aspect of adjudicative competency, by obtaining significantly greater positive change scores on MacCAT-CA Reasoning than the control group.

3. Comparing change from Time 1 to Time 2, members of the treatment group will demonstrate more improvement on appreciation of their legal situation, another aspect of competency to stand trial, by obtaining significantly greater positive change scores on MacCAT-CA Appreciation than the control group.

Secondary Hypotheses: Verbal Memory and Problem-solving

4. Comparing change from Time 1 to Time 2, individuals in the treatment group will demonstrate significantly greater positive change in ability to solve problems, as measured by performance on the D-KEFS Sorting measure (using Free Sorting Confirmed Correct) than those in the control group.

5. Comparing change from Time 1 to Time 2, members of the treatment group will demonstrate more improved problem-solving ability by obtaining significantly higher negative change scores on the D-KEFS Twenty Questions subtest (using Number of Questions Asked) compared to those in the control group.

6. Comparing change from Time 1 to Time 2, patients in the treatment group will demonstrate significantly more improved short-term verbal memory by obtaining higher positive change scores on the CVLT-II Short Delay Free Recall Correct, than those in the control group.
7. Comparing change from Time 1 to Time 2, patients in the treatment group will demonstrate significantly more improved delayed verbal memory by obtaining higher positive change scores on the CVLT-II Long Delay Free Recall Correct, than those in the control group.

**Participant Demographics and Characteristics.** Participant demographics, such as age, race, education level, type of criminal charges, degree of mental illness, and type of mental illness may relate to the study variables. The association between participant demographics and scores on measures of adjudicative competence, verbal memory, and problem solving was explored.
2. Method

Design

The study variables are displayed in Table 1. This study utilized a between-groups treatment design, with two independent groups. Pre-test and post-test time periods were hereafter labeled Time 1 and Time 2, and groups were analyzed on change from Time 1 to Time 2 by the creation of continuous change scores. The fixed factor in this study is the experimental group assignment (to either the treatment group or the control group). Dependent variables are numeric change from Time 1 to Time 2 on measures of competence to stand trial, verbal memory, and problem-solving.

Table 1: Study Variables

<table>
<thead>
<tr>
<th>Independent Variable 1</th>
<th>Treatment condition (independent groups):</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><em>Extra treatment vs. treatment as usual (control group)</em></td>
</tr>
<tr>
<td>Dependent Measure 1</td>
<td>Change on MacArthur Competence Assessment Tool-Criminal Adjudication:</td>
</tr>
<tr>
<td></td>
<td><em>Understanding</em></td>
</tr>
<tr>
<td>Dependent Measure 2</td>
<td>Change on MacArthur Competence Assessment Tool-Criminal Adjudication:</td>
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<tr>
<td></td>
<td><em>Reasoning</em></td>
</tr>
<tr>
<td>Dependent Measure 3</td>
<td>Change on MacArthur Competence Assessment Tool-Criminal Adjudication:</td>
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<tr>
<td></td>
<td><em>Appreciation</em></td>
</tr>
<tr>
<td>Dependent Measure 4</td>
<td>Change on California Verbal Learning Test-II:</td>
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<tr>
<td></td>
<td><em>Short delay free recall correct</em></td>
</tr>
<tr>
<td>Dependent Measure 5</td>
<td>Change on California Verbal Learning Test-II:</td>
</tr>
<tr>
<td></td>
<td><em>Long delay free recall correct</em></td>
</tr>
<tr>
<td>Dependent Measure 6</td>
<td>Change on Delis-Kaplan Executive Function System:</td>
</tr>
<tr>
<td></td>
<td><em>Sorting-Free sorting confirmed correct</em></td>
</tr>
<tr>
<td>Dependent Measure 7</td>
<td>Change on Delis-Kaplan Executive Function System:</td>
</tr>
<tr>
<td></td>
<td><em>Twenty questions-Total questions asked</em></td>
</tr>
</tbody>
</table>
Participants

Study participants were male patients admitted for assessment and treatment to a maximum-security state forensic psychiatric facility, Taylor Hardin Secure Medical Facility, located in Tuscaloosa, Alabama. Patients who have been admitted to the facility have either a pending or adjudicated felony criminal case within the state of Alabama and have suspected or fully diagnosed mental health symptoms. Participants for the study included the following: those deemed “Incompetent to Stand Trial” (IST), a determination that was made by the courts based on a prior inpatient or outpatient forensic evaluation; those who have been admitted to the facility for a pretrial, inpatient evaluation of competence to stand trial (CST) due to concerns regarding competency; and those adjudicated by the courts as “Not Guilty by reason of Insanity” (NGI) for a felony crime. NGI patients were included in this study because most of them have a history of being incompetent to stand trial and extensive history of severe mental illness. Patients eligible to participate in the study included those who were newly admitted during the course of the study, as well as patients who were admitted prior to the beginning of the study and were still hospitalized at the facility.

An appropriate sample size for this study was based on a power analysis performed using the G*power program (Faul, Erdfelder, Lang, & Buchner, 2007). This study aimed to reach an overall power level of .75 using a .05 error probability rate and a large effect size of $r = .50$. A large effect size was assumed due to the need for not only statistical significance but also clinically meaningful change. It was established that at least 30 participants would be needed in the study, with 15 in each condition.

Eligibility for the study was recorded on an inclusion criteria sheet (see Appendix A). Patients were eligible for participation in the study if they met the following criteria:
1) The patient was given a legal status of NGI or a variant of IST or CST.

2) The patient was able to read at least at an estimated 4th grade reading level. An estimated minimum 4th grade reading level is recommended (Medalia et al., 2009) due to the reading level of the computer activities (the most challenging game, Where in the USA is Carmen Sandiego?®, is written for a minimum 4th grade reading level). Reading level was determined by performance on the Wide Range Achievement Test-Fourth Edition (WRAT-IV; Wilkinson & Robertson, 2006a). Scores on Word Reading and Sentence Comprehension were converted to estimated grade equivalents to determine reading ability. Evidence of known reading ability was also gathered through chart information.

3) The patient did not demonstrate evidence of intellectual deficiency (IQ < 70). The NEAR model of cognitive remediation has not been empirically validated for use with intellectually deficient individuals. Intelligence was estimated through the standard score on the Reading Composite of the WRAT-IV. Evidence of intellectual deficiency was also gathered through chart information including, for example, history of prior intellectual testing and/or a diagnosis of intellectual deficiency.

4) The patient was able to speak English.

5) The patient had his initial 10-day treatment team meeting. A patient’s 10-day meeting occurs within 10 days of his admission to the facility and is the first opportunity for his psychiatrist, along with the rest of his treatment team, to establish his diagnoses and the level of his psychiatric stability and/or impairment.

6) The patient was psychiatrically stable enough to participate in a research study with a graduate student. Psychiatric stability was operationalized through ratings on an 18-item version of the Brief Psychiatric Rating Scale (BPRS; Overall & Gorham, 1962), which was regularly
completed by the patient’s psychiatrist and filed in the patient chart. Each symptom category of the BPRS was rated on a scale from 1 to 7, where 1 is not present and 7 is extremely severe. In deciding whether a patient was safe enough to meet with a graduate student and participate in a research study, the psychiatrist was encouraged to consider, in particular, the following BPRS symptom categories: uncooperativeness, hostility, disorientation, suspiciousness, excitement/agitation, hallucinatory behavior, and conceptual disorganization. When the treating psychiatrist determined that a patient was stable enough to participate in this study, he or she signed the inclusion criteria sheet.

7) The patient was deemed competent to consent to research for the purposes of this particular study. This particular competency was determined by the psychiatrist on the patient’s treatment team and follows different criteria than those established for competency to stand trial. When the treating psychiatrist determined that a patient was competent to consent to this study, he or she signed the inclusion criteria sheet, allowing the patient to consent to research participation.

8) The participant signed a consent form indicating voluntary choice to participate in the research study.

9) The patient had a score of 0 on a modified version of the MacArthur Perceived Coercion Scale (MPCS; Gardner at al., 1993), indicating that he did not perceive any coercive influence to participate in the study.

10) The patient demonstrated at least mild baseline impairment in competence to stand trial and either verbal memory or problem solving skills. Mild baseline impairment in adjudicative competence was operationalized as Time 1 scores in the “mild impairment” range or lower on at least one of the three MacCAT-CA sections: less than 10 on Understanding, less than
11 on Reasoning, or less than 11 on Appreciation. Mild baseline impairment in verbal memory was operationalized as Time 1 scores of 0.5 standard deviation (SD) or lower than the mean on either test variable from the CVLT-II. The patient must have a Time 1 raw score of 9 or less on Short Delay Free Recall or 10 or less on Long Delay Free Recall. Mild baseline impairment in problem-solving skills was operationalized as Time 1 scores of 0.5 SD or lower than the mean on either test variable from the D-KEFS. Thus, the patient must have had a Time 1 score of either of the following: Sorting subtest/raw score of 9 or less on Free Sorting Confirmed Correct Sorts or Twenty Questions subtest/raw score of 31 or more on Total Questions Asked.

**Setting**

Located in Tuscaloosa, Alabama, Taylor Hardin Secure Medical Facility is a state-supported, maximum-security inpatient forensic hospital for Alabama residents who have been charged with a felony criminal offense and who present with symptoms of a severe mental illness. The facility contains three psychiatric units, one acute care unit housing approximately 25 residents and two long-term care units, each housing approximately 45 residents. Patients are involuntarily committed to undergo evaluation and/or obtain treatment at this facility. In general, treatment as usual for the forensic patients includes medications as deemed appropriate, therapeutic activities such as recreational and group therapy, and possible enrollment in an educational Courtroom Knowledge group (for IST and CST patients to assist in restoring competence to stand trial).

**Assessment Materials**

**Wide Range Achievement Test—Fourth Edition** (WRAT-IV; Wilkinson & Robertson, 2006a). The WRAT-IV is a well-established and well-validated screening instrument for achievement composed of 4 subtests: Word Reading, Sentence Comprehension, Spelling, and
Math Computation. For the purposes of establishing basic reading ability, only the Reading Composite was administered. The Reading Composite, which combines an examinee’s performances on the Word Reading and Sentence Comprehension subtests, establishes that a patient can not only sight read words but can also comprehend basic sentences. The Reading Composite standard score can be converted to a grade equivalent for the purpose of determining the grade level of reading ability. This standardized score also represents an estimate of the patient’s intellectual ability, which, along with reading ability, addresses two elements of eligibility to participate in the study. Because this test was only administered to ascertain eligibility, it was only administered once to the participant.

Reading tests have been developed to assess premorbid intelligence in persons who have experienced neurological disease or brain injury, as the ability to read words has been shown to be less sensitive to neurologic insult and remain largely intact (Gladsjo, Heaton, Palmer, Taylor, & Jeste, 1999). Reading tests have also been used effectively as a test of premorbid intellectual functioning in studies of patients deemed incompetent to stand trial, where diagnoses included Axis I psychiatric disorders, developmental disorders, and personality disorders (Nestor et al., 1999).

The Word Reading subtest is designed to measure encoding of letters and words through letter and word recognition. This subtest includes the task of reading up to 55 words out loud. Performance on the Word Reading subtest determines the start point for the Sentence Comprehension test. The Sentence Comprehension subtest is designed to measure the examinee’s ability to gather meaning from sentences and comprehend ideas and concepts contained within them. In this subtest, the examinee is administered a maximum of 50 items.
Each item consists of one or two sentences with a blank where the examinee fills in the blank with one or, at most, two missing words.

Data from the measure’s normative study (Wilkinson & Robertson, 2006b), based on a nationally representative U. S. sample of 3,000 people, provided median reliability coefficients for internal consistency ranging from .83 to .93 for the different individual subtests. The reliability coefficients for the Reading Composite score ranged from .91 to .99, and the coefficients for the complete WRAT-IV ranged from .92 to .98. Split-half reliability for the Reading Composite was .98. Regarding external validity, the WRAT-IV generated moderate to high correlations with other achievement tests. For example, the WRAT-IV Reading Composite correlated .78 with the Wechsler Individual Achievement Test-II (WIAT-II) Reading Composite and .83 with the Woodcock-Johnson Test of Achievement-III (WJ-III) Reading Comprehension. The WRAT-IV demonstrated good correlation with tests of intellectual functioning, as well, and the test manual provides tables to convert the Reading Composite, given certain demographic information, to an estimated IQ score. High scores indicate high intellectual ability, and low scores (e.g., below 70) indicate the lower extreme of intellectual ability.

**MacArthur Competence Assessment Tool-Criminal Adjudication** (MacCAT-CA; Hoge et al., 1999). Competency to stand trial was measured using the MacCAT-CA, a highly structured and standardized interview. This 22-item instrument examines three factors related to competency: Understanding, Reasoning, and Appreciation. A brief vignette presented at the beginning is the basis for questions from the first two sections. The first section, Understanding (8 items), assesses the patient’s ability to comprehend the adjudication process and aspects of the legal system. Each item in this section includes a brief, standardized teaching instruction related to the particular question. In this way, the test assesses ability to comprehend, rather than prior
accumulated knowledge. The second section, Reasoning (8 items), tests the patient’s ability to reason through legal questions and solve relevant problems related to the vignette. The last section, Appreciation (6 items), relates to the patient’s ability to appreciate his particular legal situation. Items are rated on a 3-point scale (0, 1, or 2) on the basis of highly standardized criteria. Higher scores (e.g., 10 to 16 on Understanding) indicate minimal impairment of adjudicative competence in the criminal context. The test does not result in a total score but in a separate assessment of each of the three factors considered most relevant to adjudicative competence.

The three factors of the MacCAT-CA map very well onto the main components of the Dusky standard. The MacCAT-CA section related to Understanding may be considered in correlation to a defendant’s factual comprehension of the proceedings (“factual understanding of proceedings against him”). The factor of Reasoning corresponds to the defendant’s “reasonable degree of rational understanding” in general. Lastly, the factor of Appreciation may potentially be seen as a measure of the defendant’s “sufficient present ability to consult with his attorney” and rational understanding of the proceedings particular to his case.

Grisso (2003) highly recommended the use of the MacCAT-CA for research studies, in addition to clinical settings, due to its highly structured format and well standardized administration. Large-scale validation studies demonstrated good reliability and validity (Otto et al., 1998). Internal consistency was supported by Cronbach’s alphas of .85 for Understanding, .81 for Reasoning, and .88 for Appreciation. Analyses of intrarater reliability revealed intraclass correlations of .90 for Understanding, .85 for Reasoning, and .75 for Appreciation. Construct validity was demonstrated by significant correlations with select clinical variables in the
validation study, and has been supported elsewhere through significant correlation (.82) with other measures of adjudicative competency (Zapf & Roesch, 2005).

**California Verbal Learning Test-II** (CVLT-II: Delis, Kaplan, Kramer, & Ober, 2000). The CVLT has been used in several studies of cognitive remediation using the NEAR model (Medalia, Revheim, & Casey, 2000; Medalia et al., 2002). The CVLT-II served as a measure of verbal learning and memory, including short-term, delayed recall, and recognition memory. The CVLT-II consists of multiple trials to learn and remember a list of 16 words related to concrete objects, beginning with 5 learning trials. The examinee is then given an interference trial with a second list of words to remember, followed by a short delay free recall of the first list. The examinee is then provided categorical cues to recall the first list. A delay of 20 minutes occurs, during which non-verbal activities are recommended. After the long delay, the participant must engage in free recall of items from the first list, followed by another cued recall. After the cued recall, the patient is administered a *yes-no* recognition trial to test delayed memory at the level of recognition. The measure also includes an embedded symptom validity test that utilizes a forced-choice paradigm to detect dissimulation. The forced-choice section is completed after a 10-minute delay of non-verbal activities.

The CVLT-II was chosen as a measure of verbal memory due to its ease of administration, good reliability, and availability of alternate forms for repeat testing. Alternate forms were used at Time 2 to minimize practice effects from exposure at Time 1. While the CVLT-II offers a large number of variables with valuable information related to learning and verbal memory, the researcher has selected two distinct variables for measurement of verbal memory: short delay free recall correct and long delay free recall correct. Measures of delayed free recall in verbal learning tests have commonly been used in research assessing the gains of
cognitive remediation treatment (Hodge et al., 2010). The CVLT-II provides scores standardized according to age and education.

Split-half reliability was calculated to be .94, and test-retest stability was .82. The coefficient alpha for assessing internal consistency was .82. The test demonstrated alternate form reliability ranging of .79 on key variables. When compared to the CVLT-I, the CVLT-II demonstrated construct validity through correlations ranging from .72 to .86 (Delis et al., 2000).

**Delis-Kaplan Executive Function System** (D-KEFS; Delis, Kaplan, & Kramer, 2001a). The Sorting and Twenty Questions subtests from the D-KEFS were administered as measures of problem-solving. For the Sorting subtest, the researcher selected the variable Free Sorting Confirmed Correct, which has been utilized in cognitive remediation research as an outcome variable related to problem-solving ability (Hodge et al., 2010). For the Twenty Questions subtest, the researcher opted for the variable Total Questions Asked.

The Sorting subtest begins with a free sorting test, where participants sort a series of six cards into two different categories and describe the rule used. During a structured, sort recognition task, the examiner sorts the cards into categories and the participant must name the rule. Beatty, Jocic, Monson, and Katzung (1994) demonstrated the construct validity of the Sorting subtest (formerly known as the California Card Sorting Test), through significant correlations with the Wisconsin Card Sorting Test (WCST; Heaton, 1981), as well as the efficacy of its use for studying problem-solving skills in schizophrenic patients. The D-KEFS Sorting subtest was selected over the WCST due to availability of alternate forms (to be used at Time 2), and because the right-wrong feedback of the WCST tends to be more frustrating for patients with low education or moderate to severe cognitive dysfunction (Delis, Kramer, Kaplan, & Holdnack, 2004). Validity studies conducted by the test developers (Delis, Kaplan, & Kramer, 2001b)
demonstrated test-retest reliability coefficients of .75 for the free sort task and .65 for the sort recognition. The alternate form reliability coefficient was .39 for the free sort and .72 for the sort recognition.

