2015

Bridge/Adapt: A Systematic Cognitive Rehabilitation Curriculum

https://doi.org/10.33015/dominican.edu/2015.OT.06

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Bridge/Adapt:

A Systematic Cognitive Rehabilitation Curriculum

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A Culminating Project Submitted in Partial Fulfillment of the

Degree Master of Science Occupational Therapy

School of Health and Natural Sciences

Dominican University of California

This project, written under the direction of the candidates' faculty advisor and approved by the chair of the Master's program, has been presented to and accepted by the Faculty of the Occupational Therapy department in partial fulfillment of the requirements for the degree of Master of Science in Occupational Therapy. The content, project, and research methodologies presented in this work represent the work of the candidates alone.

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Acknowledgements

From our team:
First of all, we would like to thank our advisor, Kitsum Li, OTD, OTR/L, for her precision, expert guidance, and passion for the field of occupational therapy. We would also like to thank Ruth Ramsey, EdD, OTR/L, the department chair, for her leadership and vision.

We owe a debt of gratitude to Maggie Pesta, OTR/L, the occupational therapist at Brain Injury Network of the Bay Area, for partnering with our team and generously sharing her time and wealth of knowledge.

We would also like to thank the brain injury rehabilitation specialists who took the time to participate in our expert panel and evaluation of our project. Thank you for shaping our project with your thoughtful feedback and expertise.

Personal acknowledgements:
I, Julie Bergen, would like to thank my husband, Charles Johnson, for his insightful advice and compassionate encouragement during my graduate education. Words can barely capture how crucial his support was to my success.

I, Natalie Repin, would like to thank my friends and family for their consistent support and encouragement. They have helped me persevere and work hard for the successful completion of this program.

I, Amy Bennett, would like to thank my family and friends for their encouragements and endless support throughout this process. Their compassionate support has helped me persevere through completing the program, and I can't thank them enough for helping me accomplish as much as I have done to this very day.

Abstract

Cognitive impairment, including deficits in memory, attention, visual perception, executive functioning, and self-awareness, is a common consequence of acquired brain injury (ABI). Subsequently, these cognitive impairments result in functional impairments in daily life activities for clients with ABI. Rehabilitation efforts are categorized under two broad approaches: remediation and adaptation. Computer-assisted cognitive retraining (CACR) is a remediation approach using a computer platform to deliver cognitive exercises. CACR therapy can lead to improvements in memory and attention for adults with chronic ABI. However, memory and attention improvements from CACR may not carry over to functional improvements in occupational performance. Research suggested that therapy using an adaptive approach can yield functional improvements. The purpose of this project was to design a systematic cognitive retraining curriculum, Bridge/Adapt, to bridge the gap between memory- and attention-skill gains from CACR to functional improvements in occupational performance using adaptive strategies. The Bridge/Adapt curriculum incorporates the cognitive orientation of occupational performance (CO-OP) intervention approach, multicontext approach, and goal-oriented attentional self-regulation training. The curriculum includes eight modules that provide grading options so that occupational therapists can choose which difficulty level best suits the client. Clients practice adaptive strategies during simulations of instrumental activities of daily living (IADL), including financial management, appointment scheduling, and grocery shopping, utilizing the three themes in Bridge/Adapt: salience, context, and hierarchy. Clients use salience to choose meaningful goals to work on at home. Context refers to clients working on goals in varying environments. Lastly, clients work on tasks that increase in complexity with the hierarchical theme.

Introduction

Acquired brain injury (ABI) is an overarching term for an injury to the brain that occurs after birth and is sudden in onset (National Guideline Clearinghouse, 2014). This type of injury includes cerebral vascular accident (CVA), brain illness, and traumatic brain injury (TBI), but excludes degenerative conditions such as Alzheimer's disease and Parkinson's disease (Mahar & Fraser, 2011). Common consequences of ABI include memory and attention deficits, which impair daily functioning (McDonald et al., 2011). Deficits in executive functioning and perception, as well as behavior impairments, can also emerge after an ABI and leave the client with altered life roles, abilities, and self-worth (Kennedy et al., 2008).

Physical and cognitive interventions for clients with ABI can be a lengthy and expensive process. Owing to the perceived cost-effectiveness of computer-assisted cognitive retraining (CACR) models, many intervention programs for clients with ABI are turning to this method to improve memory and attention in clients with ABI. There are some researchers demonstrating the effectiveness of such programs in improving memory and attention deficits, however, these improvements have not translated into improved functioning (Alonso, Chadha, & Pulido, 2014; Chung, Pollock, Campbell, Durward, & Hagen, 2013; Rohling, Faust, Beverly, & Demakis, 2009). While CACR models have improved attention and memory, there is a need for functional skills improvement (Li, Robertson, Ramos, & Gella, 2013).

The purpose of this capstone project was to create a systematic cognitive retraining curriculum to bridge the skills acquired from CACR programs to functional improvements for adults with chronic ABI at the Brain Injury Network of Bay Area (BINBA) community program. We titled our systematic cognitive retraining curriculum "Bridge/Adapt." We designed our Bridge/Adapt curriculum to combine training in adaptive strategies with attention and memory

modules common to CACR programs in order to facilitate generalization.

Literature Review

An acquired brain injury (ABI) is an injury to the brain that includes brain illness, cerebral vascular accidents, and traumatic brain injuries (National Guideline Clearinghouse, 2014). The vast majority of the 2.6 million ABIs that occur in the Unites States consist of cerebral vascular accidents (CVA) and traumatic brain injuries (TBI) (Centers for Disease Control [CDC], 2013a; CDC, 2013b). The sequelae of ABIs often include impairments in memory, attention, executive functioning, and perception (Kennedy et al., 2008; McDonald et al., 2011). These impairments create challenges in daily functioning and represent a public health concern as these clients may require long-term care (Chung et al., 2013). One promising inexpensive remediation strategy is CACR (Li et al., 2013; Rohling et al., 2009, Tam & Man, 2004).

Occupational therapy is a client-centered holistic practice and its focus on functional outcomes benefits the treatment for clients with ABIs. Occupational therapists work with clients on an individual basis to develop, recover, and maintain living skills through remediation of cognitive or physical deficits or by adaptation of the task or environment as needed. The ultimate goal of occupational therapy is to promote participation in occupations in order to increase the health and engagement of the clients (American Occupational Therapy Association [AOTA], 2008).

This literature review begins with an overview of the cognitive deficits and functional problems associated with ABIs. We then examine executive dysfunction and approaches to cognitive rehabilitation. We conclude with an analysis of the efficacy of CACR interventions and examine the need for training materials to bridge the gap between improvements in cognitive

domains in attention and memory and functional outcomes.

