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Content Validity of the Occupational Therapy Anticipatory Awareness Test: A Functional Cognitive Assessment for Adults with Neurological Conditions

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Abstract

Background: The development of assessments that measure functional skills is a priority in the profession. Anticipatory awareness (i.e., the ability to anticipate the difficulties that might be experienced in daily life situations) is a critical skill in occupational performance. There is a lack of assessments measuring anticipatory awareness. The Occupational Therapy Anticipatory Awareness Test (OTAAT) is a performance-based assessment tool developed for individuals with neurological conditions. This study aimed to determine the tool's content validity.

Methods: We recruited five experts to review whether the test items are essential for assessment and calculated the Content Validity Ratio (CVR). Open-ended questions allowed opportunity to provide feedback for tool revision.

Results: Ten of the 14 items of the OTAAT were preserved. Eight out of the 14 items were rated as essential for measurement. Two of the 10 items were identified as useful but not essential. Following discussion, review of supporting literature, and analysis of qualitative feedback, the two emergent awareness items were kept. Four items were removed (strategy implementation and awareness of strategy use subdomains), as these were deemed not essential.

Conclusion: This study determined preliminary content validity of the OTAAT. Future research should focus on establishing construct validity and test reliability.

Comments

The authors report no potential conflicts of interest.

Keywords

self-awareness, content validity, occupational therapy anticipatory awareness test

Credentials Display

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An individual's cognition can support or limit full participation in meaningful life activities (American Occupational Therapy Association [AOTA], 2019; Centers for Disease Control and Prevention, 2017). It is estimated that more than 16 million people in the United States are living with cognitive impairments that are impacting their safety and everyday functioning (United States Department of Health and Human Services, Centers for Disease Control and Prevention, 2011). Individuals who have experienced an acquired brain injury (ABI) are at a high risk for experiencing self-awareness deficits (Kersey et al., 2019). ABI poses a striking public health concern in the United States with the annual incidence of all causes estimated at 3.5 million a year (Brain Injury Association of America, 2019; Parker et al., 2018).

The American Occupational Therapy Association (AOTA) defines functional cognition as "how an individual utilizes and integrates his or her thinking and processing skills to accomplish everyday activities in clinical and community living environments" (2017, para. 3). Self-awareness is a component of functional cognition that is required to maintain safe and optimal participation in all daily life activities in a variety of environmental contexts. Self-awareness of functional deficits is defined as the cognitive "ability to understand the functional impact of injury-related deficits" (Kersey et al., 2019, p. 1). Zlotnik and Toglia (2018) emphasized self-awareness as "a metacognitive process that is required to achieve successful outcomes in daily life" (p. 1). Unawareness of motor deficits was documented in 28% of individuals with a history of cerebrovascular accident, whereas unawareness of cognitive deficits was documented in 72% of those with cerebrovascular accident (Gillen, 2009). Decreased insight into memory, executive function, and attention deficits have been shown to translate into poor judgment and safety (Skidmore et al., 2018), dysfunctional interpersonal relationships (Bivona et al., 2014; Chesnel et al., 2018), the inability to set realistic goals (Fleming et al., 1996; McPherson et al., 2009; Robertson & Schmitter-Edgecombe, 2015), poor compliance and participation in rehabilitation (Geytenbeek et al., 2017), and inadequate performance in instrumental activities of daily living (Giles et al., 2019). Research has shown that lack of self-awareness is also a common problem in individuals who suffer a moderate to severe traumatic brain injury (Robertson & Schmitter-Edgecombe, 2015; Sherer, Bergloff, Levin et al., 1998; Sherer et al., 2003). Impaired awareness has been identified as a major factor in determining outcomes for traumatic brain injury survivors (Sherer, Boake et al., 1998). If an individual has poor self-awareness of the difficulties they can potentially experience with task performance, he or she is unlikely to use compensatory strategies that would improve the success and safety of the task that is being performed (Giles et al., 2019).

The terms impaired self-awareness and anosognosia have been used interchangeably (Gillen, 2009). Awareness deficits can be selective; a client with multiple impairments may appear cognizant of some deficits while unaware of others (Toglia & Maeir, 2018). For example, a person with a brain injury may be aware of left hemiparesis (physical deficit) but unaware of memory difficulties (cognitive deficit). The term anosognosia is mostly used when describing unawareness of physical deficits, such as hemiplegia or hemianopsia (Gillen, 2009). The term impaired self-awareness encompasses awareness of both physical and/or cognitive deficits. In a similar way, individuals who experience anosognosia post-ABI tend to identify visible or objective disorders (phasic disorders) better than more abstract disorders (e.g., attention disorders) (Arnould et al., 2016; Sherer, Boake et al., 1998).