In the Twenty Questions subtest of the D-KEFS, the participant is given four trials to ask the fewest yes-no questions possible to determine the target object on a page picturing 30 common objects. The examinee earns a total weighted achievement score based on the total number of questions asked across all four trials. An alternate form for Twenty Questions was used at Time 2 to minimize practice effects. During test development studies (Delis et al., 2001b), the split-half reliability coefficient across trials, corrected by the Spearman-Brown median, was .82, and the test-retest reliability was .24. Reliability coefficient for alternate forms was .37.

**Supplementary Assessment Materials**

The researcher selected three supplemental tests that are unrelated to the study hypotheses, but are necessary for administration as non-verbal, filler activities. As previously noted, the CVLT-II includes two instances of a required delay where non-verbal activities are strongly recommended. The use of non-verbal activities decreases the risk of verbal-modality interference in an assessment of an examinee’s verbal memory.

**Symbol Digit Modalities Test.** (SDMT; Smith, 1982). The Symbol Digit Modalities Test is a simple substitution task where the examinee is given a reference key of numbers and geometric symbols and must transpose symbols to numbers. The examinee is given 90 seconds to complete as many substitutions as possible. Typically, a written version is administered first, followed by an oral version of the task. The task can be utilized as a measure of shifting attention, short-term memory, complex visual scanning, motor speed, and perceptual speed. The
complete test requires approximately 5 minutes to administer and represents a nonverbal, filler
task to precede Trail Making Test.

**Trail Making Test.** (TMT). See Appendix B. This long-extant test was part of a larger
battery of tests called the Halstead-Reitan Neuropsychological Test Battery (Reitan & Wolfson,
1985). Part A of the task consists of timing the examinee as he sequentially connects 25
numbered dots scattered over a page. This task is a simple measure of processing speed, visual
scanning, and motor coordination. Part B of the task entails timing the examinee as he again
connects dots, this time alternating between letters and numbers. This task assesses the
examinee’s ability to engage in shifting mental set between ordering numbers and letters.
Administering both parts requires about 5 to 10 minutes. This task represents a non-verbal filler
task that is to be administered after SDMT.

**Examples of Computer Software Used During Treatment**

**Brainiversity.** (Brighter Minds). This computer software includes a collection of 24
activities designed to stimulate several cognitive domains such as memory and verbal skills. The
activities cover four subject categories: Language, Memory, Math, and Analysis. The researcher
utilized the activities designed for training in Memory, a collection of six different activities
including Repeat After Me, What’s New?, Card Memory, Shopping List, Phone Numbers, and
Visual Memory. The activities are designed to be enjoyable as well as oriented toward practical
uses and everyday activities. Brainiversity tracks the patient’s progress through various
activities.

**Math for the Real World.** (Knowledge Adventure). The activities included in this
package revolve around traveling with a band on a 10-city U.S. tour. Activities provide practice
with working memory, problem-solving, math skills, and common sense/social judgment. These
skills are practiced through everyday activities like managing money, buying food, using maps, etc. It is considered to be a moderate level of difficulty by NEAR authors (Medalia et al., 2009). This package represented an optional choice for practicing problem-solving skills in various domains.

**Thinkin’ Things, Collection 2.** (Edmark). This software contains a collection of different games (e.g., Frippletration) that target sustained attention, auditory and visual memory, processing speed, patterns, and spatial awareness. Frippletration is a highly recommended starter exercise (Medalia et al., 2009) that can test attention and memory in either a visual or auditory modality. Frippletration consists of a matching activity, where the patient may reveal two pictures or sounds at a time, and remember their locations, in an effort to find matching pairs. The exercises on this disc also offer various levels of difficulty from easy to difficult.

**Thinkin’ Things, Collection 3.** (Edmark). This software contains a collection of different games (e.g., Fripple House, Stocktopus) that target verbal working memory, sequencing, planning, organizational strategies, deductive reasoning, and discrimination and categorization of information in order to solve problems. For the purposes of this study, the games served as an aid to training verbal memory as well as problem solving. All games in this package offer levels of difficulty ranging from easy to difficult, and this package is recommended for the earlier stages of treatment (Medalia et al., 2009).

**Where in the World is Carmen Sandiego?® and Where in the USA is Carmen Sandiego?®** (The Learning Company). This educational software was used as part of treatment and focuses on problem-solving, organization, sequencing, accuracy, scanning, dual-tasking, concentration, sustained effort, working memory, procedural learning, reasoning, and initiation of goal-directed behavior. The purpose of the game is for the “detective” to solve a fictional
criminal case by interpreting mysterious clues, interviewing witnesses, and tracking the suspect to make an arrest. The text used by the game requires an estimated 4th grade reading level. The interactive game has been used in numerous NEAR studies as a treatment specifically for training problem-solving (Medalia et al., 2001, 2002).

**Zoombini’s Logical Journey.** (The Learning Company). The theme of this software is an adventure to help the Zoombinis find a new homeland. As the player travels across treacherous terrain, he is asked various questions of logic that require reasoning, pattern-finding, and problem-solving skills. Solving the puzzles opens up new areas for travel for the Zoombinis. The game offers four different levels of difficulty, and players move their way up in levels. This software was offered as an optional activity to practice problem-solving.

**Procedure**

**Use of volunteers.** While the researcher maintained primary responsibility for the conduct of the study, she received assistance in conducting some research activities by 11 graduate students studying clinical psychology with a focus on psychology and law (i.e., 2 students in their 1st year, 2 students in their 2nd year, 2 students in their 3rd year, 2 students in their 4th year, and 3 students in their 5th year). Overall, the volunteers were predominantly female (i.e., 10 female and 1 male) with an average age of 27.4 years (Range = 23 to 40 years). Of the 11 volunteers, 7 students were assigned to assessment activities, 3 to therapy, and 1 to being a fidelity rater. The researcher delivered the intervention to 12 participants, while the remaining 4 participants at the end of the study were divided amongst the 3 clinical graduate student therapists (i.e., 1 to 2 participants each, with 1 therapist devoted to group activities).

**Identification of eligible patients.** Recruitment initially began with psychology students starting to fill out an inclusion criteria sheet for each patient. Based on information from the
patient’s chart, the student completed the first set of items related to speaking English, legal status, and known evidence of reading ability and intelligence. For patients who met the first set of criteria, the partially completed forms were distributed to the assigned psychiatrist for consideration. The assigned psychiatrist considered current BPRS ratings on the patient and completed the remainder of the form to determine whether the patient was appropriate to participate in this research study. The treating psychiatrist also made a clinical determination regarding the patient’s current competence to consent to participation in this study. If the psychiatrist approved the patient, he or she signed the form, and it was routed back to psychology.

During the course of the study, recruitment continued with psychology students starting an inclusion criteria sheet as part of the intake process for each newly admitted patient. The student completed the first set of items related to speaking English, legal status, and evidence of reading ability and intelligence. For patients who met the first set of criteria, the partially completed forms were distributed to the assigned psychiatrist for consideration at the patient’s first treatment team meeting. This meeting of the new patient and his treatment team is called a 10-day meeting because it is required that the facility schedule the first treatment team meeting within the first 10 days of a patient’s hospitalization. BPRS ratings are determined by the treating psychiatrist during the 10-day meeting and at every treatment planning conference thereafter. The assigned psychiatrist considered current BPRS ratings on the patient, and whether the patient was competent to consent to research at that time, and completed the remainder of the form to determine whether the patient was appropriate to participate in this research study. If the psychiatrist approved the patient, he or she signed the form, and it was routed back to psychology. If initial BPRS ratings exceeded the acceptable criteria but the patient would
otherwise be eligible, a member of the treatment team (either psychiatry or psychology) would periodically review the patient’s chart for change in psychiatric stability that would indicate sufficient stabilization to participate.

**Staff approach.** When completed forms on eligible and approved patients were received in psychology, a member of the psychology staff contacted the researcher. The researcher coordinated with available psychology staff to enlist assistance with first approaching patients about the study. Using the script written by the researcher (see Appendix C), the staff person approached each eligible patient individually on the patient’s unit to briefly introduce the research study in general terms and ask about initial interest in learning more about it. The researcher stood in view of the patient but far away enough to be out of earshot. If a patient expressed initial interest and consented to talk to the researcher, the staff person pointed out the researcher to the patient. The staff person handed the patient’s criterion form to the researcher for follow-up. Only then was the researcher authorized to approach the patient for recruitment. Each eligible patient was only approached once to inquire about participating in the study. To encourage participation, patients were offered incentives to participate in the study. Specifically, each participant was given a $10 phone card for completion of the pre- and post-treatment assessments, regardless of their group assignment.

**Informed consent process.** Eligible and interested patients were approached and provided further information about the study from the researcher. Patients were told that the study was examining a cognitive skills treatment for patients, and the study would take about five weeks to complete. The researcher informed eligible patients that participation included testing on how they read, think, and solve problems, on two separate occasions, and may include participating in additional activities to occur every week. The researcher reviewed with each
patient an informed consent form (see Appendix D) that stressed the voluntary nature of participation and the confidentiality of his information and the test results. It also informed participants that they retain the right to withdraw from participation at any time for any reason without penalty. The researcher also informed the patient that participation or lack of participation would not impact his current legal status. The researcher addressed any questions and explained further any areas as necessary. Patients demonstrated understanding of the informed consent, including the purpose and the procedures of the study, the voluntary nature of participation, outcome of services, and confidentiality, by answering simple questions about these topics (see Appendix E Check for Understanding of Consent). If patients demonstrated understanding and agreed to participate in the study, they were asked to sign the consent form. During the consent process, patients were given the option to discuss research participation with family members, loved ones, or others before making a decision to participate. This option was documented as part of the Informed Consent form. However, during the course of the study, no participants chose to contact loved ones for advice before making a decision.

Next, the patient was asked to sign an Authorization for Use/Disclosure of Health Information for Research (see Appendix F) so that the researcher could gather additional information from the patient’s chart. Lastly, the researcher administered a revised MacArthur Perceived Coercion Scale (MPCS; see Appendix G) to ensure that the participant did not feel coerced. The participant needed to score a 0 on the measure (denoting no coercion) to participate in the study.

The original signed consent forms were thereafter stored in a secured file cabinet in a locked office at Taylor Hardin and were maintained separately from individual testing data. A copy of the signed consent form was placed in the patient’s medical chart.
**Chart review.** The Authorization for Use/Disclosure of Health Information authorized the researcher to gather chart information concerning research variables and information relevant to ongoing participation in the study. The researcher needed the patient’s schedule of group treatment so that she could schedule research activities around it. During the course of the study, in order to maintain a safe environment, the researcher needed to stay informed about safety issues the patient may have, including recent violent or suicidal episodes, ward restrictions, phone restrictions, and whether he is allowed to have a female escort. The researcher also wanted to stay informed about significant changes in the patient’s psychiatric stability and competency to consent to research in order to maintain a safe and ethically appropriate treatment environment for the patient. Lastly, the researcher needed some basic information to compare treatment and control groups, as these variables may affect response to treatment. Chart information was necessary to describe the sample of participants according to demographic and other information and to assess whether the randomization process produced equivalent groups. Such information included age, race/ethnicity, years of education, diagnosis, and length of stay at Taylor Hardin. The researcher employed a patient data sheet (see Appendix H) to collect the above-described chart information as well as to record scores from testing. Each participant was given a unique, randomized participant code to be used on all protocols and potentially identifying information to maintain confidentiality.

**Assignment to group.** Recruitment of participants and group assignment occurred in two stages with two different methods. The first stage concerned the potentially eligible patients who are already held at Taylor Hardin at the start of the study. This group of patients evidenced a widely varying length of stay (LOS) in days, with some patients having just arrived and others having been hospitalized at Taylor Hardin for a number of years. Eligible patients who signed
the consent form were recorded in accordance to their LOS. To control for the potential confound of this widely varying hospitalization period, the researcher, after patient consent had been given, conducted a simple alternating (ABAB) process for group assignment after placing them in order by LOS. The patients were placed in order from longest LOS to shortest LOS. Beginning with the patient with the longest LOS, the researcher assigned each individual in an alternating pattern to either the control group (A) or the treatment group (B). The researcher continued this alternating process until all the current patients had been assigned to a group. In this manner, if an odd number of patients were present at the start, the next eligible patient to be admitted could balance the unmatched one on short LOS.

The second stage of patient recruitment concerned the continuous enrollment of patients as they are admitted to Taylor Hardin. After having enrolled an even number of patients out of the current population, the newly admitted, eligible patients who have consented to participation were also assigned to group in alternating sequence (control group, treatment group, control group, etc.). This process of enrollment allowed for immediate assignment to group.

**WRAT-IV assessment.** After patient consent was obtained, each participant was administered the WRAT-IV Reading sections to determine minimum requirements of reading comprehension and estimated intelligence. The measure takes an estimated 15 to 20 minutes to complete. The WRAT-IV Reading was administered once, after patient consent, strictly to determine eligibility for the study.

**Time 1 assessment.** All testing measures were administered by clinical psychology graduate students who were trained on the use of these specific instruments. Use of a blind procedure ensured that the assessors were unaware of the participant’s experimental condition, and the researcher was blind to test scores until all research participants completed the study.
After the completion and scoring of the WRAT-IV Reading Composite, eligible participants were tested with the full battery of measures to assess baseline cognitive functioning before treatment. See Figure 1 for a diagram of the assessment plan. The MacCAT-CA required 25 to 55 minutes for completion. This measure was administered first and separately from the other measures to minimize participant fatigue and potentially waning attention during testing. Excessive participant fatigue could have significant detrimental effects on performance, and evaluators were trained to remain vigilant for signs of fatigue and offer to take a short break when necessary and possible.

Next, on a separate occasion, the participant was administered CVLT-II Learning Trials 1 through 5, Interference List B, Short Delay Free Recall and Short Delay Cued Recall, which was estimated to take about 16 minutes. A 20-minute delay comprised of non-verbal activities occurred before the remainder of the CVLT-II could be administered. During this delay, the examiner administered the DKEFS Sorting subtest (approximately 20 minutes). The examiner then administered the CVLT-II Long Delay Free Recall, Long Delay Cued Recall, and Long Delay Yes/No Recognition, which was estimated to take approximately 6 minutes. Another 10-minute delay of non-verbal activities is required, wherein the SDMT and the TMT was administered (approximately 5 minutes each). The examiner next administered the Forced Choice Recognition section of the CVLT-II, which takes approximately 2 minutes. Lastly, the participant completed the D-KEFS Twenty Questions subtest in approximately 10 minutes. Assessment with the CVLT, DKEFS, SDMT, and TMT was estimated to require 64 minutes. Opportunities for testing breaks during this group of cognitive tests were significantly more limited due to required delay times and the importance of accurately assessing delayed verbal memory within the testing period. This first round of testing, including the MacCAT-CA, was
Figure 1. Diagram of Assessment Plan

<table>
<thead>
<tr>
<th>Test</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>WRAT-IV</td>
<td>15-20 minutes (one time only, completed on separate occasion)</td>
</tr>
<tr>
<td>MacCAT-CA</td>
<td>25-55 minutes (may be completed on separate occasion)</td>
</tr>
<tr>
<td>CVLT-II Learning Trials 1-5</td>
<td>estimated 16 minutes</td>
</tr>
<tr>
<td>CVLT-II Interference List B</td>
<td></td>
</tr>
<tr>
<td>CVLT-II Short Delay Free Recall</td>
<td></td>
</tr>
<tr>
<td>CVLT-II Short Delay Cued Recall</td>
<td></td>
</tr>
<tr>
<td>DKEFS Sorting</td>
<td>20 minutes</td>
</tr>
<tr>
<td>CVLT-II Long Delay Free Recall</td>
<td>estimated 6 minutes</td>
</tr>
<tr>
<td>CVLT-II Long Delay Cued Recall</td>
<td></td>
</tr>
<tr>
<td>CVLT-II Long Delay Yes/No Recognition</td>
<td></td>
</tr>
<tr>
<td>Symbol Digit Modalities</td>
<td>5 minutes</td>
</tr>
<tr>
<td>Trail Making A and B</td>
<td>5 minutes</td>
</tr>
<tr>
<td>CVLT-II Forced Choice Recognition</td>
<td>estimated 2 minutes</td>
</tr>
<tr>
<td>DKEFS Twenty Questions</td>
<td>10 minutes</td>
</tr>
</tbody>
</table>
deemed Time 1.

**Treatment phase.** Following pre-testing, a five-week period followed in which patients assigned to the treatment group attended treatment and patients assigned to the control group were given treatment as usual. The patients assigned to the treatment group began attending treatment sessions, to be held on weekday evenings in a group room outside of the patients’ ward. Every week for five weeks, patients in the treatment group attended two one-hour sessions of individual treatment utilizing computer-based educational games on a facility-approved laptop, and one Bridging Group session of one-hour, that consisted of all current members of the treatment condition meeting as a group. During the computer sessions, patients practiced computer activities specifically designed to focus on memory and problem-solving. Therapists allowed the patient to choose his activities for the first 30 minutes, after which they introduced new software periodically and asked the patient to spend a minimum amount of time practicing it (usually 20-30 minutes). During the bridging sessions, participants discussed their progress and how the activities they have completed utilized certain cognitive skills and apply to real-world situations. The NEAR treatment manual recommends bridging groups consisting of six to eight clients. During the course of the present study, bridging groups usually consisted of three to five patients.

Each individual patient followed treatment in accordance with his session-by-session schedule (see Appendix I), indicating, for example, that patients in the first individual session learn the basics of using a computer and begin practicing very basic computer activities. Patients were responsible for recording their daily computer activities in an Individual Session Log (see Appendix J). They also added periodically to a list of Software I Have Learned to Use (see Appendix K), in which they name the software and the cognitive skills they practiced through
that software. The purpose for logging their own activities in this manner is to create a sense of personal responsibility and ownership as well as build onto the sense of competence that patients develop through successes in the computer activities. NEAR model authors also recommended the use of certificates to give to patients to mark achievements (Medalia et al., 2009). Over time the therapist took note of the types of activities the patient chose, how long the patient typically spent on one activity, how willing the patient was to try new activities, and the level and frequency of apparent frustration. The therapist used this information to assist the patient in selecting types of activities and monitor the patient’s progress.

Assistance was given as needed, in accordance with NEAR values that emphasize autonomy and self-determination (Ryan & Deci, 2000). Many patients needed instruction on how to use the computer (a script for these instructions was provided in the manual). Patients initially needed instruction and prompting to document their activities. All patients required instruction to understand new computer software that was periodically introduced by the therapist, and patients were educated briefly regarding which cognitive domains the tasks cover. The therapist interspersed periodic positive and specific feedback to provide validation (e.g., “You seem to have really gotten the hang of using the computer”) and tapered off this feedback gradually as patients built self-confidence in their abilities.

Coaching was gradually reduced as patients become more independent. However, especially during the early sessions, many patients came to a stumbling block and had questions as to how to move forward on a task. For this purpose, the authors of the NEAR model (Medalia et al., 2009) described a guided question strategy (see Appendix L), where the therapist begins by asking broad questions, such as “What is your goal in this activity?” “What do you think is the next step?” The therapist may also say, “I noticed you did X; do you think it worked well? (if
not) Let’s go back and try something else.” If broad questions do not adequately guide the patient, specific questions are asked in accordance with a hierarchical order. Step 1 in the outer circle of the diagram represents the most general questions the therapist can ask. Step 2 is the next circle one level in, and therapist asks more specific questions in an effort to assist without simply giving the answer. Step 3 is even more specific questions (e.g., “Where do all the Fripples who wear hats live?”). Should these specific questions fail to guide the patient, the therapist helps the patient move forward by giving the answer or suggests trying a different activity altogether. The therapist also often asks questions to help patients begin to consider how their activities translate to real life. For example, the therapist may ask, “How do you think doing this activity will help you outside of here?” or comment, “You told me you had problems with your memory; do you think this activity might help you? How so?”

The five weeks of Bridging Groups followed the concept of “Cognitive Skills Building Groups” described in Medalia’s NEAR model of cognitive remediation. Topics and activities comprising the five one-hour groups were selected from two treatment manuals commonly utilized by NEAR treatment providers. The first manual, Bridging Groups for Cognitive Remediation: 30-Session Plan developed by Medalia, Saperstein, and Einzig, is the group treatment manual corresponding to the 2009 NEAR manual. This group manual provided the topics and activities for the first group session, which focused on educating the group about cognitive skills in general, and for the last two group sessions focused on improving problem solving skills. As an example of a group task outlined in the manual, one activity that served to review cognitive skills required each group member to pull a slip of folded paper out of a bowl. Written on each slip of paper was a cognitive skill, such as short-term memory. Each patient was asked to think of a good example of the skill they had selected (e.g., keeping a phone
number in mind until you can write it down). Taking turns, each patient described the example he had developed, and other patients tried to figure out which cognitive skill it represented.

An example of a problem solving exercise from the group manual is given in Appendix M. In this example, a woman Paula is having trouble finding the doctor’s office so she can get to her appointment. The group is asked to brainstorm things that Paula can do as well as ways she can get more organized for future doctor visits. The second manual used was Twamley’s Compensatory Cognitive Training manual (2011), which provided talking points and activities for the two group sessions focused on improving verbal memory. For example, participants were given a grocery shopping list and, to illustrate the compensatory memory strategy of categorizing, were asked to categorize the shopping list of nine items into three categories of three items. Participants were able to remember the list of multiple items better after developing categories for them.

**Treatment fidelity.** Due to the recognized importance of treatment fidelity (Bellg et al., 2004; Lichstein, Riedel, & Grieve, 1994; Moncher & Prinze, 1991), the researcher incorporated several practices to maximize adherence to the NEAR model of cognitive remediation. The authors of NEAR recommended a number of methods for enhancing treatment fidelity, such as adherence to the treatment manual, intensive training, and regular supervision with a trained expert (Medalia et al., 2009). While regular supervision from a professional experienced in the NEAR model was not possible for the present study, other practices were used. As Medalia and colleagues recommended, the use of manualized treatment and specialized training helps maintain fidelity to the model. The researcher conscientiously adhered to the manuals and traveled to an outpatient community mental health center where the NEAR model of cognitive remediation is practiced regularly—The Bridge operated through Columbia University, New York.
York, New York. Visiting a Learning Center in action, and viewing the therapists using the particular NEAR techniques to facilitate patient learning, assisted in training the researcher on the use of the treatment. Therapists there also provided two manuals of structured and semi-structured cognitive activities they recommended for use during Bridging Groups.

In addition to manual adherence and visiting a Learning Center, the researcher utilized fidelity checklists, a trained fidelity rater, trained alternate therapists, and training booster sessions. The researcher developed two fidelity checklists, one for the individual computer training sessions (see Appendix N) and one for the Bridging Groups (see Appendix O). Each checklist outlined specific aspects of treatment delivery and treatment receipt (see Lichstein, Riedel, & Grieve, 1994). Treatment delivery refers to how well the therapist’s treatment efforts adhered to the conceptual principles and unique design of the treatment used (in this case, the NEAR model of cognitive remediation). Treatment receipt means the degree to which patients showed in-session gains that are expected in accordance the particular treatment used. Treatment receipt may be gauged by general behavioral observations such as evidence of paying attention and remembering conveyed information as well as specific and measurable progress on computer games, for example. These checklists were used by the researcher to periodically rate herself (at least once per week, alternating between computer sessions and the group) and provide a written reminder of important practices to utilize. The checklists were also used by a separate fidelity rater and trained alternate therapists. The fidelity rater provided ratings on the basis of in vivo observations (with the prior consent of the participant).

Together with the researcher/primary therapist, training for the fidelity rater entailed study of the manual, review of the principles of NEAR and the techniques utilized in the model, and learning how to use the educational software, as well as role playing to practice use of the
model to facilitate learning in patients. The fidelity rater observed and rated the researcher at least once per week for the first five weeks, then one to two occasions every other week during the fifth month, alternating between observation of the computer sessions and the bridging group. The researcher, the fidelity rater, and three new alternate therapists met for training seven months into the study to freshen current therapist skills and minimize treatment drifting as well as to provide formal training for the three new alternate therapists. This training entailed the same elements as the original training. Each new therapist was rated at least twice during the last five weeks of the study, with ratings alternating between individual and group sessions.

**Time 2 assessment.** After 15 sessions of treatment were completed by a patient in the treatment group or the equivalent amount of time (5 weeks) passed for a patient in the control group, the participant was again provided the consent form for review and signature. The participant was also asked questions to gauge his understanding of the consent, to ensure that his understanding and appreciation of the consent had not been significantly impacted by fluctuation of his mental illness. After Time 2 consent was completed, each patient was administered the second round of testing for Time 2. The procedure here was the same as the Time 1 testing: MacCAT-CA (separate), first sections of the CVLT-II (Trials 1-5, Interference List B, Short Delay Free Recall and Short Delay Cued Recall), D-KEFS Sorting, the next sections of the CVLT-II (Long Delay Free Recall, Long Delay Cued Recall, and Long Delay Yes/No Recognition), SDMT, TMT, the Forced-Choice Recognition section of the CVLT-II, and finally D-KEFS Twenty Questions.

**Debriefing.** Upon a participant’s completion of the study, the researcher provided a Debriefing Form (see Appendix P), debriefed the participant on the goals of the study, and addressed any questions or concerns the patient had.
Protection of Human Participants

The researcher obtained Institutional Review Board (IRB) approval from Taylor Hardin Secure Medical Facility as well as from The University of Alabama to conduct the study. In order to ensure data from pre-trial research participants remained confidential and protected from forced disclosure, the researcher also obtained a Certificate of Confidentiality from the National Institute of Mental Health (NIMH) (see Appendix Q).

There were minimal foreseeable risks to patients who chose to participate in this study. All participant information was completely de-identified to maintain confidentiality. Participants were introduced to the research study with the option and right to withdrawal without penalty. Participants were debriefed about the research purposes and goals, and were given the opportunity to immediately ask questions or address concerns. If questions or concerns arose after study completion, participants were directed to contact the primary investigator, faculty advisor and licensed clinical psychologist, or the university’s research compliance officer.
3. Results

The current study utilized independent groups and had a total sample size of 33. Due to the small and unequal sample sizes (16 participants in the treatment condition, and 17 participants in the control group) as well as violations of assumptions of normality, it was necessary to examine the data using non-parametric analyses. Analyses with Mann-Whitney $U$ were used to test whether groups differed on the dependent variables. Mann Whitney $U$ has been used in other studies examining competency restoration (e.g., Bertman et al., 2003) and studies testing cognitive remediation (e.g., Medalia, Dorn, et al., 2000). To examine the effect of treatment and incorporate Time 1 performance, change scores were calculated from Time 1 to Time 2 on each dependent variable for each participant. Mann-Whitney $U$ was employed to test for whether groups tended to differ on the change scores. As described by Clark-Carter (2009), effect sizes with Mann-Whitney $U$ were calculated with the following equation: 

$$r = \frac{z}{\sqrt{N}},$$

where $N$ is the total number of cases, and $z$ is the standardized score for the Mann-Whitney $U$.

The Mann-Whitney $U$ test, developed by Mann and Whitney (1947), is a nonparametric statistical technique for comparing two independent groups on a continuous measure, and it compares ranks and medians, as opposed to means and variance in parametric statistics. When using Mann Whitney $U$, scores for each group are placed in numerical order and converted to ranks. The ranks of scores for the two groups are then compared. Due to the rank-ordering process, analyses are less affected by extreme scores and scores that do not represent a normal distribution. The test is designed to determine whether two independent samples represent either
two populations with different median values or two different distributions with respect to the rank ordering of scores in two population distributions (Sheskin, 2003).

The Mann-Whitney technique of data analysis may be selected when the assumptions of a t-test for two independent samples are violated, including unequal sample sizes in the two groups, small samples overall, and data that do not represent a normal distribution (Gibbons & Chakraborti, 1991). Evidence also supports that Mann-Whitney U is less affected by a violation of the homogeneity of variance (Sheskin, 2003). Compared to a t-test, Mann-Whitney is more robust to these violations and is more likely to reveal significant differences when such differences are in fact present (Gibbons & Chakraborti, 1991). Use of the Mann-Whitney U test nevertheless includes its own assumptions (Daniel, 1990; Marascuilo & McSweeney, 1977): a) Each group sample must be randomly selected from the population it represents; b) The two samples must be independent of one another; c) The dependent variable to be ranked is a continuous variable; and d) The underlying distributions from which the samples are derived are identical in shape. In cases where the last assumption is violated, as occurred in this study, it is recommended to report mean ranks, instead of medians, and consider the group differences in terms of different distributions, rather than a difference of medians (Hart, 2001).

**Participant Characteristics**

Approximately 94% of the sample completed both the pre- and post-treatment assessments (see Figure 2), and 81% of participants in the treatment group completed all sessions of treatment before completing Time 2 assessments. Table 2 presents the demographic and clinical characteristics for the full sample, as well as separately for the treatment and control group. The sample was largely African-American (78.8%) with an average age of 39.33 years ($SD = 13.40$). Criminal charges related to murder, attempted murder, or manslaughter
Figure 2: Flow of Participants through the Course of the Study

136 patients

54 ineligible, including:
27 too mentally ill/not appropriate
19 intellectually or cognitively impaired
5 not criminally charged
3 do not speak English

82 patients approached

29 refused

53 consented

3 discharged
3 refused to do testing

47 screened

12 disqualified, including:
6 had Time 1 scores too high
5 failed the WRAT
1 faked low scores at Time 1

35 participants at Time 1

Time 1 Testing

2 discharged before Time 2 testing could be done

Time 2 Testing

Control Group:
17 participants

Treatment Group:
16 participants

3 refused to do testing

53 consented

82 patients approached

29 refused
Table 2: Demographic and Clinical Characteristics of the Sample

<table>
<thead>
<tr>
<th>Variable</th>
<th>Overall (n = 33)</th>
<th>Treatment (n = 16)</th>
<th>Control (n = 17)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length of Stay (M ± SD)</td>
<td>273.9 ± 372.7</td>
<td>319.2 ± 416.1</td>
<td>231.2 ± 333.9</td>
</tr>
<tr>
<td>Legal Status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CST/IST</td>
<td>8 (24.2%)</td>
<td>5 (31.3%)</td>
<td>3 (17.6%)</td>
</tr>
<tr>
<td>NGI</td>
<td>25 (75.8%)</td>
<td>11 (68.8%)</td>
<td>14 (82.4%)</td>
</tr>
<tr>
<td>Age (M ± SD)</td>
<td>39.3 ± 13.4</td>
<td>39.5 ± 13.3</td>
<td>39.2 ± 13.9</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>7 (21.2%)</td>
<td>2 (12.5%)</td>
<td>5 (29.4%)</td>
</tr>
<tr>
<td>Black</td>
<td>26 (78.8%)</td>
<td>14 (87.5%)</td>
<td>12 (70.6%)</td>
</tr>
<tr>
<td>Years of Education (M ± SD)</td>
<td>11.6 ± 2.1</td>
<td>11.6 ± 2.2</td>
<td>11.6 ± 2.2</td>
</tr>
<tr>
<td>Estimated IQ (M ± SD)</td>
<td>81.0 ± 10.2</td>
<td>80.8 ± 8.1</td>
<td>81.2 ± 12.2</td>
</tr>
<tr>
<td>Criminal Charge</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Murder/Manslaughter</td>
<td>13 (39.4%)</td>
<td>8 (50.0%)</td>
<td>5 (29.4%)</td>
</tr>
<tr>
<td>Rape/Sex Offense</td>
<td>4 (12.1%)</td>
<td>2 (12.5%)</td>
<td>2 (11.8%)</td>
</tr>
<tr>
<td>Assault/Kidnapping</td>
<td>6 (18.2%)</td>
<td>3 (18.8%)</td>
<td>3 (17.6%)</td>
</tr>
<tr>
<td>Burglary/Robbery</td>
<td>6 (18.2%)</td>
<td>2 (12.5%)</td>
<td>4 (23.5%)</td>
</tr>
<tr>
<td>Terrorist Threats</td>
<td>2 (6.1%)</td>
<td>1 (6.3%)</td>
<td>1 (5.9%)</td>
</tr>
<tr>
<td>Misc.</td>
<td>2 (6.1%)</td>
<td>0 (0%)</td>
<td>2 (11.8%)</td>
</tr>
<tr>
<td>BPRS Score (M ± SD)</td>
<td>24.2 ± 4.1</td>
<td>25.1 ± 3.3</td>
<td>23.3 ± 4.6</td>
</tr>
<tr>
<td>Diagnosis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schizophrenia</td>
<td>15 (45.5%)</td>
<td>8 (50.0%)</td>
<td>7 (41.2%)</td>
</tr>
<tr>
<td>Schizoaffective</td>
<td>5 (15.2%)</td>
<td>0 (0%)</td>
<td>5 (29.4%)</td>
</tr>
<tr>
<td>Psychosis NOS</td>
<td>5 (15.2%)</td>
<td>3 (18.8%)</td>
<td>2 (11.8%)</td>
</tr>
<tr>
<td>Delusional Disorder</td>
<td>2 (6.1%)</td>
<td>1 (6.3%)</td>
<td>1 (5.9%)</td>
</tr>
<tr>
<td>Bipolar</td>
<td>5 (15.2%)</td>
<td>3 (18.8%)</td>
<td>2 (11.8%)</td>
</tr>
<tr>
<td>Depression</td>
<td>1 (3.0%)</td>
<td>1 (6.3%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Personality Disorder</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Present</td>
<td>11 (33.3%)</td>
<td>6 (37.5%)</td>
<td>5 (29.4%)</td>
</tr>
<tr>
<td>Absent</td>
<td>22 (66.7%)</td>
<td>10 (62.5%)</td>
<td>12 (70.6%)</td>
</tr>
<tr>
<td>Drug/Alcohol Abuse</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Present</td>
<td>23 (69.7%)</td>
<td>10 (62.5%)</td>
<td>13 (76.5%)</td>
</tr>
<tr>
<td>Absent</td>
<td>10 (30.3%)</td>
<td>6 (37.5%)</td>
<td>4 (23.5%)</td>
</tr>
</tbody>
</table>

Note: CST = being evaluated for competence to stand trial; IST = determined Incompetent to Stand Trial; NGI = Not Guilty by reason of Insanity; IQ = intelligence quotient, as estimated by the Wide Range Achievement Test-Fourth Edition Reading Composite score; BPRS = Brief Psychiatric Rating Scale, 18-item.
represented the largest category (39.4%). Approximately three times as many NGI patients finished the study as CST or IST patients. The majority of the sample was diagnosed with some form of psychosis (including, for example, a severe mood disorder with psychotic features), and the most common diagnosis was schizophrenia (45.5% of the sample). Most of the patients (69.7%) also had comorbid diagnoses related to drug and/or alcohol abuse or dependence. One third of the group (33.3%) were also diagnosed with a personality disorder. Most participants had not finished high school and exhibited intelligence in the low average range.

