

Research Article

Dynamic Occupational Therapy Cognitive Assessment for Children: Perceived utility in Australian occupational therapy practice

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Background and Aim: *The Dynamic Occupational Therapy Cognitive Assessment for Children (DOTCA-Ch), recently developed in Israel, assesses the cognitive areas: orientation, spatial perception, praxis, visuomotor construction and thinking operations of 6- to 12-year-old children. The dynamic aspect, which incorporates mediation and prompting, has been presented as a valuable clinical feature of this new assessment. This study investigated the cultural suitability, dynamic nature and comprehensiveness of the DOTCA-Ch as a single cognitive assessment for occupational therapy practice in Australia.*

Methods: *Twenty-three paediatric occupational therapists participated in three tutorial and video demonstrations, which were then followed by a group interview.*

Results and Conclusion: *Thematic analysis of transcripts identified four main themes: appropriateness of assessment tasks, language, mediation and clinical utility. Within each theme, the participants raised both positive and negative features. This paper highlights occupational therapists' mixed views on the clinical utility of this assessment in Australia. Limitations of this study and areas for further research are suggested.*

KEY WORDS children, cognition, culture, dynamic assessment, mediation.

Introduction

This paper presents a newly developed cognitive assessment called the Dynamic Occupational Therapy Cognitive Assessment for Children (DOTCA-Ch) and its perceived utility in an Australian context. First, assessment in paediatric occupational therapy is discussed in relation to assessment approaches and the levels of the International Classification of Functioning, Disability and Health (ICF) (World Health Organization, 2001). This is followed by a brief overview of dynamic cognitive assessment. The DOTCA-Ch is described, as well as the results of a small qualitative study of therapists' perceptions of its potential use within the Australian occupational therapy context.

Assessment in paediatric occupational therapy

Assessment is a critical first step in occupational therapy intervention. Paediatric occupational therapists have an exhaustive list of measures to choose from, which cover various aspects of occupational functioning: (i) occupational performance components such as biomechanical, sensory-motor, cognitive, intrapersonal and interpersonal; (ii) occupational performance areas such as rest, self-care/self-maintenance, productivity/school and play/leisure; and (iii) occupational roles (Chapparo & Ranka, 1997). A recent distinction has been made in the occupational therapy intervention literature between 'bottom-up' approaches that aim to remediate sensory, perceptual and motor deficits, and 'top-down' approaches that focus on performance difficulties (Missiuna, Malloy-Miller & Mandich, 1997; Trombly, 1993). In the top-down approach, assessment focuses first on issues of role competency and meaningfulness, as well as self-care, rest, play and school occupations. The underlying factors (performance skills, patterns, context, activity demands, and client factors) are considered if needed later.

By contrast, the bottom-up approach considers foundational factors such as performance components

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to obtain an understanding of a person's strengths and deficits (Weinstock-Zlotnick & Hinojosa, 2004). Hence, the emphasis is on components such as strength, balance, range of motion, visual perception, vestibular functioning, etc. These are believed to be prerequisites to successful occupational performance. The inherent assumption is that acquisition of the underlying sensory motor, biomechanical, cognitive and psychosocial component skills and abilities will lead to successful occupational performance, for example, in play or self-care. Assessments therefore are selected by therapists depending on the approach adopted and frame of reference utilised (Kramer & Hinojosa, 1999). For example, therapists using a sensory integrative frame of reference would likely choose the Ayres' Clinical Observations and Sensory Integration and Praxis Tests (Ayres, 1989), which measure underlying capacities consistent with this frame of reference.

In addition to classifying assessments as primarily bottom-up or top-down, it is possible to draw parallels between occupational therapy assessment and intervention approaches and the International Classification of Functioning, Disability and Health (ICF) (WHO, 2001). The ICF conceptualises health conditions impacting on the individual at the level of body structures and functions (e.g. motor, physiological systems and psychological (perceptual) function); activities level (e.g. engagement in appropriate culturally relevant activities such as handwriting for a school-aged child, play/leisure activities) and participation, referring to a child's involvement in their school, home and community environments. Assessment at the performance component level is consistent with the ICF conceptualisation of body function and structure, whereas assessment of occupational performance areas and roles is consistent with the ICF levels of activities and participation. Also, occupational therapists directly consider environmental and personal factors that impact on a child's occupational performance. Each of these approaches has its own strengths and limitations (Weinstock-Zlotnick & Hinojosa, 2004) and use of either in isolation may well be inappropriate. While some paediatric assessments such as The revised Motor-Free Test of Visual Perception (Colarusso & Hammill, 1995) is purely focused on a specific component level assessment (e.g. visual perception); others span several components (e.g. Ayres' Clinical Observations). Still, other assessments incorporate performance components and occupational performance, for example, the Sensory Profile (Dunn, 1999); Miller Assessment for Preschoolers (Miller, 1988) and some focus specifically on occupational performance or activities and participation, for example, the School Function Assessment (Haley,

Coster, Ludlow, Haltiwanger & Andrellos, 1992) and the Pediatric Evaluation of Disability Inventory (Coster, Deeney, Haltiwanger & Haley, 1998).