The construct of self-awareness has traditionally been divided into three interdependent levels: intellectual, emergent, and anticipatory awareness (Barco et al., 1991; Chesnel et al., 2018; Crosson et al., 1989; Toglia & Maeir, 2018). Intellectual awareness is defined as the lowest awareness level and is

described as a client's basic understanding of the existence of a deficit (Toglia & Maeir, 2018). At this level, clients are able to identify that one or more specific functional skills are impaired as compared to pre-injury function (Chesnel et al., 2018). At a level of emergent awareness, a client is able to recognize and self-monitor difficulties as they occur during occupational performance in daily life. Anticipatory awareness is the most advanced level of awareness and involves a client's ability to anticipate that some difficulties will be experienced in future daily life situations as a result of deficits secondary to disability (Chesnel et al., 2018; Robertson & Schmitter-Edgecombe, 2015).

When evaluating current occupational therapy practice, it is evident that the importance of measuring self-awareness has not been overlooked; however, the methods used, and the targeted level of self-awareness being assessed, need to be expanded and refined. The majority of existing self-awareness assessments evaluate perceived self-awareness in the context of interviews rather than functional daily life activities (i.e., Awareness Interview, Awareness Questionnaire, Insight Interview, Patient Competency Rating Scale, Patient Competency Rating Scale for Neuro-Rehabilitation, Patient Distress Scale, Self-Awareness of Deficits Interview, and Self-Regulation Skills Interview) (Mahoney et al., 2019). Only one instrument, the Assessment of Awareness of Disability (Tham et al., 1999), involves assessment of client self-awareness through both direct observation of functional activity performance and interview. To gain an accurate understanding of client self-awareness of the existence of deficits, how deficits impact functional performance, and the potential consequences of deficits in near future events, occupational therapists must use performance-based assessments.

Another area of concern with existing self-awareness assessments is the type of awareness being evaluated (i.e., intellectual, emergent, and/or anticipatory). Nine self-awareness assessments are presented in Table 1. Through thorough review, it was found that the Self-Regulation Skills Interview assesses both emergent and anticipatory awareness and can provide information regarding a client's abilities to identify if, when, and how potential problems may occur as a result of impaired self-awareness. The Assessment of Awareness of Deficits addresses the measurement of both intellectual and emergent awareness but not anticipatory awareness. All other assessments measure intellectual awareness alone and can yield only basic data about the client's abilities to recognize a deficit's presence.

Extensive research has revealed a paucity of available assessment tools pertaining to the assessment of anticipatory awareness. Scholars and experts have advocated that to improve client outcomes, occupational therapists must consistently screen for and, when appropriate, evaluate and treat functional cognition impairments and consider functional cognition in the discharge planning process (Giles et al., 2020).

Gaps in Assessment of Anticipatory Awareness

AOTA and the American Occupational Therapy Foundation (AOTF) have listed assessment and measurement as one of its priority research areas (2011). The AOTA/AOTF Research Agenda advocates for the development of screening and outcome measurements that are sufficiently responsive to measuring change in daily life activities, including activity and participation. Through clinical practice, authors recognized a great need for an assessment tool that measures anticipatory awareness. Clinicians have referenced multiple occasions in which a client will excel in all basic areas of daily living but still have difficulty in more complex real-world situations because of his or her lack of ability to anticipate deficits. This impairment in higher level awareness is often overlooked or not recognizable to other members of the interdisciplinary team. It is the occupational therapist's duty to assess and provide treatment for

functional cognition, which includes anticipatory awareness (AOTA, 2019). To address this need, the authors created the Occupational Therapy Anticipatory Awareness test (OTAAT) (see Table 2).

The OTAAT is a performance-based assessment that allows occupational therapists to gain further understanding into the level of self-awareness that individuals may be experiencing. The assessment has been developed for individuals 18 years of age and older (both male and female) who are presenting with cognitive deficits that appear to be impacting their safety. The OTAAT can be used with individuals in a variety of settings, including acute rehabilitation, subacute rehabilitation, outpatient, home health practice, and community-based settings at varying levels of functional capacity (e.g., mobility, upper extremity use, cognitive capacity). The OTAAT has been developed for registered occupational therapists to use throughout their daily practice, to assess and address an individual's level of self-awareness, underlying cognitive deficits, safety awareness and judgment, use of compensatory strategies, and need for assistance in the future. In addition to the score sheet, a concise practice manual has also been developed to help guide occupational therapists in the optimal use of the OTAAT.

This development of the OTAAT offers to address the gap in assessments and potentially change the way clinicians practice, create discharge plans, advocate for clients, and perform research. For evidence-based research and practice to occur, health care professionals must establish psychometric properties of assessments (Gutman, 2017). The purpose of this study was to establish the content validity of the OTAAT.

