



# Comparing memory and meta-memory abilities between children with acquired brain injury and healthy peers



Rachel Kizony<sup>a,b,\*</sup>, Shoshi Tau<sup>a,c</sup>, Orly Bar<sup>d</sup>, Batya Engel Yeger<sup>a</sup>

<sup>a</sup> Department of Occupational Therapy, Faculty of Social Welfare and Health Sciences, University of Haifa, Israel

<sup>b</sup> Department of Occupational Therapy, Sheba Medical Center, Tel Hashomer, Israel

<sup>c</sup> Ministry of Education, Local Resource Center for Special Education Services, Raanana, Israel

<sup>d</sup> Pediatric Rehabilitation Department, The Edmond and Lily Safra Children's Hospital, Sheba Medical Center, Tel Hashomer, Israel

## ARTICLE INFO

### Article history:

Received 3 February 2014

Received in revised form 18 March 2014

Accepted 18 March 2014

Available online 13 April 2014

### Keywords:

Acquired brain injuries

Visual memory

Meta-memory

Children

## ABSTRACT

This study compared visual memory and meta-memory abilities of children with ABI to that of healthy peers. Participants included 16 children (aged  $13.55 \pm 3.29$  years) with moderate or severe ABI and 16 healthy children (aged  $12.44 \pm 3.24$  years) with typical development. Children completed the Contextual Memory Test for Children (CMT-CH). The study group showed significantly lower immediate and delayed recall abilities. While the controls used the context for better memorizing, most of the children with ABI used rehearsals. In both groups better delayed recall correlated with the use of a more efficient strategy. Meta-memory should be an integral part of the assessment for children with ABI. Therapists should enhance child's self-awareness to his/her abilities and encourage the use of strategies (e.g. context) for memorizing in daily life.

© 2014 Elsevier Ltd. All rights reserved.

## 1. Introduction

Acquired brain injuries (ABI) are one of the leading causes of death and disability among children and adolescents (Lowther & Mayfield, 2004). Children who survive their brain injuries, and subsequent medical complications, often develop lifetime difficulties in their motor, sensory and cognitive skills. Moreover, brain injury in children not only disrupts well established skills but also affects those that have been recently acquired as well as those that have yet to be emerged (Brenner et al., 2007; Thompson et al., 1994).

Cognitive deficits are common among children with ABI and persist even when the child overcomes his or her physical disability (Hooft, Andersson, Sejersen, Bartfai, & Wendt, 2003). Deficits in attention and memory are the most common cognitive dysfunctions in ABI (Allen et al., 2010; Anderson & Catroppa, 2007; Klonoff, Campell, & Klonoff, 1995; Yeates et al., 2004). However, post injury cognitive impairments also include decreased mental flexibility, organization, self-monitoring and behavioral control, learning ability, reasoning, problem solving (Taylor et al., 2002) and working memory (Engle, Kane, & Tuholsky, 1999). These difficulties may impact one another, e.g. slow processing speed may limit attention capacity (Hooft et al., 2003) and negatively impact the child's academic, social, and emotional performance (Dise-Lewis, Calvery, & Lewis, 2002).

\* Corresponding author at: Occupational Therapy Department, Faculty of Social Welfare and Health Sciences, University of Haifa, Mount Carmel, Haifa 31950, Israel. Tel.: +972 4 8240364; fax: +972 4 8249753.

E-mail addresses: rkizony@univ.haifa.ac.il, rachel.kizony@gmail.com (R. Kizony).

Memory is one of the most important underlying components of activities of daily life, that is essential for explicit learning experience. Memory is not a single entity, but an array of cognitive processes involving the acquisition, retaining, and retrieving of information (Baddeley & Wilson, 2002). Deficits in the capacity to learn and remember new information reduce the child's ability to acquire essential knowledge, which in turn influences quality of life from short- and long-term perspectives (Souza, Braga, Filho, & Dellatolas, 2007).

Brain injury may lead to various memory impairments, such as impaired explicit rather than implicit memory (Watt, Shores, & Kinoshita, 1999), poor immediate and delayed recall and reduced recognition memory for verbal and visual information (Allen et al., 2010; Bassett & Slater, 1990; Farmer et al., 1999) as well as impaired recollection of everyday memories (Kinsella et al., 1996).

