A Meal Preparation Treatment Protocol for Adults With Brain Injury

Maureen E. Neistadt

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Adults with acquired brain injury often need assistance with meal preparation because of deficits in that activity’s component cognitive-perceptual skills. Some occupational therapists choose to address this occupational performance problem by providing remedial training for the deficit cognitive-perceptual skills with activities like block design. Others choose to work on those component skills in the context of actual meal preparation activities (Neistadt, 1988, 1990). Therapists using the former approach can find specific treatment protocols for remedial activities in the occupational therapy literature (Neistadt, 1989, 1994; Neistadt, McAuley, Zecha, & Shannon, 1993). Therapists using the latter approach, however, do not have the benefit of treatment protocols that structure meal preparation training to address clients’ cognitive-perceptual component skill deficits, because no such protocols exist in the occupational therapy literature (Hopkins & Smith, 1993; Pedretti & Zoltan, 1990; Trombly, 1989; Zoltan, Siev, & Frieshtat, 1986). A structured protocol based on cognitive-perceptual theory would allow precise documentation of clients’ skills and deficits, focused intervention, and a clear record of client progress with this community living skill activity.

This paper describes a meal preparation treatment protocol based on cognitive-perceptual information processing theory that has been pilot tested in a treatment outcome study comparing remedial and functional approaches to cognitive-perceptual training for adult men with traumatic or anoxic acquired brain injury. In that study, 23 subjects were treated with this meal preparation protocol. As a group, these 23 subjects showed significant improvement after treatment in their meal preparation skill, as measured by the Rabideau Kitchen Evaluation-Revised (RKE-R), a test of meal preparation skill, and in cognitive-perceptual skill, as measured by the WAIS-R Block Design Test (Neistadt, 1992a). The light meal preparation treatment protocol used in that study and its theoretical base are described below.

Theoretical Base For Protocol

Abreu and Toglia (1987) have proposed an information-processing theory of cognition and perception. According to this theory, the cognitive-perceptual process includes: (a) sensory detection, (b) analysis, (c) hypothesis formation (i.e., comparing the analysis with prior experiences and relating it to the overall purpose and goal of the activity), and (d) response. Responses can be either data-driven, which are direct responses to external stimuli, or conceptually driven, which proceed from internal expectations of incoming data.

Adults with cognitive-perceptual deficits due to brain injury often rely heavily on the data-driven mode of information processing, particularly in early stages of recovery. Clients relying heavily on this mode of processing would show mental inflexibility, stimulus-bound beha-
sponses so that clients could transfer cognitive-perceptual stimulus-bound behaviors to conceptually driven responses, allowing them to perform that sequence in a variety of situations. Such clients would not need specific environmental strategies to trigger occupational performance. A client using conceptually driven processing, for example, would know the general sequence of a cooking task and be able to perform that sequence in a variety of kitchens.

The goal of treatment based on this information-processing theory would be to improve the clients' abilities to handle increasing amounts of information by helping them develop efficient mental strategies and efficient behavioral repertoires. That is, therapists would be aiming to help clients move from a reliance on data-driven, stimulus-bound behaviors to conceptually driven responses so that clients could transfer cognitive-perceptual learning across different activities and situations.

Abreu and Toglia (1987) suggested that this goal can be achieved by emphasizing the cognitive strategies that underlie performance of a variety of tasks, in different environments, using different body positions and active movement patterns. Strategies are defined as organized sets of rules that operate to select relevant information from the environment and guide the processing of that information. Treatment strategies include having clients plan ahead and check their work. Toglia (1991) has further suggested that therapists can foster strategy development by offering clients feedback about their performance errors and outcomes.

Toglia (1991) has also identified degrees of transfer along a continuum from transfer to very similar to transfer to very different tasks. She suggested examining the surface characteristics of treatment and transfer tasks to determine the degree of transfer a client is making. Surface characteristics include type of stimuli (objects, letters, numbers), presentation mode (written form, auditory or tactile modes), variable attributes (color, texture, size), stimuli arrangement (scattered, horizontal, rotated), movement requirements (sitting, standing, active movement patterns), environmental context (place, people, familiarity), and the rules or directions (number of steps required).