Cognitive Deficits Caused by Brain Injury

Following a traumatic brain injury, clients experience cognitive impairments that affect reasoning, planning, concept formation, mental flexibility, attention and awareness, and purposeful behavior (McDonald, Flashman, & Saykin, 2002). Among these cognitive deficits, attention and memory deficits are most disabling for clients with ABI and are among the most commonly observed (Slovarp, Azuma, & LaPointe, 2012). Clients with ABI exhibit three types of attention deficits. The first is called sustained attention, or vigilance, which involves focusing on a single task for a sustained period of time. The second is called divided attention, which involves moving attention between two or more tasks. The last is called selective attention and refers to selectively attending to information in an environment with multiple messages (Oken, Salinsky & Elsas, 2006; Slovarp et al., 2012).

Clients with ABI have difficulty storing information into long-term memory because slower reaction to stimuli impacts their ability to fully engage in functional activities (Slovarp et al., 2012). Memory impairment can also affect clients' ability to recall past information, known as retrospective memory, and involves retrieving stored memories from long-term memory to working memory (Johansson & Tornmalm, 2013; Kasahara et al., 2011; Slovarp et al., 2012). Working memory is one type of memory that requires clients to retain information for functional purposes. Working memory uses cognitive processes for temporarily storing and manipulating information in order to perform functional activities that require learning, reasoning, and comprehending cognitive tasks (Kasahara et al., 2011).

To gain a better understanding of working memory and its deficit in clients with brain injuries, Kasahara et al. (2011) used functional magnetic resonance imaging to examine working

memory impairment in clients with TBIs. The study included nine clients with TBI and nine age-matched healthy controls and used psychophysiogical interaction analysis to test the functional connectivity of brain regions responsible for working memory performance (Kasashara et al., 2011). The clients were given an activity to respond to a visual display projected from a computer. Other tasks included a finger-thumb opposition functional activity, a verbal memory task, and face-place-object-emotional picture recognition tasks. Clients with TBIs made more errors than controls while performing a task that required higher working memory in the functional brain network.

The authors also found a significant decrease of activation in the brain regions responsible for working memory in clients compared to the control group. This TBI-induced alternation is influenced by a reduction of cerebral blood flow, which causes a functional decline in various regions of the brain. The researchers concluded from their study that functional neural networks in TBI clients, who experience verbal working memory performance issues due to changes, centered within brain regions on the parietal gyrus (Kasashara et al., 2011).

Prospective memory is another area where clients with ABI may experience deficits (Slovarp et al., 2012). This type of memory involves planning for the future and includes functional tasks such as remembering to pick up one's medications (Harrison, Mullet, Whiffen, Ousterhout, & Einstein, 2014). Prospective memory incorporates self-cueing strategies and depends on clients' abilities to remember information that they need in order to complete an intended action (McDonald et al., 2011). According to Ellis, in his prospective memory theory there are five important phases in prospective memory: the formation and encoding of an intended act, retention interval, performance interval, a response window in which a person must execute their intention, and an evaluation of its outcome (Ellis & Kvavilashvili, 2000). Clients

with ABI may experience difficulties in any of these phases (Ellis & Kvavilashvili, 2000). Results of such deficits can include failure to remember upcoming doctor's appointments or forgetting to pay a bill.

In a 2007 study, researchers looked at prospective memory deficits in TBI clients using Ellis's model of five phases of prospective memory (Roche, Moody, Szabo, Fleming, & Shum, 2007). The study included 38 clients with severe TBI and 34 control clients who were matched for age, gender, and education level. Clients completed a questionnaire regarding prospective remembering and forgetting using section C of the Comprehensive Assessment of Prospective Memory, which was designed to measure the processes involved in Ellis's five phases. The authors examined the effect of group membership (TBI or control) on reported reasons for prospective remembering and forgetting. Their hypothesis, which was that there would be a significant difference between the TBI and the control groups' responses, was supported by major differences on five items. The results indicated that the TBI population had difficulties with encoding, performance interval, and executive phases of prospective memory. The authors discovered that clients with TBI were highly likely to forget planned activities, forget to do things when engrossed in other tasks, forget to do things that are important to other people, require memory aids such as notebooks and medication alarms, and rely on others to remind them to do things (Roche et al., 2007). These findings suggest that people with brain injuries have prospective memory problems even at the point of initial memory formation (Roche et al., 2007).

Executive function constitutes essential skills necessary for critical thinking, problem solving, reasoning, and social functioning. Deficits in executive functioning are a common area of dysfunction in clients with ABI (Perna, Loughan & Talka, 2012). Executive function also

supports high-level cognitive skills (Mueller & Dollaghan, 2013). Dysfunction in executive control impairs performance of any tasks that require long term planning and organized sequencing. (Sloan, Winkler, & Anson, 2007).

Self-awareness is another cognitive component that is commonly affected in clients' post-ABI (Bach & David, 2006). Self-awareness is defined as "a process by which an individual is able to rate their behavioral responses (physical, somatic, cognitive, and affective) in accordance with ratings with some objectives standard, usually from an informant, who knows the individual well" (Bach & David, 2006, p. 398). Clients with brain injuries exhibit a significant lack of self-awareness when compared to peers without brain injuries (Roche, Fleming, & Shum, 2002). Impairment of self-awareness is particularly evident early in the recovery phase with some improvement in self-awareness during the first six months to one year post-injury (Hart, Seignourel, & Sherer, 2009). Bach and David (2006) further stated that improvement in self-awareness was often limited over time in clients with brain injuries. The authors assessed clients' self-awareness using cognitive measures such as the general intellectual function, memory, attention, and executive tests to assess their everyday problem-solving skills. They also had their clients perform a gambling task to assess their decision-making abilities and behavior. Their major finding on self-awareness suggested that TBI clients would most often experience behavioral disturbances such as impulsivity and aggressive behavior, thus affecting their social functioning and self-awareness around others (Bach & David, 2006).

Functional Challenges from Cognitive Deficits

Difficulties in paying attention, maintaining good working memory and organization, and developing efficient strategies for daily activities are the most common and persistent sequelae in clients with brain injuries (Novakovic-Agopian et al., 2011). These cognitive challenges often

result in functional challenges such as social isolation, loss of life-role participation, and loss of employment (Sloan et al., 2009). Chung et al., (2013) reported that once an individual has had a brain injury, he or she may have difficulty with basic activities of daily living due to the inability to develop adaptive strategies**.** The authors also indicated that clients with ABIs encounter difficulties regaining the necessary skills that help them become independent with their basic self-care activities. Additionally, impairments in attention, memory, executive function, and self-awareness lead to difficulties in instrumental activities of daily living (IADL). IADLs are defined as the "activities to support daily life within the home and community that often require more complex interactions than self-care" (AOTA, 2014, pg. S19). Many clients with ABI are dependent on some degree of care from family members and caregivers (Sloan et al., 2009). Furthermore, this dependence on others for care can lead to depression and anxiety (Perna et al., 2012; Sloan et al., 2009).