**Comparing Groups at Time 1**

The researcher compared the initial, pre-test features of the individuals in the treatment group and the control group to determine whether randomization to group was successful or if significant differences existed between the groups. The researcher examined the influence of continuous factors such as age, reading ability/estimated intelligence (as operationalized by the WRAT-IV score), and symptom severity (BPRS scores). Mann-Whitney U calculations determined there were no significant differences on age, years of education, estimated intelligence, reading ability, and length of hospital stay. Even though the treatment group generally evidenced more severe symptoms (mean rank = 20.09) than the control group (mean rank = 14.09), the difference was marginal, $U = 87, z = -1.797, p = .072, r = .31$. Comparable findings are listed in Table 3. Chi Square tests for independence were conducted to test for group differences on categorical variables such as race, legal status, and criminal charges. Treatment and control groups did not significantly differ on race/ethnicity, legal status, type of criminal charges, category of mental illness, or presence of mood disorder, psychotic disorder, personality disorder, drug/alcohol abuse, cognitive impairments, or history of seizure or head injury. Chi square tests were conducted on all categories of crime as well as comparing murder
Table 3: Mann-Whitney $U$ Tests Comparing Group Characteristics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mann-Whitney</th>
<th>Probability Value</th>
<th>Effect size</th>
<th>Mean Rank Treatment n = 16</th>
<th>Mean Rank Control group n = 17</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOS</td>
<td>$U = 112$</td>
<td>$p = .377$</td>
<td>$r = .15$</td>
<td>18.53</td>
<td>15.56</td>
</tr>
<tr>
<td></td>
<td>$z = -0.883$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>$U = 134$</td>
<td>$p = .928$</td>
<td>$r = .02$</td>
<td>17.16</td>
<td>16.85</td>
</tr>
<tr>
<td></td>
<td>$z = -0.090$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Years of education</td>
<td>$U = 135$</td>
<td>$p = .971$</td>
<td>$r = .01$</td>
<td>17.06</td>
<td>16.94</td>
</tr>
<tr>
<td></td>
<td>$z = -0.037$</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Est. IQ</td>
<td>$U = 128$</td>
<td>$p = .759$</td>
<td>$r = .05$</td>
<td>17.53</td>
<td>16.50</td>
</tr>
<tr>
<td></td>
<td>$z = -0.307$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WR Grade</td>
<td>$U = 124$</td>
<td>$p = .665$</td>
<td>$r = .07$</td>
<td>17.75</td>
<td>16.29</td>
</tr>
<tr>
<td></td>
<td>$z = -0.434$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SC Grade</td>
<td>$U = 125$</td>
<td>$p = .691$</td>
<td>$r = .07$</td>
<td>17.69</td>
<td>16.35</td>
</tr>
<tr>
<td></td>
<td>$z = -0.397$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BPRS</td>
<td>$U = 87$</td>
<td>$p = .072$</td>
<td>$r = .31$</td>
<td>20.09</td>
<td>14.09</td>
</tr>
<tr>
<td></td>
<td>$z = -1.797$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: LOS = length of hospital stay; Est. IQ = intelligence quotient, as estimated by the Wide Range Achievement Test-Fourth Edition (WRAT-IV) Reading Composite score; WR Grade = Word Reading grade level on WRAT-IV; SC Grade = Sentence Comprehension grade level on WRAT-IV; BPRS = Brief Psychiatric Rating Scale, 18-item.
versus non-murder charges. Table 4 presents the relevant findings on these tests. Analyses of the characteristics of the treatment and control groups suggest that randomization to group was successful.

Regarding assessment scores at Time 1, Mann-Whitney $U$ analyses revealed no significant differences on any cognitive measures or the subsections of the MacCAT-CA devoted to Understanding and Appreciation. Table 5 presents the means and standard deviations, and Tables 6 and 7 outline the relevant Mann-Whitney analyses. There was, however, a significant Time 1 difference between groups on the Reasoning section of the MacCAT-CA, $U = 79$, $z = -2.068$, $p = .039$, $r = .36$, where the control group performed significantly better at Time 1 (mean rank = 20.35) than the treatment group (mean rank = 13.44).

**Primary Hypotheses: Competence To Stand Trial**

Experimental groups significantly differed on one measure of Time 1 performance. Thus, to examine the effect of treatment and incorporate Time 1 performance, change scores were calculated from Time 1 to Time 2 on each dependent variable for each participant (see Table 8 for means and standard deviations of the change scores). Mann-Whitney $U$ was employed to test for group differences on the change scores (see Table 9). Concerning Hypothesis 1, the difference between group scores on the Understanding section of the MacCAT-CA was not statistically significant, $U = 115$, $z = -0.785$, $p = .432$, $r = .14$. However, the mean rank of the change score for the treatment group (mean rank = 18.34) exceeded that of the control group (mean rank = 15.74) and the effect was small. Regarding Hypothesis 2, the treatment group demonstrated significantly more change on the Reasoning section of the MacCAT-CA (mean rank = 20.78) than the control group (mean rank = 13.44), with a medium effect size, $U = 76$, $z = -2.196$, $p = .028$, $r = .38$. Figure 3 illustrates the change in MacCAT-CA Reasoning from Time 1
Table 4: Chi Square Tests Comparing Group Characteristics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Chi Square</th>
<th>Probability Value</th>
<th>Effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Race/ethnicity</td>
<td>$\chi^2 (1, n = 33) = .58$</td>
<td>$p = .45$</td>
<td>phi = -.21</td>
</tr>
<tr>
<td>Legal status</td>
<td>$\chi^2 (1, n = 33) = .26$</td>
<td>$p = .61$</td>
<td>phi = -.16</td>
</tr>
<tr>
<td>Crime categories, all</td>
<td>$\chi^2 (5, n = 33) = 3.33$</td>
<td>$p = .65$</td>
<td>Cramer’s V = .32</td>
</tr>
<tr>
<td>Murder vs. Non</td>
<td>$\chi^2 (1, n = 33) = .73$</td>
<td>$p = .39$</td>
<td>phi = -.21</td>
</tr>
<tr>
<td>Mental illness type</td>
<td>$\chi^2 (5, n = 33) = 6.44$</td>
<td>$p = .27$</td>
<td>Cramer’s V = .44</td>
</tr>
<tr>
<td>Mood disorder</td>
<td>$\chi^2 (1, n = 33) = .77$</td>
<td>$p = .38$</td>
<td>phi = -.21</td>
</tr>
<tr>
<td>Psychotic disorder</td>
<td>$\chi^2 (1, n = 33) = .00$</td>
<td>$p = .96$</td>
<td>phi = -.12</td>
</tr>
<tr>
<td>Personality disorder</td>
<td>$\chi^2 (1, n = 33) = .02$</td>
<td>$p = .90$</td>
<td>phi = .09</td>
</tr>
<tr>
<td>Drug/alcohol abuse</td>
<td>$\chi^2 (1, n = 33) = .24$</td>
<td>$p = .62$</td>
<td>phi = -.15</td>
</tr>
<tr>
<td>Cognitive impairment</td>
<td>$\chi^2 (1, n = 33) = .01$</td>
<td>$p = .93$</td>
<td>phi = .09</td>
</tr>
<tr>
<td>Seizure or head injury</td>
<td>$\chi^2 (1, n = 33) = .00$</td>
<td>$p = .99$</td>
<td>phi = .01</td>
</tr>
</tbody>
</table>
Table 5: Means and Standard Deviations of Time 1 Test Scores

<table>
<thead>
<tr>
<th>Time 1 Variable</th>
<th>Overall (n = 33)</th>
<th>Treatment (n = 16)</th>
<th>Control (n = 17)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MacCAT-CA Understanding</td>
<td>10.5 ± 2.9</td>
<td>11.2 ± 2.2</td>
<td>9.9 ± 3.3</td>
</tr>
<tr>
<td>MacCAT-CA Reasoning</td>
<td>10.6 ± 3.6</td>
<td>9.7 ± 2.8</td>
<td>11.4 ± 4.1</td>
</tr>
<tr>
<td>MacCAT-CA Appreciation</td>
<td>8.7 ± 3.5</td>
<td>8.7 ± 3.9</td>
<td>8.8 ± 3.1</td>
</tr>
<tr>
<td>CVLT-II Short Delay</td>
<td>6.2 ± 2.6</td>
<td>5.7 ± 2.4</td>
<td>6.7 ± 2.7</td>
</tr>
<tr>
<td>CVLT-II Long Delay</td>
<td>6.0 ± 3.0</td>
<td>5.8 ± 2.9</td>
<td>6.1 ± 3.2</td>
</tr>
<tr>
<td>DKEFS Sorting</td>
<td>6.5 ± 3.0</td>
<td>6.6 ± 2.9</td>
<td>6.4 ± 3.1</td>
</tr>
<tr>
<td>DKEFS 20 Questions</td>
<td>37.0 ± 14.5</td>
<td>34.6 ± 13.1</td>
<td>39.3 ± 15.8</td>
</tr>
</tbody>
</table>


Table 6: Mann-Whitney $U$ Tests Comparing Groups on Time 1 MacCAT-CA Factors

<table>
<thead>
<tr>
<th>Time 1 Variable</th>
<th>Mann-Whitney</th>
<th>Probability Value</th>
<th>Effect size</th>
<th>Mean Rank Treatment n = 16</th>
<th>Mean Rank Control group n = 17</th>
</tr>
</thead>
<tbody>
<tr>
<td>MacCAT-CA Understanding</td>
<td>$U = 102$</td>
<td>$p = .216$</td>
<td>$r = .21$</td>
<td>19.13</td>
<td>15.00</td>
</tr>
<tr>
<td></td>
<td>$z = -1.236$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MacCAT-CA Reasoning</td>
<td>$U = 79$</td>
<td>$p = .039$</td>
<td>$r = .36$</td>
<td>13.44</td>
<td>20.35</td>
</tr>
<tr>
<td></td>
<td>$z = -2.068$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MacCAT-CA Appreciation</td>
<td>$U = 124$</td>
<td>$p = .648$</td>
<td>$r = .08$</td>
<td>17.78</td>
<td>16.26</td>
</tr>
<tr>
<td></td>
<td>$z = -0.457$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: MacCAT-CA = MacArthur Competence Assessment Tool-Criminal Adjudication.
Table 7: Mann-Whitney U Tests Comparing Groups on Time 1 Cognitive Measures

<table>
<thead>
<tr>
<th>Time 1 Variable</th>
<th>Mann-Whitney</th>
<th>Probability Value</th>
<th>Effect size</th>
<th>Mean Rank Treatment n = 16</th>
<th>Mean Rank Control group n = 17</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVLT-II Short Delay</td>
<td>$U = 101$ $z = -1.274$</td>
<td>$p = .203$</td>
<td>$r = .22$</td>
<td>14.81</td>
<td>19.06</td>
</tr>
<tr>
<td>CVLT-II Long Delay</td>
<td>$U = 125$ $z = -0.400$</td>
<td>$p = .689$</td>
<td>$r = .07$</td>
<td>16.31</td>
<td>17.65</td>
</tr>
<tr>
<td>DKEFS Sorting</td>
<td>$U = 125$ $z = -0.419$</td>
<td>$p = .675$</td>
<td>$r = .07$</td>
<td>17.72</td>
<td>16.32</td>
</tr>
<tr>
<td>DKEFS 20 Questions</td>
<td>$U = 115$ $z = -0.775$</td>
<td>$p = .438$</td>
<td>$r = .13$</td>
<td>15.66</td>
<td>18.26</td>
</tr>
</tbody>
</table>


Table 8: Means and Standard Deviations of MacCAT-CA Change Scores

<table>
<thead>
<tr>
<th>Variable</th>
<th>Treatment (n = 16)</th>
<th>Control (n = 17)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MacCAT-CA Understanding</td>
<td>0.4 ± 2.5</td>
<td>0.3 ± 2.3</td>
</tr>
<tr>
<td>MacCAT-CA Reasoning</td>
<td>2.2 ± 3.8</td>
<td>-0.5 ± 3.3</td>
</tr>
<tr>
<td>MacCAT-CA Appreciation</td>
<td>0.8 ± 4.1</td>
<td>-0.2 ± 3.1</td>
</tr>
</tbody>
</table>

Note: MacCAT-CA = MacArthur Competence Assessment Tool-Criminal Adjudication.

Table 9: Mann-Whitney U Tests Comparing Groups on Change in MacCAT-CA Factors

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mann-Whitney</th>
<th>Probability Value</th>
<th>Effect size</th>
<th>Mean Rank Treatment n = 16</th>
<th>Mean Rank Control group n = 17</th>
</tr>
</thead>
<tbody>
<tr>
<td>MacCAT-CA Understanding</td>
<td>$U = 115$ $z = -0.785$</td>
<td>$p = .432$</td>
<td>$r = .14$</td>
<td>18.34</td>
<td>15.74</td>
</tr>
<tr>
<td>MacCAT-CA Reasoning</td>
<td>$U = 76$ $z = -2.196$</td>
<td>$p = .028$</td>
<td>$r = .38$</td>
<td>20.78</td>
<td>13.44</td>
</tr>
<tr>
<td>MacCAT-CA Appreciation</td>
<td>$U = 127$ $z = -0.347$</td>
<td>$p = .729$</td>
<td>$r = .06$</td>
<td>17.59</td>
<td>16.44</td>
</tr>
</tbody>
</table>

Note: MacCAT-CA = MacArthur Competence Assessment Tool-Criminal Adjudication.
Figure 3: Comparison of Groups on Time 1 and Time 2 MacCAT-CA Reasoning

Note: MacCAT-CA = MacArthur Competence Assessment Tool-Criminal Adjudication.
to Time 2 in the treatment group compared to the control group. Treatment participants started out with lower scores \((M = 9.7, SD = 2.8)\) than the control group \((M = 11.4, SD = 4.1)\) and benefited from treatment to such a degree that their scores at Time 2 \((M = 11.88, SD = 2.6)\) surpassed the control group \((M = 10.88, SD = 4.2)\). For Hypothesis 3, the treatment group (mean rank = 17.59) did not differ significantly from the control group (mean rank = 16.44) on change scores for the Appreciation section of the MacCAT-CA, \(U = 127, z = -0.347, p = .729, r = .06\).

**Secondary Hypotheses: Cognitive Measures**

Change scores were also calculated to compare group differences on cognitive measures (see Table 10 for means and standard deviations). Again, Mann-Whitney \(U\) tests were employed to analyze group differences on the change scores (see Table 11). Hypothesis 4 was not supported in that the treatment group (mean rank = 15.56) did not exhibit significantly greater improvement on DKEFS Sorting than the control group (mean rank = 18.35), \(U = 113, z = -.842, p = .400, r = .15\). Analyses of data also did not support Hypothesis 5; the treatment group (mean rank = 17.06) did not differ significantly from the control group (mean rank = 16.94) on change in performance on DKEFS 20 Questions, \(U = 135, z = -0.036, p = .971, r = .01\). Hypothesis 6 was not supported, either. The treatment group (mean rank = 16.44) did not improve significantly more than the control group (mean rank = 17.53) on CVLT-II Short Delay Free Recall, \(U = 127, z = -0.329, p = .743, r = .06\). Lastly, Hypothesis 7 was not supported. The treatment group (mean rank = 14.09) did not exhibit significantly greater change than the control group (mean rank = 19.74) on CVLT-II Long Delay Free Recall, \(U = 90, z = -1.699, p = .089, r = .30\).
Table 10: Means and Standard Deviations of Change Scores on Cognitive Measures

<table>
<thead>
<tr>
<th>Variable</th>
<th>Treatment (n = 16)</th>
<th>Control (n = 17)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVLT-II Short Delay</td>
<td>0.2 ± 2.1</td>
<td>0.7 ± 2.0</td>
</tr>
<tr>
<td>CVLT-II Long Delay</td>
<td>0.0 ± 2.0</td>
<td>1.1 ± 1.6</td>
</tr>
<tr>
<td>DKEFS Sorting</td>
<td>-1.4 ± 2.3</td>
<td>-0.8 ± 2.0</td>
</tr>
<tr>
<td>DKEFS 20 Questions</td>
<td>-1.1 ± 20.3</td>
<td>1.1 ± 15.2</td>
</tr>
</tbody>
</table>

Note: CVLT-II = California Verbal Learning Test-Second Edition; DKEFS = Delis-Kaplan Executive Function System. High scores on DKEFS 20 Questions denote poor performance; thus, a negative change score indicates improvement.

Table 11: Mann-Whitney U Tests Comparing Groups on Change on Cognitive Measures

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mann-Whitney</th>
<th>Probability Value</th>
<th>Effect size</th>
<th>Mean Rank Treatment n = 16</th>
<th>Mean Rank Control group n = 17</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVLT-II Short Delay</td>
<td>U = 127</td>
<td>p = .743</td>
<td>r = .06</td>
<td>16.44</td>
<td>17.53</td>
</tr>
<tr>
<td></td>
<td>z = -0.329</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CVLT-II Long Delay</td>
<td>U = 90</td>
<td>p = .089</td>
<td>r = .30</td>
<td>14.09</td>
<td>19.74</td>
</tr>
<tr>
<td></td>
<td>z = -1.699</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DKEFS Sorting</td>
<td>U = 113</td>
<td>p = .400</td>
<td>r = .15</td>
<td>15.56</td>
<td>18.35</td>
</tr>
<tr>
<td></td>
<td>z = -0.842</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DKEFS 20 Questions</td>
<td>U = 135</td>
<td>p = .971</td>
<td>r = .01</td>
<td>17.06</td>
<td>16.94</td>
</tr>
<tr>
<td></td>
<td>z = -0.036</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: CVLT-II = California Verbal Learning Test-Second Edition; DKEFS = Delis-Kaplan Executive Function System. High scores on DKEFS 20 Questions denote poor performance; thus, a negative change score indicates improvement.
Treatment Implementation

There are cogent reasons to infer that treatment was conducted as intended, which is supported by the following delivery and receipt outcomes. An independent reviewer rated the delivery of treatment and found that individual sessions were appropriately delivered at an average of 98.25%. The fidelity rater also determined that group sessions were delivered appropriately at an average of 96%. Fidelity ratings indicated that treatment receipt averaged 99% in individual computer sessions and 93% in the Bridging Groups. Thirteen of the sixteen intervention participants (81.3%) engaged in all 15 sessions of cognitive remediation ($M = 14.06, SD = 2.14$), and attendance in sessions was only affected by early discharge, not voluntary decisions to skip an activity. In addition, no significant correlation was found between number of treatment sessions completed and change scores on dependent measures. Treatment participants all demonstrated enthusiasm for the treatment and progress on computer games and evidenced good to excellent participation in group activities.

