

International Handbook of Occupational Therapy Interventions

Chapter 20

Metacognitive Occupation-Based Training in Traumatic Brain Injury

Jennifer Fleming

It wasn't until the client watched the video of himself trying to cook dinner that he understood that he needed to use a checklist to keep on track.

Abstract Clients with impaired self-awareness following brain injury may benefit from an occupation-based approach to metacognitive training that uses real-life meaningful occupations in a supported therapy context. Metacognitive training aims to improve clients' intellectual awareness by demonstrating the impact of impairments on activities and participation, and thereby facilitate realistic collaborative goal setting and strategy use. Occupational performance takes place in real-life contexts to provide familiar structured experiences that allow for error recognition and error correction. Training strategies include the use of self-prediction before occupational performance; self-monitoring and self-checking during performance; and self-evaluation, verbal or video feedback, and education following performance. The occupational therapist plays a supportive role and monitors the client's emotional responses. A small but growing body of research evidence supports the use of occupation-based metacognitive training.

Keywords Brain injuries • Closed head injuries • Cognition • Human activities • Meta-cognitive strategies • Self-awareness.

Historical Development of Cognitive Teaching Approaches

Education has traditionally been incorporated as a component of cognitive rehabilitation by occupational therapists (OTs) alongside remedial and adaptive approaches to intervention (Unsworth, 1999). Teaching clients and their family members about the nature of cognitive impairments and providing feedback on cognitive performance is fundamental to assisting clients in understanding and accepting limitations in occupational performance. While most early research on the link between self-awareness and engagement in and feedback on functional performance was from

the field of psychology (e.g., Berquist and Jacket, 1993; Klonoff et al., 1989), this approach falls naturally within the domain of occupational therapy. Descriptions of the application of cognitive teaching approaches in the context of occupation can be found in the texts by Katz (1998, 2005).

Research evidence for a systematic occupation-based approach to the assessment and treatment of intellectual functions in people with acquired brain damage was first provided by Soderback (1988a,b). This randomized trial of 67 patients demonstrated that intellectual functions improved using intellectual training approaches that incorporated functional tasks (housework), pen-and-paper tasks, and a combination of both approaches to a greater extent than regular occupational therapy rehabilitation (Soderback, 1988a). Abreu and Toglia (1987) presented a cognitive rehabilitation model for occupational therapy, which emphasized the teaching/learning process as an important component of therapy. Since then, both authors have been pivotal in establishing the link between cognition and occupation in rehabilitation, and Katz (2005) includes chapters by each describing sophisticated models that incorporate self-awareness.

Definition

An occupation-based approach to metacognitive training (Fleming et al., 2006) uses real-life meaningful occupations in a supported therapy context to assist clients with brain injury to *develop self-awareness* and, in turn, facilitate realistic goal setting and strategy use. It is based on neuropsychological theories of the role of the frontal lobes in self-awareness. *Metacognitive strategies* and training techniques are drawn from the multicontext treatment approach proposed by Toglia (1998).

Background

Occupation-based metacognitive training emerged from work in the 1990s that emphasized the importance of timely, specific, consistent, and respectful feedback to clients about the nature of limitations in task performance (Barco et al., 1991; Mateer, 1999). Subsequently, Toglia and Kirk (2000) proposed a model of self-awareness that highlights the dynamic relationship between clients' self-knowledge and beliefs about their abilities (intellectual awareness) and the situational or "on-line" awareness generated during occupational performance (e.g., error recognition, error correction, error anticipation, and behavioral compensation). The authors recommended intervention strategies that engage the client in familiar structured experiences that allow for self-monitoring and evaluation. The premise of occupation-based metacognitive training is that the on-line experience of limitations during occupational performance facilitates the development of the client's intellectual awareness or self-knowledge.

Purpose

Occupation-based metacognitive training aims to remediate clients' metacognitive functioning by assisting them to recognize the extent of brain-injury-related impairments, and their impact on activities and participation. Gains in self-awareness can then be used as a starting point for realistic collaborative goal setting and selection of appropriate compensatory strategies, with the ultimate aim of improving occupational performance.

Method

Candidates for the Intervention

Occupation-based metacognitive training has been designed for use with adults with traumatic brain injury and other acquired brain injuries (such as stroke) that result in impairment of metacognitive functions (including self-awareness) mediated by the prefrontal cortex. It is intended to improve function including body structures of the brain (International Classification of Functioning, Disability, and Health [ICF] codes 1100 to 1103) and specific mental functions (ICF codes b140 to b189). Impairments targeted are described using various terms including *impaired self-awareness*, *denial of disability*, *lack of insight*, *unawareness*, *anosognosia*, and *dysexecutive syndrome*.