Method

Development of the OTAAT

To expand our knowledge of what assessment tools were already being used in practice and which tools had established reliability and validity, a scoping review of self-awareness instruments for ABI was performed (Mahoney et al., 2019). Nine assessment tools were identified as common tools to measure self-awareness: the Assessment of Awareness of Disability (Tham et al., 1999), the Awareness Interview (Anderson & Tranel, 1989), the Awareness Questionnaire (Sherer, Bergloff, Boake et al., 1998), the Insight Interview (Malouf et al., 2014), the Patient Competency Rating Scale (Prigatano et al., 1986), the Patient Competency Rating scale for Neuro-Rehabilitation (Borgaro & Prigatano, 2003), the Patient Distress scale (Borgaro et al., 2003), the Self-Awareness of Deficits Interview (Fleming et al., 1996), and the Self-Regulation Skills Interview (Ownsworth et al., 2000). Each assessment was reviewed in detail regarding its purpose, administration time, format, type of awareness assessed, psychometric properties, and advantages and disadvantages (for full details, see Mahoney et al., 2019). Table 1 summarizes available assessments and the gaps of each assessment in terms of assessing self-awareness.

Table 1

Available Self-Awareness Assessments

Assessment	Purpose	Type of self-awareness assessed		
		Intellectual	Emergent	Anticipatory
Assessment of Awareness of Disability (AAD) (Tham et al., 1999)	To measure client self-awareness and self-evaluation of disability in relation to actual performance in activities of daily living.	X	X	
Awareness Interview (Anderson & Tranel, 1989)	To evaluate clients' self-awareness of cognitive and motor deficits after brain damage secondary to cerebral infarction, dementia, or head trauma.	X		

Awareness Questionnaire (Sherer, Bergloff, Boake et al., 1998)	Developed to further previous findings regarding the characteristics of impaired self-awareness after brain injury and their relationship to functional outcomes.	X		
Insight Interview (Malouf et al., 2014)	Developed to assess self-awareness of deficits over time, from early recovery stages (< 3 months post injury), following traumatic brain injury.	X		
Patient Competency Rating Scale (PCRS) (Prigatano et al., 1986)	Designed to evaluate lack of self-awareness in four psychosocial domains of function: activities of daily living, cognitive and prevocational skills, emotional lability, and interpersonal skills.	X		
Patient Competency Rating Scale for Neuro-Rehabilitation (PCRS-NR) (Borgaro & Prigatano, 2003)	To assess clients' self-perceptions of functioning in the acute care setting, as well as clients' level of self-awareness compared to family and caregivers' ratings.	X		
Patient Distress Scale (PDS) (Borgaro et al., 2003)	To assess self-awareness of emotional disturbances in clients after brain injury and during recovery in acute inpatient neurorehabilitation.	X		
Self-Awareness of Deficits Interview (SADI) (Fleming et al., 1996)	Aims to provide both qualitative and quantitative data regarding self-awareness following traumatic brain injury.	X		
Self-Regulation Skills Interview (SRSI) (Ownsworth et al., 2000)	Intended for use during the post acute rehabilitation stage and is designed to measure a range of metacognitive skills essential for rehabilitation planning, monitoring an individual's progress, and evaluating the outcome of interventions.		X	X

While reviewing the available assessment tools, a gap in practice was recognized pertaining to an assessment tool that measures anticipatory awareness. In the past two decades, occupational therapists have developed several psychometrically sound assessments designed to identify deficits of self-awareness of clients with neurological disorders; however, the previously established assessment tools are limited in their ability to measure anticipatory awareness in terms of a performance-based task that has both cognitive and motor demands. Occupation-based and ecologically valid assessments of self-awareness are critically important because they assess self-awareness in daily life activities. This study aimed to determine the preliminary content validity of the OTAAT. This study will answer the following research questions:

1. Does the OTAAT contain test items that are critically essential in measuring anticipatory awareness as determined by a panel of experts?
2. What items need to be refined or removed to strengthen its content validity?

Overview of the OTAAT

The variables measured by the OTAAT are described in Table 2. The OTAAT is a performance-based, ipsative, nonstandardized assessment tool that specifically aims to assess anticipatory awareness as measured by strategy use in the context of occupational performance. There are two parts of the OTAAT: one part is more heavily focused on the cognitive aspect of a task (i.e., medication management), and the second part is more heavily focused on the physical, motor aspect of a task (i.e., storing items). The scoring scale of the OTAAT follows an ordinal level of measurement. The numbers used are allocated depending on the ordering of the property assessed, from more to less or first to last, so that they have real meaning beyond being used simply as labels (Fawcett, 2009). The OTAAT should take approximately 30–45 min to complete depending on the client's performance on the two tasks. This assessment requires at least 10–15 min of preparing materials prior to administration. The two parts (i.e., cognitive and motor) do not necessarily need to be completed in the same meeting or treatment session. It is strongly suggested that both tasks are completed to gain a full understanding of the client's anticipatory awareness and the functional implications through participation in occupations. It is also suggested that the full task (either 1 or 2) is performed in one session in order to maintain the characteristic of self-awareness during a task.