Analyses also supported the effectiveness of training the volunteer therapists. Mann-Whitney $U$ analyses determined that performance on dependent measures was not significantly impacted by a difference in treatment provider. In addition, no significant differences between therapists were found on fidelity ratings of treatment delivery or receipt.

Exploratory Analyses

The researcher sought to explore other possibilities regarding factors that could affect success in treatment.

**Delay before testing.** When individuals in the treatment group completed five weeks of treatment, they were scheduled for Time 2 testing. While the researcher endeavored to schedule these individuals as promptly as possible, nevertheless a gap occurred between the end of
treatment and the assessment of treatment gains. The gap in number of days, ranging from 0 to 50, was recorded for each participant \((M = 11.1, SD = 14.0)\). Pearson correlations revealed no significant relationship between the gap in number of days and the change scores across all dependent measures.

**Legal status.** The researcher included patients who were adjudicated “not guilty by reason of insanity” (NGI) in addition to the more obvious target group of individuals with questionable or impaired competence to stand trial (CST or IST). IST/CST patients were rated with marginally higher symptom severity (mean rank = 22.38) than NGI patients (mean rank = 15.28), \(U = 57, z = -1.821, p = .069, r = .32\). Tables 12, 13, 14, and 15 compare the Time 1 and Time 2 test score means and standard deviations from the NGI group and the IST/CST group.

Mann-Whitney \(U\) analyses were conducted to determine if the NGI patients performed differently than the IST/CST patients on assessment measures used in the study. At Time 1, while NGI patients appeared to perform better across all measures, only MacCAT-CA Reasoning was statistically significant. NGI patients had marginally higher scores (mean rank = 18.78) than IST/CST patients (mean rank = 11.44), \(U = 56, z = -1.883, p = .060, r = .33\). At Time 2, the NGI patients and IST/CST patients did not differ on MacCAT-CA Reasoning or any other MacCAT-CA factors. Figure 4 illustrates the change in MacCAT-CA Reasoning from Time 1 to Time 2. However, IST/CST patients performed worse on all cognitive measures at Time 2 than NGI patients. On CVLT-II Long Delay, the difference between IST/CST (mean rank = 11.38) and NGI (mean rank = 18.80) was marginally significant, \(U = 55, z = -1.909, p = .056, r = .33\). Differences between IST/CST (mean rank = 22.25) and NGI (mean rank = 15.32) patients were also marginally significant on DKEFS 20 Questions, \(U = 58, z = -1.766, p = .077, r = .31\).
### Table 12: Comparing Legal Status Means on Time 1 MacCAT-CA Scores

<table>
<thead>
<tr>
<th>Time 1 Variable</th>
<th>IST/CST ($n = 8$)</th>
<th>NGI ($n = 25$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MacCAT-CA Understanding</td>
<td>10.3 ± 2.5</td>
<td>10.6 ± 3.0</td>
</tr>
<tr>
<td>MacCAT-CA Reasoning</td>
<td>8.5 ± 3.9</td>
<td>11.2 ± 3.3</td>
</tr>
<tr>
<td>MacCAT-CA Appreciation</td>
<td>7.6 ± 3.9</td>
<td>9.1 ± 3.3</td>
</tr>
</tbody>
</table>

Note: CST = being evaluated for competence to stand trial; IST = determined Incompetent to Stand Trial; NGI = Not Guilty by reason of Insanity; MacCAT-CA = MacArthur Competence Assessment Tool-Criminal Adjudication.

### Table 13: Comparing Legal Status Means on Time 1 Cognitive Measures

<table>
<thead>
<tr>
<th>Time 1 Variable</th>
<th>IST/CST ($n = 8$)</th>
<th>NGI ($n = 25$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVLT-II Short Delay</td>
<td>5.5 ± 2.0</td>
<td>6.4 ± 2.7</td>
</tr>
<tr>
<td>CVLT-II Long Delay</td>
<td>4.5 ± 3.7</td>
<td>6.4 ± 2.7</td>
</tr>
<tr>
<td>DKEFS Sorting</td>
<td>6.0 ± 2.3</td>
<td>6.6 ± 3.2</td>
</tr>
<tr>
<td>DKEFS 20 Questions</td>
<td>35.5 ± 15.0</td>
<td>37.5 ± 14.7</td>
</tr>
</tbody>
</table>

Note: CST = being evaluated for competence to stand trial; IST = determined Incompetent to Stand Trial; NGI = Not Guilty by reason of Insanity; CVLT-II = California Verbal Learning Test-Second Edition; DKEFS = Delis-Kaplan Executive Function System. High scores on DKEFS 20 Questions denote poor performance.

### Table 14: Comparing Legal Status Means on Time 2 MacCAT-CA Scores

<table>
<thead>
<tr>
<th>Time 2 Variable</th>
<th>IST/CST ($n = 8$)</th>
<th>NGI ($n = 25$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MacCAT-CA Understanding</td>
<td>10.9 ± 2.2</td>
<td>10.8 ± 3.7</td>
</tr>
<tr>
<td>MacCAT-CA Reasoning</td>
<td>11.4 ± 2.7</td>
<td>11.4 ± 3.8</td>
</tr>
<tr>
<td>MacCAT-CA Appreciation</td>
<td>7.9 ± 3.9</td>
<td>9.3 ± 2.8</td>
</tr>
</tbody>
</table>

Note: CST = being evaluated for competence to stand trial; IST = determined Incompetent to Stand Trial; NGI = Not Guilty by reason of Insanity; MacCAT-CA = MacArthur Competence Assessment Tool-Criminal Adjudication.
Table 15: Comparing Legal Status Means on Time 2 Cognitive Measures

<table>
<thead>
<tr>
<th>Time 2 Variable</th>
<th>IST/CST ($n = 8$)</th>
<th>NGI ($n = 25$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVLT-II Short Delay</td>
<td>5.6 ± 3.3</td>
<td>6.9 ± 2.8</td>
</tr>
<tr>
<td>CVLT-II Long Delay</td>
<td>5.3 ± 3.0</td>
<td>6.9 ± 2.7</td>
</tr>
<tr>
<td>DKEFS Sorting</td>
<td>4.4 ± 2.5</td>
<td>5.7 ± 3.4</td>
</tr>
<tr>
<td>DKEFS 20 Questions</td>
<td>43.8 ± 13.3</td>
<td>34.9 ± 16.9</td>
</tr>
</tbody>
</table>

Note: CST = being evaluated for competence to stand trial; IST = determined Incompetent to Stand Trial; NGI = Not Guilty by reason of Insanity; CVLT-II = California Verbal Learning Test-Second Edition; DKEFS = Delis-Kaplan Executive Function System. High scores on DKEFS 20 Questions denote poor performance.

Figure 4: Comparison of Legal Status with Time 1 and Time 2 MacCAT-CA Reasoning

Note: CST = being evaluated for competence to stand trial; IST = determined Incompetent to Stand Trial; NGI = Not Guilty by reason of Insanity; MacCAT-CA = MacArthur Competence Assessment Tool-Criminal Adjudication.
Taking into account change scores across the whole sample, NGI participants did not exhibit differential change on MacCAT-CA factors or cognitive measures, with the exception of DKEFS 20 Questions. NGI patients exhibited greater positive change (mean rank = 15.10) than the IST/CST patients (mean rank = 22.94) on 20 Questions, $U = 53, z = -2.002, p = .045, r = .35$. Within only the group of treatment participants, legal status was not significantly linked to change scores on any measures.

**Success in treatment.** The researcher coded all 16 treatment group participants as either “more successful” or “less successful.” The eight “more successful” treatment recipients were selected as a result of rank ordering all participants based on their change scores for each MacCAT-CA factor. Mann-Whitney $U$ analyses demonstrated the effectiveness of this method. Successful treatment group participants exhibited greater positive change on MacCAT-CA Reasoning (mean rank = 11.31) than less successful treatment participants (mean rank = 5.69), $U = 10, z = -2.377, p = .017, r = .59$. The more successful group of participants also exhibited greater positive change on MacCAT-CA Appreciation (mean rank = 11.25) than less successful treatment participants (mean rank = 5.75), $U = 10, z = -2.351, p = .019, r = .59$. Those deemed successful treatment participants did not differ on cognitive measures from less successful participants.

The more successful treatment group included more IST/CST-designated patients (37.5% compared to 25%), more Caucasians (25% versus 0%), and more who were charged with murder or manslaughter (62.5% versus 37.5% in the less successful group). The group of more successful treatment recipients included more individuals with schizophrenia (62.5% versus 37.5%) and fewer with mood disorders (12.5% versus 37.5%), more with a personality disorder (50% versus 25%), and were no different on presence of alcohol or drug abuse disorders. Chi
Square analyses determined that none of these comparisons were statistically significant; however, violations of necessary assumptions usually occurred due to proliferation of low cell counts. The more successful participants of the treatment group tended to be younger, have slightly more education but slightly lower IQ, and had generally higher ratings of symptom severity on the BPRS \( (M = 26.3, SD = 3.8, \text{ versus } M = 23.9, SD = 2.4) \). Mann-Whitney \( U \) analyses determined that the two subgroups did not differ significantly on age, years of education, estimated IQ, and BPRS scores. Even though the more successful treatment group generally evidenced a shorter length of hospital stay (mean rank = 6.50) than the control group (mean rank = 10.50), the difference was statistically marginal, \( U = 16, z = -1.680, p = .093, r = .42 \). Table 16 presents a demographic and clinical comparison of participants who were deemed successful in treatment versus those who were less successful.

Table 17 charts the means and standard deviations of Time 1 MacCAT-CA test scores for successful and less successful groups of treatment participants. While the more successful group evidenced lower scores across all Time 1 MacCAT-CA measures, only Reasoning was significantly different between successful (mean rank = 5.13) and less successful participants (mean rank = 11.88), \( U = 5, z = -2.885, p = .004, r = .72 \). The means and standard deviations of Time 2 MacCAT-CA scores between the two subgroups are presented in Table 18. Successful treatment group participants had higher Time 2 scores on both Appreciation and Reasoning, but only MacCAT-CA Appreciation was significant. More successful treatment group participants had higher Time 2 Appreciation scores (mean rank = 10.88) than the less successful participants (mean rank = 6.13), \( U = 13, z = -2.068, p = .039, r = .52 \).

**Correlations among variables.** The researcher performed Pearson product-moment correlations to inform examination of the piloted treatment and relevant study variables. For
Table 16: Demographic and Clinical Characteristics of Successful Treatment Participants

<table>
<thead>
<tr>
<th>Variable</th>
<th>More Successful (n = 8)</th>
<th>Less Successful (n = 8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length of Stay (M ± SD)</td>
<td>130.0 ± 166.0</td>
<td>508.4 ± 511.5</td>
</tr>
<tr>
<td>Legal Status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CST/IST</td>
<td>3 (37.5%)</td>
<td>2 (25.0%)</td>
</tr>
<tr>
<td>NGI</td>
<td>5 (62.5%)</td>
<td>6 (75.0%)</td>
</tr>
<tr>
<td>Age (M ± SD)</td>
<td>36.6 ± 7.1</td>
<td>42.4 ± 17.7</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>2 (25.0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Black</td>
<td>6 (75.0%)</td>
<td>8 (100%)</td>
</tr>
<tr>
<td>Years of Education (M ± SD)</td>
<td>12.0 ± 1.8</td>
<td>11.1 ± 2.5</td>
</tr>
<tr>
<td>Estimated IQ (M ± SD)</td>
<td>80.0 ± 10.1</td>
<td>82.0 ± 5.0</td>
</tr>
<tr>
<td>Criminal Charge</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Murder/Manslaughter</td>
<td>5 (62.5%)</td>
<td>3 (37.5%)</td>
</tr>
<tr>
<td>Non-Murder</td>
<td>3 (37.5%)</td>
<td>5 (62.5%)</td>
</tr>
<tr>
<td>BPRS Score (M ± SD)</td>
<td>26.3 ± 3.8</td>
<td>23.9 ± 2.4</td>
</tr>
<tr>
<td>Diagnosis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schizophrenia</td>
<td>5 (62.5%)</td>
<td>3 (37.5%)</td>
</tr>
<tr>
<td>Psychosis NOS</td>
<td>1 (12.5%)</td>
<td>2 (25.0%)</td>
</tr>
<tr>
<td>Delusional Disorder</td>
<td>1 (12.5%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Bipolar</td>
<td>1 (12.5%)</td>
<td>2 (25.0%)</td>
</tr>
<tr>
<td>Depression</td>
<td>0 (0%)</td>
<td>1 (12.5%)</td>
</tr>
<tr>
<td>Personality Disorder</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Present</td>
<td>4 (50.0%)</td>
<td>2 (25.0%)</td>
</tr>
<tr>
<td>Absent</td>
<td>4 (50.0%)</td>
<td>6 (75.0%)</td>
</tr>
<tr>
<td>Drug/Alcohol Abuse</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Present</td>
<td>3 (37.5%)</td>
<td>3 (37.5%)</td>
</tr>
<tr>
<td>Absent</td>
<td>5 (62.5%)</td>
<td>5 (62.5%)</td>
</tr>
</tbody>
</table>

Note: CST = being evaluated for competence to stand trial; IST = determined Incompetent to Stand Trial; NGI = Not Guilty by reason of Insanity; IQ = intelligence quotient, as estimated by the Wide Range Achievement Test-Fourth Edition Reading Composite score; BPRS = Brief Psychiatric Rating Scale, 18-item.
Table 17: Means and Standard Deviations Comparing Success and Time 1 MacCAT-CA Scores

<table>
<thead>
<tr>
<th>Time 1 Variable</th>
<th>More Successful ($n = 8$)</th>
<th>Less Successful ($n = 8$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MacCAT-CA Understanding</td>
<td>10.5 ± 2.4</td>
<td>11.9 ± 1.8</td>
</tr>
<tr>
<td>MacCAT-CA Reasoning</td>
<td>7.8 ± 1.8</td>
<td>11.6 ± 2.1</td>
</tr>
<tr>
<td>MacCAT-CA Appreciation</td>
<td>7.6 ± 4.2</td>
<td>9.8 ± 3.4</td>
</tr>
</tbody>
</table>

Note: MacCAT-CA = MacArthur Competence Assessment Tool-Criminal Adjudication.

Table 18: Means and Standard Deviations Comparing Success and Time 2 MacCAT-CA Scores

<table>
<thead>
<tr>
<th>Time 2 Variable</th>
<th>More Successful ($n = 8$)</th>
<th>Less Successful ($n = 8$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MacCAT-CA Understanding</td>
<td>11.0 ± 2.8</td>
<td>12.1 ± 3.3</td>
</tr>
<tr>
<td>MacCAT-CA Reasoning</td>
<td>12.3 ± 1.8</td>
<td>11.5 ± 3.3</td>
</tr>
<tr>
<td>MacCAT-CA Appreciation</td>
<td>10.6 ± 1.2</td>
<td>8.3 ± 2.7</td>
</tr>
</tbody>
</table>

Note: MacCAT-CA = MacArthur Competence Assessment Tool-Criminal Adjudication.
example, correlations demonstrated the relationship of mental illness (as measured by BPRS scores) to scores from pre- and post-treatment assessment measures. Higher ratings of active symptoms were associated with poorer performance on all Time 1 testing, especially CVLT-II Short Delay \((r = -0.43, p = 0.013)\) and Long Delay \((r = -0.37, p = 0.034)\) and DKEFS Sorting \((r = -0.44, p = 0.011)\). Correlation coefficients for Time 1 test scores and other variables are presented in Table 19. Higher BPRS scores were also associated with lower scores on Time 2 testing, especially CVLT-II Short Delay \((r = -0.59, p < 0.001)\) and Long Delay \((r = -0.53, p = 0.001)\) and DKEFS Sorting \((r = -0.45, p = 0.009)\). Correlations for Time 2 scores with other variables are outlined in Table 20. BPRS ratings were, however, not correlated with change scores on dependent variables.

BPRS ratings were also positively correlated with age \((r = 0.36, p = 0.039)\), in that increased symptom severity was associated significantly with increased age. Age also operated to negatively impact performance on measures of cognitive functioning. Higher age was associated with lower scores on DKEFS Sorting at Time 1 \((r = -0.53, p = 0.002)\) as well as lower scores at Time 2 on CVLT-II Long Delay Free Recall \((r = -0.36, p = 0.040)\) and DKEFS Sorting \((r = -0.39, p = 0.024)\).

Length of hospital stay (LOS) may be considered another potentially influential variable to affect test performance. No correlations of LOS with test scores were statistically significant. However, when considering change in test performance, Pearson correlations revealed that the length of hospital stay among treatment participants, in particular, was negatively correlated with change on MacCAT-CA Reasoning \((r = -0.49, p = 0.053)\).