Interventions Addressing Cognitive Deficits

Regaining the necessary skills to become independent is a desired outcome for clients with ABI and is possible through interventions that target functional recovery by focusing on restoring the client's ability to problem-solve, form strategies, or increase self-awareness (Sloan et al., 2009). Interventions include compensation for executive dysfunction by using strategies or technology that provide the individual with feedback or instruction in relation to functional tasks (Chung et al., 2013). Occupational therapy interventions targeting cognitive deficits fall into two broad categories: remediation and adaptation. Severity of injury, type of injury, time since injury and treatment setting are all factors that determine whether remediation or adaptation is emphasized in intervention (Rohling et al., 2009; Katz, Baum, & Maeir, 2011). In clinical practice, most rehabilitation programs gauge the needs of the individual and use a combination

of both types of interventions (Cicerone et al., 2011; Katz et al., 2011).

Remediation or restorative forms of intervention. Remediation or restorative interventions aim to improve the specific underlying cognitive deficit through cognitive exercises such as drills, worksheets, or computer-based programs (Cicerone et al., 2011; Katz et al., 2011). Attention, memory, language, and visual perception are cognitive processes commonly targeted in remediation-based approaches (Cicerone et al., 2011). For example, if an individual with an ABI is struggling with memory impairment, remediation interventions would strive to restore the individual's previous abilities with drills or exercises. Remediation strategies are considered most appropriate in the acute stage of recovery for clients with a minimal to moderate degree of cognitive deficits (Katz et al., 2011).

There is a large volume of literature on cognitive remediation interventions. Government and non-profit organizations have developed task forces to address the complexity of the literature on this topic and have developed clinical guidelines for health care practitioners. Cicerone et al. (2011) conducted a systematic review on clinical studies from 2003 to 2008 to update clinical recommendations on cognitive rehabilitation for the Cognitive Rehabilitation Task Force of the American Congress of the Rehabilitation Medicine. The researchers reviewed 112 studies on cognitive remediation strategies and found sufficient evidence that remediation interventions, focused on improving attention, memory, language, and executive function, produced gains in the respective cognitive domains. Thus, remediation interventions for memory, attention, language, and executive function are given the highest level of recommendation for clinical practice.

Computer-assisted cognitive retraining (CACR) is a type of remediation intervention that has gained attention in brain injury rehabilitation in recent years (Lundqvist, Grundstrom,

Samuelsson & Ronnberg, 2010; Tam & Man, 2004). CACR uses a computer platform to administer cognitive exercises that target cognitive processes such as visual perception, visual attention, working memory, and remembering written directions and visual patterns (Li, et al., 2013; Lundqvist et al., 2010). CACR has numerous advantages over traditional remediation approaches. CACR programs can provide instant feedback to the user (Tam & Man, 2004), provide rigidly structured and consistent treatment sessions (Lundqvist et al., 2010), and can be more cost effective than traditional therapies (Tam & Man, 2004). Despite the advantages of CACR, there is limited research evidence regarding efficacy outcomes and skill generalization. However, preliminary studies have shown that CACR intervention is associated with significant improvements in attention and memory for clients with chronic ABI (Li, et al., 2013; Lundqvist et al., 2010).

Li et al. (2013) conducted a quantitative quasi-experimental pretest-posttest study on the effectiveness of Parrot Software, a CACR, for improving attention and memory in clients with chronic ABI. Twelve clients with chronic ABI were assessed pre- and post-interventions for memory and attention using the Cognistat Assessment, a paper-based neuropsychological test. Each client participated in eight 60-minute sessions of the memory and attention modules of the Parrot Software program. When pre- and post-intervention scores were analyzed, significant improvements in both memory and attention were found (Li et al., 2013). While the results of this study are promising for clients with ABI who participate in CACR, the lack of a control group in this study makes it uncertain if the gains in memory and attention are solely the result of the intervention.

Alonso, et al. (2014) completed a follow up study to Li's et al. (2013) study to investigate whether clients experienced skills transfer into functional life tasks after completion of the

CACR intervention. The researchers used a quasi-experimental single group repeated measures design with 12 adult clients with chronic ABI. Each client completed eight 60-minute Parrot Software program modules targeting memory and attention. Alonso et al. (2014) assessed memory and attention using the Montreal Cognitive Assessment (MoCA), a quick cognitive screening tool. The functional life task consisted of a simulated medication box-sorting task. Clients completed the MoCA and the medication box-sorting task prior to and following participation in the Parrot Software intervention. Results indicated that while clients experienced an overall significant improvement in cognitive function as measured by the MoCA, they gained no specific improvements in memory or attention and experienced no significant improvement in functional life skills as measured by the simulated medication box-sorting task. The results of the Alonso et al. (2014) study suggest that skills gained from the CACR program may not transfer into real life functional tasks.

In another study on the link between CACR intervention and functional outcomes, Lundqvist et al. (2010) conducted a randomized control trial using a crossover design while investigating a CACR program called "QM" that focused specifically on working memory. Twenty-one Swedish clients with ABIs participated in 45-60 minutes of QM training for 5 days a week for 5 weeks. Lundqvist et al. (2010) assessed working memory using a neuropsychological test battery. They also assessed quality of life and perceived functional performance using the Canadian Occupational Performance Model (COPM). The COPM identifies life activities that the client needs or wants to do but has difficulties doing. When Lundqvist et al. (2010) analyzed scores on pre- and post-intervention assessments, they found that clients experienced significant improvement in working memory scores on neuropsychological tests after using the QM program. Moreover, clients experienced an improvement on perceived functional performance

and quality of life on the COPM. However, since the COPM measures self-reported perception of functional performance, and not the actual performance itself, improvements on the COPM may not reflect actual gains in functional skills.

Due to limited evidence on the generalizability and skill transfer to real life tasks from the cognitive gains made in the CACR interventions, CACR is currently recommended as an "adjunctive" or additive intervention (Cicerone et al., 2011). In other words, CACR should be used in conjunction with individualized therapy and not as a stand-alone intervention for cognitive deficits. The CACR intervention approach has led to gains in attention and memory but may still lack improvements in functional outcomes. In view of this lack of transfer, it is our goal to provide a systematic cognitive retraining curriculum—named Bridge/Adapt—that could provide transfer training so that the memory and attention skills gained during CACR intervention can be bridged into gains in functional life skills.

Adaptive or compensatory interventions. Adaptive or compensatory strategies are the other broad class of rehabilitation approaches for clients with ABI (Dawson et al., 2009; Rohling et al., 2009; Katz, et al., 2011). Adaptive strategies are designed to provide clients with skills and equipment to perform their daily living activities in spite of cognitive deficits. While remediation attempts to restore the client's underlying cognitive problem, adaptive strategies give the client new ways to do activities so that the cognitive deficits have less of an impact on their lives. Adaptive treatments include problem solving skills, self-talk, environmental modifications, and memory aids (Katz, et al., 2011; Cicerone et al., 2011). There is strong evidence to suggest that adaptive strategies can produce significant improvement in daily life functioning for clients with ABI (Cicerone et al., 2011). Furthermore, adaptive strategies may generalize to life activities not targeted in therapy (Dawson et al., 2009; Toglia, Johnston,

Goverover & Dain, 2010). Many occupational therapy cognitive rehabilitation programs have focused primarily on using adaptive intervention models. Following is a review of four cognitive adaptation occupational therapy programs, including specific strategies used and studies regarding efficacy.