Near transfer of learning involves transfer between tasks that are different in only one or two surface characteristics. A client who spontaneously applied dressing techniques learned with a cotton pullover to donning a wool pullover would be demonstrating near transfer of learning. Intermediate transfer involves transfer between tasks that are different in three to six surface characteristics. A client who applied one-handed dressing techniques learned bedside with a wool pullover to dressing a polyester shirt that buttons down the front in the bathroom would be showing intermediate transfer of learning. Far transfer involves tasks that are conceptually similar but have one or no surface characteristics in common. A client who could apply one-handed dressing techniques learned in putting on shirts to donning pants or socks would be illustrating far transfer. Very far transfer, or generalization, involves "the spontaneous application of what has been learned in treatment to everyday functioning" (Toglia, p. 508). A client who could apply the visual analysis and organizational skills learned in parquet-block assembly to dressing or kitchen activities would be showing very far transfer.

Occupational therapists working in rehabilitation facilities should be training for transfer of cognitive-perceptual learning (i.e., skill competency in varied settings), because clients' home environments are always different from clinical training environments. To train for task competency and transfer, occupational therapists need theory-based grading and cuing methods that will help clients develop information-processing strategies.

Information-processing theory suggests that the cognitive-perceptual difficulty of tasks is determined by the information-processing demands those tasks make on the central nervous system. This concept has implications for task grading and for methods of cuing. Relative to grading, for example, increasing the number of steps in a task is one way to increase task difficulty, because the brain must process more information to plan and execute the behaviors needed for the additional steps. Decreasing the structure or external cues for a task also increases task difficulty because the brain has to do more cognitive processing, e.g., take in order or number.
Numerous treatment activities are based on the principle that visual-perceptual, sequencing, and organizational skills level 1, preparing a single cup of hot beverage (coffee, tea, or hot chocolate) and a snack which could include toast with a choice of toppings (lightly salted butter, low-fat margarine, low-fat cream cheese, peanut butter, low-sugar jelly or jam, cinnamon, marshmallow fluff, cheese spreads), fruit salads, frozen dough rolls, gelatin dessert, or low-fat puddings. The snacks are relatively low fat, nutritious, and easy to prepare in a 30-min treatment session. The snacks are also different from the sandwich activity of the RKE-R, which assures the validity of the RKE-R on posttest. This difference between the treatment and evaluation activities also means that the RKE-R posttest measures not only light meal preparation skill, but also near (from toast and topping snacks) or intermediate (from fruit salads, frozen dough rolls, rolls, gelatin dessert, or low-fat pudding snacks) transfer of learning, giving therapists information about how well a client might transfer a skill from the clinic to home. Clients who are not able to perform well on the sandwich task after training with this protocol have probably learned task-specific skills, not general cognitive-perceptual strategies about how to approach meal preparation activities. Such clients would probably not transfer the kitchen skills they had learned in occupational therapy to their home environments.

Grading. The light meal activity has been broken down into six levels of difficulty (see Appendix B), with level 1 being the easiest and level 6 the most difficult. For each successive level, the number of steps required to complete the activity increases, thereby increasing the demand on the client’s visual-perceptual, sequencing, and organizational skills. Level 1, preparation of a single cup of hot beverage, is an appropriate starting level for clients who are unable to initiate a kitchen activity at all or who score above 20 on the pretest RKE-R. Level 6, preparing more involved snacks like fruit salads, is an appropriate starting level for clients who score 5 or less on the pretest RKE-R.
Treatment Procedures

Choosing a level. Clients are started at a level that therapists think would be challenging but possible with minimal frustration, given the RKE-R pretest performances. Clients begin the activity by choosing their beverage and snack ingredients from a list of the choices available in the occupational therapist's department. (A department could keep an inventory of the snack supplies listed above.) When clients are totally accurate at a given level and can prepare their snack within 10 min, they are progressed to the next level of difficulty. Therapists should offer assistance with clean-up, if needed, to keep the treatment session to 30 min.

Training for generalization. Clients who start at Level 1 or 2 will probably need several weeks of repetition of the same routine to become competent at basic kitchen tasks. For instance, one client, B., whom I treated with this protocol, needed 5 weeks of three 30-min sessions a week to master the task of making instant coffee. He was a 34-year-old man who had sustained a closed head injury 9.5 years prior to this meal preparation training.