Estimated intelligence as well as years of education also affected performance on measures of competence and cognitive functioning. Intelligence, estimated by the Reading
Table 19: Pearson Correlation Coefficients for Time 1 Scores and Other Variables

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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<tbody>
<tr>
<td>1</td>
<td>BPRS ratings</td>
<td>----</td>
<td></td>
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<tr>
<td>2</td>
<td>Age</td>
<td>.36*</td>
<td>----</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Length of stay</td>
<td>-.13</td>
<td>-.14</td>
<td>----</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Estimated IQ</td>
<td>-.27</td>
<td>-.01</td>
<td>.05</td>
<td>----</td>
</tr>
<tr>
<td>5</td>
<td>Years of Education</td>
<td>-.23</td>
<td>.07</td>
<td>-.16</td>
<td>.56**</td>
</tr>
<tr>
<td>6</td>
<td>MacCAT-CA Understanding</td>
<td>-.24</td>
<td>-.04</td>
<td>.22</td>
<td>.50**</td>
</tr>
<tr>
<td>7</td>
<td>MacCAT-CA Reasoning</td>
<td>-.32</td>
<td>-.23</td>
<td>.19</td>
<td>.29</td>
</tr>
<tr>
<td>8</td>
<td>MacCAT-CA Appreciation</td>
<td>-.18</td>
<td>-.10</td>
<td>-.27</td>
<td>.26</td>
</tr>
<tr>
<td>9</td>
<td>CVLT-II Short Delay</td>
<td>-.43*</td>
<td>-.28</td>
<td>-.05</td>
<td>.04</td>
</tr>
<tr>
<td>10</td>
<td>CVLT-II Long Delay</td>
<td>-.37*</td>
<td>-.29</td>
<td>-.01</td>
<td>.07</td>
</tr>
<tr>
<td>11</td>
<td>DKEFS Sorting</td>
<td>-.44*</td>
<td>-.53**</td>
<td>.13</td>
<td>.45**</td>
</tr>
<tr>
<td>12</td>
<td>DKEFS 20 Questions</td>
<td>.10</td>
<td>.25</td>
<td>.10</td>
<td>-.41*</td>
</tr>
</tbody>
</table>

Note: BPRS = Brief Psychiatric Rating Scale, 18-item; IQ = Intelligence quotient; MacCAT-CA = MacArthur Competence Assessment Tool-Criminal Adjudication; CVLT-II = California Verbal Learning Test-Second Edition; DKEFS = Delis-Kaplan Executive Function System.
* $p \leq .05$; ** $p \leq .001$
Table 20: Pearson Correlation Coefficients for Time 2 Scores with Other Variables

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>BPRS ratings</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Age</td>
<td>----</td>
<td>----</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Length of stay</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Estimated IQ</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>5</td>
<td>Years of Education</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>6</td>
<td>MacCAT-CA Understanding</td>
<td>-.31</td>
<td>-.22</td>
<td>.02</td>
<td>.41*</td>
</tr>
<tr>
<td>7</td>
<td>MacCAT-CA Reasoning</td>
<td>-.28</td>
<td>-.17</td>
<td>-.09</td>
<td>.38*</td>
</tr>
<tr>
<td>8</td>
<td>MacCAT-CA Appreciation</td>
<td>-.09</td>
<td>-.13</td>
<td>-.28</td>
<td>.32</td>
</tr>
<tr>
<td>9</td>
<td>CVLT-II Short Delay</td>
<td>-.59**</td>
<td>-.30</td>
<td>-.10</td>
<td>.22</td>
</tr>
<tr>
<td>10</td>
<td>CVLT-II Long Delay</td>
<td>-.53**</td>
<td>-.36*</td>
<td>.01</td>
<td>.11</td>
</tr>
<tr>
<td>11</td>
<td>DKEFS Sorting</td>
<td>-.45**</td>
<td>-.39*</td>
<td>.06</td>
<td>.61**</td>
</tr>
<tr>
<td>12</td>
<td>DKEFS 20 Questions</td>
<td>.26</td>
<td>.26</td>
<td>-.07</td>
<td>-.48**</td>
</tr>
</tbody>
</table>

Note: BPRS = Brief Psychiatric Rating Scale, 18-item; IQ = Intelligence quotient; MacCAT-CA = MacArthur Competence Assessment Tool-Criminal Adjudication; CVLT-II = California Verbal Learning Test-Second Edition; DKEFS = Delis-Kaplan Executive Function System. * $p \leq .05$; ** $p \leq .001$
Composite of the WRAT-IV, was positively correlated with years of education in patients ($r = - .56, p = .001$). Higher estimated intelligence was significantly associated with better scores at Time 1 on MacCAT-CA Understanding ($r = .50, p = .003$), DKEFS Sorting ($r = .45, p = .009$), and DKEFS 20 Questions ($r = -.41, p = .019$). High IQ was also linked to better performance at Time 2 on MacCAT-CA Understanding ($r = .41, p = .017$) and Reasoning ($r = .38, p = .029$) and DKEFS Sorting ($r = .61, p < .001$) and 20 Questions ($r = -.48, p = .005$). Similarly, years of education correlated positively at Time 1 with MacCAT-CA Understanding ($r = .40, p = .021$) and negatively with DKEFS 20 Questions at Time 1 ($r = -.42, p = .016$).
4. Discussion

Participant Characteristics

The sample of forensic patients who self-selected to participate in this research study generally represented a broad spectrum of the patients admitted to this site and had widely varying lengths of hospital stay. Data came from three times as many patients adjudicated “not guilty by reason of insanity” (NGI) as patients who presented with impaired or questionable competence to stand trial (IST and CST). The majority of patients were diagnosed with some form of psychosis (consistent with findings by Viljoen, Zapf, & Roesch, 2003), exhibited low average intelligence, and had not graduated from high school.

The research utilized a process of randomization to place participants in treatment groups, a process which was generally successful. However, ostensible differences between the two groups appeared to influence the data. The treatment group included a greater percentage of IST or CST-designated patients and, likely related, exhibited marginally higher ratings of symptom severity. The treatment group also had a higher percentage of African-American patients and individuals charged with murder, attempted murder, or manslaughter. While none of these group differences were statistically significant, they become salient when considering the measurement of treatment outcomes.

Legal Status and Mental Illness

NGI participants differed from IST/CST participants in multiple, generally expected ways. On average, the IST/CST patients exhibited marginally higher ratings of current symptoms of mental illness, as measured by the BPRS scores obtained at Time 1. Higher ratings on current
symptoms of mental illness in IST/CST patients may be related to poor performance on measures of competence to stand trial. Accordingly, IST/CST patients obtained lower scores on all measures at Time 1, differences, however, that were statistically significant only on MacCAT-CA Reasoning. At Time 2, when at least five weeks had passed, the IST/CST patients had generally improved, ostensibly as a result of standard hospital treatment that includes psychotropic medication. Thus, they exhibited no significant differences from NGI patients at Time 2 on all measures of competence to stand trial. These associations between severe mental illness and competence to stand trial parallel the significant negative correlations found between BPRS ratings of Psychoticism and performance on the MacCAT-CA scales in the measure’s norming research (Otto et al., 1998; Poythress et al., 1999).

Marginally significant differences remained between NGI and IST/CST patients at Time 2 on cognitive measures of verbal memory and problem-solving. Perhaps current symptoms of mental illness still operated to reduce cognitive functioning, a theory which is supported by other research (Medalia & Thysen, 2008; Ting et al., 2010). Considering that these impairments persisted after stabilization on medication, the remaining deficits warrant the study of non-pharmacological treatments that target cognitive functions (e.g., see Silverstein, 2000).

Analyses of the data further supported the importance of measurements of current mental illness. High BPRS ratings, along with higher age, were significantly associated with poorer performance on cognitive measures during Time 1 and Time 2, a finding that aligns well with the above-noted difference between NGI patients and IST/CST patients. BPRS ratings were also strongly linked to age, suggesting that older patients in the study exhibited more severely entrenched mental illness that may present a barrier to change. Supporting this theory is research by Mossman (2007) who found that older age, as a marker of chronic mental illness, predicted
unrestorability in the context of incompetence to stand trial. As expected, higher age in the present study also served to reduce performance on cognitive measures.

**Competence to Stand Trial**

Analyses of the changes scores on the MacCAT-CA for the treatment and control groups revealed that only the MacCAT-CA factor of Reasoning was significantly improved for the treatment group more than the control group, with a medium effect size. One could argue against the effect of treatment on Reasoning by noting that the treatment group performed significantly worse on Reasoning than the control group at Time 1. However, analyses accounted for this Time 1 difference, and means and mean ranks provide ample support that the treatment group, which started out so much lower on Reasoning, surpassed the control group on this measure at Time 2.

This study’s findings may be viewed in the context of recent work by Advokat, Guidry, Burnett, Manguno-Mire, and Thompson (2012), in which they examined characteristics of individuals eventually restored to competency in comparison to those who were not restored. Inpatient defendants who were never restored to competency (IST) performed significantly worse than those who were restored at both initial and final evaluations on measures of competence to stand trial and the Global Assessment of Functioning. Thus, the IST patients were distinguished already by their worse performance at Time 1 compared to those restored. In the present study, the treatment group performed worse at Time 1 on a measure of competence to stand trial, similar to IST patients in the Advokat et al. findings, but improved significantly at Time 2 as a result of treatment, exceeding the improvement of the control group after five weeks.

A significant improvement in reasoning related to competence to stand trial may be logically connected to cognitive remediation treatment. Legal reasoning, as tested by the
MacCAT-CA, represents a fluid ability to rationalize, think through, and solve problems related to a legal setting (Grisso, 2007). This factor may be more likely to change as a result of cognitive remediation than Understanding, which is somewhat more factually based, and Appreciation, which is often impaired by paranoid delusional thinking. The connection between MacCAT-CA Understanding and factually-based knowledge is underscored by the significant positive correlations of Understanding with estimated intelligence and years of education. The associations in this area coincide well with the normative research on the MacCAT-CA, which found that Understanding, more than the other two factors, positively correlated with Full Scale IQ (Otto et al., 1998; Poythress et al., 1999). Most of the participants in this study did not demonstrate clinically significant impairments in Understanding (scores of 10 and up indicate minimal to no impairment) but did present with impaired Reasoning and/or Appreciation, which would appear to indicate that a lack of factual knowledge was not the barrier to adjudicative competence for most patients in the study.

**Cognitive Functioning**

Despite a significant change on MacCAT-CA Reasoning, hypotheses related to improvements on verbal memory and problem solving were not supported. The influence of various other factors may serve to explain the lack of significant change in these areas. The treatment group included more IST/CST patients and presented with more current symptoms of mental illness. Patients designated IST or CST and who were rated higher on the BPRS tended to perform poorly on cognitive measures at Time 1 and Time 2, likely due to the effects of current mental illness and cognitive functioning that did not significantly improve with psychotropic medications.
Correlational analyses also revealed that performance on cognitive tests may be more influenced by some static factors. Estimated intelligence was positively correlated with higher scores on problem solving measures. The estimate of a patient’s intelligence was strongly associated with years of education, which also correlated with problem solving performance.

**Success in Treatment**

The researcher sought to investigate variables that may explain success or lack of success with the module of cognitive remediation. The eight treatment participants who exhibited the greatest change as a result of cognitive remediation (significant change on MacCAT-CA Reasoning and Appreciation) appeared to be the ones who needed the most help and who were more acutely mentally ill. Those patients who demonstrated the most positive change exhibited lower scores at Time 1 across all measures, with significant differences on MacCAT-CA Reasoning. Those who benefitted the most from this treatment included more individuals with questionable or impaired competence to stand trial (IST/CST) and who had higher ratings of current mental illness. They were more likely to be diagnosed with schizophrenia than a mood disorder, indicating the diagnoses present fundamental differences in impairment. In recent years, research studies on schizophrenia continue to document the pathological impact on social skills, cognitive functioning, and brain functioning, in general (Bowie & Harvey, 2006; Heinrichs & Zakzanis, 1998; Silverstein, 2000). The NGI patients within the successful treatment group appeared more like the IST/CST patients across most variables (e.g., higher BPRS scores and poorer Time 1 test performance).

Consistent with the IST/CST legal status, the successful treatment group tended to have shorter length of hospital stays (LOS). However, another interpretation of these data may consider high LOS in connection to observed characteristics such as fixed delusions, an aspect of
mental illness which may be an indicator of treatment-resistant symptoms. These individuals had not improved with time and exhibited correspondingly longer periods of hospitalization. Thus, individuals with high LOS may tend to be less successful in treatment because their mental illness was or had become increasingly resistant to change. Indeed, Mossman’s study (2007) analyzing predictor variables for unrestorability determined that LOS as well as older age tended to be markers for chronic and severe mental illness that was resistant to competency restoration treatment.

The successful treatment group included more IST/CST patients, as previously noted, as well as more patients with serious charges such as murder, attempted murder, and manslaughter. Considering the higher stakes involved in the more severe charges, and that IST/CST patients had not yet gone to trial on their cases, these two factors may have served to affect motivation in treatment. Ongoing observations by the researcher support the increase in motivation among individuals who had not yet gone to trial and those facing possibly the most severe consequences. These types of patients may exhibit increased motivation due to the pending nature of the charges and the knowledge that severe punishment is a possibility if one is found guilty. Increased motivation may have served to amplify the benefits of treatment.

At Time 2, the successful group of participants exhibited greater change and higher scores on aspects of competence to stand trial than did the less successful group. The fact that the successful group exhibited higher scores than the less successful group at Time 2 indicates that these successful participants were not only brought up to the level of their less-sick peers in the treatment group; they significantly benefited from cognitive remediation and exceeded their peers’ performance.
Nature and Quality of Treatment

All indicators suggest that NEAR model cognitive remediation was delivered as intended and at a high quality. No significant differences were found between treatment providers, suggesting that any properly trained and motivated therapist could deliver this treatment to this type of population. Patients also reacted positively to the treatment, expressing enthusiasm. Most participants in the treatment group finished the entire five weeks of treatment. The three participants who did not complete all the treatment were discharged and did not voluntarily choose to miss out on treatment. Those three participants still demonstrated benefits from a smaller dose of treatment, despite stopping prematurely.

Limitations and Future Directions

The current investigation was intended as a pilot investigation to test whether cognitive remediation improved competence to stand trial in an inpatient forensic population. However, the low sample size, which is inherent to pilot studies, negatively affected the data through multiple avenues. Statistically, the small number of participants resulted in data points that were not normally distributed, precluding parametric analyses and requiring nonparametric alternatives such as Mann-Whitney U tests. The benefits of the experimental treatment were difficult to detect using these means, despite achieving adequate sample size in accordance with initial power analyses. Chi square analyses, for example, often resulted in violations of assumptions due to low cell counts, further reducing the usefulness of those calculations.

The non-normative characteristics of the sample were likely affected by the nature of the target group. Forensic inpatient populations are a challenging population to treat and study within empirically-based and controlled research designs. These individuals commonly present with constantly fluctuating severe mental illness and a mixture of diagnoses and treatment
problems, including not only psychosis and mood disorders but also personality disorders, intellectual and cognitive impairments, and drug and alcohol abuse disorders. Increasing the size of the sample in future studies may serve to reduce the idiosyncratic effects of this widely varying patient population.

Analysis of treatment effects may have been hampered due to the inclusion of patients who were already adjudicated “not guilty by reason of insanity” (NGI). Presumably, these patients had already been found competent to stand trial and would not require cognitive treatment as proposed in this study. While a number of these NGI patients performed similar to pre-trial patients considered “not competent to stand trial” (IST) on a measure of competence to stand trial, NGI patients generally did not evidence significant impairments and presented with some notable differences on other characteristics. Though the researcher designed the inclusion criteria to select only those NGI patients who evidenced impairment on a factor of the MacCAT-CA, the inclusion criteria may not have been stringent enough. In general, the NGI patients appeared notably different in numerous ways that may have affected results. Future studies may limit the study population only to those individuals who are pre-trial and evidence impaired or questionable competence to stand trial.

Related to the inclusion of the NGI patients, the study results may have been affected by the inclusion criteria in other ways. The inclusion criteria were intended to gather as large a sample as possible from this difficult-to-study population. For example, the resulting sample included some individuals with specific fixed delusions who evidenced very little cognitive impairment. The selection criteria were not designed to systematically choose those patients who may benefit most from a module of cognitive remediation. However, the lack of extant research on this population with this treatment precluded the adequate development of informed
inclusion criteria. Future research studies may consider these results when deciding the most appropriate patients for this treatment and may more accurately attest to whether this treatment can improve competence to stand trial along with cognitive functioning.

While the data indicate excellent treatment delivery among the primary and volunteer treatment providers, the question may be presented as to whether the NEAR model of cognitive remediation was accurately conducted in every respect. The primary therapist and the three volunteers did not attend a formal training designed by the developers of the NEAR model, although steps were taken to replicate the training as much as possible, including the use of group materials produced by the authors of the manual. In addition, it was necessary to adapt the model to the unique characteristics of the site and the sample. For example, the NEAR model recommends the development of a Learning Center composed of a room filled with computers where multiple individuals work at the same time, which differed from the individual computer sessions devised by the researcher. The forensic facility did not have a Learning Center like this, and the researcher had only one portable laptop available for running computer sessions. Thus, Bridging Groups were conducted separately from the individual computer sessions, which may have reduced some of the “bridging” that is intended to occur between the computer activities and the interactive development of improved cognitive functioning. In addition, due to small numbers of participants, it was not possible to run Bridging Groups that included new as well as experienced participants. Instead, the researcher prioritized having as many participants as possible in each group, with the objective of avoiding the possibility of having a group of only one or two participants. Adaptations in this study, however, were not as notably divergent as one successfully employed by Medalia, Dorn, and Watras-Gans (2000) in an acute-care psychiatric inpatient unit. Medalia and colleagues in that study also met individually for computer sessions
with patients but held no Bridging Groups. Future studies may aim to more accurately represent the NEAR model of cognitive remediation as it was designed.