Cognitive orientation to occupational performance (CO-OP). CO-OP is one example of a program using adaptive approaches for cognitive rehabilitation (Dawson et al., 2009; Dawson et al., 2013). CO-OP is a systematic protocol that targets executive function deficits in clients with ABI and other cognitive impairments. The CO-OP protocol teaches clients with ABI and their caregivers a set of adaptive strategies, including metacognitive strategies. Metacognition is the cognitive process of reflecting upon one's own thought process and decision-making (Dawson et al., 2009). Metacognitive strategies focus on skills to help the individual with ABI reflect upon their own thinking and include problem-solving skills, planning strategies, and self-talk (Dawson et al., 2009). Other specific strategies in the CO-OP protocol include caregiver training, patient-selected goals, and task modification (Dawson et al., 2009).

In a pilot study, Dawson et al. (2009) used a case study design to investigate outcomes of the CO-OP protocol for three clients with TBI. The three clients and their caregivers participated in a CO-OP program twice weekly for 10 weeks in their homes. Dawson et al. (2009) assessed clients' functional performance and satisfaction using the COPM. The clients were assessed at pre-and post-intervention and at a three-month follow up session. From the COPM, each client identified three personal goals to work on during the CO-OP intervention. Dawson et al. (2009) labeled the goals targeted during the CO-OP sessions as "trained goals." Each client also selected three goals to work on individually, outside the CO-OP training sessions. These goals were regarded as "untrained goals."

After CO-OP intervention, all three clients reported improved functional performance for at least one trained goal and one untrained goal on the COPM. The improvements in untrained goals suggested that the clients used strategies from the CO-OP protocol in the absence of direct intervention. However, caution should be applied to interpretation of the results of this study because the outcome measurement, the COPM, is a subjective tool. The COPM reports on client and caregiver *perception* of functional performance and not on any objective measurements. In this study the clients and caregivers did experience an improvement in perceived functional performance, a factor that should not be discounted as a component of the therapeutic process. The results of this pilot study indicate there is potential for adaptive strategies from the CO-OP protocol to facilitate generalization. Although additional research is needed, Dawson et al.'s (2009) pilot study suggested that the CO-OP protocol may facilitate improvement in functional performance across contexts and thus warrant inclusion in an adaptive strategies curriculum.

Multicontext approach. The multicontext rehabilitation approach, similar to CO-OP, focuses on functional treatment outcomes by using a variety of strategies and components. Multicontext approach uses varied activities and contexts to promote generalization of skills. The multicontext approach uses both remedial and compensatory strategies (Toglia, 1990; Togilia et al., 2010). In the multi-context approach, interventions focus on functional everyday activities. Everyday activities are thought to provide the client with two benefits: 1. Familiar activities increase awareness of the quality of performance by supplying a benchmark by which to monitor progress 2. Increased awareness improves motivation (Johansson & Tornmalm, 2012; Toglia et al., 2010). According to the multicontext approach, strategies should be practiced in a variety of contexts so that the client has opportunities to incorporate the new strategies into other experiences (Johansson & Tornmalm, 2012; Toglia et al., 2010).

Within the multicontext treatment approach, it is important to relate the newly acquired information with learned knowledge and skills in order to ensure generalization (Toglia, 1991). Toglia et al. (2010) found in a single-subject, repeated-measures study that self-regulatory skills increased after a treatment session that involved gradually changing contexts and tasks to promote generalization of skills. The evidence suggests that meaningful and comprehensible tasks performed in multiple contexts provide greater opportunities for generalization of skills. Although participants exhibited improvements in self-regulatory skills and strategy use in various tasks and contexts, deficits of general awareness remained constant, making the evidence level in this single-subject study non- significant (Toglia et al., 2010). However, the results in this study serve as a baseline for further research in randomized controlled trials to confirm the efficacy of the multicontext approach (Toglia et al, 2010).

Other strategies training. Researchers tested the efficacy of a seven- to eight-week cognitive retraining program that combined CACR training along with coaching, education, and peer support for clients with ABI (Johansson & Tornmalm, 2012). This prospective cohort study examined 18 adult clients in an outpatient clinic who had sustained an acquired brain injury at least one year prior to the recruitment. The educational component of this study introduced cognitive strategies and provided opportunities for guided self-reflection. The peer support component consisted of a weekly meeting with other members of the study. Results indicated that clients reported greater self-esteem and an increased satisfaction with occupational performance upon completion of this study's cognitive retraining program as measured by the COPM, Cognitive Failures Questionnaire, diaries, and semi-structured interviews (Johansson & Tornmalm, 2012). Furthermore, previous studies affirm that, when combined, peer support and group interventions are effective components of a cognitive retraining program (Cicerone et al.,

2011; Hadas-Lidor, Katz, Tyano, & Weizman, 2001).

Additional research supports the effectiveness of teaching clients with ABI multiple adaptive strategies. When analyzing the problem-solving strategies of five community dwelling adults with severe TBI during a novel grocery shopping task, researchers found that using a variety of strategies may have greater effectiveness for completing a task than any single strategy alone (Bottari, Shun, Dorze, Gosselin, & Dawson, 2014). Most effective strategies for the grocery shopping task involved internal self-generated strategies such as determining the main objective of the task, repeating necessary steps and mental activities out loud during the task, visually scanning the grocery aisles, and creating written lists to assist with memory. Widely used external strategies included seeking social cues to complete the task and seeking assistance (Bottari et al., 2014).

Results from the studies on CO-OP, multicontext approach and other adaptive strategies trainings indicate that adaptive strategies are promising interventions for ABI. However, these studies used methodology that is considered low in the evidence hierarchy. Additional studies with more rigorous research methodology are needed for adaptive strategies training interventions.

Metacognition. An essential component in the interventions that multicontext rehabilitation shares with CO-OP is metacognition. Metacognition is the self-awareness component of cognition that is necessary for clients with ABI to monitor their performance and develop compensatory strategies (Toglia, 1991; Toglia et al., 2010). Some studies suggested that self-awareness must be embedded within skills training in order to allow clients to effectively process the tasks and increase self-awareness. Additionally, self-awareness may also result in greater occupational participation for clients with ABI (Toglia, 1991; Toglia et al., 2010).

Methods to increase metacognition during task completion include mental and self-verbalization strategies. Mental strategies use mental practice and visualization (i.e. imaging oneself completing the task) in order to anticipate potential challenges prior to attempting a task and focus on developing the necessary steps to accomplish a goal (Cicerone et al., 2011; Toglia 1991; Toglia et al., 2010). Self-verbalization strategies are internal strategies in which the client verbally identifies aspects of the tasks, possible obstacles, and methods to overcome such obstacles, followed by self-reflection with a therapist and use of a journal (Goverover, Johnston, Toglia & DeLuca, 2007).

Self-verbalization strategies also include self-guidance procedures and restructuring. During self-guidance procedures, the client will verbally describe the steps required to complete an activity as he or she performs that activity (Toglia 2011; Toglia et al., 2012). Restructuring is a component of metacognitive intervention in which a client reflects on a previous activity for the purpose of generalizing his or her performance in novel situations.

Researchers investigated the effects of incorporating self-awareness training for twenty clients with ABI in a single-blinded randomized clinical trial (Goverover et al., 2007). Clients performed functional activities such as arranging medications in a medication box organizer and preparing a lunch box. The experimental group received self-awareness treatment, while the control group received feedback from the therapist without a self-awareness component. In this study, self-awareness training included five subcomponents: identification of the task steps, predicting performance and challenges, creating strategies to overcome challenges, participant evaluation of the performance and receiving feedback from the researchers. Results demonstrated an increase in performance outcomes after six sessions as measured by the self-

regulation skills interview, as well as the Assessment of Motor and Process Skills. Clients in the experimental group showed increased functional performance and self-regulation (Goverover et al., 2007).

For clients with impaired self-awareness, Cicerone et al. (2011) recommended incorporating emotional regulation within problem-solving strategies. Interventions for emotional regulation focus on anticipating and internalizing the outcomes of clients' actions and choices (Cicerone, Levin, Malec, Stuss, & Whyte, 2006). Similarly, researchers recommended that emotional regulation be addressed in interventions for clients with early stage Alzheimer's disease. Interventions that address emotional regulation within this population include self-assertiveness training, muscle relaxation, multisensory stimulation, caregiver support, and stress management. Although the Bridge/Adapt curriculum manual is intended for clients with acquired brain injuries, it is important to incorporate emotional regulation strategies within any multi-component cognitive remediation intervention (Kurz, Pohl, Ramsenthalar & Sorg, 2009; Olazaran et al., 2010). In fact, many family members and caregivers find the emotional disturbances to be the most challenging aspect of working with clients with ABI (Mahar & Fraser, 2011). Addressing emotional regulation within a multi-component cognitive remediation intervention will therefore aid in clients' functional outcomes as well as support caregivers and family members throughout the cognitive retraining program (Cicerone et al., 2011).

Goal-oriented attentional self-regulation. Goal-oriented attentional self-regulation is an intervention within Goal Management Training and focuses on developing strategies that increase mindfulness and reduce distractibility to increase goal acquisition. Within goal-oriented attentional self-regulation, clients must generate goals that are meaningful and within their abilities. Strategies for goal management include defining the goal and determining the

subcomponents of a goal's task (Chen et al., 2011; Novakovic-Agopian et al., 2011).

Novakovic-Agopian, et al. (2011) studied the effects of goal-oriented attentional self-regulation on functional outcomes for 16 clients with chronic brain injury. Goal-oriented attentional self-regulation training included group-based and individual training with home practice over a period of 5 weeks. Intervention focused on reducing distractibility and redirecting oneself to goal-oriented activities by focusing only on relevant information. Using a pseudo-random crossover design, researchers measured functional outcomes using the modified Multiple Errands Task, which involved various subtasks such as purchasing items, meeting researchers at specific locations and times, and remembering directions. Researchers found increased performance in naturalistic functional tasks when using goal-oriented attentional self-regulation training. The results support the theory that meaningful activity combined with attentional regulation training provides positive results that can be measured in functional task completion (Novakovic-Agopian et al., 2011).

Conclusion

Clients who sustain ABIs often endure a range of cognitive sequelae including memory and attention deficits, deficits in executive functioning, and difficulties in self-reflection (McDonald et al., 2011; Slovarp et al., 2012). These impairments affect activities of daily living, independence, employment, and relationships (Mahar & Fraser, 2011; McDonald et al., 2002).

The use of remedial or restorative approaches aims to improve underlying cognitive deficits through cognitive exercises such as drills or computer training programs (Rohling et al., 2009; Katz et al., 2011; Li et al., 2013). On the other hand, adaptive strategies, such as the CO-OP and the Mulitcontext approach, may be more effective because adaptive strategies generalize

across contexts and allow for greater functional outcomes (Johansson & Tornmalm, 2012; Toglia et al., 2010).

Though CACR remediation training has limited evidence regarding improvement in functional performance, it has demonstrated improvements in cognitive domains such as memory and attention. These improvements could translate to functional improvements and therefore should not be excluded from intervention programs (Alonso et al., 2014; Cicerone et al., 2011). Thus, the systematic cognitive retraining curriculum, Bridge/Adapt, can be used by occupational therapists along with CACR programs to bridge the gap between cognitive gains and functional skills.

Theoretical Frameworks

Occupational therapists use the Ecology of Human Performance (EHP) model to examine the relationship between a person's abilities and skills, the demands of the desired task or activity, the environmental context, and the performance itself (Dunn, Gilbert, & Parker, 1997). Clients bring with them a host of skills and abilities as well as personal interests while performing tasks. In the EHP model, these are referred to as "person variables" (Dunn, Brown, & McGuigan, 1994). Task demands are important in the EHP model because these demands must match with the person variables in order for the client to successfully complete the task. The context in the EHP model includes all aspects of the environment including physical, social, cultural, and temporal facets. Successful performance occurs when a client accomplishes a task using his or her abilities within a specific context (Dunn & Dunbar, 2007).

The five intervention strategies within EHP are establish/restore, alter, adapt/modify, prevent, and create. The establish/restore intervention strategy focuses on a client's skills and abilities. Using this strategy, skills based upon new experiences are established and skills that were lost to injury or disease are restored. The alter intervention strategy focuses on the context and its alteration to ensure a client can carry out a successful performance. The adapt/modify intervention strategy focuses on the context or task; the task demands and environmental variables change to ensure a successful performance. The prevent intervention strategy focuses on anticipating challenges and making changes prior to performance. Finally, the create intervention strategy focuses on the participation needs of a population (Dunn & Dunbar, 2007).

Every model or frame of reference has a set of basic assumptions. The assumptions in the EHP model are as follows (Dunn, Brown & Youngstrom, 2003):

1. The relationship between clients and contexts is dynamic.

2. Natural and artificial contexts are different.
3. Occupational therapy advocates for full inclusion and autonomy.
4. Clients achieve independence when their wants and needs are fulfilled

Using the EHP model in practice begins with establishing the client's wants and needs. The next step is to assess the contextual factors. Next, the occupational therapist must determine what a successful performance looks like. Following this, the occupational therapist will examine the characteristics of the task. Finally, the occupational therapist will develop an appropriate treatment plan in order to encourage participation (Dunn et al., 1994).

The EHP model is appropriate for this project because our purpose is to facilitate participation among adults with chronic ABI by improving functional performance. In order to accomplish this we first examined the desires of clients currently using a CACR program. Client interests and experiences can vary the performance outcomes (Dunn et al., 1994; Dunn & Dunbar, 2007). We then determined what functional skills the clients are attempting to restore and designed a tool that may facilitate improved performance. Because of the nature of ABIs, the needs of other stakeholders—specifically caregivers and family members—also need to be addressed. As such, the Bridge/Adapt curriculum includes family participation. We also examined the contextual factors that may be influencing functional performance. During the development of the Bridge/Adapt curriculum we researched the contexts that the curriculum would be used, and used that information to guide our decision making process. Lastly, we analyzed the task demands and developed intervention strategies that bridge the gap between CACR and functional skills.