B. was fully ambulatory with only minimal coordination problems in his right, dominant hand. He had some difficulties with verbal comprehension and some circumlocution in his verbal communication, but he was able to engage fully in conversation. Cognitively, he had difficulties with attention, organization, sequencing, and memory. His scaled score on the WAIS-R Block Design Test, a measure of visual-perceptual and executive function skills, was 2; an average scaled score for a healthy adult his age is 10.

At the time of our work together, he was attending an outpatient day treatment program for adults with head injury and lived with his mother. He was not employed and was not able to drive. He had scored 23 on the RKE-R at pretest. Although he had worked as a cook before his injury, he was not able to initiate kitchen activities without a specific verbal cue about what to do first.

B. needed to practice the instant coffee task the same way each time; any change in task presentation threw him off and negatively affected his performance. By the end of the fifth week of treatment, he was able to independently initiate and execute this task safely; he needed progressively fewer specific cues to make a cup of instant coffee, and that he became faster and more organized with this task. During our feedback sessions, he would always look very pleased by this information about his performance and would not refer to himself as stupid—his typical assessment of his performance on any activity he attempted.

This documentation system also helps the occupational therapist do formal ongoing assessments. As a memory aide, it helps therapists grade cuing and task difficulty more precisely to keep clients optimally challenged and minimally frustrated. Ongoing review of B.'s daily forms, for instance, told me when he was ready to progress to a more complicated activity (week 5), and the amount and type of cuing I needed to give him during our treatment sessions.

Cuing. Therapists can use a variation of saturational cuing with this task. A general cue like "Let's get started" could be tried first, at the beginning of a treatment session. If that cue is not sufficient to help a client initiate the activity, then the therapist can try leading the client through a collaborative problem-solving process with a series of questions: (a) "What do you see in the kitchen? Does anything that you see suggest what you have to do next?" and (b) "What steps are you going to take to com-
plete your snack?” During activity performance, therapists can use a variation of this sequence of questions to correct client performance errors. For example, if a client filled a coffee cup too high to be able to add milk and sugar without spilling, the therapist could ask (a) “How full does that cup look to you? Does it look like there is room in that cup for milk and sugar?” and (b) “What steps can you take to make room in the cup for your milk and sugar?” Both sets of questions guide the client to perceptually analyze the situation first, then plan a series of actions based on that analysis.

This cuing method uses the general cues of saturalional cuing and incorporates Singer and Cauraugh’s (1985) five-part strategy: (a) reading, or relaxing and attending; (b) imaging, or picturing oneself performing the task at hand; (c) focusing, or concentrating on one relevant feature of the situation to avoid distractions; (d) executing, or performing the task; and (e) evaluating, or using available feedback from the performance to learn better response patterns (p. 112). The first “What do you see?” questions direct clients’ attention to the task, and to the perceptual features of the task—this is a form of reading. The idea of beginning with attention to the perceptual features of the task is supported by research suggesting that persons rely heavily on visuospatial skills in the initial stages of learning psychomotor tasks (Fleishman & Rich, 1963). The “What steps are you going to take?” question encourages clients to plan and possibly imagine how they will do the task at hand—this is a form of imaging. The clients’ performances are the executing step, and the feedback from the therapists about task accuracy and times relative to previous performances is the evaluating step. The focusing step is not recommended because one aim of treatment with adults with brain injury is to promote skill in divided attention, that is, the ability to consider more than one aspect of a situation at a time (Lezak, 1983). This cuing system provides ongoing guidance and error correction during activity performance.

B.’s case illustrates how this cuing system might be used with a particular client. B. needed specific verbal cues to initiate each step of a new task, such as “First you need to find the coffee in the cabinet.” After several repetitions of a task, however, he needed only general cues like “What do you need to do first?” or “What’s next?” to help him remember the steps of a task. B. also needed constant encouragement to persist with his problem-solving strategies when faced with failure. For instance, when B. looked for his coffee and snack ingredients in the cupboards of the occupational therapy kitchen, he would call himself stupid and be ready to give up if he opened the wrong cabinet on the first try (i.e., if he did not remember where things were from the day before). With encouragement, he was able to persist in his search strategy in an organized way, when his memory failed him, and find what he was looking for. B. also needed frequent, specific error correction cues initially, like the ones described above. After several repetitions of these cues, however, B. was able to start avoiding and correcting his performance errors.