Most of the sites that regularly offer NEAR-model cognitive remediation are community outpatient settings where the treatment is not necessarily time-limited. For this study, however, treatment was limited to fifteen sessions across five weeks. A possible limitation to this study is the short duration of treatment, considered in study terms as “low dose” treatment. While some prior research on cognitive remediation secured significant treatment effects in an inpatient setting in as little as six one-hour sessions (Medalia, Dorn, & Watras-Gans, 2000), it is possible that participants in the treatment group of this study could have benefitted from a longer period of treatment. Notably, however, number of treatment sessions in this study did not correlate with change scores on dependent variables, indicating that patients already benefitted from as few as eight sessions. Future research studies may increase the duration of treatment and measure the effect of number of treatment sessions to further inform the importance of treatment dose.

The researcher did not include a participant feedback form that may have provided individual commentary on the benefits of treatment. Future studies should include some type of open-ended and/or semi-structured feedback measure.

The highly diverse sample population exhibited not only variability in diagnoses but also on performance on assessment measures. The effect of the highly variable states of patients during testing was amplified due to the low sample size. Increasing the sample size may help to reduce the effect of this variability. Future research studies may also reduce these effects by including more time points and/or more tests by which to measure the effect of stabilization and clinical improvements. For example, a treatment group participant may have been having a bad
day when tested on Time 2. Including another time point on which to test may demonstrate that this participant did, in fact, improve in functioning as a result of treatment.

The researcher must also consider the possibility that the selected measures of competence to stand trial, verbal memory, and problem-solving skills did not accurately assess the ameliorative changes that were occurring for each individual from Time 1 to Time 2. For example, some measures were highly associated with relatively stable characteristics of intelligence and years of education, suggesting that treatment may not produce measurable change on these tests. A review of extant measures, including ones used successfully in other studies of cognitive remediation, may be necessary for future research designs.

In addition, perhaps the choice to use the MacCAT-CA presented a limitation to the study. While the MacCAT-CA offers a number of advantages, such as standardized administration, scoring, and the ability to measure capacity for understanding and reasoning rather than simply current knowledge (Zapf & Viljoen, 2003), the measure has also been subject to criticisms. Two-thirds of the measure is based on a fictional vignette which presents the basis for numerous hypothetical questions, meaning that defendants are not questioned about the specifics of their own case, as required by the Dusky standard. However, Melton and colleagues (2007) reasoned that most questions on measures of competence to stand trial are essentially hypothetical in nature (e.g., “What is the job of the prosecutor?”). Rogers, Grandjean, Tillbrook, Vitacco, and Sewell (2001) found that, while the MacCAT-CA demonstrated very good internal reliability and excellent interrater reliability, the hypothetical nature of the vignette design confounded the measure’s ability to demonstrate construct validity in accordance with the Dusky standard. Other critics may find that the measure maintains too high a threshold for determining competence to stand trial, unlike measures such as the Evaluation of Competence to Stand Trial-Revised
Future treatment studies of competency restoration may consider competency measures such as the ECST-R, which incorporates a subsection related to assessing feigned mental illness. Future research may also consider more comprehensive and more subjective clinical decisions related to a defendant’s competence to stand trial as a dependent measure.

In practice, it appeared that patients found the alternate tests used to test cognitive functioning at Time 2 to be more challenging than the original standard tests. While this observation may suggest a negative effect of alternate tests on analyses to test for treatment benefits, this negative effect should have been true for all participants, both in the control group and the treatment group. Thus, this factor seems unlikely to have differentially varied Time 2 test performance. Regardless, however, future research should take into account the advantages and disadvantages of using alternate forms when conducting post-treatment assessments.

Other factors may also have affected the accuracy with which selected tests were able to measure functioning. The researcher conducted extensive training with the volunteers on the use of the measures (including “check-outs” of proper test administration) and checked the scoring of 13 randomly selected sets of testing. Despite these efforts, it is possible that assessors did not score reliably on measures, especially the MacCAT-CA which incorporates a small degree of subjectivity. It is important to note, however, that the MacCAT-CA is one of the most reliably scored forensic measures (see Rogers et al., 2001) and is used commonly in research studies where reliability is key (Grisso, 2003). Lastly, in many cases, a gap of time occurred between the end of treatment and Time 2 testing, and this gap may have dampened the effects of treatment. While treatment providers endeavor to deliver treatment that has long-lasting benefits, a lack of prior research on this particular use of cognitive remediation prohibits the estimation of
duration of treatment benefits. Future research of this type may establish more control over the timing of the testing after the conclusion of the treatment period.

**Conclusion**

This pilot study provided initial support for the use of cognitive remediation to improve aspects of competence to stand trial (legal reasoning) but did not support improvements on cognitive functioning as tested by the selected measures. Patients in the treatment group benefitted from five weeks of cognitive remediation and overcame poor pre-test performance on a measure of competence to stand trial. On legal reasoning, the treatment group ultimately surpassed the improvement from five weeks of standard hospital treatment provided to the control group. Further research is necessary to explore cognitive remediation as an additional treatment option for individuals with impaired or questionable competence to stand trial.

While much research has focused on *assessment* for competence to stand trial, only a small number of studies have been published concerning effective *treatments* to restore legal competency. This study is the first of its kind. No known treatment study has attempted yet to apply cognitive remediation for the purposes of restoring competence to stand trial in an inpatient, forensic setting. Current models focus instead on pharmacological treatment and teaching “courtroom education.” Treating cognitive deficits related to legal incompetence has received little attention despite its unmistakable connection. This study may advance the emerging recognition of cognitive deficits as an avenue to treat incompetence to stand trial.


Appendices
Appendix A

Inclusion Criteria sheet

*Competence Through Cognition:*
*Cognitive Remediation and Restoration of Trial Competence*
Jennifer Wilson, University of Alabama

Patient: ______________________________________
Program: ______________________________________
Date: ______________________________

**Inclusion criteria:**

**Psychology Intern at Intake:** (Check if a criterion is met.)

1. Designated IST, NGRI, PT-CST, PT-MSO, or PT-CST/MSO.
2. Speaks English.
3. No definitive evidence of intellectual deficiency (intellectual deficiency = IQ below 70).
4. The patient can read to some degree.

**Psychiatrist at or after 10-day meeting:** (Check if a criterion is met.)

5. Has had his 10-day treatment team meeting.
6. Stable enough psychiatrically to meet with a graduate student and participate in a research study. Minimal psychiatric stability could be considered through ratings on the *Brief Psychiatric Rating Scale* (*BPRS*; Overall & Gorham, 1962). In particular, please consider the following BPRS symptom categories:
   - uncooperativeness
   - hostility
   - disorientation
   - suspiciousness
   - excitement/agitation
   - hallucinatory behavior
   - conceptual disorganization

7. Is deemed competent to consent to this research.

**Is this patient approved for female escort at this time?**
Yes ☐
No, requires an FT ☐

Approval by: ______________________________ Date: ____________________

85
Appendix B

TRAIL MAKING

Part A

SAMPLE

1  4  3

Begin

2  5

End

6  7  8
TRAIL MAKING

Part B

SAMPLE

Begin
1

End
D

4

A

B

2

C

3
Appendix C

Script for Staff Person to Introduce the Study

Hi, ________ (patient’s name).

There’s a girl running a research study (point at researcher).

She is looking for 50 patients to be in it.

Some people in the study get to play computer games.

Participants do things related to memory and problem-solving.

She can tell you more about it and answer any questions.

Do you want to talk to her about her study? (Patient’s answer)

(If no) Okay, I just thought I would check. Thanks!

(If yes) Okay, that young lady over there will talk with you more about it.
VOLUNTARY PARTICIPATION
You are being asked to take part in a research project. This study is called “Competence Through Cognition: Cognitive Remediation and Restoration of Trial Competence.” The project is being done by Jennifer Wilson, Stanley L. Brodsky, and approved graduate students from the Psychology Department at the University of Alabama.

You are being asked to take part because you are a patient at Taylor Hardin with pending or past legal charges. You were also selected because

1) you speak English
2) you can read
3) you had your 10-day meeting
4) you are stable enough to take part
5) you can understand enough to decide whether you want to be in it.

Your participation is totally voluntary. This means you can choose whether you want to do the project or not. You can refuse to be in the study. You can stop at any time without any problems. Refusing or stopping will not affect your treatment at Taylor Hardin.

PURPOSE: WHY ARE WE DOING IT?
Patients in forensic hospitals may have problems with remembering things or solving problems. Problems with thinking may affect how well patients can understand their charges and work with their lawyers.

Some treatment activities can improve thinking and problem-solving skills. This study is being done to see if these treatment activities will also help patients in other ways, too. It is possible the activities could help some patients understand their charges and work with their lawyers. This study could help in creating new treatments for patients who have pending legal charges.

PROCEDURE: WHAT HAPPENS?
• 50 people will be in this study.
• If you choose to take part in the study, you will soon be screened to be in the study. This should take about 2.5 hours. It will include:
  o Reading words
  o Reading sentences and filling in the missing word
  o Answering questions related to how you think and solve problems
• To be in the study, you must:
  o Meet the required score on the reading test
  o Meet the required score on the first set of questions
  o Agree to let us look at general information in your chart
If you do not qualify, you cannot take part in the study. If you do qualify and you agree to take part in this study, you will be asked to:
  o Be in the study for about 5 weeks
  o Answer questions related to how you think and solve problems.
    ▪ First set of questions will be given at the beginning
    ▪ Final set of questions will be given after 5 weeks
  o We randomly assign you to either:
    ▪ Treatment As Usual: keep doing everything as usual
    ▪ Extra Treatment: receive usual care plus computer and group activities

In Treatment As Usual, people will:
  o Answer questions related to how they think and solve problems. This would happen two times over about 5 weeks
  o Take 4 ½ hours of their time

In Extra Treatment, people will:
  o Play games on a computer two times every week for one hour, one on one with the therapist
  o Meet with a group of other patients once a week for one hour. Patients talk about how the games relate to real life.
  o Answer questions related to how they think and solve problems. This would happen two times over about 5 weeks
  o Take 19 ½ hours of their time

There will be no cost to do the study, except your time.
The researchers cannot tell you how you did on testing.
There are no other similar treatments that you can choose to do instead.

OUTCOMES
This study can have both benefits and risks.
The benefits:
  o To thank you for your time during testing, we will give a $10 phone card after finishing each of the two sets of testing. Testing is done at first for screening and testing is done later at the end of the study.
  o You may enjoy some of the activities.
  o You might be able to remember information and solve problems better.
  o This study will help us, too. We will learn how to give better treatment to patients in forensic hospitals who have pending legal charges. Better treatment may lead to shorter stays at the hospital.

The risks:
  o It is possible that you will get frustrated in doing some activities. We will make every effort to lower your frustration.
  o This study has very few risks. We will make every effort to help you feel at ease.

Can the researchers take you out of the study?
  o We can take you out of the study if
    ▪ We think your symptoms are becoming much worse
    ▪ The study appears to be upsetting you.
We will be closely watching out for these things. We do not expect them to happen.

We will contact your doctor if we believe it is in your best interest.

PRIVACY
You have a right to privacy. We will do all your activities in a private room at Taylor Hardin.

CONFIDENTIALITY
You have a right to confidentiality. To help us protect your privacy, we have gotten a Certificate of Confidentiality from the National Institute of Mental Health. If the court or a lawyer demands information about you from the researchers (for example, with a subpoena), we can use it to protect your information. With the Certificate, the researchers can legally refuse to give out your information. Some exceptions to this protection are listed below.

You also have a right to personal safety. To protect yourself and others, the researchers must report all of the following:

- if you tell us you are going to hurt yourself
- if you tell us you are going to harm someone else
- if you tell us that someone else is hurting you.

Also, a Certificate of Confidentiality does not stop you from voluntarily releasing information about yourself or your involvement in this research. If you give written consent to give someone your information, then the researchers may not use the Certificate to withhold that information. This means that you must also actively protect your own privacy.

A Certificate of Confidentiality does not mean that the research study was endorsed by the Department of Health and Human Services or the National Institute of Mental Health.

A copy of this form must be put in your chart. Staff members who treat you can see your chart. The Certificate of Confidentiality cannot prevent staff from seeing the consent form in your chart. On all other forms, though, we will only use ID numbers instead of names or any other personal information. This way, no one will be able to connect your name with other research data. All your research information will be kept secret. Your data will be kept safe in a locked office. Some of your data will be kept on a computer with a password. Only the researchers can see the files.

With your okay, we will also look at your chart to get background information. We will ask you to sign a separate form to let us look at your chart.

UNIVERSITY OF ALABAMA IRB
The University of Alabama Institutional Review Board (IRB) is the committee that protects the rights of people in research studies. The IRB may review study records from time to time to be sure that people in research studies are being treated fairly and that the study is being carried out as planned.

If you have questions about the study right now, please ask them. If you have questions about the study later on, please call one of the Principal Investigators.

- The Principal Investigator, Jennifer K. Wilson, is a psychology graduate student at UA. She may be contacted by calling 205-348-5083 or writing a letter to University of Alabama, Department of Psychology, Box 870348, Tuscaloosa, AL 35487-0348.
• You may also call Dr. Stanley L. Brodsky, Co-Principal Investigator and UA faculty supervisor, at 205-348-5083.

If you have questions about your rights as a person taking part in a research study, you may call Ms. Tanta Myles, the Research Compliance Officer of the University at (205)-348-8461 or toll-free at 1-877-820-3066. You may also ask questions, make suggestions, or file complaints and concerns by mailing a letter to the University of Alabama Office for Research Compliance, Box 870127, Tuscaloosa, AL 35487-0127.

After you participate, you are encouraged to complete a survey for research participants. You may ask the investigator for a copy of it. Mail it back to the University of Alabama Office for Research Compliance, Box 870127, Tuscaloosa, AL 35487-0127.

__CONTACT__?

Would you like to contact someone before deciding whether you want to be in the study?

____ No
____ Yes, contact was made ____ during this meeting _____ at a later date

__CONSENT__:

I read this consent form. I had a chance to ask questions. I understand what I will be asked to do. I know that I can stop being in the study at any time without affecting my treatment. I freely agree to take part in it. I will get a copy of this consent form to keep.

______________________________                                    ___________________________
Signature of participant                                                Signature of researcher

_____________________________                                     ___________________________
Date                                                                     Date

Consent to be Observed

Treatment sessions will sometimes be observed. This is to find out if the treatment is being done correctly. Only one person will do these observations. Any notes will be stored in a locked cabinet in a private office at Taylor Hardin. Only the researchers will be able to see any notes.

I understand that part of my participation in this study could be observed by another person. I give my permission to let the person observe.

☐ Yes, my participation in the study can be observed.

☐ No, I do not want my participation in the study to be observed.
Appendix E

Check for Understanding of Consent

Voluntary Participation:

<table>
<thead>
<tr>
<th>Question</th>
<th>Participant Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How free are you to do this project?</td>
<td>1.</td>
</tr>
<tr>
<td>2. Your doing the study is voluntary, which means you can choose whether you want to be in this project or not. So, do you HAVE to be in the study?</td>
<td>2.</td>
</tr>
</tbody>
</table>

Purpose:

<table>
<thead>
<tr>
<th>Question</th>
<th>Participant Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Can you explain the purpose of this project?</td>
<td></td>
</tr>
<tr>
<td>2. The project is being done to see if certain activities help people to remember and solve problems easier and understand their charges. So, how do you think these activities could affect people?</td>
<td></td>
</tr>
</tbody>
</table>

Procedures:

<table>
<thead>
<tr>
<th>Question</th>
<th>Participant Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. You will randomly be assigned to a treatment condition. Can you explain to me what this means?</td>
<td>1.</td>
</tr>
<tr>
<td>2. You will be randomly assigned to either continue getting treatment as usual from the hospital, or receive usual care plus computer activities. So, will everyone get to do the computer activities?</td>
<td>2.</td>
</tr>
</tbody>
</table>

Outcome of Services:

<table>
<thead>
<tr>
<th>Question</th>
<th>Participant Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Can I guarantee how this project will turn out?</td>
<td>1.</td>
</tr>
<tr>
<td>2. Help cannot be promised, but it is possible that you will remember things and solve problems better. So, can we guarantee you WILL have better memory and problem-solving skills?</td>
<td>2.</td>
</tr>
</tbody>
</table>
Confidentiality:

<table>
<thead>
<tr>
<th>Question</th>
<th>Participant Response</th>
</tr>
</thead>
</table>
| 1. What does it mean when I say I have to keep your private information confidential?  
  a. Are there times when I can’t keep your private information confidential? | 1.  
  a. |
| 2. Well, when I say your information is confidential, it means that only the researchers have access to this information. However, we are bound by law to tell somebody else this information if you tell us you are going to hurt yourself, someone else, or that someone else is hurting you. That’s really to make sure you are safe.  
  a. So if I tell you your information is confidential, what does that mean?  
  b. Can you name some times when I have to tell somebody besides the other researchers some of this information? | 2.  
  a.  
  b. |
| 3. Okay, this section is an important part, so I want to make sure you're with me. For us, confidential means we keep your information secret, unless you tell us you are going to hurt yourself, someone else, or that someone else is hurting you. But these are really the only conditions we don’t keep your information secret. Just to recap, confidential means we keep your information secret.  
  a. So, if I tell you your information is confidential, what does that mean?  
  b. When do I have to tell somebody about this information? | 3.  
  a.  
  b. |
Appendix F

University of Alabama

AUTHORIZATION FOR USE/DISCLOSURE OF HEALTH INFORMATION
FOR RESEARCH

What is the purpose of this form? You are being asked to sign this form so that UA researchers may use your health information for research. Participation in research is voluntary. If you choose to participate, you must sign this form so that researchers can access your health information.