This assessment tool is a combination of self-rating, observation, and interview. The focus of the tool is not on whether the participant can actually accomplish the specified tasks. The goal is to allow the therapist to gain insight into the client's ability to anticipate his or her difficulties because of their current situation (i.e., physical or cognitive impairments). The information gained from this assessment will assist occupational therapists to advocate for their clients' needs based on their occupational performance. Occupational therapists will have a more holistic view of a client and can better inform the interdisciplinary rehabilitation teams, as well as a client's family, on a safe discharge plan.

Table 2

Overview of the Occupational Therapy Anticipatory Awareness Test (OTAAT)

Functional Tasks	Latent Variables	Observable Variables	How is this Variable Measured?
Storing common household items	Intellectual Awareness	Can the client gauge level of difficulty of task prior to performance?	Client responds using a 5-pt rating scale.
Medication management	Anticipatory Awareness	Can the client anticipate what aspects of task performance will be challenging?	Client answers open-ended prompt; therapist rates response using a 5-pt. rating scale.
		Emergent Awareness	Therapist rates performance using a 5-pt. rating scale.
	Can the client perform the task?	Client responds using a 5-pt. rating scale.	
		Can the client anticipate how well the task can be performed?	Client responds using a 5-pt. rating scale.
		Can the client articulate level of task difficulty after performing the task?	Client responds using a 5-pt. rating scale.

Study Design

Once the OTAAT was created, the next step in the process of ensuring, and if necessary improving on, its use was to assess its content validity. To assess content validity, the researchers used quantitative methods following Classical Test Theory (CTT). CTT is the most widely used form of analysis for standardizing assessments (Petrillo et al., 2015) because it allows for the evaluation of more limited population samples. Content validity is defined as “the comprehensiveness of an assessment and its inclusion of items that fully represent the attribute being measured” (Law, 1997, p. 431). The attribute being measured by the OTAAT is anticipatory awareness. The literature describes several methods to assess the content validity of an assessment tool. First, a more structured empirical method can be used to describe item difficulty and discrimination, as precursors to determining construct validity. The other method is the use of judgments by content experts (Thorn & Deitz, 1989). Content validity assessment via content experts is often a preliminary step in construct validation. Seminal articles on this process require a minimum of two content experts to examine each item, match the test items to their respective latent variables, and assess the relevance of such items based on the variable being assessed (Waltz et al., 1984). Using Lynn’s guidelines (1986), a minimum of five reviewers will minimize chance agreement and the total number should not exceed 10. There are no widely established parameters on standard number of raters or requirement for geographical representativeness of raters when doing content validation.

The institutional review board at Columbia University Irving Medical Center approved this study. All of the participants provided written consent to participate. No confidential records were used in this study. All of the participants were consenting occupational therapists who agreed to participate as an expert on a panel established to determine the content validity of the OTAAT.

Participants

An expert panel of five occupational therapists were purposefully recruited, as a gold standard, to establish content validity (Gilbert & Prion, 2016). The number of experts recruited was a convenience sample and was determined to be sufficient for a pilot study, and preliminary information regarding content validity was the goal. The recruited occupational therapists were considered content experts in the field of neurological rehabilitation using the following criteria: (a) had been working for at least 5 years with individuals with ABI; (b) had at least one professional publication, continuing education in-service, or presentation pertaining to a topic related to ABI; and (c) had at least two cognitive assessments in their “typical” practice. At the time of this study, the five recruited occupational therapy experts worked in either inpatient or outpatient neurorehabilitation. The mean years in occupational therapy practice was 14 years (range = 8–20 years). The mean number of publications and/or presentations pertaining to the ABI population was 16 (range = 3–30). The participants reported that they frequently use the Montreal Cognitive Assessment, the Mini Mental Status Exam, the Loewenstein Occupational Therapy Cognitive Assessment, the Cognitive Assessment of Minnesota, the Executive Functional Performance Test, the Kettle Test, the Contextual Memory Test, and the Coma Recovery Scale in practice. The content experts’ demographics are provided in Table 3.

Table 3
Demographics of Content Experts

Expert	Primary practice area	Years of experience	Number of related publications
1	Outpatient neurorehabilitation	13	25
2	Inpatient acute neurorehabilitation	18	30
3	Inpatient acute neurorehabilitation	10	10
4	Outpatient neurorehabilitation	20	3
5	Inpatient acute neurorehabilitation	8	10

Data Collection

The participating occupational therapists received the OTAAT scoring sheet, administration guide, and materials electronically. Using an online form, the content experts rated each item on the OTAAT as either (a) essential, (b) useful but not essential, or (c) not necessary following guidelines by Lawshe (1975). Opportunities were provided for comments on how to improve the test item, as needed. The therapists were provided with 6 months to complete this portion of the study. All results were sent back to the researchers electronically.