Epidemiology

There are no specific epidemiologic statistics as to the proportion of clients who may benefit from the intervention. However, occupation-based metacognitive training is not considered appropriate for all people with brain injury who display impaired self-awareness. In particular, clients who present with denial of disability, which is primarily the result of a psychological defense mechanism, may experience psychological distress if confronted with difficulties during occupation-based training. These clients are more likely to respond to psychological support, counseling, or psychotherapeutic approaches to facilitate adjustment (Fleming and Ownsworth, 2006). An occupation-based approach is considered more successful with clients whose impaired self-awareness is primarily due to neurologic damage such as injury to the prefrontal cortex and impaired executive function. In contrast to clients with defensive denial of disability who tend to respond to feedback in a resistant or angry manner, clients with neurologically based impaired self-awareness have a more surprised or indifferent response (Katz et al., 2002).

In a cluster analysis study of 84 participants with acquired brain injury (Ownsworth et al., 2007), only 14% were classified as having poor self-awareness, which appeared to be due to neurologic deficits in error self-regulation. Therefore, it could be assumed that this approach may be applicable to approximately 14% of people with acquired brain injury, although this requires further investigation. The investigation may also be useful for clients who have impaired self-awareness due to environmental factors such as lack of opportunity to experience injury-related disabilities either due to the recency of injury or the high levels of assistance by others (Fleming and Ownsworth, 2006).

Settings

Occupation-based metacognitive training is designed for use in real-life contexts so that activities can be meaningful and relevant to client's goals. Occupational performance in the client's natural environment allows the client to make direct comparison with preinjury performance. It is therefore most applicable to community-based rehabilitation settings where therapy occurs in the client's home, workplace, or local community. However, the intervention can be used in outpatient rehabilitation settings using simulated activities, although the effectiveness of this approach has not been evaluated.

The Role of the Occupational Therapist

The occupational therapist (OT) uses collaborative goal-setting techniques to select appropriate target occupations, and grades activities to provide sufficient challenge to the client. The OT selects and introduces metacognitive training strategies before task performance (e.g., self-prediction of numbers of errors or self-estimation of time for task completion). During the client's task performance, the OT provides prompts to encourage self-checking (e.g., stop every 2 minutes to check the recipe) and self-questioning (e.g., "Am I paying attention? Have I missed any steps?"). Following task completion, the OT encourages the client to self-evaluate, provides verbal or video feedback, educates the client about the nature of any identified problems, and facilitates selection of appropriate compensatory strategies. The OT plays a supportive role by closely monitoring the client's reaction to experiential feedback at all times, and intervening should any emotional distress or excessive frustration be displayed. The aim of the OT is to make the clients' experience a positive one of self-discovery and problem solving, which will result in gains in self-awareness being translated into productive functional gains rather than a failure experience.

Results

A Brief Guide to Clinical Application of the Intervention

The OT assists clients in choosing an activity that is relevant and meaningful to their occupational goals, and in which their current performance is limited. For clients with very low levels of self-awareness, this can be done in consultation with a family member. Examples include meal preparation, shopping, washing the car, ironing, writing a job application, taking lecture notes, or a leisure activity. It is important that the selected activity present a level of “just-right” challenge, which allows some success so as not to be overwhelmingly difficult, but at the same time provides opportunity for errors or difficulties to become apparent. Using metacognitive techniques such as self-prediction of performance before engaging in the activity, and time-monitoring, self-checking, self-evaluation, and self-questioning during and after the performance, discrepancies between the client’s predicted and actual performance are highlighted (Toglia, 1998). Task performance may be videotaped to enhance the client’s self-evaluation. Other techniques that are less confrontational include role reversal, in which the OT performs the task and the client detects errors (Toglia, 1998). At the end of the session, the client and OT discuss any difficulties that the client experienced, and use this improved self-knowledge as a platform to generate realistic therapy goals and choose relevant compensatory strategies. In subsequent sessions, the same process is repeated with the incorporation of compensatory strategy training.

How the Intervention Eases Impairments, Activity Limitations, and Participation Restrictions

Occupation-based metacognitive training is aimed at the remediation of impairments in metacognitive functions include error-recognition, error-correction, self-awareness, and strategy selection. It also targets activity limitations in the specific areas of occupational performance that are selected by clients as meaningful and challenging for them, by facilitating use of the appropriate strategies. This can have a flow-on effect in mitigating participation restrictions and enhancing engagement in valued occupational roles.

Evidence-Based Practice

While earlier intervention studies employing occupation-based metacognitive training have provided level IV case study evidence of its effectiveness (Fleming et al., 2006;

Katz et al., 2002; Landa-Gonzalez, 2001; Ownsworth et al., 2006), a recent randomized control has provided level II evidence supporting the intervention (Ownsworth et al., 2008). Ownsworth et al. (2008) compared an individual occupation-based intervention with group-based support and a combined group and individual intervention in a sample of 35 community-dwelling participants with acquired brain injury. Interventions were 3 hours per week for 8 weeks. Significant gains on performance self-ratings and relatives' ratings on the Canadian Occupational Performance Measure (COPM) (Law et al., 1994) were found for both the individual occupation-based intervention and the combined intervention at postintervention and 3-month follow-up assessments. Significant gains in psychological well-being were also found at follow-up for the individual occupation-based intervention.