Assessment practices in Australia

A recent survey of the assessment practices (Rodger, Brown & Brown, 2005) of 330 Australian paediatric occupational therapists indicated that the theoretical models commonly used by paediatric clinicians focused on sensory integration/multisensory approaches (i.e. bottom-up), occupational performance (i.e. top-down) and client-centred practice. Assessment tools most frequently used were the Test of Visual Motor Integration (Beery, 1997), Sensory Profile (Dunn, 1999), Bruininks-Oseretsky Test of Motor Proficiency (Bruininks, 1978), Handwriting Speed Test (Wallen & Mackay, 1999), and the Motor-Free Visual Perception Test (Colarusso & Hammill, 1995). Paediatric occupational therapists appeared to draw on a range of theoretical models. The assessments most frequently used focused on the body structures and functional levels of the ICF (WHO, 2001). Rodger *et al.* encouraged paediatric therapists to also address the ICF levels of activities and participation in both assessment and treatment.

Dynamic assessment

Paediatric assessments can also be classified along another dimension, related to the amount of support or prompting possible during administration of standardised assessments, that is, whether the assessment is considered static (administered as per the manual with no exploration of child's performance with support) or dynamic (allowing active interaction between the child and assessor). Psychologists first considered dynamic assessment when standardised IQ tests were questioned as an accurate measure of learning ability, especially for children who were poorly educated, came from cultural minorities, or had no prior testing experience (Kirschenbaum, 1998; Luchlan & Elliott, 2001). In contrast to standardised assessment, dynamic assessment relies on the assumption that ability and performance are not equal (Lidz, 2001) and that active interaction between clinician and child can elucidate the child's zone of proximal development (ZPD). ZPD refers to the child's learning potential or area between a task that can be performed independently and one that can be performed with assistance (L. Vygotsky, as cited in Kozulin & Falik, 1995). Establishing the child's current level of functioning and then challenging the child to aim for the next level is the goal of dynamic assessment (Lidz). Assessment of what the children can achieve with assistance may provide more valuable information about their capabilities than standardised assessment

alone (Luchlan & Elliott). Also, it provides links to intervention in terms of the most appropriate type of mediation or facilitation.

Dynamic assessment processes have recently been introduced into cognitive assessments and interventions within occupational therapy. Two specific examples of this will be briefly described prior to presenting the DOTCA-Ch (Katz & Parush, 2003), which is the subject of this paper. First, Polatajko *et al.* (Polatajko *et al.*, 2001b; Polatajko, Mandich, Miller & Macnab, 2001a) introduced Cognitive Orientation to (daily) Occupational Performance (CO-OP) as an intervention approach for 6- to 12-year-old children with motor-based occupational performance deficits. This top-down cognitive approach requires the use of dynamic analysis of performance (DPA) (Polatajko, Mandich & Martini, 2000) to identify points of performance breakdown. DPA is undertaken by the CO-OP therapist throughout the intervention, allowing the therapist to guide the child's discovery of specific strategies to help him/her improve his/her performance. Mediation and use of questions are critical processes used by the therapist to assist the child to improve his/her performance.

Second, Chapparo and Ranka (1997) developed an assessment process called the Perceive, Recall, Plan and Perform Process (PPRP) as part of the Occupational Performance Model (Australia) (www.occupationalperformance.com). PPRP is based on task analysis methodology, allowing simultaneous observation of task performance, context and the client's component abilities. It allows the therapist to assess the person's cognitive abilities during any occupational performance task. In the first stage, behavioural task analysis is used to determine the steps of the task or routine to be assessed. Performance errors are identified; then the second stage of assessment focuses on cognitive component behaviours required for performance. Use of this criterion-referenced system allows for the identification of cognitive problems in everyday function. This leads directly to intervention based on errors in observable behaviours. Within the PPRP, the stage perceived focuses on attention/perception, recall on memory/recall, plan on planning/problem solving, and perform on motor enactment (www.occupationalperformance.com/prppdesc.html).

Cognitive assessment and the DOTCA-Ch

Occupational therapists' interest in cognitive assessment is primarily from the perspective of the impact of cognition on function or occupational performance, rather than in measuring intelligence or cognitive ability and potential. Cognition underlies the ability to attend to, perceive and learn (e.g. think, problem

solve, remember) from the environment, and thus impacts on a child's ability to learn skills related to self-care, play, leisure and academics (Case-Smith, Allen & Pratt, 1996). Despite this, Katz, Kizony and Purush (2002, p. 34) suggested that 'cognitive performance components are frequently overlooked in paediatric occupational therapy'. To date, there have been limited assessments available to occupational therapists that have been able to assess cognitive function. Information about a child's cognitive functioning allows therapists to understand a child's approach to the task, examine potential ability and plan appropriate interventions by incorporating cueing and reinforcement to facilitate task completion (Case-Smith *et al.*; Ukrainetz, Harpell, Walsh & Coyle, 2000). Occupational therapists use many static standardised assessments that rely on the assumption that learning ability is stable, and that test performance equates with ability (Lidz, 2001). While a number of these address cognitive skill components, none are specifically cognitive assessments.