Minimum treatment length and duration. For meal preparation training to be effective, training sessions need to last for 30 min and be held at least three times a week (Neistadt, 1992a). The number of weeks a client will need to become proficient at light meal preparation at this frequency of treatment will depend on his or her initial level of competence with this activity; clients who need more assistance initially need training for a greater number of weeks. Clients who receive more frequent treatment sessions may show performance gains more quickly than those who receive treatment only 3 times per week.

Expected outcomes. In my study of adult men with head injury, 23 clients showed an average improvement of 7.9 points on the RKE-R after 6 weeks of 30-min sessions three times a week with this meal preparation protocol (Neistadt, 1991). These clients also showed an average 20% decrease in the amount of time they needed to complete the RKE-R after treatment (Neistadt, 1991). These 23 clients also showed an average of 0.74 points improvement on their WAIS-R Block Design Test scores after treatment with this protocol. These clients had an average age of 29.4 years (SD = 7.6), were an average of 7.3 years (SD = 4.3) postinjury, and were all being treated in long-term head injury rehabilitation programs. Their average pretreatment scaled score on the WAIS-R Block Design test was 5.44 (SD = 2.17), compared to an average of 10 for healthy adults of the same age (Neistadt, 1991). Clients who are closer to onset of the brain injury and less involved cognitively may progress faster than the clients in this study.

Implications for Discharge Recommendations
Therapists who follow this protocol will be able to specify, at discharge, client skill level and general approach for meal preparation activities, the amount and kind of cuing a client needs to be safe with kitchen activities, and the amount of repetition a client will need to learn meal preparation tasks of given complexity.

For example, after 6 weeks of treatment with B., I was able to tell his family that he had needed 15 sessions to master making a cup of instant coffee. Therefore I suggested that B. be given only part of a meal preparation task to start, like making the coffee or pouring the cereal, and that he be allowed 2 weeks of daily practice with that task before any other tasks were introduced. I suggested that new tasks not be introduced until B. had mastered the tasks he was already doing, that only one new task be introduced at a time, and that B. would probably need 2 weeks of daily practice to master each new task.

I was also able to tell B.’s family what type of cues he
Appendix A
Rabideau Kitchen Evaluation — Revised

Rating Scale

0—Subject requires no assistance; initiates and performs the component step independently.
1—Subject requires one verbal cue or instruction to perform the component step.
2—Subject requires more than one verbal cue or instruction to perform the component step.
3—Subject is unable to perform the component step and requires direct intervention from the supervisor to complete the step.

Component Steps of the Activities
Preparation of a Hot Instant Beverage
1. Initiates beverage preparation procedure (exhibits intent/awareness of goal by asking appropriate questions, seeking appropriate items)
2. Scans directions on beverage box
3. Selects appropriate container for boiling water on stovetop (heat resistant, with handles, large enough)
4. Brings container to sink for filling
5. Reaches and operates faucet
6. Fills container with adequate amount of water (sufficient to provide at least one cup of beverage)
7. Brings container to stove
8. Places container on stovetop burner
9. Turns on appropriate burner
10. Turns burner to appropriate heat setting (medium to high)
11. Selects adequate cup for beverage (large enough, heat resistant)
12. Opens beverage box, selects and opens individual beverage packet
13. Pours contents of packet into cup
14. Safely determines if water on stove is adequately heated (waits for signs—steam, bubbles forming; does not touch water; does not touch burner)
15. Turns proper burner off
16. Removes container of water safely from stove (uses handles)
17. Transports hot container safely (uses handles)
18. Pours hot water into cup safely (uses handles, does not overflow cup, does not touch hot portions of container)
19. Returns hot container to safe location on stove
20. Stirs hot beverage (uses appropriate, heat resistant utensil; does not touch hot liquid; does not spill beverage while stirring)