In addition, we used the adult learning theory, andragogy, to supplement the EHP model as we developed the Bridge/Adapt curriculum. Andragogy encompasses the student-directed

teaching strategies for adult learners as developed by Malcolm Knowles in the 1950's (Merriam, 2001). Knowles developed adult learning strategies after reviewing psychological research that indicated that even well into old age, adults do continue to learn. Knowles theorized that adults also learn differently than young children do. The andragogy framework is based on five assumptions about the needs of adult learners. Andragogy assumes that adult learners (Merriam, 2001):

1. Are capable of being self-directed in the learning process
2. Have learning needs based on changing life roles
3. Are focused on immediate applicability of knowledge (identifying problems and solutions)
4. Are internally motivated to access knowledge for their own betterment (intrinsic motivation)
5. Have differing levels of experience that enhance the learning process

As we designed the Bridge/Adapt curriculum manual, we used the principles of andragogy to guide our selection of the content, structure, layout, and graphics of the manual. Most notably, we focused on the principle of immediate applicability of knowledge. Our goal was to make the manual concise, practical, and user-friendly for an occupational therapist working with clients with ABI in a community setting.

Methodology

Agency Description

The Brain Injury Network of the Bay Area (BINBA) partnered with four of Dominican University of California's occupational therapy students, the authors of this paper, for the implementation of this project. Located in Larkspur, Marin County, California, BINBA is a non-

profit community program that provides services for clients who are in the recovery process for acquired brain injuries and are transitioning back to the community.

BINBA provides long-term post-acute rehabilitation (BINBA, 2012). The services they provide include support and education for survivors of ABI, caregiver support groups, and neuropsychological assessment and consultation. Therapeutic day group programs include activities that address independent living skills such as money management, cooking, and gardening. BINBA also has an active expressive art therapy program which uses art, music, and poetry to encourage self-awareness and emotional regulation. The programs at BINBA place a strong emphasis on individualized care and the occupational therapist shapes the sessions to match the needs of the individual in each group setting (BINBA, 2012).

BINBA offers an Individualized Therapeutic Computer Program (ITCP). The ITCP matches the client's needs with particular computer-based exercises from a variety of software programs in a structured setting in order to increase cognitive abilities and assist with goal acquisition. Our Bridge/Adapt curriculum is designed to be used in conjunction with Parrot Software, a CACR program used at BINBA as part of ITCP.

Population

The Bridge/Adapt project includes two target populations: the occupational therapists at BINBA and the clients with ABI who receive occupational therapy services. Occupational therapy services within BINBA include evaluation and consultation for the clients and group therapy that focuses on IADLs such as cooking or gardening. The Bridge/Adapt manual provides BINBA's occupational therapist with a systematic curriculum to bridge the CACR intervention with functionally-based activities. The clients at BINBA who receive group therapy are the second population that our curriculum addresses. On any given day, the number of clients at

BINBA can total up to 16, and group sessions consist of eight or fewer clients per group. The clients at BINBA have sustained acquired brain injuries including traumatic brain injuries and strokes. The majority of clients include survivors of stroke who are on average older than those who have had traumatic brain injuries and generally have a stronger social support system. It is important to acknowledge the variable level of functional and cognitive abilities of each individual member at BINBA.

Treatment sessions are designed to match the interests and needs of each specific client. The clients whom this manual targets are those who participate in the BINBA programs. While the functional level of the class varies, many of the clients who participate in this curriculum are considered higher functioning clients as determined by staff at BINBA. Levels of functioning refer to the ability of an individual to perform daily tasks independently. Therefore, the higher the functional level of a client, the greater his or her ability is to complete various tasks without the need to adapt to the environment or require assistance (Bilbao et al., 2003). According to the occupational therapist at BINBA, the clients who are classified as higher functioning have some capacity to complete tasks independently yet have difficulties with skills such as organization, time management, and multi-tasking. Therefore, the occupational therapist at BINBA charged the project developers to design a systematic cognitive retraining curriculum manual to use as a tool in BINBA programming to bridge the gap.

Ethical and Legal Considerations

This project and project evaluation did not require working directly with clients with ABI. Instead, we worked with the occupational therapist at BINBA and our expert panel in order to determine content and design elements of the Bridge/Adapt systematic cognitive retraining curriculum. Although we did not work closely with specific populations during the formulation

of our manual, we respected the privacy of members of BINBA. Additionally, since the Bridge/Adapt curriculum manual was intended for the general population of clients with acquired brain injury who use CACR programs, no individual client of BINBA will be the sole recipient of our project. Therefore, our project did not require the Institutional Review Board of Human Subjects approval.

The project developers upheld the American Occupational Therapy Association (AOTA) Code of Ethics and specifically focused on the principles of beneficence, nonmaleficence, veracity, and fidelity. Beneficence is the principle regarding the concern for clients' safety and wellbeing (AOTA, 2005). Conducting a needs assessment and a thorough literature review ensured that the manual we developed was a well-guided curriculum intended to benefit our target population and produce the greatest possible results for clients using CACR programs. Nonmaleficence is the principle that occupational therapists should avoid intentional harm (AOTA, 2005). By having a clear understanding of acquired brain injury and any associated contraindications, our systematic cognitive retraining curriculum followed the principle of nonmaleficence. Additionally, we upheld the principle of veracity by ensuring that all information obtained from our needs assessments and expert panel interview reflected the opinions of the professionals who contributed their knowledge to this project. Finally, we upheld the principle of fidelity, respecting the policies and procedures of BINBA and ensuring that we do not violate the regulations of the organization. There are no legal considerations for this project and we treated all professional and community members of BINBA with fairness and integrity.

Needs Assessment

Our needs assessment consisted of two parts: an expert panel and an interview with the

occupational therapist at BINBA. We used the information from the expert panel and the interview to guide the development of our curriculum so that it can best meet the needs of clients with ABIs.

On October 8, 2013, the project developers convened an expert panel at Dominican University of California consisting of three occupational therapists, including the occupational therapist at BINBA, and two speech-language pathologists. The purpose of the expert panel was to gather more information on the requirements of a systematic cognitive retraining curriculum for clients with ABI. All therapists had experience working with clients with ABIs within a variety of settings, including acute care hospitalization, intensive rehabilitation, and community-based intervention. We used a semi-structured interview to guide our information gathering (Appendix A).

We analyzed the discussion from the expert panel and found that three themes emerged. We used these themes to guide the development of both the content and structure of the Bridge/Adapt curriculum. These themes are *salience, context, and hierarchy*. *Salience* refers to the quality of being pronounced, meaningful, or striking**.** Our panel suggested that the therapeutic activities selected for our curriculum had to be salient for clients with ABI in order for those activities to be effective. Activities that are salient help improve memory retention and motivation. Salience is incorporated into the Bridge/Adapt curriculum in the goal setting module and the homework component of the program. The first module of the Bridge/Adapt curriculum (Appendix B) includes a goal setting worksheet for clients to select the IADLs that they find most salient and personally relevant. Clients select an IADL to be their "personal goal activity" for the duration of the Bridge/Adapt program. The personal goal activity is targeted during the homework assignment each week.