Participant name: ___________________________ UA IRB Protocol Number: 13-011-ME
Principal Investigators: Jennifer K. Wilson, M.A. and Stanley L. Brodsky, Ph.D.

What health information do the researchers want to use and why? The researchers require some information related to being eligible for the study: whether you can read and speak English, any evidence of intellectual deficiency, your legal status (for example, IST), whether you had your 10-day treatment planning conference, your current ratings of psychiatric stability, and whether you are competent to consent to the research. The researchers will need to know your schedule of group treatment so that they can schedule research activities around it. During the course of the study, in order to maintain a safe environment, the researchers will need to stay informed about safety issues you may have: recent violent or suicidal episodes, ward restrictions, phone restrictions, and whether you are allowed to have a female escort. The researchers also want to stay informed about significant changes in your psychiatric stability and competency to consent to research in order to maintain a safe and ethically appropriate treatment environment for you. Lastly, the researchers need some basic information to compare treatment and control groups, as these variables could influence your response to treatment. This information includes age, race/ethnicity, years of education, diagnosis, and length of stay at Taylor Hardin.

Who will disclose, use and/or receive my health information? The approved personnel on the research protocol will have access to the above-referenced information.

How will my health information be protected once it is given to others? Your health information provided now and during the study will remain private to the fullest extent possible.

How long will this Authorization last? Your authorization for the uses and disclosures described in this Authorization will last no more than 12 months from the date you signed this form.

Expires: _______________________________________

Can I cancel the Authorization? You may cancel this Authorization at any time by notifying one of the Principal Investigators (Jennifer Wilson) and Medical Records Department, in writing, referencing the Research Protocol and IRB Protocol Number. If you cancel this Authorization, the researchers will not use any new health information for research. However, researchers may continue to use the health information that was provided before you cancelled your authorization.

Can I see my health information? You have a right to request to see your health information. However, to ensure the scientific integrity of the research, you will not be able to review the research information until after the research protocol has been completed.

Signature of participant: ___________________________ Date: __________
### Revised Version of MacArthur Perceived Coercion Scale:

<table>
<thead>
<tr>
<th></th>
<th>TRUE</th>
<th>FALSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I felt free to do or not do the study.</td>
<td>TRUE</td>
<td>FALSE</td>
</tr>
<tr>
<td>2. I chose to be in the study.</td>
<td>TRUE</td>
<td>FALSE</td>
</tr>
<tr>
<td>3. It was my idea to participate in the study.</td>
<td>TRUE</td>
<td>FALSE</td>
</tr>
<tr>
<td>4. I have control of being in the study.</td>
<td>TRUE</td>
<td>FALSE</td>
</tr>
<tr>
<td>5. I was not pressured by anyone to do the study.</td>
<td>TRUE</td>
<td>FALSE</td>
</tr>
</tbody>
</table>

**Scoring:**

TRUE = 0  
FALSE = 1
Appendix H

**Patient Data Sheet**

Patient Assessment Code: ________________  Patient Admission Date: ________________

Length of Stay at time of signing consent: _______ days  Legal Status (e.g., IST): _______

Date of first consent: ________________  BPRS _______  Age at time of consent: _____

Race/Ethnicity: _________________________  Date of birth: _________________________

Food allergies? ________________________  Extent of education: ______________________

Diagnoses at time of consent: _____________________________________________________

______________________________________________________________________________

______________________________________________________________________________

Clinical notes (suicidality, violent behavior toward staff, specific delusions, seizures or history of brain injury): _____________________________________________________

______________________________________________________________________________

______________________________________________________________________________

Charges: _______________________________________________________________________

______________________________________________________________________________

WRAT-IV  Assessor: _____________________________________________________________

Word Reading raw score: _______  Sentence Comprehension raw score: _______

Word Reading grade equivalent: _____  Sentence Comp. grade equivalent: _____

Reading Composite standard score: __________________

______________________________________________________________________________

Time 1:  Assessor(s) and date(s): ________________________________________________

MacCAT-CA  Understanding______  Reasoning_______  Appreciation_____

CVLT-II  Short Delay Free Recall raw_____  Long Delay Free Recall raw____

Forced Choice Recognition: _____________/16 Correct

D-KEFS  Sorting: Free Sort Confirmed Correct raw score_____

Twenty Questions: Total Questions Asked raw score_____

______________________________________________________________________________
Time 2: Assessor(s) and date(s): ______________________________________

MacCAT-CA Understanding_____ Reasoning_____ Appreciation_____

CVLT-II  Short Delay Free Recall raw_____ Long Delay Free Recall raw_____
Forced Choice Recognition: ____________/16 Correct

D-KEFS  Sorting: Free Sort Confirmed Correct raw score_____
Twenty Questions: Total Questions Asked raw score_____

Experimental condition (check one): Treatment As Usual/Control ____
Experimental/Extra Treatment ____
(for Extra Treatment Condition) Number of Treatment Sessions Completed: ____ Group
________ Individual

Date of Debriefing: _________________

Scheduling Notes: __________________________________________________________
_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________
<table>
<thead>
<tr>
<th>Session #</th>
<th>Plan/Software programs to introduce</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction to using a computer, Frippletration (Thinkin’ Things™ Collection 2) and Fripple House (Collection 3)</td>
</tr>
<tr>
<td>2</td>
<td>Frippletration (Thinkin’ Things™ Collection 2) and Fripple House (Collection 3)</td>
</tr>
<tr>
<td>3</td>
<td><strong>Bridging Group: Introduction to Cognitive Skills</strong></td>
</tr>
<tr>
<td>4</td>
<td>Brainiversity Memory and Fripple House (Thinkin’ Things™ Collection 3)</td>
</tr>
<tr>
<td>5</td>
<td>Brainiversity Memory and Fripple House (Thinkin’ Things™ Collection 3)</td>
</tr>
<tr>
<td>6</td>
<td><strong>Bridging Group: Review Cognitive Skills, Focus on Memory</strong></td>
</tr>
<tr>
<td>7</td>
<td>Brainiversity Memory and either Stoctopus or Zoombini’s Logical Journey activities</td>
</tr>
<tr>
<td>8</td>
<td>Brainiversity Memory and either Stoctopus or Zoombini’s Logical Journey activities</td>
</tr>
<tr>
<td>9</td>
<td><strong>Bridging Group: Focus on Memory</strong></td>
</tr>
<tr>
<td>10</td>
<td>Where in the USA is Carmen Sandiego?® or Where in the World is Carmen Sandiego?®</td>
</tr>
<tr>
<td>11</td>
<td>Where in the USA is Carmen Sandiego?® or Where in the World is Carmen Sandiego?®</td>
</tr>
<tr>
<td>12</td>
<td><strong>Bridging Group: Focus on Problem-Solving</strong></td>
</tr>
<tr>
<td>13</td>
<td>Where in the USA is Carmen Sandiego?® or Where in the World is Carmen Sandiego?®</td>
</tr>
<tr>
<td>14</td>
<td>Where in the USA is Carmen Sandiego?® or Where in the World is Carmen Sandiego?®</td>
</tr>
<tr>
<td>15</td>
<td><strong>Bridging Group: Focus on Problem-Solving and Wrap-Up</strong></td>
</tr>
</tbody>
</table>
Appendix J

Individual Session Log

Name: _______________________________________

<table>
<thead>
<tr>
<th>Session #</th>
<th>Date</th>
<th>Software Activity disk</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>04/04/12</td>
<td>Frizzletration</td>
<td>G</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Thinkin' Things™ Collection 2</td>
<td></td>
</tr>
</tbody>
</table>

See first row for an example
## Appendix K

### Software I Have Learned to Use

<table>
<thead>
<tr>
<th>Software I have learned to use Activity/disk name</th>
<th>What skills have I practiced?*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td></td>
</tr>
</tbody>
</table>

For example:
*problem solving
*processing speed
*reasoning and logic
*quick responses
*concentration
*planning
*attention
*reasoning and logic
*working memory
*organization
*memory
Appendix L

An Example of NEAR’s Guided Questions Strategy

Specific Questions

If broad questions fail to guide the client, ask more specific questions, such as (example questions 1–4 are for Carmen Sandiego games):

1. Where do you have to travel?
2. Where did you come from? Where are you going next?
3. What are your choices and options when you arrive at a new city?
4. Do you need to get more information about where the thief went or about what they look like?
5. What do you know about all the purple fripples? (for the Fripple House software)

Figure 7.1 shows the steps of the guided questions strategy.

Figure 7.1
CRS-guided questions strategy.
Appendix M

Example of NEAR Problem Solving Activity

Module II: Verbal Reasoning and Problem-Solving
Group 10: Problem Solving Group II

Group Objective: Using a real-life scenario, discuss participants’ approaches to solving a problem.

Clinical Objective: Practice using problem-solving skills to solve another real-life scenario, different from the one used last session.

Materials: The Paula scenario—one sheet per participant. A blackboard or presentation easel.

Introduction: Last session we worked on a problem situation involving Charlie and many tasks that he needs to accomplish. We brainstormed various ways deal with the situation. Today, I am going to tell you about Paula’s problem. Listen carefully and then we will discuss how to solve the problem.

Facilitator asks everyone to read a few sentences so that story gets read by going around until all sentences are read.

Scenario: Paula has an appointment at Gardsung Hospital at 12:30 with Dr. Smith. She takes the hospital address and the doctor’s phone number with her. She gets to the hospital right on time, but can’t seem to find the doctor’s office. How can she find out how to get to the doctor’s office?

Discussion Guide: Let’s see if we can help Paula get to the doctor’s office.

- What cognitive skills are used in this situation?
  - Memory – Paula had to remember when and where to go
  - Planning – Paula had to know how much time she needed to get to the doctor’s office
  - Problem-solving – Paula needs to figure out how to get to the doctor’s office

- What additional strategies could Paula have used to help solve this problem?
  - Participants should point out that Paula did use the memory aid of writing things down (she wrote down the address and phone number) and probably some sort of alarm because she got to the doctor’s office on time
  - Additional strategies should include problem-solving (brainstorming ideas of either asking someone for help, looking at the building’s directory, or calling the doctor)
## Treatment Fidelity Checklist: Individual Computer Activity Sessions

<table>
<thead>
<tr>
<th>Therapist _____________________</th>
<th>Session Date ____________</th>
<th>Time _______</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant Code ___________________</td>
<td>Participant Session # _______</td>
<td>Rater__________</td>
</tr>
</tbody>
</table>

### Treatment Delivery

<table>
<thead>
<tr>
<th>NEAR-specific procedures</th>
<th>DELIVERED</th>
<th></th>
<th></th>
<th>Weight %</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strived for errorless learning through gradually increasing difficulty level</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Minimized patient frustration</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Utilized guided questions</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Provided positive feedback</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Exhibited positive regard</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Promoted patient self-efficacy</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Assisted patient with computer use, as needed</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Assisted patient with software use, as needed</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Demonstrated knowledge of computer software</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

**SUM:**

### Treatment Receipt

<table>
<thead>
<tr>
<th>NEAR-specific gains</th>
<th>RECEIVED</th>
<th></th>
<th></th>
<th>Weight %</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient demonstrated progress in computer activities (evidenced through increasing levels of difficulty, increasing complexity of games played, and increasing number of software learned)</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>65</td>
<td></td>
</tr>
<tr>
<td>Patient demonstrated progress in self-efficacy</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>35</td>
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</tbody>
</table>

**SUM:**
Appendix O

Treatment Fidelity Checklist: Bridging Groups

Therapist____________________________ Session Date ____________ Time ________
Participant Code____________________ Participant Session # _______ Rater________________

Treatment Delivery

<table>
<thead>
<tr>
<th>NEAR-specific procedures</th>
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<th>Part</th>
<th>Full</th>
<th>Weight %</th>
<th>Score</th>
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</thead>
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<tr>
<td>Facilitated discussion through prompts</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>20</td>
<td></td>
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<tr>
<td>Promoted concept of generalization of computer activities to everyday activities</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Taught cognitive concepts as needed</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>10</td>
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<tr>
<td>Provided relevant examples of cognitive skills at work</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Exhibited positive regard</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Promoted patient self-efficacy</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Tested patient’s knowledge of cognitive skills</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Created supportive environment</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>5</td>
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<tr>
<td><strong>SUM:</strong></td>
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Treatment Receipt

<table>
<thead>
<tr>
<th>NEAR-specific gains</th>
<th>None</th>
<th>Part</th>
<th>Full</th>
<th>Weight %</th>
<th>Score</th>
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</thead>
<tbody>
<tr>
<td>Patient demonstrated progress in connecting computer activities to everyday activities (generalization)</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>40</td>
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<td>Patient demonstrated progress in connecting cognitive skills to everyday activities</td>
<td>0</td>
<td>1</td>
<td>2</td>
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<tr>
<td>Patient demonstrated progress in self-efficacy</td>
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<td>1</td>
<td>2</td>
<td>30</td>
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<tr>
<td><strong>SUM:</strong></td>
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</tbody>
</table>

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Appendix P
Debriefing Form

The goals of the current study are listed below:

1. To find out if computer activities and the related group therapy helped patients to understand their charges and work with their attorneys
2. To find out if computer activities and the related group therapy helped patients to remember things like words and names
3. To find out if computer activities and the related group therapy helped patients to think and solve problems

You may call the researcher, Jennifer Wilson, at (205) 348-5083 if you have any questions after this.

You can also call the other researcher, her supervisor, Stanley L. Brodsky, Ph. D., at (205) 348-5083. He is a licensed clinical psychologist and professor. He is available if you have questions about any part of this study.

Finally, you can also call Ms. Tanta Myles, Research Compliance Officer at (205) 348-8461. She can answer any questions or concerns about your rights related to being in this study.
CONFIDENTIALITY CERTIFICATE
MH-13-112A
issued to
The University of Alabama
conducting research known as
“Competence through Cognition: Cognitive Remediation and Restoration of Trial Competence”

In accordance with the provisions of section 301(d) of the Public Health Service Act 42 U.S.C. 241(d), this amended Certificate is issued in response to the request of the Principal Investigator, Stanley Brodsky, to protect the privacy of research subjects by withholding their identities from all persons not connected with this research. Dr. Brodsky is primarily responsible for the conduct of this research which is funded by the National Institute of Mental Health.

Under the authority vested in the Secretary of Health and Human Services by section 301(d), all persons who:

1. are enrolled in, employed by, or associated with The University of Alabama and its contractors or cooperating agencies, and

2. have in the course of their employment or association access to information that would identify individuals who are the subjects of the research pertaining to the project known as “Competence through Cognition: Cognitive Remediation and Restoration of Trial Competence”,

are hereby authorized to protect the privacy of the individuals who are the subjects of that research by withholding their names and other identifying characteristics from all persons not connected with the conduct of that research.

This Certificate extends and amends MH-13-112, “Competence through Cognition: Cognitive Remediation and Restoration of Trial Competence” to examine the effectiveness of adding a module of cognitive remediation to standard hospital treatment compared to incompetent individuals to stand trial. In addition, forensic inpatients with pending or past criminal charges will be examined.

A Certificate of Confidentiality is needed because sensitive information about mental health, substance use, illegal activity and psychological well-being will be collected during the course of the study. The certificate will help researchers avoid involuntary disclosure that could expose subjects or their families to adverse economic, legal, psychological and social consequences.
All subjects will be assigned a coded number and identifying information and records will be kept in locked files.

This research is underway, and is expected to end on 12/31/2016.

As provided in section 301 (d) of the Public Health Service Act 42 U.S.C. 241(d):

"Persons so authorized to protect the privacy of such individuals may not be compelled in any Federal, State, or local civil, criminal, administrative, legislative, or other proceedings to identify such individuals."

This Certificate does not protect you from being compelled to make disclosures that: (1) have been consented to in writing by the research subject or the subject’s legally authorized representative; (2) are required by the Federal Food, Drug, and Cosmetic Act (21 U.S.C. 301 et seq.) or regulations issued under that Act; or (3) have been requested from a research project funded by NIH or DHHS by authorized representatives of those agencies for the purpose of audit or program review.

This Certificate does not represent an endorsement of the research project by the Department of Health and Human Services. This Certificate is now in effect and will expire on 12/31/2016. The protection afforded by this Confidentiality Certificate is permanent with respect to any individual who participates as a research subject (i.e., about whom the investigator maintains identifying information) during any time the Certificate is in effect.

Nitin Gogtay, M.D.
Associate Director for Clinical Research
National Institute of Mental Health

Date of Issuance: April 29, 2014
June 14, 2013

Jennifer K. Wilson, MA
Department of Psychology
College of Arts & Sciences
The University of Alabama

Re: IRB Protocol # 13-011-ME
“Competence through Cognition: Cognitive Remediation and Restoration of Trial Competence”

Ms. Wilson:

The University of Alabama Medical IRB has granted initial approval of the above application for a one-year period. Please be advised that your protocol will expire one year from the date of approval, 6/13/13.

If your research will continue beyond this date, complete the Renewal Application Form. If you need to modify the study, please submit the Modification of An Approved Protocol Form. Changes in this study cannot be initiated without IRB approval, except when necessary to eliminate apparent immediate hazards to participants. When the study closes, please complete the Request for Study Closure Form.

Should you need to submit any further correspondence regarding this proposal, please include the assigned IRB application number. Please use reproductions of the IRB approved stamped consent/assent forms to obtain consent from your participants.

Good luck with your research.

Sincerely,

John C. Higginbotham, Ph.D., MPH
Medical IRB Chair
The University of Alabama