Total score for beverage: __________

Rating Scale
Preparation of a Cold Sandwich With Two Items
21. Initiates sandwich preparation procedure (exhibits intent/awareness of goal by asking appropriate questions, selecting appropriate items)
22. Locates loaf of bread and transports safely to counter
23. Opens bread wrapper
24. Selects only two slices of bread
25. Reseals bread wrapper
26. Arranges slices on flat surface to prepare sandwich
27. Locates item 1 only and transports safely to counter
28. Opens container for item 1
29. Applies item 1 (one slice of bread)
30. Reseals container for item 1
31. Returns item 1 to original location
32. Locates item 2 only and transports safely to counter
33. Opens container for item 2
34. Applies item 2 to slice of bread
35. Reseals container for item 2
36. Returns item 2 to original location
37. Uses appropriate utensil to apply items (knife for spreading)
38. Cuts sandwich properly (items inside between slices of bread)
39. Cuts sandwich safely (selects knife, knife below hand with blade down, stabilizes item when cutting)
40. Initiates kitchen clean-up activity (exhibits intent/awareness of goal by asking appropriate questions relating to clean-up, places dirty items in sink, wipes counters)

Total score for sandwich: __________
Total time for preparation of meal: __________
Total score for beverage and sandwich: __________

Developed by Gary Rabideau and Maureen Neistadt.

Appendix B
Meal Preparation Treatment Protocol Grading

The task difficulty will be increased by increasing the number of steps and, consequently, the amount of planning needed in the snack preparation. The levels of difficulty, from least to most, are:

Level 1
Tea, hot chocolate, or coffee — 1 serving

Level 2
Tea, hot chocolate, or coffee; toast with one topping — 1 serving

Level 3
Tea, hot chocolate, or coffee; toast with two toppings — 1 serving

Conclusion

Skill in light meal preparation can make the difference between total dependence in a living situation and partial independence for adults with acquired brain injury. An adult with brain injury who is able to prepare breakfasts, lunches, and light dinners will have a better sense of self-worth and be less burdensome to caregivers than one who cannot. This paper described a meal preparation treatment protocol based on information-processing theory that has proven effective in improving meal preparation skill and cognitive-perceptual processing in adult men with long-term diffuse brain injury within 6 weeks. Clients with less severe brain injuries and those closer to onset of injury will probably show improvements sooner.
Level 6
Fruit salads using variety of fresh fruits (the greater the number of different fruits, and the greater the number of pieces of fruit to be cut up, the more difficult the salad), or frozen cinnamon rolls or other frozen pastries and 2 hot beverages, or low-fat puddings or gelatin dessert with fruit

Level 5
Tea, hot chocolate, or coffee; toast with two toppings—2 servings

Level 4
Tea, hot chocolate, or coffee; toast with one topping—2 servings

Appendix C
Meal Preparation Scoring Sheet

Client Name: Date: Therapist: Level _

Set-up:
— Choose beverage and snack — Collect foodstuffs, kettle, utensils, dishware

Start beverage:
— Fill kettle with water — Put kettle on stove — Turn burner on to medium-high

Prepare snack:
— Take bread slice(s) out of package or — Peel fruit and/or — Open packages
— Close package — Slice fruit — Mix ingredients
— Toast bread — Mix fruit — Put gelatin dessert or pudding in refrigerator
— Open spreads — Put spreads on toast
— Close spreads

or
— Preheat oven — Open dough — Place on cookie sheet
— Remove from oven — Remove from cookie sheet

Finish beverage:
— Turn off stove when water boils — Pour water into cups
— Add milk, sugar, marshmallows, as desired
— Stir beverages

Eating snack:
— Take beverages and snack to table (beverage only with gelatin dessert or pudding)
— Have beverage and snack

Clean-up:
— Clear table — Wipe table — Put foodstuffs away
— Wash and dry dishes and utensils — Put dishes and utensils away
— Wipe counters

Scoring: Number the steps in the sequence performed. Note whether performance was:
1 — Independent
VC(#) — Verbal cues needed to complete step safely (S) or in time limits (T)
A/S — Physical assist needed to complete step safely (S) or in time limits (T)

Total Time: ___________

References
Neistadt, M. E. (1988). Occupational therapy for adults with...