Context refers to the surroundings or situation in which an activity takes place. Context is often used interchangeably with *environment*. According to the *Occupational Therapy Practice Framework*, context encompasses a "wide array of interrelated variables that influence performance" (OTPF, 2014, pg. S8). Context can refer to the physical world, such as buildings, lighting or furniture. Context can also refer to the non-physical elements of a situation, such as cultural and social norms, time of day, or relational factors. Context is particularly relevant to the concept of generalization, because by definition, generalization is the transfer of a skill into contexts other than the setting in which the skill was originally learned. Memory and attention gains made by clients using CACR intervention have not carried over into functional skills in the natural environment (Alonso et al., 2014). The panel stressed that context can play a key role in whether a skill is fully learned. Learning a new skill in a naturalistic environment helps clients retain the new knowledge and apply it in the appropriate situation. However, BINBA is a community-based day program, thus clients are not necessarily experiencing skills in the most home-like and naturalistic environment. To promote practice of adaptive strategies at home, the Bridge/Adapt curriculum utilized homework assignments. After each lesson, clients practice their personal goal activity at home and reflect upon the effectiveness of adaptive strategies they experienced. By introducing adaptive strategies in a variety of settings and providing participants with guidance to practice the strategies in a naturalistic environment, we are switching the context in which participants practice these strategies and increasing likelihood of generalization.

Hierarchy is the final theme that emerged from the expert panel discussion. Our expert panel suggested that we organize the manual so that the lessons proceed from easier to more challenging tasks. Organizing the content in a hierarchical manner allows clients to build upon previously learned skills and incorporate prior skills gained from the CACR. Additionally,

hierarchy is an important factor in making the curriculum systematic. We developed a hierarchy in the content and structural components of our curriculum to fulfill our goal for a systematic cognitive rehabilitation program.

On October 17, 2013, the project developers visited BINBA and conducted an interview with the lead occupational therapist to focus on the curriculum content that would most benefit the clients at BINBA. We received verbal permission to collaborate on our capstone project at BINBA in Larkspur, Marin County, California. From the information provided to us by the occupational therapist at BINBA, we included cognitive training skills in the Bridge/Adapt curriculum that provide strategies to promote generalization and transference to clients' functional outcomes in addition to the use of a CACR training program.

Project Implementation

Our Bridge/Adapt curriculum manual consists of eight weekly modules that combine training in adaptive strategies, a simulation of an IADL to provide a practice session for the adaptive strategy, a Parrot Software memory or attention lesson, and a homework session to practice the adaptive strategy on a personal goal activity. Bridge/Adapt is intended to be implemented by an occupational therapist able to provide task analysis, skilled group facilitation, and grading modifications. In Bridge/Adapt, the occupational therapist facilitating the group is referred to as the group instructor(s).

We designed the Bridge/Adapt curriculum to utilize the attention and memory skills already addressed in CACR programs (such as the Parrot Software) and transfer those gains to functional improvements. Examples of skills that are practiced in Parrot Software's attention training include: *visual instructions, visual perception and discrimination, concentration, and visual attention training.* Examples of skills that are practiced in the Parrot Software's memory

retraining include: *remembering written directions, remembering visual patterns, remembering written letters, and remembering written numbers*

To achieve generalizability and transference, we investigated the Parrot Software program to recommend specific memory and attention skills that the program targets for the eight modules. We then paired each Parrot Software lesson with a simulated IADL in each Bridge/Adapt module. Each weekly session of the Bridge/Adapt includes grading options so that the instructor(s) can chose which gradation would best suit the client.

To promote generalization, we incorporated opportunities for clients to practice adaptive strategies during simulated IADLs. We conducted a task analysis on various IADLs to determine which IADLs were feasible in a group setting and were able to be simulated using pen and paper-based worksheets. Based on our task analysis we selected the IADLs of financial management, grocery shopping, and appointment scheduling. We developed worksheets that simulate IADLs to enable clients to practice adaptive strategies during each Bridge/Adapt session. Clients will receive mock bills, mock grocery shopping worksheets, and mock appointment scheduling assignments to facilitate skill generalization to IADL performance. Immediate practice of adaptive strategies will facilitate generalization of the acquired skills from the Parrot Software program to occupational performance. Since clients at BINBA are at different cognitive functioning levels, the instructor(s) can modify each simulated IADL to the appropriate level of difficulty depending on the needs of the specific client. This allows the group instructor(s) to select the "just right challenge" based on the clients' cognitive levels.

Lastly, in addition to the weekly group sessions and Parrot Software lessons, we include a homework component that provides the opportunity to practice adaptive strategies in a naturalistic context. The homework revolves around the practice of the client's personal goal

activity. Participants select a goal that is personally meaningful to them and then practice the goal in their homes using the adaptive strategies introduced during the weekly group sessions. The group instructor(s) will use task analysis for each personal goal activity to determine sub-tasks that the participants can select each week. For example, if the participant's goal is completing laundry, a subtask may include gathering the dirty clothing to transfer to a washing machine.

The adaptive strategies in the Bridge/Adapt curriculum are based on the adaptive strategies discussed in our literature review. This curriculum uses three main approaches towards cognitive adaptation: CO-OP, multicontext, and goal-oriented attentional self-regulation. These approaches are embedded within the curriculum and help guide the overall structure of the manual. Each module introduces a new adaptive strategy that clients can practice during the simulated IADL practice sessions followed by a reflective group discussion to scaffold metacognition. For example, one strategy that specifically stems from goal-oriented attentional self-regulation is "Stop-Relax-Refocus" which involves keeping the goal in mind during a task while avoiding distractions. While participants are planning their route through a grocery store, they will utilize "Stop-Relax-Refocus" by taking brief breaks when feeling distracted and re-orienting themselves to the goal of creating an efficient path through a store to get groceries.

Aside from introducing the general strategies of "visual-scanning," "visual cues," "emotional regulation," and "self-talk," the instructor(s) will be introducing CO-OP's "Goal-Plan-Do-Check" early in the curriculum. This strategy is deeply embedded throughout each weekly group session. "Goal-Plan-Do-Check" is incorporated in each weekly group session with "Goal" being the introduction of the practice activity and the discovery of what the participant hopes to accomplish within each practice session. The "Plan" component introduces a new

adaptive strategy as well as reviewing past strategies to determine how the goal can be accomplished. “Do” is the practice component in which the participants are attempting the simulated IADL within the module. Finally, “Check” is the group reflection where the participants discuss strategies practiced during the session and explore how to transfer their learning towards the “goal occupation.”

All of the worksheets, instructions and feedback forms were published using Microsoft Word or Microsoft Excel. We designed graphic elements of simulated IADLs (e.g. mock bank statements) using Microsoft Word or Apple Pages. Some photos used in the manual were set up and taken by the project developers. All other photos are royalty-free photos purchased from stock photo websites or selected from royalty-free clip art from Microsoft Word.