Data Analysis

To analyze all data collected, a spreadsheet was created to organize the items on the OTAAT with the score they received from each expert. Content Validity Ratio (CVR) was calculated manually for each item using the formula:

$$CVR = (ne - N/2) / (N/2)$$

Legend: ne = the number of experts identifying the item as essential

N = the total number of experts (N / 2 = half the total number of experts).

The formula, based on Lawshe (1975), was entered manually on the spreadsheet, which then generated the CVR. To ensure the accuracy of calculations, two of the researchers reviewed the data collected and the calculations. A minimum value of the CVR is based on the number of experts (i.e., the more experts the lower the CVR value) (Lawshe, 1975). For this study's purposes five experts requires a minimum CVR value of 0.99. The online review form also provided an optional opportunity for the experts to provide feedback and comments on how the test item may be further refined. The feedback was collected and reviewed by the first and third researchers, collectively, and was used as discussion points for item revision. The researchers triangulated the CVR results and qualitative findings with supporting literature to determine whether the revision or removal of a test item is supported by best evidence available.

Results

Table 4 provides an overview of the CVR of the OTAAT. Eight out of the 14 items were rated with a CVR = 0.99 (1.00) indicating that 5 out of 5 of the experts on the panel believed the item to be essential. The two items specifically addressing emergent awareness received a CVR of 0.6 (for the storing items portion of the assessment) and 0.2 (for the medication management portion of the assessment). Following data analysis, 10 out of the 14 items on the original version of the assessment tool were preserved. Following discussion of the results, the analysis of qualitative feedback provided from the

experts, and a review of literature, it was decided that the two emergent awareness items would be kept on the assessment tool at this time because more than half of the experts rated these items as essential, and the authors wanted to stay consistent with the original pyramid model for self-awareness (Crosson et al., 1989). The four items that were removed from the assessment tool following data analysis were the two (optional) items related to strategy implementation and the two (optional) items related to awareness of strategy use. The CVRs received by these items indicated that they were not essential to measure anticipatory awareness. For the authors to address strategy use, the updated version of the OTAAT will include a space for therapists to comment on a client's strategy use and awareness of strategy use, if they feel it is appropriate.

Table 4
Cumulative Therapist Ratings for Content Validity Study

	Essential	Useful but not essential	Not necessary to rate	Content Validity Ratio (CVR)
Storing items				
Step 2 (Intellectual awareness)	5/5			1.00
Step 3 (Anticipatory awareness)	5/5			1.00
Step 4 (Strategy implementation)	2/5	2/5	1/5	-0.2
Step 5 (Actual task performance)	5/5			1.00
Step 6 (Emergent awareness)	4/5	1/5		0.6
Step 7 (Awareness of performance following the task)	5/5			1.00
Step 8 (Awareness of strategy use)	2/5	3/5		-0.2
Medication management				
Step 9 (Intellectual Awareness)	4/4 (one no response)			1.00
Step 10 (Anticipatory Awareness)	5/5			1.00
Step 11 (Strategy Implementation)	1/4 (one no response)	2/4	1/4	-0.5
Step 12 (Actual Task Performance)	5/5			1.00
Step 13 (Emergent Awareness)	3/5	2/5		0.2
Step 14 (Awareness of performance following the task)	5/5			1.00
Step 15 (Awareness of strategy use)	3/4 (one no response)	1/4		0.5

Discussion

The aim of this study was to determine preliminary content validity of an anticipatory awareness assessment tool for the ABI population. This study demonstrated that, with the mentioned revisions, the OTAAT demonstrates adequate content validity.

The two items addressing emergent awareness (Steps 6 and 13) were rated as essential by two of the experts, useful but not essential by two of the experts, and not necessary to rate by one of the experts. Self-awareness is hierarchical in nature; to have anticipatory awareness an individual must also have intellectual and emergent awareness (Toglia & Maeir, 2018). When reviewing the qualitative feedback from the experts, the researchers notes that their explanation of why they deemed the emergent awareness items as not essential may have reflected their misunderstanding of the hierarchical nature of the self-awareness pyramid. This may also provide feedback that the user's manual of the OTAAT needs to clearly define its latent constructs and clearly explain the rationale for the tasks in the assessment.

The four items pertaining to strategy implementation and awareness of strategy use (Steps 4, 8, 11, and 15) were deemed not essential by the content experts. The researchers believe that these items were deemed as not essential because they begin to measure an additional construct of strategy selection and implementation that is outside of the scope of anticipatory awareness. Strategy implementation and awareness of strategy use do coincide with the construct of self-awareness; however, these items could also be an assessment of a different latent construct independent for anticipatory awareness. Because the researchers believe that awareness and implementation of strategies do help a therapist have an overall understanding of an individual's self-awareness, the items were revised on the updated version of the OTAAT. This item was revised as a qualitative prompt at the end of the assessment tool that will provide therapists opportunity to expand their thinking process pertaining to the client's overall performance.

Throughout this research process, the researchers have identified a common challenge among occupational therapists of defining and/or operationalizing the construct of anticipatory awareness. This was evident in the current research study as there was confusion by some of the content experts. Anticipatory awareness is an abstract concept that can be difficult for individuals to grasp outside the context of a functional task. Assessment tools that use an interview method only are not sufficient to observe and evaluate anticipatory awareness. It was challenging to create a performance-based evaluation of anticipatory awareness that was versatile enough to be used in a variety of settings, while still maintaining its focus on the one construct of anticipatory awareness.

To the authors' knowledge to date, numerous assessment tools have been generated to measure an individual's level of self-awareness; however, there are no assessment tools to specifically measure anticipatory awareness. The OTAAT is a newly-developed, performance-based assessment tool that strives to address this gap in practice. The OTAAT appears to have essential test items that can potentially allow therapists to collect valuable, critical information pertaining to client function in natural contexts compared to typical pencil and paper neuropsychology test batteries.

Limitations and Acknowledgement of Bias

The limitations of this study relate to (a) the number of experts used, (b) the limitation of the experts to occupational therapists working in the New York state area, and (c) the involvement of only two reviewers in the analysis process, all of which could lead to increased potential for bias. Future research studies should involve a greater number of therapists from more diverse contexts.

Future Research

Future research will focus on establishing additional psychometric properties to ensure the reliability and validity of the OTAAT. A priority is to establish the ecological validity of the assessment to focus on how the assessment tool relates to real-life challenges and situations that an individual may encounter. Construct validation and clinical utility testing will also be a focus of future research. CTT can be used to measure clinical use and ecological validity. To measure construct validity, it is proposed that unidimensionality testing be conducted using Rasch analysis. Unidimensionality indicates that the items on the scale belong to a single construct with items ranging from those that are easy to perform to those that are hard to perform, thus supporting the scale's internal validity (Bond & Fox, 2015). Rasch analysis using sample-invariant item parameter estimation has additive properties that are reported as areas of weakness of CTT methods (Hambleton & Jones, 1993).

Aside from the research specifically focused on the OTAAT, future research on the general concept of anticipatory awareness, as well as the even more broad concept of self-awareness assessment and intervention approaches, is greatly needed and should be prioritized for the occupational therapy profession.

References

- American Occupational Therapy Association. (2017). *Role of occupational therapy in assessing functional cognition*. <https://www.aota.org/Advocacy-Policy/Federal-Reg-Affairs/Medicare/Guidance/role-OT-assessing-functional-cognition.aspx>
- American Occupational Therapy Association. (2019). Cognition, cognitive rehabilitation, and occupational performance. *American Journal of Occupational Therapy*, 73(Suppl. 2), 7312410010. <https://doi.org/10.5014/ajot.2019.73S201>
- American Occupational Therapy Association and American Occupational Therapy Foundation. (2011). Occupational therapy research agenda. *American Journal of Occupational Therapy*, 65(Suppl. 6), S4–S7. <https://doi.org/10.5014/ajot.2011.65s4>
- Anderson, S. W., & Tranel, D. (1989). Awareness of disease states following cerebral infarction, dementia, and head trauma: Standardized assessment. *Clinical Neuropsychologist*, 3(4), 327–339. <https://doi.org/10.1080/13854048908401482>
- Arnould, A., Dromer, E., Rochat, L., Van der Linden, M., & Azouvi, P. (2016). Neurobehavioral and self-awareness changes after traumatic brain injury: Towards new multidimensional approaches. *Annals of Physical and Rehabilitation Medicine*, 59(1), 18–22. <https://doi.org/10.1016/j.rehab.2015.09.002>
- Barco, P. P., Crosson, B., Bolesta, M. M., Werts, D., & Stout, R. (1991). Training awareness and compensation in postacute head injury rehabilitation. In J. S. Kreutzer & P. H. Wehman (Eds.), *Cognitive rehabilitation for persons with traumatic brain injury: A functional approach* (pp. 129–146). Paul H. Brookes.
- Bivona, U., Riccio, A., Ciurli, P., Carlesimo, G. A., Donne, V. D., Pizzona, E., Caltagirone, C., Formisano, R., & Costa, A. (2014). Low self-awareness of individuals with severe traumatic brain injury can lead to reduced ability to take another person's perspective. *Journal of Head Trauma Rehabilitation*, 29(2), 157–171. <https://doi.org/10.1097/htr.0b013e3182864f0b>
- Bond, T., & Fox, C. (2015). *Applying the Rasch model: Fundamental measurement in the human sciences* (3rd ed.). Routledge.
- Borgaro, S. R., & Prigatano, G. P. (2003). Modification of the patient competency rating scale for use on an acute neurorehabilitation unit: The PCRS-NR. *Brain Injury*, 17(10), 847–853. <https://doi.org/10.1080/0269905031000089350>
- Borgaro, S. R., Prigatano, G. P., Alcott, S., Kwasnica, C., & Cutter, N. (2003). The patient distress scale questionnaire: Factor structure and internal consistency. *Brain Injury*, 17(7), 545–551. <https://doi.org/10.1080/0269905031000070206>
- Brain Injury Association of America. (2019). *Brain injury facts and statistics*. <https://www.biausa.org/public-affairs/media/brain-injury-fact-sheet>
- Centers for Disease Control and Prevention. (2017). *Healthy aging*. <https://www.cdc.gov/aging/healthybrain/>
- Chesnel, C., Jourdan, C., Bayen, E., Ghout, I., Darnoux, E., Azerad, S., Charanton, J., Aegerter, P., Pradat-Diehl, P., Ruet, A., Azouvi, P., & Vallat-Azouvi, C. (2018). Self-awareness four years after severe traumatic brain injury: Discordance between the patient's and relative's complaints. Results from the Paris-TBI study. *Clinical Rehabilitation*, 32(5), 692–704. <https://doi.org/10.1177/0269215517734294>
- Crosson, B. C., Barco, P. P., Velozo, C. A., Bolesta, M. M., Werts, D., & Brobeck, T. (1989). Awareness and compensation in post-acute head injury rehabilitation. *Journal of Head Trauma Rehabilitation*, 4, 46–54. <http://dx.doi.org/10.1097/00001199-198909000-00008>
- Fawcett, A. (2009). *Principles of assessment and outcome measurement for occupational therapists and physiotherapists: Theory, skills, and application*. John Wiley & Sons, Ltd.