Apart from DPA (Polatajko *et al.*, 2000) and PRPP (Chapparo & Ranka, 1997), the DOTCA-Ch (Katz, Parush & Bar-Ilan, 2005) is the only other specific dynamic occupational therapy cognitive assessment that can be used with children. It was developed by Katz and Parush in Israel to fill a gap in cognitive assessment for 6- to 12-year olds in current practice. The DOTCA-Ch is based on the Lowenstein Occupational Therapy Cognitive Assessment (LOTCA) (Itzkovich, Elazar & Averbuch, 1990), an internationally utilised adult cognitive assessment. Like the LOTCA, the DOTCA-Ch comprises 21 subtests to assess five cognitive areas: orientation, spatial perception, praxis, visuomotor construction and thinking operations. Table 1 describes the five cognitive areas and lists the subtests that comprise each area. In addition, immediate and delayed memory is tested in five of the visuomotor construction subtests, and length of time to complete each subtest in visuomotor construction and thinking operations was also tested. All items are administered to all children irrespective of age. The DOTCA-Ch could be considered to assess skills at the body structure/function (performance components) and activities level of the ICF. For example, items such as orientation and spatial relationships address performance components while items such as peg-board designs, puzzles and drawing address functional school-related activities. The room set-up required for administration is similar to any quiet, non-distracting assessment room but also requires a door and window within easy view of the child. A table and a chair are required with the assessor sitting opposite the child. In our previous study (Ziviani *et al.*, 2004), the administration time for typical

TABLE 1: *Subtests of the Dynamic Occupational Therapy Cognitive Assessment for Children*

Area	Subtest
Orientation: Awareness of self in relation to surroundings Requires consistent and reliable integration of attention, perception and memory (Cermak <i>et al.</i> , 1995)	1. Orientation for place 2. Orientation to time
Spatial perception: The active process of searching for corresponding information, distinguishing the essential features of an object comparing the features and creating and comparing hypotheses (Cermak <i>et al.</i>)	3. Directions on child's body 4. Spatial relationships between child and objects in near space 5. Spatial relationships on a picture
Praxis: The ability to plan and perform purposeful movement	6. Motor imitation 7. Utilisation of objects 8. Symbolic actions
Visuomotor construction: Consists of copying, drawing and building/assembly (Cermak <i>et al.</i>)	9. Copy geometric forms 10. Reproduction of 2-D model 11. Pegboard construction 12. Coloured block design 13. Plain block design 14. Reproduction of puzzle 15. Drawing a clock
Thinking operations: Includes the ability to identify discrete features of objects, appreciate them hierarchically and classify them (Cermak <i>et al.</i>)	16. Categorisation 17. ROC unstructured 18. ROC structured 19. Pictorial sequence A 20. Pictorial sequence B 21. Geometrical sequence

Data taken from Ziviani *et al.* (2004, p. 18). Permission obtained from the *New Zealand Journal of Occupation Therapy* (Ziviani, J., Rodger, S., Pacheco, P., Rootsey, L., Smith, A., & Katz, N. (2004). The Dynamic Occupational Therapy Cognitive Assessment for Children (DOTCA Ch.): Pilot study of inter-rater and test retest reliability. *New Zealand Journal of Occupational Therapy*, 51(2), 17–24). ROC, Risca object classification.

developing children ranged from 1 to 1.5 h depending on how much mediation was required.

Each subtest is administered in three stages: test, mediation, and retest. In the test stage, items are administered and scored against performance criteria, providing an initial baseline measure (static test). When submaximal performance is observed, mediation is provided with cues arranged in a five-level hierarchy (1, general instructions; 2, general feedback; 3, specific feedback; 4, structured; and 5, demonstration or reduced difficulty) (Katz & Parush, 2003). The process is followed until the child is able to perform the task correctly or is unable to do so despite mediation. If mediation is needed, the subtest is retested to determine the influence of learning. The post mediation scores provide an indicator of the child's immediate learning potential.

The mediation format of the DOTCA-Ch involves providing graded cues after an initial task perform-

ance to determine if the child can improve or self-correct his/her performance (Katz *et al.*, 2002). This graduated prompting (Campione & Brown, 1987) involves the clinician providing a fixed sequence of clues to the task solution (with increasing contextual support) in response to the child's errors, until a complete solution has been achieved (Kozulin & Falik, 1995; Lidz, 2001). The focus, therefore, is on the amount of assistance a child requires to complete the task, rather than merely assessing the child's task performance (Kozulin & Falik). Kirschenbaum (1998) proposed that cooperative learning during the assessment with the clinician's assistance helps to identify emerging cognitive abilities. Initially developed to operationalise Vygotsky's ZPD, graduated prompting indicates the number of prompts required to obtain the correct answer (Gutierrez-Clellen & Pena, 2001; Lidz). Specifically, dynamic assessment highlights the

thinking and learning strategies a child can, but does not spontaneously utilise, to complete a task and the types and intensity of assistance or modifications that will motivate and enhance the child's ability to learn and perform more efficiently (Kahn & King, 1997; Luchlan & Elliot, 2001).

While the majority of literature supports the notion of dynamic assessment, Luchlan and Elliott (2001, p. 647) were more cautious, stating that:

'while intuitively attractive ... the complexity of the measures, ongoing debates about their validity and applicability and the pressures from resource managers for easily understandable, clear cut psychometric results have tended to deter all but the most committed practitioner'.

Further investigation of the use of dynamic assessment is therefore warranted.