Assessment of memory is an important part of rehabilitation after ABI. Although there has been an increase in the number of available memory assessments for children there is still a concern regarding age-appropriate instruments for this population (Lowther & Mayfield, 2004). Moreover, most existing instruments refer to memory only, and do not evaluate *Meta memory* that is crucial for the child's development and daily performance and may be significantly impaired among children with ABI (Josman, Berney, & Jarus, 2000).

Meta memory includes two interrelated aspects: awareness of one's own memory processes and capacities, strategies for better memorization and the ability to monitor performance (Flavell, 1985; Pannu & Kaszniak, 2005). The relationships between memory, knowledge about memory, and the use of memory strategies have generated considerable theoretical and research interest (Josman et al., 2000; Pannu & Kaszniak, 2005). Strong theoretical reasons exist for expecting people or children with greater awareness and knowledge about memory processes to be more likely to use memory strategies and show greater levels of recall than those with less awareness and knowledge (Grammer, Purtell, Coffman, & Ornstein, 2011; Schneider & Pressley, 1997).

Different aspects of awareness may be observed before, during, and immediately after performing a task (Toglia, 1992; Toglia & Kirk, 2000). These aspects which include general awareness, prediction of performance, and estimation of performance, are critical components in learning and generalization processes. Moreover, they also influence an individual's degree of motivation and self-efficacy which is the set of judgments and beliefs about one's performance capabilities with respect to a task or series of tasks (Gage, Noh, Polatajko, & Kaspar, 1994).

The discussion about the use of memory strategies focuses on a framework for organizing and remembering information. Using contextual information is one of the main memory strategies, named 'Contextual Memory'. Contextual memory refers to the effectiveness of using contextual cues and emphasizes the ability to attend to the overall context in order to facilitate memory (Toglia, 1993, 2011).

As mentioned above, although meta memory is crucial for child's performance (Engel-Yeger, Durr, & Josman, 2011), it has not been studied enough among children with typical development nor among children with disabilities, such as ABI. Moreover, although memory and meta-memory interventions have been performed in children with ABI, in the clinic (Porr, 1999) only few standardized instruments exist for measuring these abilities (Williams & Haut, 1995).

Josman et al. (2000) used of the Contextual Memory Test (CMT)(Toglia, 1993) to compare aspects of memory and meta memory in children with severe brain injury (8–14 years old) and typically developing children. The CMT was originally created to measure memory and meta memory in adults. The test consists of two picture cards, each containing 20 objects that are related to a theme (restaurant or a morning theme). Performance is scored on (1) immediate and delayed recall as well as recognition, (2) self-awareness of memory ability and (3) strategy use. Children with brain injury obtained significantly lower scores than children without brain injury. Their self-awareness scores significantly correlated with performance scores. Recently, an adapted version of the CMT called "The Contextual Memory Test for Children" (CMT-CH) was developed and investigated in children with disabilities related to memory impairments, such as hearing loss. The authors recommended to further study this assessment in other populations such as ABI (Engel-Yeger et al., 2011).

To summarize, brain injuries are relatively prevalent among children and one of their main negative outcome is memory impairment that significantly limits the child's development and daily performance. Nevertheless, the number of studies that have examined memory and moreover meta-memory in this population is very limited (Lowther & Mayfield, 2004). In addition, the lack of studies which focus on developing and evaluating pediatric cognitive rehabilitation methods for children with ABI (Sjö, Spellerberg, Weidner, & Kihlgren, 2010) lead to the purpose of this study. This study aimed to compare memory and metamemory abilities of children with ABI to those of healthy peers using the CMT-CH.

It was hypothesized that (1) children with ABI would perform poorly on memory and meta-memory than the controls, and (2) in both groups significant positive correlations would be found between memory and meta-memory abilities.

## 2. Materials and methods

### 2.1. Participants

Thirty-two children and adolescents participated in the study. Their age ranged from 8 to 19 years. The study group included 16 children (13 boys and 3 girls; mean age:  $13.55 \pm 3.29$  years) with moderate or severe ABI at least six months prior to their participation in the study. Severity of the ABI was determined by the Glasgow Coma Scale (Teasdale & Jennett, 1974) or according to a report from the medical records. They were not diagnosed with developmental impairments or cognitive deficits before the injury according to reports from their parents. In addition, children with neglect or with the existence of co-morbidity

متن کامل مقاله

دریافت فوری ←

**ISI**Articles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات