Cognitive Adaptation Training for Outpatients With Schizophrenia

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Schizophrenia is a complex neurodevelopmental disorder characterized by cognitive deficits. These deficits in cognitive functioning have been shown to relate to a variety of functional and treatment outcomes. Cognitive adaptation training (CAT) is a home-based, manual-driven treatment that utilizes environmental supports and compensatory strategies to bypass cognitive deficits and improve target behaviors and functional outcomes in individuals with schizophrenia. Unlike traditional case management, CAT provides environmental supports and compensatory strategies tailored to meet the behavioral style and neurocognitive deficits of each individual patient. The case of Ms. L. is presented to illustrate CAT treatment. © 2009 Wiley Periodicals, Inc. J Clin Psychol: In Session 65:842–853, 2009.

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Schizophrenia is a complex mental disorder characterized by a constellation of symptoms including positive symptoms, negative symptoms, and cognitive deficits in the areas of memory, attention and executive functions. For individuals with schizophrenia, such cognitive impairments have been shown to predict many domains of community functioning such as activities of daily living, social relationships and occupational functioning (Granholm et al., 2008; Velligan et al., 2008b; Velligan et al., 2006a,b). Research suggests that advancements in medication treatments have resulted in improvement of positive symptoms; however, they have done less to improve negative symptoms and cognitive deficits in clients with schizophrenia (Bark et al., 2003).

The treatment of cognitive deficits has focused on either restorative or compensatory approaches (Table 1). Restorative interventions, such as cognitive

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remediation, are most commonly found in academic and research settings in which drill and practice or problem-solving cognitive tasks are used in an attempt to directly improve aspects of memory, psychomotor speed, and problem solving (Bark et al., 2003; Medalia & Freilich, 2008). Cognitive remediation, particularly in the context of integrated rehabilitation programs, has led to improvements in cognitive functioning which, in turn, have been found to lead to improvements in vocational and social functioning (Velligan et al., 2006b; Bell et al., 2008; McGurk & Wykes, 2008).

Rather than directly attempting to improve cognitive skills, compensatory approaches are designed to work around cognitive deficits by creating external systems in the client’s natural environment to support improved functioning. Environmental supports and compensatory strategies attempt to bypass cognitive deficits and negative symptoms through the organization of belongings and reminders and environmental cues to support specific adaptive behaviors. For example, watches and clocks with multiple alarms can be used as an auditory cue that it is time to take a medication. Such environmental supports are used in everyday life by many individuals in the general population: alarm clocks prompt punctual awakening, personal hand-held computers alarm prior to an appointment, and chiming in a car reminds the driver that the headlights are still on. In recent years, the systematic use of compensatory strategies has been extended to schizophrenia in cognitive adaptation training (CAT) with promising results.

### Table 1

<table>
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<th>Treatment</th>
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<td>CAT</td>
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Cognitive Adaptation Training

CAT is a manualized treatment based upon the principle that impairments in executive function (i.e., the ability to plan and carry out goal-directed activity) in schizophrenia lead to one of three behavioral styles evident during the performance of everyday tasks: (a) apathy; (b) disinhibition; or (c) mixed, a combination of apathy and disinhibition (Frith, 1992; Velligan et al., 2006a,b; Velligan et al., 2008a). Apathy is defined by poverty of speech and movement and the inability to initiate and follow through on behaviors requiring multiple steps. An individual with a disinhibited behavioral style is disorganized, easily distracted, and highly driven by cues from the environment. The mixed behavioral style is characterized by trouble both initiating behavior and becoming easily distracted during task behavior, thus undercutting completion of functionally relevant tasks.

Apathy may be treated by providing individuals with cues in the environment that prompt them to begin each step in a sequenced task. For example, environmental supports for apathetic behavior may include placing signs and tools for daily activities in clearly visible locations.
activities directly in front of the client (e.g., placing toothbrush and toothpaste in a basket next to the bathroom mirror), checklists with tasks broken down into specific steps, and electronic devices to provide auditory prompts for specific behaviors. Clients with disinhibited behavior benefit from the removal of distracting stimuli and the reorganization of their environment. For example, rather than having a closet full of clothing choices, an intervention might include separating matching outfits into bins labeled with each day of the week and the removal of clothes that no longer fit or those that are inappropriate for the current season’s weather. For clients with mixed behavior deficits, a combination of interventions that cue initiation and prevent distraction is offered to address problems with dressing (e.g., placing individual outfits in hanging bags at the foot of the bed).

Assessment and Treatment Planning

CAT treatment begins with a comprehensive assessment that provides information about a client’s current level and pattern of neurocognitive functioning, behavior, adaptive functioning, and living environment. The neuropsychological test battery examines attention, memory, executive functioning, and psychomotor speed. Based upon the results of several measures of executive functioning, an individual’s skills in this area are classified broadly as either fair or poor. Overt behavior is assessed by directly observing the individual at their home during the performance of everyday tasks. The therapist rates observed behavior on the Frontal Systems Behavior Scale (FrSBe; Grace et al., 1999; Velligan et al., 2002). The FrSBe identifies the level of apathy and disinhibition. Table 2 provides examples of how each behavioral style may be exhibited in the completion of everyday tasks.

In addition, we use tests of independent living skills known as the Functional Needs Assessment (Dombrowski et al., 1990) and the Life Skills Profile (Rosen & Hadzi-Pavlovic, 1989). These tests identify specific activities of daily living that may be problematic for the individual (e.g., hygiene, money management, taking the bus). Additionally, a thorough assessment of the individual’s environment is conducted to identify safety hazards (e.g., frayed electric wires), to assess the availability of needed supplies (e.g., does the person have soap, toothpaste, trash bags?), and to evaluate the functional adequacy of the location or placement of necessary equipment and supplies (e.g., medication containers spread out around the home instead of located in a central place).

Treatment plans are based upon the level of executive functioning (poor, fair) and the corresponding behavioral style (apathy, disinhibition, mixed) as identified by the FrSBe. Clients with poorer executive functioning benefit from higher levels of structure and more obvious environmental cues, such as brightly colored signs and checklists with simple, behaviorally specific instructions to complete each task. Clients whose executive functioning falls within the average range for someone with schizophrenia may benefit from slightly less structured environmental supports, for example, checklists that simply list the tasks to be completed are often sufficient to support adaptive behavior. An individual’s functioning and behavioral type inform the selection of specific interventions. Once the CAT assessment is complete, the CAT therapist works with the client to identify which areas to address first. In the initial phases of treatment, priority is given to behaviors related to risk and safety, as well as to areas that the client perceives as a priority.

Once initial targets for treatment are identified with the client, the CAT therapist explains the rationale and content for each intervention. Weekly 40–50-minute home
visits by the CAT therapist are used to modify and track the effectiveness of each intervention. The length of treatment in randomized clinical trials and clinical applications is typically 9 months. Throughout the treatment phase, the CAT therapist routinely elicits client feedback about each intervention. In addition, they continue to work collaboratively to reprioritize the problem list and address emerging concerns.

**Clients likely to benefit.** Research suggests that clients experiencing challenges in any area of functioning may benefit from CAT. Examples of problem areas include: difficulty engaging in functionally relevant daily activities, paucity of or difficulties in interpersonal relationships, occupational challenges, difficulties maintaining personal hygiene or a clean home, difficulties managing money, and poor medication or appointment adherence. Individuals who are willing to work with...
an in-home case manager or therapist and who have difficulty with activities of daily living and community functioning are good candidates for CAT. CAT is also beneficial for individuals who do not engage in regular mental health treatment and are functioning below their capacity. Clinical experience also suggests that clients experiencing high levels of paranoia and those lacking insight into their disorder are more likely to refuse CAT treatment or withdraw before treatment completion. Studies also suggest that clients who have high levels of mental healthcare utilization improve in functional outcomes with CAT (Ritch et al., 2002; Korell et al., 2002).

**Supportive Research**

Initial research exploring the efficacy of CAT provides promising results. One of the first studies was conducted with 45 individuals diagnosed with schizophrenia. Patients were randomized to one of three groups for a 9-month treatment. The three groups were weekly CAT treatments, a sham treatment designed to control for the non-specific effects of CAT (e.g., home visits by caring individuals and new stimuli in the living environment), and treatment as usual (regular medication follow-up only). Results indicated that clients receiving CAT treatment experienced lower levels of psychotic symptomatology, lower rates of symptom relapse, higher levels of motivation and adaptive functioning, and better quality of life than participants in the other two groups (Velligan et al., 2000; Velligan et al., 2002).

A more recent randomized study compared the efficacy of a 9-month treatment phase of CAT, Pharm-CAT (an abbreviated form of CAT treatment focused only on treatment adherence), and treatment as usual (TAU) on adherence and maintenance of treatment gains (Velligan et al., 2008a). Participants were outpatients with a diagnosis of schizophrenia or schizoaffective disorder who were being treated at a community mental health clinic. Results indicated that CAT improved functional outcomes relative to Pharm-CAT or TAU and that those treated with CAT and Pharm-CAT showed less likelihood to relapse early. However, when home visits were withdrawn at the end of active treatment, group differences in functional outcomes were no longer observed at a 6-month follow-up assessment, suggesting that maintenance of gains in adaptive functioning may require ongoing direct support (Velligan et al., 2008a). As this could be cost prohibitive in many settings, other alternatives might include less frequent home visits or working with family and caregivers to learn how to set up and maintain functionally relevant environmental supports.

To explore further the issue of treatment use and durability, another study of 120 people with schizophrenia compared the efficacy of two treatments using environmental supports, CAT and GES (a generic set of environmental supports given to clients at an outpatient clinic visit), and compared them with TAU (Velligan et al., 2008b). Following 9 months of acute treatment, visits were decreased from weekly to monthly to examine whether treatment gains could be maintained. Results indicated that during the initial three months of treatment participants in the CAT group used their environmental supports with greater frequency than those assigned to GES (Velligan et al., 2008b). This finding suggests that clients are more likely to use compensatory strategies when they are tailored to their specific needs and in their home environment. Results for the entire study duration indicated that CAT recipients also showed greater improvement in global functioning compared to the other groups. This study also examined the sustainability of CAT treatments gains, following a decrease in the frequency of treatment. Although individuals in the CAT
group remained significantly better than those in the TAU group, a reduction in
treatment frequency may have decreased the level of gains to that seen in the GES
condition. This suggests for some individuals more intensive ongoing treatments
may be needed to maintain the gains seen in CAT (Velligan et al., 2008b).

In summary, initial studies provide evidence that environmental supports and
compensatory strategies can improve functional outcomes in clients with schizo-
phrenia. The following case study provides a detailed illustration of the CAT process
and how this treatment can impact adaptive functioning across a range of domains.

Case Illustration

Presenting Problem/Client Description

Ms. L. is a 45-year-old Hispanic woman with a diagnosis of paranoid schizophrenia.
She was originally diagnosed upon admission to a psychiatric facility for a suicide
attempt at the age of 28.

Upon entrance to CAT, Ms. L. displayed both positive and negative symptoms.
She had auditory and visual hallucinations throughout the day which were at times
berating. She had severe paranoia when in public places, particularly when riding the
bus. She had withdrawn to her own apartment for everything but her doctor visits
and weekend visits to her grandmother’s house. At times she would try to go outside
to smoke a cigarette, but if she saw someone she did not know, then she would
retreat into her home. Her affect was blunted and both her speech and her
movements were slowed. Although she was quite depressed and had suicidal ideation
with nightly thoughts that it would be better if she did not wake up, she did not have
a plan to harm herself. She remained in bed a large portion of the day. Often when
the CAT therapist came for scheduled weekly visits, Ms. L. would still be in bed,
sometimes not even coming to answer the door. When she did answer, her
appearance was unkempt, her clothes were often dirty, and she had a strong odor
from poor hygiene. Her personal hygiene was severely diminished as she was
currently bathing and brushing her teeth only one time weekly. Her hair, which
appeared to have not been cut in many years, was also coarse and dry due to her
poor self-care and nutrition. She was unable to accomplish even light household
chores.

Ms. L. also had numerous medical problems including uncontrolled diabetes,
hypertension, hepatitis C, and possible coronary artery disease for which she was
being evaluated at the start of CAT. The initial CAT visit revealed that Ms. L. was
prescribed seven oral medications and daily insulin injections. Due to her
considerable apathy, Ms. L. was not initiating or completing the tasks necessary
to organize her multiple medications. Bottles appeared to be left wherever they were
last used. Partially full medication bottles were found in kitchen cabinets that were
over 8 months old. Other bottles were empty with no sign that they had been refilled
for many weeks.

Case Formulation

In CAT therapy, behavioral style and executive functioning inform the treatment
selection. Initial assessments revealed that Ms. L. had an apathetic behavioral style
with poor executive functioning. Ms. L.’s low executive functioning significantly
impaired her ability to plan and execute simple tasks, while her apathetic behavioral
style severely limited her motivation to initiate ADLs social- or household-related tasks. These things made even sheltered work impossible for her.

In the case of a client with poor executive functioning, the interventions provide step-by-step task instructions in a very simple format. Often verbal prompts through electronic devices are used, as are large, colorful signs and large desk calendars that are hung on a wall. Her apathetic behavior style had detrimentally affected virtually every area of her daily functioning, including hygiene, medication and treatment adherence, and ability to work, socialize, or engage leisure activities.

Ms. L. had become isolated from most social relationships, with the exception of her grandmother and brother. However, these relationships were severely strained due, in part, to her lack of initiative. She had no personal friends with whom she participated in any social activity, and meeting new people was restricted due to paranoia. In addition to the impact on her social relationships, her presentation created difficulties in developing a working alliance between the therapist and client. In the beginning stages of treatment, the CAT therapist found it difficult to activate her participation in developing helpful interventions. Her apathetic style even interfered with her ability to maintain a conversation about specific problem areas or about useful techniques for change. As with many apathetic individuals, the therapist developed several intervention options and let Ms. L. choose from among them. Throughout treatment, it was necessary to create and recognize small successes (such as waking one hour earlier than usual), even if such successes occurred by accident. Fortunately, Ms. L. did respond positively to praise and acknowledgement of her efforts, and this promoted her desire to continue in CAT. In those first weeks, contact was frequent both in person and by phone as the therapist worked to create a relationship of trust and to instill basic structure in her daily life.

Course of Treatment

Due to the high incidence of medication non-compliance in people with a diagnosis of schizophrenia and the fact that non-adherence is among the most important predictors of relapse, one of the first priorities of CAT therapy is to address problems with medication adherence. Therefore, we immediately sought to address the condition of Ms. L.’s medication organization and treatment compliance. We provided Ms. L. with a plastic box with a secure lid for storing all medication bottles. Initially, this required verbal and written reminders in the form of colorful signs, but fairly quickly the client remembered to put her medication in the box. The client was also given a weekly pill container that accommodated four daily doses of medication. In conjunction with the weekly pill counts, the client and therapist filled the container so that Ms. L. could readily tell if she had taken the necessary doses each day. Initially, there were several doses missed throughout the week. As memory cues, an alarm clock with two alarms was set to go off when her two mid-day doses were due, and signs were placed near her bed to remind her to take her medication when she woke up and before going to bed. This reduced the number of missed doses, but did not eliminate them completely. Most frequently, she would miss the first and second doses of the day due to oversleeping. Subsequently, an electronic medication monitoring device, which was funded as part of a federal grant, was placed in her home. The device has several compartments for medications and could be programmed to alarm at the times medication self-administration was due. The device also required that she answer
questions about taking the medication. All information from the device was downloaded and monitored by the therapist remotely. Eventually, Ms. L. began to wake with the morning alarm to take her dose of medication. With these interventions, medication adherence improved approximately 60% from baseline. Not surprisingly, with improved medication compliance, she experienced a significant reduction in her paranoia.

An intervention provided to nearly all CAT clients is a large desk style calendar. A permanent marker is attached to the calendar, which is hung in a prominent location on a wall. Ms. L. was taught to record all doctor appointments, medication refill dates, and other important events on the calendar. She was also trained to mark an “X” through each day as it ended so that she would immediately know the current date. In the case of Ms. L., this was a highly successful intervention for improving her temporal orientation. She moved quickly from not knowing what day it was to checking her calendar every day. Initially, it did not improve her compliance with doctor visits because of unreliable transportation. Bus passes had been provided, but her paranoia prevented her from using public transportation. The therapist assisted Ms. L. in arranging alternative transportation via a shuttle service provided on the basis of medical necessity to and from all doctor visits; her compliance with treatment visits improved dramatically.

Later in treatment, when her paranoia had become somewhat more manageable, Ms. L. practiced riding the bus with the therapist. Prior to the practice bus rides, she was trained in relaxation exercises to reduce anxiety. We also provided headphones and a cassette tape of her favorite music as a form of distraction while riding the bus. By using these techniques, Ms. L. eventually rode the bus alone, but this never became her preferred method of transportation.

Nutrition was another important safety concern in the case of Ms. L. due to poorly controlled insulin-dependent diabetes. With only $68.00 in monthly food stamp benefits, this was a particular challenge. Initially, Ms. L. was asked to keep a record of her food intake each day. Upon review of this food diary, it was discovered that her diet consisted mostly of tortillas, eggs, potatoes, frozen pizzas, and other high-carbohydrate items that are inexpensive in large quantities. She was educated about food choices using the American Diabetes Association nutritional guidelines. Together, the therapist and Ms. L. developed samples of nutritious meal plans, and they went together to her local grocery store to practice using a grocery list created from the sample meal plans. The therapist also taught her that healthy food choices are typically located in the outer aisles of the store; whereas, less healthy, processed foods are displayed in the inside aisles. Additionally, we went to a local food bank on a monthly basis as a way of supplementing her groceries. Even with these interventions, healthier foods such as vegetables were scarce due to their higher cost and her limited financial resources. Together, the client and therapist planted vegetables such as tomatoes, onions, green beans, and squash in pots on her apartment balcony. Signs were placed in the home to remind her to water the plants and initially the produce of these plants were harvested at the weekly visits. Eventually, Ms. L. began to pick the produce on her own, outside of visits with the therapist. These simple interventions resulted in a 15-pound weight loss and the elimination of one of her diabetes medications.

Several cultural considerations related to Ms. L.’s dietary preferences were also engaged in the treatment. A traditional Hispanic menu includes many high-carbohydrate foods, such as tortillas, corn and flour, rice, and greasy meats. These were the foods Ms. L. had eaten most of her life and were also the foods served by
her grandmother on their weekend visits. Addressing these concerns with Ms. L.’s grandmother (who considered herself her granddaughter’s primary caregiver), required gently educating the family about ways to incorporate their favorite foods into a healthy diet, while remaining sensitive to the family’s cultural norms.

Once her safety and compliance were adequately addressed, CAT focused on helping Ms. L. improve her personal hygiene, as well as her reliable completion of other activities of daily living. Maintaining clean clothes was a significant obstacle because Ms. L. did not have laundry appliances and could not afford to use the facilities in her apartment complex. She did, however, have access to her grandmother’s laundry machines during their weekend visits. Laundry bags were provided to assist with easy transportation. Initially, the therapist helped her prepare the bags to be taken at their weekly visits, and each week the therapist reminded Ms. L. to take her laundry bags with a phone call. After this became routine, the therapist created signs that reminded Ms. L. to take the laundry bags with her and withdrew verbal reminders. With the signs her memory was less reliable, but she still took the laundry with her at least two to three times monthly. To maintain her attention, it was necessary to change the color of the signs weekly. This prevented her from habituating to the sign.

To work on personal hygiene, the therapist gave Ms. L. a checklist of daily hygiene tasks. The list included the following items: shower, wash hair, brush teeth, apply deodorant, change clothes, and brush hair. The checklist was hung in her bathroom as a visual cue. The therapist trained her to check off the tasks that she completed on a daily basis, allowing us to monitor her daily progress. In the first weeks, Ms. L. only completed these tasks sporadically. She continued to rarely take a shower or change her clothes. She did brush her hair more frequently and brushed her teeth slightly more frequently based upon completion of her daily checklist and appearance. To simplify the instructions and achieve more consistent success, the task lists were reduced to three items: shower, brush teeth, and brush hair. After approximately one month of success (compliance 4 or more days weekly), the task lists were expanded to include all hygiene tasks.