Culture and assessment

The DOTCA-Ch has been used extensively in Israel and with Ethiopian and Bedouin children (Katz *et al.*, 2002; Parush, Sharoni, Hahn-Markowitz & Katz, 2000; Rosenblum, Katz, Hahn-Markowitz & Parush, 2000). For these children, the DOTCA-Ch was found to be sensitive to their cultural and environmental contexts. The development of the DOTCA-Ch in Israel raises issues about its cultural suitability for use in other countries such as Australia. Cross-cultural studies show that each culture has its own distinctive child-rearing practices, attitudes toward and expectations of children, and differing concepts of behaviours and skills that should be encouraged and developed (Katz *et al.*, 2002; Schneider, Parush, Katz & Miller, 1995). For these reasons, it is argued that before any assessment is adopted internationally, it should be tested to ensure its cultural appropriateness. Chow, Henderson and Barnett (2001) stated that if cross-cultural differences are found, separate norms may be required. In a study comparing Israeli and American children's performance on the Denver Developmental Screening Test (DDST), performance differences were significant enough to justify developing culturally specific norms for Israel (Shapira & Harel, 1983) so as to ensure no misinterpretation of ability.

Lidz (2001) proposed that dynamic assessment is more suitable than standardised assessment for culturally diverse populations because the nature of the assessment permits relaxed social interaction, which is more likely to reveal the actual abilities of those children from different cultures. The appropriate translation of instructions and tasks is important if an assessment is to be used cross-culturally. Inappropriate translation makes administration and scoring difficult

and compromises the assessment's reliability and validity, thus many checks need to be performed to provide accurate translation. In the study by Schneider *et al.*, comparing Israeli and American children's performance on the Miller Assessment for Preschoolers (MAP), accuracy and comprehensibility of items and instructions were ensured by translation into Hebrew, evaluation by linguists, pilot study (to judge the accuracy of translation and children's comprehension) and blind-back translation.

Because culture impacts upon the cognitive development and abilities of a child, it is likely that Israeli and Australian children would experience different sociocultural environments. One pilot study suggested the DOTCA-Ch may not be culturally appropriate in Australia and may require some modification of task items, verbal instructions (language) and norms to ensure cultural appropriateness (Ziviani *et al.*, 2004). The present study aimed to extend our previous research (Ziviani *et al.*) by exploring the views of Australian paediatric occupational therapists to determine if therapists perceived that the DOTCA-Ch: (i) was culturally appropriate; (ii) provided unique information based on its dynamic assessment approach; and (iii) offered a comprehensive measure of cognitive ability for children.

Methods

Participants

Twenty-three occupational therapists working in paediatric settings or with a paediatric caseload within the state of Queensland, Australia, and who were familiar with current standardised paediatric assessment tools participated. With stratified purposeful sampling (Patton, 2002), we aimed to include therapists with a wide range of clinical experiences, for example, community, hospital, private practice and education settings. Consequently, participants for the first focus group were recruited (through sending flyers out to major children's hospitals, an advertisement in the *Occupational Therapy Australia Queensland* newsletter and on the Education Queensland intranet). The second and third focus-group participants were recruited by using a 'snowball approach' (Patton, 2002) through members of paediatric special interest groups in south-east Queensland. Demographic characteristics of participating therapists are summarised in Table 2.

Inspection of Table 2 indicates that the three main work environments of participants include community organisations, Education Queensland and private practice. Their main paediatric caseloads involved children with developmental delay, autistic spectrum disorder, learning/behavioural difficulties and intellectual and physical impairment. Participants had

TABLE 2: Focus group participants: Demographic characteristics (n = 23)

Type of work environment	Community organisation government funded	Education Queensland	Private	Public practice	Non-hospital funded organisation	Other government-funded community organisation	Acute medical
†Number of participants Caseload	8	6	5	2	2	1	
†Number of participants Paediatric experience	Developmental delay 19	Autism spectrum disorder 16	Learning behaviour 14	Intellectual disability 12	Physical disability 11	Neurological 5	Psychosocial 4
No. participants	0–2 years 4	3–5 years 1	6–10 years 10	11–15 years 5	16+ years 3		Acute medical 1
University attended	University of Queensland	Charles Sturt	University of Sydney	Newcastle	Latrobe	South Australia	Did not indicate
No. participants	12	2	2	2	2	1	2

†Numbers do not add up to 23 as some participants worked across several environments and worked with more than one caseload.

between 1 and 31 years (mean = 10 years) of paediatric work experience. All participants were graduates of Australian occupational therapy schools, with the majority from The University of Queensland.

Procedure

Ethical clearance was obtained from The University of Queensland. Upon expression of interest, each participant was sent an information sheet, consent form and demographic questionnaire with questions regarding: place of training, current employment, duration (in years) of working in paediatrics, specialty within paediatrics, familiarity with standardised assessment and current caseload.

Three focus groups were conducted between July and September 2003, each lasting between 2–3 h and were facilitated by two Masters of Occupational Therapy students in their final year of study. The first group was held at The University of Queensland, with seven occupational therapists attending. The second group of six therapists was held at a special school, 2 h north of Brisbane. The third was held on the South Coast of Queensland and involved 10 therapists.

Focus groups: Rationale and format

Because of the descriptive nature of the research question and the overall goal of gaining insight into the opinions of clinicians currently working with children, qualitative data were collected by using a semistructured group interview format (Patton, 2002). Group discussion was guided and participants were encouraged to discuss responses to questions posed. A semistructured interview guide ensured that the research questions were directly addressed and that the data gathered were consistent across groups (Patton). This format also allowed investigators to ask additional questions, and encouraged participants to raise issues (Appendix A).