Project Evaluation

To evaluate if the Bridge/Adapt manual provides a systematic adaptive strategies curriculum, we developed a survey on the meaningfulness/salience, transferability, and systematic progression of modules (Appendix C). We sent the first draft of the Bridge/Adapt curriculum to be evaluated by the ABI specialists from the expert panel. We received detailed feedback and recommendations from the expert panel for improvements on the Bridge/Adapt curriculum. We analyzed the feedback and summarized the most common areas for modification. The expert panel reviewers suggested that we provide additional visual aids, make instructions more succinct, clarify the role of the Parrot Software lessons within the curriculum, increase family participation and clarify the role of the simulated IADL activities.

We addressed this feedback during revision of the Bridge/Adapt curriculum in several ways. First, we added visual aids to improve communication of the instructions and editing instructions for precision and clarity. Next, we increased family participation by adding a

"family feedback" performance assessment to the homework assignment. This will allow group instructor(s) to gather information about the client's performance on the personal goal activity at home. We also revised the manual to clarify the instructions for the use of Parrot Software lessons within the Bridge/Adapt curriculum.

Research indicates that self-selected activities are more meaningful and salient to clients with ABI, however, the Bridge/Adapt curriculum includes pre-selected simulated IADLs during the group session of the curriculum. The feedback regarding the simulated IADLs was that it was unclear if the IADLs selected for the curriculum would be meaningful to the clients. We addressed this concern by clarifying in the manual that the goal of the simulated IADLs was to provide an opportunity to practice the adaptive strategy during a structured group session. The "personal goal activity" that is the main component of the homework provides the client with the opportunity to work on a task that is self-selected and personally meaningful.

Discussion and Recommendations

There were several limitations to this project. While we made extensive revisions based on the feedback from our expert panel, ultimately the curriculum was developed without instituting a pilot trial with actual clients with ABI. We did not have the resources to practice the curriculum modules with real clients and thus the curriculum may be disconnected with the realities of running therapeutic groups with clients with ABI.

A second limitation is that the simulated IADLs have low fidelity to real world occupations. This constitutes a major tradeoff that we made in the design of our curriculum. Our primary focus was to provide simulated IADLs in order to allow a client to implement a new adaptive strategy during the group session. However, in order to make the simulated IADLs fit within the short time allowed in a group session we had to vastly simplify the simulations.

Additionally, in order to translate IADLs into paper-based worksheets we had to use simplified graphics. Lastly, some of the IADLs we selected as paper-based simulations in the Bridge/Adapt curriculum are now trending to be computer-based tasks, particularly financial management and scheduling.

The next step for the Bridge/Adapt curriculum is to conduct a pilot study to test its effectiveness at bridging the gap between skills gained in CACR and improvements in functional performance. Modifications after the pilot study of may lead to improvements in the curriculum's effectiveness, feasibility and applicability for clients with ABI. Future directions for the Bridge/Adapt curriculum may include turning the curriculum into a software program. Using software as a delivery system would have several advantages. First, the software could provide more choices so that the Bridge/Adapt curriculum could be individualized. Second, the simulated IADLs could be made to more accurately mimic the real life computerized IADL tasks. Lastly, the software could provide real time feedback to performances.

Conclusion

Clients with ABIs often sustain significant deficits in memory and attention that translate into deficits in functional performance (McDonald et al., 2011). These deficits in functional performance have a detrimental effect on clients' quality of life. CACR intervention approaches, such as the Parrot Software program, have demonstrated improvements in memory and attention. However, these improvements have not yet transferred into functional gains. Bridge/Adapt aims to fill the need for a systematic cognitive retraining program that bridges the gap between memory and attention skill gains from CACR programs and improved functional performance in daily living. By pairing adaptive strategies along with CACR lessons, the Bridge/Adapt curriculum has the potential to become an effective tool in cognitive rehabilitation.

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Appendix A: Questions for Expert Panel

1. Describe some of the cognitive adaptation or cognitive remediation approaches that you've been using for your clients. Is there a general trend in favor of adaptive versus remedial?

Follow up: Are there any approaches that you have found to be ineffective?

2. What do you think is missing in our current practice in cognitive rehabilitation?

3. What is Parrot [Software] used for in CNS [Center for Neuroskills]?

4. What is currently the biggest problem or challenge that clients face during cognitive rehabilitation?

5. What do you think we should keep in mind when designing a clinician-friendly manual?

Appendix B: Sample curriculum page

Module 1: Goal Worksheet

Name: _____ Date:_____

Instructions: This worksheet is designed to help you identify the daily life activities that you would like to do or need to do but currently cannot do or that you would like to improve. Using the following categories as a guideline, write down specific activities that you would like to work on. Rate each activity on how important it is to you.

Category	Specific Activity	Importance (circle one)
Taking Care of the Home (Examples: laundry, cooking, cleaning)		High Medium Low
Managing Time (Examples: making appointments, keeping a schedule)		High Medium Low
Managing Finances (Examples: paying bills, banking online)		High Medium Low
Communication and Technology (Examples: using internet search engines, email)		High Medium Low
Transportation (Examples: using public bus system, getting around in the community)		High Medium Low
Other (Examples: gardening, crafts)		High Medium Low

Based on the activities you identified, which one activity would you like to work on as part of the Bridge/Adapt program?

Appendix C: Project Evaluation Form

Thank you for reading our Bridge/Adapt teaching plan. We value your input and appreciate any feedback you have to offer.
Please circle the response that most accurately reflects your opinion on this teaching plan. Additional comments are welcome.

Meaningfulness/Salience

1. The activities are appropriate for clients with acquired brain injuries (ABI):

Strongly agree agree neutral disagree strongly disagree

Comment:

2. The activities reflect real life occupations:

Strongly agree agree neutral disagree strongly disagree

Comment:

3. The activities within this manual provide a simulation of real-life challenges that an adult with ABI would encounter:

Strongly agree agree neutral disagree strongly disagree

Comment:

Systematic

4. The grading options for activities will enable therapists to provide the "just right challenge":

Strongly agree agree neutral disagree strongly disagree

Comment:

5. The practice activities (financial management---grocery shopping--scheduling) are sequenced in such a way that it provides an increasing challenge for clients with ABI:

Strongly agree agree neutral disagree strongly disagree

Comment:

6. The module progression allows clients to build upon their skills as they move through the modules:

Strongly agree agree neutral disagree strongly disagree
Comment:

Transferability

7. The adaptive strategies recommended in each module are appropriate to progress clients' functioning in daily life:

Strongly agree agree neutral disagree strongly disagree

Comment:

8. The Bridge/Adapt curriculum may help clients transfer attention and memory skills that were gained from the computer-based cognitive retraining to their goal occupations:

Strongly agree agree neutral disagree strongly disagree

Comment:

9. Is there any additional feedback that you have or anything else that you would like to see in this curriculum?