Discussion

There is mounting research evidence that occupation-based metacognitive training is effective in improving the occupational performance of some clients with acquired brain injury. Clients are supported in the context of a safe therapeutic relationship to experience brain-injury-related activity restrictions and to develop strategies for dealing with them. Arguably, this is preferable to clients' attempting to reintegrate into the community and experiencing repeated failures without support. Nevertheless, with any attempt to facilitate the development of self-awareness, there is a *risk of emotional distress* for clients as they become aware of the extent of postinjury changes. The OTs' clinical reasoning skills are required to determine those clients for whom low self-awareness is more reflective of psychologically based denial, and to refer these clients to more intensive counseling to facilitate adjustment to their loss before participating in occupation-based training. However, further research is needed to test the suitability of occupation-based metacognitive training for particular types of clients.

References

- Abreu, B.C., and Togliola, J.P. (1987). Cognitive rehabilitation: a model for occupational therapy. *Am J Occup Ther*, 41, 439–448.
- Barco, P.P., Crosson, B., Bolesta, M.M., Werts, D., and Stout, R. (1991). Training awareness and compensation in postacute head injury rehabilitation. In: Kreutzer, J.S., and Wehman, P.H., eds. *Cognitive Rehabilitation for Persons with Traumatic Brain Injury: A Functional Approach* (pp. 129–146). Baltimore, MD: Paul H. Brookes.
- Berquist, T.F., and Jacket, M.P. (1993). Programme methodology: awareness and goal setting with the traumatically brain injured. *Brain Injury*, 7, 275–282.
- Fleming, J.M., Lucas, S.E., and Lightbody, S. (2006). Using occupational to facilitate self-awareness in people who have acquired brain injury: a pilot study. *Can J Occup Ther*, 73, 44–54.
- Fleming, J.M., and Ownsworth, T. (2006). A review of awareness interventions in brain injury rehabilitation. *Neuropsychol Rehabil*, 16, 474–500.

- Katz, N. (1998). *Cognition and Occupation Across the Lifespan. Models for Intervention in Occupational Therapy*. Bethesda, MD: American Occupational Therapy Association.
- Katz, N. (2005). *Cognition and Occupation Across the Lifespan. Models for Intervention in Occupational Therapy*, 2nd ed. Bethesda, MD: American Occupational Therapy Association.
- Katz, N., Fleming, J., Keren, N., Lightbody, S., and Hartman-Maeir, A. (2002). Unawareness and/or denial of disability: implications for occupational therapy intervention. *Can J Occup Ther*, 69, 281–292.
- Klonoff, P.S., O'Brien, K.P., Prigatano, G.P., Chiapello, D.A., and Cunningham, M. (1989). Cognitive retraining after traumatic brain injury and its role in facilitating awareness. *J Head Trauma Rehabil*, 4, 37–45.
- Landa-Gonzalez, B. (2001). Multicontextual occupational therapy intervention: a case study of traumatic brain injury. *Occup Ther Int*, 8, 49–62.
- Law, M., Baptiste, S., Carswell, A., and McColl, M.A. (1994). *Canadian Occupational Performance Measure Manual*, 2nd ed. Canada: Canadian Association of Occupational Therapist, ACE Publishers.
- Mateer, C.A. (1999) The rehabilitation of executive disorders. In: Stuss, D.T., Winocur, G., and Robertson, I.H., eds. *Cognitive Neurorehabilitation* (pp. 314–332). London: Cambridge University Press.
- Owensworth, T., Fleming, J., Desbois, J., Strong, J., and Kuipers, P. (2006). A metacognitive contextual intervention to enhance error awareness and functional outcome following traumatic brain injury: a single-case experimental design. *J Int Neuropsychol Soc*, 12, 54–63.
- Owensworth, T., Fleming, J., Shum, D., Kuipers, P., and Strong, J. (2008). Comparison of individual, group and combined intervention formats in a randomized controlled trial for facilitating goal attainment and improving psychosocial function following acquired brain injury. *J Rehabil Med*, 40, 81–88.
- Owensworth, T., Fleming, J., Strong, J., Radel, M., Chan, W., and Clare, L. (2007). Awareness typologies, long-term emotional adjustment and psychosocial outcomes following acquired brain injury. *Neuropsychol Rehabil*, 17, 129–150.
- Soderback, I. (1988a). The effectiveness of training intellectual functions in adults with acquired brain injury: an evaluation of occupational therapy methods. *Scand J Rehabil Med*, 20, 47–56.
- Soderback, I. (1988b). A housework-based assessment of intellectual functions in patients with acquired brain damage: development and evaluation of an occupational therapy method. *Scand J Rehabil Med*, 20, 57–69.
- Toglia, J., and Kirk, U. (2000). Understanding awareness deficits following brain injury. *Neurorehabilitation*, 15, 57–70.
- Toglia, J.P. (1998). A dynamic interactional model to cognitive rehabilitation. In: Katz, N., ed. *Cognition and Occupation in Rehabilitation. Cognitive Models for Intervention in Occupational Therapy* (pp. 5–50). Bethesda MD: AOTA.
- Unsworth, C. (1999). *Cognitive and Perceptual Dysfunction. A Clinical Reasoning Approach*. Philadelphia: F.A. Davis.