Each participant wore a name tag and was given a number so that responses could be linked to demographic characteristics, and field notes were individualised. The first hour was spent in an information session describing the DOTCA-Ch, and included a formal presentation and short video of some subtests being administered by one of the test developers. The remaining time was spent in the group interview. Questions were open-ended, neutral and conversational. Twenty questions were developed to address the research questions and canvas therapists' views about the potential use of the DOTCA-Ch (Polgar & Thomas, 1995; Patton, 2003). The initial question was intentionally broad to encourage interaction (Crabtree & Miller, 1999). Researchers avoided 'why' in response to participants' suggestions, to ensure participants did not feel that their response was incorrect (Grbich, 1999; Patton).

TABLE 3: Range of standardised assessments currently used by participants to assess cognition

Assessment name	No. therapists utilising an assessment (<i>n</i> = 23)
Developmental Test of Visual Motor Integration (VMI) (Beery, 1997)	19
Sensory Profile (Dunn, 1999)	13
Miller Assessment for Preschoolers (MAP) (Miller, 1988)	13
Gesell Preschool Test (Bates-Ames, Gillespie, Haines & Ilg, 1980)	12
Developmental Test of Visual Perception (DTVP-2) (Hammill, Pearson & Voress, 1998)	10
Test of Visual Perceptual Skills (TVPS) (Gardener, 1997)	9
Ayres Clinical Observation of Sensory Integration	7
Learning Efficiency Test (LET II) (Webster, 1992)	7
Bruininks–Oseretsky Test of Motor Proficiency (BOTMP) (Bruininks, 1978)	6
School Function Assessment (SFA) (Coster <i>et al.</i> , 1998)	5
Paediatric Evaluation of Disability Inventory (PEDI) (Haley <i>et al.</i> , 1992)	5

Analysis

Audiotapes from each of the focus groups were transcribed verbatim, and summaries of the data were then developed. In order to ensure research rigour in data collection, participant and colleague checks were carried out (Krefting, 1991). A summary of the main themes was sent to the participants within 3 weeks of the focus groups being held, so that they could review, make comments and return them. The group interview summaries were collated and analysed thematically. This involved two researchers independently reading the transcribed data, searching for recurrent themes and manually assigning codes (Crabtree & Miller, 1999). In addition, meetings with project supervisors, who also read the transcription summaries, enabled colleagues to check the interpretation and this resulted in consensus regarding codes and themes. Because of time restrictions, participants were not involved in a further focus group or able to offer feedback regarding final interpretation and emerging themes.

Results and discussion

This section outlines the results of the present study and discusses them in relation to current occupational therapy literature and theory. Quotation marks and italics indicate direct quotes. For parsimony, discussion points are incorporated after the results as appropriate. Participants reported that the following aspects of cognition were important for occupational therapists to assess: *'memory, problem solving/organisation, learning, orientation, attention and verbal comprehension'*. These

reflect aspects at the ICF body structure/function level with potentially some overlap with the activities level. With reference to function, the participants wanted to be able to assess *'processing skills'* and determine how a cognitive deficit might be presented functionally (i.e. at the ICF activities/participation level). There were three aspects of children's learning that participants considered important: ability, style and transfer to novel tasks. These aspects were considered inadequately addressed in the currently used standardised assessments. The assessments used by participants to assess cognition are listed in Table 3. None of the therapists mentioned using DPA or PRPP to assess performance.

With the exception of the Learning Efficiency Test (Webster, 1992) and the School Function Assessment (Coster *et al.*, 1998), the remaining assessments do not necessarily measure cognitive functioning. Some of these assessments address specific aspects of memory such as visual memory (DTVP-2, TVPS). Several assessments such as the PEDI and Ayres' Clinical Observations do not appear to address cognition specifically. Given the lack of specific occupational therapy cognitive assessments, it would appear that therapists made assumptions about children's cognitive processes such as thinking and problem-solving skills from their approach to test items. In addition, the participants identified four areas of cognition that they considered under-represented in currently used standardised assessments: *'memory, learning, organisational skills and thinking/problem solving skills'*.

The suggestion by Katz *et al.* (2002) that paediatric therapists frequently overlooked cognitive performance components, although they are crucial to functional performance, was supported by the participants.

Four major themes emerged from the focus groups, namely, appropriateness of the assessment tasks, language, mediation and clinical utility of the DOTCA-Ch. These will be reported and discussed in turn.

Assessment tasks

Two main issues arose with respect to the tasks in the DOTCA-Ch: their comprehensiveness for the purpose of cognitive assessment and their appropriateness. Most participants noted that the DOTCA-Ch assessed *some* aspects of the following cognitive areas: sequencing, planning, learning, memory, problem solving, orientation, and timetabling. They proposed that it could be a useful cognitive screening tool; however, the significant time requirement was considered to reduce its utility for screening. The motor imitation section of the praxis component was considered useful, because of a lack of readily available standardised assessments of motor planning and praxis. In contrast, some participants felt the areas of memory and orientation were not adequately assessed.

With respect to the functionality of the tasks, some participants described them positively, with functional implications for home and school, whereas others felt they did not provide sufficient information about the functional presentation of deficits. For example, some test items such as copying geometric forms are similar to academic tasks, others like miming how you cut with scissors or cut bread with a knife are performed out of context, lacking an indication of how the child might perform these tasks with actual implements in real-life situations. The nature of the tasks was also contentious. While some felt the tasks were motivating, others reported that they were neither interesting nor part of natural play. Some tasks were considered *'unfamiliar and abstract'* (e.g. slicing bread, categorising pictures). Also, the *'relevance'* of some tasks to the child may depend on their socioeconomic background, age and environmental exposure (e.g. putting numbers on an analogue clock-face). Some tasks were generally considered *'too complex and multifaceted'*, particularly for younger children.

One participant highlighted that the DOTCA-Ch was trying to cater for too wide a range of populations. For example, while the orientation section was considered relevant for children with acquired brain injury, it was not considered appropriate for children with learning difficulties, who tend to be orientated in time, place and person. Participants felt they would rarely use only one assessment to address any area of difficulty. They indicated that most standardised assessments are not appropriate to be used as single *'off the shelf'* assessments. The participants also believed that the test results could not be generalised to functional activities. In summary, the DOTCA-Ch

was considered neither *'individualised'* nor *'functional enough'* to be used as a single cognitive assessment.

The tasks were not felt to *'be purely cognitive'* because they relied heavily on high-level motor and language skills, and assumed that the child had good visual and auditory memory. One participant stated, *'... a lot of the items, they are not straight cognitive at all ... they include language and motor components combined into the assessment'* (FG3). They felt that this caused difficulties in interpretation, which may confound item validity. These issues are common to all tests of cognition. One of the inherent difficulties with cognitive measurement is the need to observe performance indirectly through actions or verbal responses. Cognitive functioning is therefore implied from observations of test performance. Salvia and Ysseldyke (2004) suggested that a child's ability to understand and respond to stimuli during an assessment may provide therapists with an inaccurate picture of a child's abilities. This supports participants' concerns that the reliance on motor and language skills means that the actual cognitive ability may not be elucidated if limitations in motor and language functioning exist.

Several non-verbal IQ assessments have been developed such as the Test of Non-Verbal Intelligence (TONI-3) (Brown, Sherbenou & Johnson, 1997), and the Leiter-R (Roid & Miller, 1997), which are language free and motor reduced in an attempt to reduce the effects of language and culture. They utilise demonstrations of test items or pantomimed directions and do not require verbal or written responses from the child or examiner. The DOTCA-Ch was not considered sufficiently non-verbal by participants to ignore the impact of language and assess cognition independently.

It was also suggested that the DOTCA-Ch over-emphasised laterality tasks, assumed that the child was right-hand dominant, and did not evenly assess both sides of the body. These comments were related to items in the area of spatial perception, which could be argued to be more relevant to visual perception (and spatial relationships) than to cognition. The participants also commented that the nature of the tasks meant that practise effects may confound retesting.

The appropriateness of the task items with respect to the elected age range yielded varied opinions. In general, it was felt that some of the tasks were not appropriate for all age groups, being too complex for younger children, and too simple for older children. To resolve this, participants suggested: (i) tasks should be graded according to age and ability; (ii) more complex tasks (e.g. visual perception) be removed for younger children; and (iii) different tasks be included for different age groups.

The wide age range covered by the DOTCA-Ch was felt to impact upon the utility of the tasks. Other assessments

with wide age ranges (e.g. Batelle Developmental Inventory (BDI); Newborg, Stock & Wnek, 1984) use different items to ensure all age ranges and stages of development are catered for. In contrast, the DOTCA-Ch uses the same items for all ages, which was perceived both positively and negatively. The consistency of tasks was felt to minimise the time required for clinicians to become competent with administration of the assessment. However, an inappropriate level of difficulty was thought to affect the motivation of a child to engage in the tasks.

While the tasks were considered to be generally appropriate for different cultures, it was felt that the DOTCA-Ch was not entirely culture-free. Certain tasks were seen to have a specific religious orientation (e.g. Adam and Eve picture sequence in the thinking operations section), and to be specific to the Northern Hemisphere (e.g. importance of seasons), and thus less appropriate for Australian use. The DOTCA-Ch was considered inappropriate for use with remote indigenous populations because of the *'foreign concepts'* (e.g. slicing a loaf of bread), the tasks, the length and the *'need to be singled out from class'*. However, the latter criticism could be made against most standardised testing of indigenous children. Salvia and Ysseldyke (2004) described acculturation as an individuals' particular set of background experiences, opportunities to learn in informal and formal education settings and length of exposure to these. These differences in cultural suitability support the idea of acculturation and the view that certain skills and traditions are more appropriate in different cultures as a result of child-rearing practices and specific skill development (Katz *et al.*, 2002; Schneider *et al.*, 1995). Acculturation affects the assessment of intelligence and possibly cognition. As a result, 'the same test item may create different psychological demands for different people' (Salvia & Ysseldyke, p. 315). The distinct differences in socialisation, home environment and socioeconomic status between Israeli and indigenous Australian children, may also further limit its utility. This should be kept in perspective, however, as indigenous children comprise a very small percentage of children seen by Australian paediatric occupational therapists.

Language

The second major theme of language was dominated by negative impressions. Participants felt that the test required high levels of receptive and expressive language, especially in the sequencing and categorisation subtests. Furthermore, the language used was not considered *'child friendly'*. The instructions were reported to *'be too long, specific, formal and complex'* (e.g. *'demonstrate'* and *'construct'*). They were con-

cerned that this could lead to misinterpretation and under achievement. The multistep nature of the instructions was thought to be difficult to follow. These comments were reiterated with respect to the suitability of the age range. To increase utility, participants suggested that instructions would need to be shortened and the language simplified.

'As soon as you start throwing in words like construct, demonstrate ... they are not child friendly. I think it would not be hard to come up with synonyms for those words, which I think would be much more child friendly' (FG2).

The use of identical instructions for all ages was considered unsuitable and it was suggested that graded instructions to cater for different ages would be helpful. Participants suggested that the lengthy and multistep instructions may be difficult for some children.

In some sections, the instructions were described as *'ambiguous'*. For example, in the spatial perception section where the examiner asks, *'On which side of you is the door?'* The child could either respond *'this side'* or *'my left'*. The language was also felt to be *'stilted and directive with insufficient praise and encouragement'*, and required more flexibility and personalisation. While the language itself was not culturally biased, some directions appeared stilted. That is, they were grammatically correct but not expressed in the everyday idiom of children. For example, *'I'll ask you to move your hands and your body. Please listen and then perform what I asked'*.

To use an assessment cross-culturally, the instructions need to be translated with care and 'blind-back reviews' completed to demonstrate grammatical accuracy and comprehension (Schneider *et al.*, 1995). The word choice may be explained by changes in the complexity of vocabulary through the translation process (Salvia & Ysseldyke, 2004). Before the DOTCA-Ch can be utilised in an Australian setting, further pilot studies are required to ensure it is *'child friendly'*. The view that the instructions were *'stilted and directive'* may be explained by possible cultural differences that exist regarding assessment procedures and differing expectations of the relationship between examiner and child (Salvia & Ysseldyke).

Mediation

This third theme was positively described as allowing interaction between the therapist and child. The dynamic nature of the assessment (i.e. mediation) made it more flexible than standardised assessments. Participants liked the way the DOTCA-Ch did not focus on a score, it rather focused on the child's learning potential

explicated through mediation and graded prompting. Another benefit of mediation highlighted was that it gave the child an *'opportunity to master, gain confidence and feel successful at tasks, and helped the child grasp concepts'*. Another participant stated:

It also gives us some indication of how receptive the child is to teaching, so again it gets away from that right/wrong thing and looks at how well a child may pick up a skill when given the right level of mediation and help' (FG 2).

Participants concurred with Lidz (2001) regarding the flexibility of dynamic assessment. Luchlan and Elliott's (2001) contention that dynamic assessment indicates what the child is able to achieve with assistance was supported by participants' views that the DOTCA-Ch did not focus on a score, and provided children with an opportunity to learn and succeed. It is through the five-step process of mediation that the dynamic nature of the assessment is operationalised.

Participants felt that the mediation provided a *'structured way'* to assess the current level of performance and the ability of the child to learn with help. More specifically, it enabled the therapist to assess the level and type of mediation and support required by the child, and assisted in determining learning style, receptivity to teaching, and ability to learn with assistance. It was also considered to be a formalised way *'to grade tasks in order to get around the child's deficit'* and to focus on therapists' observations. These suggestions were congruent with previous research on the benefits of dynamic assessment (Kahn & King, 1997; Luchlan & Elliott, 2001).

However, when compared with other forms of gaining information such as standardised assessments (administered in a non-standardised way), play and observation of performance, participants felt the DOTCA-Ch provided less detail. They were concerned that the standardised nature of the prompts meant the mediation was not sufficiently individualised. More specifically, it lacked prompts other than verbal (or minimal physical and visual) prompts. They considered that the research version of the DOTCA-Ch manual did not provide consistent cues. Participants desired more information about the links between mediation and learning style.

It gives you a formalised way of looking at some prompts and mediation ... but they are standardised and that is its limitation ... but it gives you a standard score, which is limited to the standard prompts so you can not individualise those prompts for that child' (FG3).

Overall, views of dynamic assessment were positive; however, participants were not convinced that

the standardised prompting format was fully achieving the aims of dynamic assessment, namely information on the types of interaction that facilitated success (preferred learning style) (Kahn & King, 1997; Lidz, 2001). Information regarding a child's ability as an auditory learner could be obtained; however, there was less information regarding other learning styles (visual or tactile/kinaesthetic).

Therapists were concerned that the repetitive nature of the mediation may cause *'potential self-esteem issues'*, particularly if the highest level of mediation was consistently required. The repetition may also lead to a child *'switching off'* which could affect motivation and success at tasks.

Clinical utility

Factors impacting on clinical utility included participants' opinions on its ease of administration, its suitability for various client ages, groups and work settings. The ease of administration was influenced by the time required to complete the assessment. Participants felt that it was too long and an impractical use of time, as therapists indicated that they aimed to assess more areas of occupational performance in the same period:

It is not particularly time efficient, an hour and a half for one assessment is a long time, like in an hour and a half I would have expected to assess 4-5 different areas for a student ...' (FG3).

Participants reported that they would require time and practice to be natural and efficient in administering the assessment because of the complexity of mediation prompts. A positive aspect of the DOTCA-Ch's utility was that it incorporated the same items for all age groups, decreasing the amount of practice the therapists would require.

The introduction of basals and ceilings for each age group was proposed as a method to increase the utility of the DOTCA-Ch, by eliminating the tasks unsuitable for certain ages, and reducing the total administration time. This was illustrated by:

You might need to have some sort of cut off as you go through the task ... if they have consistently needed level five mediation on the previous tasks then you cease ...' (FG1).

Separate norms for each of the five areas were also suggested to reduce the time required and increase the flexibility of the assessment by allowing the relevant areas to be assessed as an adjunct to other assessments. Communication with the test developer indicated that while norms are not currently available because of low sample size, descriptive data and cut-off scores

will be presented in the manual for each area and each age (6–12 years) (N. Katz, personal communication, October 31, 2003).

The utility of this assessment was also affected by its theoretical components. Participants of one of the focus groups felt that the DOTCA-Ch's components-based 'bottom-up approach' was not consistent with the contemporary 'top-down approach' of assessment (Missiuna *et al.*, 1997). It was also felt to be a 'failure-orientated' approach, giving the child an 'opportunity to demonstrate their incompetence' at a task, which was something the participants also disliked about other standardised assessments. Several participants suggested that this could be resolved by describing the assessment to the child as an opportunity to learn and achieve skills with assistance.

With respect to the appropriateness of the age range, participants' opinions were divided. By encompassing all primary school ages (majority of participants' caseloads), the age range was considered appropriate. It was also suggested that the inclusion of 5-year olds would increase its utility (the Australian preschool year age). In contrast, the age range was considered by some to be too wide, as a large range of ability and cognitive skills develop during this period.

The following children were considered appropriate for assessment with the DOTCA-Ch: those with organisational problems, executive functioning, learning difficulties and those with mild developmental delays, and those who experienced latent effects of chemotherapy. These difficulties reflected the participants' current caseloads. In contrast, children with intellectual impairment, speech and language disorders, and autism were considered to be less suitable because of language difficulties. The DOTCA-Ch was considered unsuitable for children with severe physical impairments such as cerebral palsy because of the motor demands.

With respect to work setting, therapists held a range of views. One stated:

'I think if you were a sole person and you needed to get a lot of [varied] information, you might use this. But if you were in a team situation, where you can get language components from a speech pathologist and cognitive information from a psychologist or a teacher, you may not' (FG 3).

Some indicated that school-based occupational therapists may find the DOTCA-Ch relevant to guide mediation in the classroom (with respect to orientation, learning/processing or attention). Therapists working within a medical setting, for example, using 'direct service' delivery models, those using bottom-up approaches (Dunn, 2000), or in sole positions were

more positive about the DOTCA-Ch's utility. However, therapists working with a broad, top-down approach, such as that used in Education Queensland (Education Queensland, 2003) or a multidisciplinary team, considered that it may not provide enough 'OT' specific information. While not mentioned by participants, other assessment approaches such as DPA (Polatajko *et al.*, 2000) and PRPP (Chapparo & Ranka, 1997) may be more useful in these settings.

Conclusion

The present study investigated the clinical utility of the DOTCA-Ch in Australian occupational therapy practice. Opinions of therapists with a wide range of paediatric experience were varied. Areas of refinement were suggested in order to increase its utility. While the present study found that only some cultural limitations existed with regard to its utilisation in Australia, these findings cannot be generalised beyond this group of therapists. Possible limitations of the research include: most participants were from and practised in south-east Queensland, and the majority had been educated at the same occupational therapy school. Further research is suggested to obtain more opinions and saturation of responses. Therapists' opinions related to only a brief exposure to dynamic assessment and the DOTCA-Ch specifically prior to the focus groups. In future research studies, it may be beneficial for participants to trial the assessment in their own practice and have access to more background information, prior to interview.

In order to gain a definitive view of the utility of the DOTCA-Ch, further research is required into the clients, age groups and settings where the assessment may be most useful. Focus groups performed in other states, and incorporating therapists in rural or remote locations, would broaden our understanding of its Australian utility. However, to date, these preliminary findings indicate that the DOTCA-Ch shows promise as a cognitive assessment for Australian children, with some modification needed in the tasks and language used.

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Appendix A

Focus group questions

Cognition and cognitive assessment

1. What aspects of cognition do you feel are important for occupational therapists to assess?
2. What current assessments do you use to assess cognition in children?
3. What areas of cognition do you feel are not addressed adequately in these assessments?
4. From what you know of the DOTCA-Ch, do you feel it identifies cognitive abilities or limitations that current assessments do not?
5. The DOTCA-Ch is being promoted as a single cognitive assessment for children aged 6–12 years, to replace the need to do bits and pieces of other assessments. Do you think this is appropriate?

DOTCA-Ch

6. With the knowledge you have concerning the DOTCA-Ch, what is your understanding of its purpose?
7. What are the potential benefits of the DOTCA-Ch?
8. What are the potential limitations of the DOTCA-Ch?
9. Have you any comments about the suitability of the elected age range of 6–12 years?
10. What, if any, do you see as the benefits of the DOTCA-Ch compared to current cognitive assessments?

Dynamic assessment

11. What do you understand by the words ‘dynamic assessment’?
12. What do you feel are the benefits of dynamic assessment, in particular the DOTCA-Ch?
13. Are there any limitations of dynamic assessment, in particular the DOTCA-Ch?

Prompting or mediation

14. What are your views on the usefulness of the prompting used in this assessment?
15. In what ways might it be beneficial?
16. In what ways might it be a hindrance?
17. Have you any comments on the ease of administration of this assessment?

Utility in an Australian paediatric practice

18. What clientele would you use the DOTCA-Ch with?
19. What client groups would this assessment be inappropriate for?
20. If your department budget allowed it, would you want to purchase this assessment?

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