One of the goals early in treatment was to involve Ms. L. in an adult day treatment program. The rationale was that she would get two nutritious meals and two snacks daily. In addition to being a potential resolution to her nutritional concerns, the day program would reinforce a daily schedule and provide leisure and social activities. She initially agreed and went to visit a facility near her home that provided transportation. However, when the van came to pick her up for the first day, she did not go, probably due to high anxiety brought on by paranoid thinking. After discussion, the client did agree to go with the therapist the first day so that she could become comfortable in this new environment. After the first visit, she continued to be uncomfortable, so the weekly CAT visits were held at the facility until the client made a new friend and began to feel more at ease.

Outcome and Prognosis

The study in which Ms. L. participated allowed for 2 years of treatment. In the initial 9 months, the client received CAT visits weekly. Beginning in the 10th month, visits were tapered to three, two, and then one visit monthly. For the 2nd year of treatment, the visits remained at once monthly. As might be expected, during the first nine months of treatment, when visits were most frequent, Ms. L. made a great deal
of progress in areas related to safety, medication and treatment adherence, social activity, and hygiene. She began waking at an earlier time each day and working to accomplish daily tasks such as meal preparation and light housekeeping. Ms. L. even developed an interest in crossword puzzles and painting. As the frequency of treatment contact diminished, there was some regression in her daily hygiene. However, she maintained her medication and treatment compliance, remained oriented to date/time, and continued to take her laundry to her grandmother’s house at least twice monthly. Additionally, Ms. L. continued to attend the day treatment program approximately 3 days each week. At the final CAT visit, she continued to have better control of her diabetes, and it had not been necessary to increase any of her diabetes medications.

Clinical Issues and Summary

CAT is a manualized, in-home psychosocial treatment for individuals with schizophrenia that has been found to improve community functioning in more than a decade of research. CAT provides individually tailored environmental supports and compensatory strategies to cue and sequence adaptive behavior and addresses a spectrum of functional outcomes. CAT differs from pragmatic in-home case management in its systematic use of environmental supports to address a broad range of outcomes. The benefits of in-home visits by case managers or members of an assertive community treatment team can be extended with the use of environmental supports that allow aspects of the treatment to be present in the absence of the therapist. Supports in CAT are established based upon a comprehensive assessment of neurocognitive strengths and weaknesses, behavioral style, functional ability, and the environment. These assessments can be streamlined and taught to case managers (Maples, 2007). As discussed earlier in this article, at times it may be challenging to engage patients with schizophrenia in treatment. However, because CAT provides consumers with individually customized interventions to address specific problems in their home environment, they may see this treatment as more relevant to their everyday needs. Home visits also increase the consistency of contact with the therapist and provides more opportunity to build a therapeutic relationship. In addition, they can be reinforcing in and of themselves if made by enthusiastic and helpful treatment staff. Moreover, conducting visits in the home lessens some of the barriers to attending clinic visits including problems with transportation or decreased motivation. Finally, antecedent control (cueing behavior with signs, alarms and appropriate placement of supplies) may bypass the problems in motivation exhibited by those with negative symptoms (Velligan et al., 2000; Velligan et al., 2008a,b; Velligan et al., 2006a,b). Clinical observation in CAT suggests that consumers enjoy and value the treatment.

In the case described above, the functional gains made by Ms. L. were substantial and clinically meaningful. However, some continuation of in-home treatment to encourage the continued use of environmental supports may be necessary to sustain treatment gains for some individuals. As discussed earlier, research on CAT therapy has shown that for some individuals there may be a drop in functional outcomes with the withdrawal of home visits. This finding suggests the need for booster sessions.

Agencies must advocate to create ways of implementing and paying for programs such as CAT. We have taught the CAT model to existing case managers who conduct regular home visits (Maples et al., 2007). In these cases, CAT can be added
to the standard treatment with little increased cost. However, creative strategies and donations may be necessary to fund some supports (e.g. hygiene products, supplies for leisure activity). The implementation of CAT in this manner would increase the availability of this research supported treatment and could improve functional outcomes and decrease rates of relapse in outpatients with schizophrenia.

Selected References and Recommended Readings