- Fleming, J. M., Strong, J., & Ashton, R. (1996). Self-awareness of deficits in adults with traumatic brain injury: How to best measure? *Brain Injury*, *10*(1), 1–15. <https://doi.org/10.1080/026990596124674>
- Geytenbeek, M., Fleming, J., Doing, E., & Ownsworth, T. (2017). The occurrence of early impaired self-awareness after traumatic brain injury and its relationship with emotional distress and psychosocial functioning. *Brain Injury*, *31*(13–14), 1791–1798. <https://doi.org/10.1080/02699052.2017.1346297>
- Gilbert, G. E., & Prion, S. (2016). Making sense of methods and measurement: Lawshe's content validity index. *Clinical Simulation in Nursing*, *12*, 530–531. <http://dx.doi.org/10.1016/j.ecns.2016.08.002>
- Giles, G. M., Clark-Wilson, J., Baxter, D. M., Tasker, R., Holloway, M., & Seymour, S. (2019). The interrelationship of functional skills in individuals living in the community, following moderate to severe traumatic brain injury. *Brain Injury*, *33*(2), 129–136. <http://doi.org/10.1080/02699052.2018.1539762>
- Giles, G. M., Edwards, D. F., Baum, C., Furniss, J., Skidmore, E., Wolf, T., & Leland, N. E. (2020). Health policy perspectives—Making functional cognition a professional priority. *American Journal of Occupational Therapy*, *74*, 7401090010. <https://doi.org/10.5014/ajot.2020.741002>
- Gillen, G. (2009). Self-awareness and insight: Foundations for intervention. In G. Gillen (Ed.), *Cognitive and perceptual rehabilitation: Optimizing function*. Elsevier/Mosby.
- Gutman, S. (2017). *Journal article writing and publication: Your guide to mastering clinical health care reporting standards*. SLACK Incorporated.
- Hambleton, R. K., & Jones, R. W. (1993). Comparison of classical test theory and item response theory and their applications to test development. *Educational Measurement: Issues and Practice*, *12*, 38–47. <http://dx.doi.org/10.1111/j.1745-3992.1993.tb00543.x>
- Kersey, J., Juengst, S. B., & Skidmore, E. (2019). Effect of strategy training on self-awareness of deficits after stroke. *American Journal of Occupational Therapy*, *73*(3), 7303345020. <http://doi.org/10.5014/ajot.2019.031450>
- Law, M. (1997). Self care. In J. Van Deusen & D. Brunt (Eds.), *Assessment in occupational therapy and physical therapy*. WB Saunders.
- Lawshe, C. H. (1975). A quantitative approach to content validity. *Personnel Psychology*, *28*(4), 563–575. <https://doi.org/10.1111/j.1744-6570.1975.tb01393.x>
- Lynn, M. R. (1986). Determination and quantification of content validity. *Nursing Research*, *35*, 382–385. <https://doi.org/10.1097/00006199-198611000-00017>
- Mahoney, D., Gutman, S. A., & Gillen, G. (2019). A scoping review of self-awareness instruments for acquired brain injury. *The Open Journal of Occupational Therapy*, *7*(2). <https://doi.org/10.15453/2168-6408.1529>
- Malouf, T., Langdon, R., & Taylor, A. (2014). The insight interview: A new tool for measuring deficits in awareness after traumatic brain injury. *Brain Injury*, *28*(12), 1523–1541. <https://doi.org/10.3109/02699052.2014.922700>
- McPherson, K. M., Kayes, N., & Weatherall, M. (2009). A pilot study of self-regulation informed goal setting in people with traumatic brain injury. *Clinical Rehabilitation*, *23*(4), 296–309. <https://doi.org/10.1177/0269215509102980>
- Ownsworth, T. L., McFarland, K., & Young, R. M. (2000). Development and standardization of the self-regulation skills interview (SRSI): A new clinical assessment tool for acquired brain injury. *Clinical Neuropsychologist*, *14*(1), 76–92. [https://doi.org/10.1076/1385-4046\(200002\)14:1;1-8:ft076](https://doi.org/10.1076/1385-4046(200002)14:1;1-8:ft076)
- Parker, H. A., Rapport, L. J., Williams, M. W., Hanks, R. A., Lumley, M. A., & Bogg, T. (2018). Functional independence after acquired brain injury: Prospective effects of health self-efficacy and cognitive impairment. *Rehabilitation Psychology*, *63*(4), 595–603. <https://doi.org/10.1037/rep0000243>
- Petrillo, J., Cano, S. J., McLeod, L. D., & Coon, C. D. (2015). Using classical test theory, item response theory, and Rasch measurement theory to evaluate patient-reported outcome measures: a comparison of worked examples. *Value Health*, *18*(4), 25–34. <https://doi.org/10.1016/j.jval.2014.10.005>
- Prigatano, G. P., Fordyce, D., Zeiner, H., Roueche, J., Pepping, M., & Wood, B. (1986). *Neuropsychological rehabilitation after brain injury*. John Hopkins University Press.
- Robertson, K., & Schmitter-Edgecombe, M. (2015). Self-awareness and traumatic brain injury outcome. *Brain Injury*, *29*(7–8), 848–858. <https://doi.org/10.3109/02699052.2015.1005135>
- Sherer, M., Bergloff, P., Boake, C., High, W., Jr., & Levin, E. (1998). The awareness questionnaire: Factor structure and internal consistency. *Brain Injury*, *12*(1), 63–68. <https://doi.org/10.1080/026990598122863>
- Sherer, M., Bergloff, P., Levin, E., High, W., Oden, K., & Kathryn, E. (1998). Impaired awareness and employment outcome after traumatic brain injury. *The Journal of Head Trauma Rehabilitation*, *13*(5), 52–61. <https://doi.org/10.1097/00001199-199810000-00007>
- Sherer, M., Boake, C., Levin, E., Silver, B. V., Ringholz, G. M., & High, W. M. (1998). Characteristics of impaired awareness after traumatic brain injury. *Journal of International Neuropsychological Society*, *4*(4), 380–387. <https://doi.org/10.1017/s1355617798003804>
- Sherer, M., Hart, T., Nick, T. G., Whyte, J., Thompson, R. N., & Yablon, S. A. (2003). Early impaired self-awareness after traumatic brain injury. *Archives of Physical Medicine and Rehabilitation*, *84*(2), 168–176. <https://doi.org/10.1053/apmr.2003.50045>
- Skidmore, E. R., Swafford, M., Juengst, S. B., & Terhorst, L. (2018). Self-awareness and recovery of independence with strategy training. *American Journal of Occupational Therapy*, *72*, 7201345010. <https://doi.org/10.5014/ajot.2018.023556>

- Tham, K., Bernspang, B., & Fisher, A. G. (1999). Development of the assessment of awareness of disability. *Scandinavian Journal of Occupational Therapy*, 6(4), 184–190.
<https://doi.org/10.1080/110381299443663>
- Thorn, D., & Deitz, J. (1989). Examining content validity through use of content experts. *OTJR: Occupation, Participation, and Health*, 9(6), 334–346.
<https://doi.org/10.1177%2F153944928900900602>
- Toglia, J. P., & Maeir, A. (2018). Self-awareness and metacognition: Impact on occupational performance and outcome across the lifespan. In N. Katz & J. P. Toglia (Eds.), *Cognition, occupation, and participation across the lifespan: Neuroscience, neurorehabilitation, and models of intervention in occupational therapy* (4th ed., pp. 143–163). AOTA Press.
- United States Department of Health and Human Services, Centers for Disease Control and Prevention. (2011). Cognitive impairment: A call for action, now!
https://www.cdc.gov/aging/pdf/cognitive_impairment/cogimp_poilicy_final.pdf
- Waltz, C. F., Strickland, O. L., & Lenz, E. R. (1984). *Measurement in nursing research*. FA Davis.
- Zlotnik, S., & Toglia, J. (2018). Measuring adolescent self-awareness and accuracy using a performance-based assessment and parental report. *Frontiers in Public Health*, 6(15), 1–9.
<https://doi.org/10.3389/fpubh.2018.00015>