

REALITY COMPREHENSION CLOCK TEST: A VALIDITY AND RELIABILITY ANALYSIS FOR INDIVIDUALS DIAGNOSED WITH MENTAL RETARDATION

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Although incidence and prevalence estimates vary, many adults with Down's syndrome (DS) are known to develop dementia of the Alzheimer's type (Temple, Jozsvai, Konstantareas, & Hewitt, 2001). The presence of life-long intellectual deficits in individuals with DS, however, complicates the task of determining the earliest signs of dementia in this group (Devenny, Krinsky-McHale, Sersen, & Silverman, 2000). While methods for determining cognitive decline in this population have been reported (Gedye, 1995; Devenny et al, 2000), further research focused on the detection, staging, and tracking of Alzheimer's disease in persons with DS is clearly warranted. This need is further heightened by recent research suggesting that intervention aimed at improving level of cognitive functioning may also be useful in delaying the onset of dementia in persons with DS (Temple et al, 2001).

As a preliminary step in our collaborative efforts to develop effective assessment and intervention methods for this population, the present study was conducted to *explore* the validity and reliability of the Reality Comprehension Clock Test (RCCT) (Brock et al, 1999) as a measure of reality orientation and comprehension with mentally retarded adults, in general, and DS adults in particular. The RCCT was designed to assess reality orientation and comprehension by asking the individual to draw a clock while looking at a sample picture of a clock. In contrast to most other clock tests (Tuokko, Hadjistavaropoulos, Miller, & Beattie, 1992; Manos & Wu,

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1994; Bourke, Castleden, Stephen, & Dennis, 1995) and other methods of assessing reality comprehension (Folstein, Folstein, & McHugh, 1975), the RCCT has only one question and obtains the majority of its information from the client drawing a clock from the sample provided. Because of the presence of language deficits in persons with DS, there are clear advantages to a measure which minimizes linguistic demands.

Available evidence supports the content and criterion validity as well as the test-retest, interrater, and internal consistency reliability of the RCCT as a measure of cognitive impairment in elderly, non-retarded individuals with Alzheimer's Disease (Olsson, Kucharewski, & Eichner, 2001). The purpose of this study was to determine the validity and reliability of the RCCT with individuals diagnosed with mental retardation.

The subjects consisted of 117 adults diagnosed with mental retardation. Of the 117, sixty-five were diagnosed as mild, forty-three as moderate and nine as severe/profound. Seventy-two (62%) were males and 45 (38%) were females. Nineteen (16%) were in their twenties, 36 (31%) were in their thirties, 43 (37%) were in their forties and 19 (16%) were in their fifties.

Assessment tools used were the RCCT and the Wechsler Adult Intelligence Scale (WAIS). The WAIS (Wechsler, 1955) is used to measure the intelligence quotient (IQ) of adults. The full scale score from the WAIS was used as the score to compare with the RCCT. The RCCT is designed to obtain cognitive comprehension by drawing a picture of a clock. Subjects look at a picture of a clock and attempt to duplicate the picture. Points are awarded for (1) repeating instructions, (2) writing their correct name and date, (3) correctly duplicating the clock numbers, hands, circles, base and shadows, and (4) correct spacial placement.

Procedure and Analysis

Each of the subjects were given the RCCT twice between 5 and 7 days apart. The first RCCT score was compared to the WAIS IQ using a Pearson's r to determine criteria-related validity. In addition, ANOVA and Tukey N.D. were used to determine if there was a difference in RCCT scores based on mental retardation classification (mild, moderate, severe/profound). The first score from the RCCT was also compared to the second RCCT using a Pearson's r to determine test-retest reliability.

A Pearson's r - .73 indicated an acceptable relationship between the full-scale WAIS IQ and the full-scale RCCT score ($p < .001$) supporting that the RCCT is testing cognitive/mental skills and performance. Results support previous findings of the RCCT when compared to the Mini-Mental Status Examination (MMSE) using individuals with Alzheimer's Disease (Olsson, Kucharewski, & Eichner, 2001). Table 1 delineates RCCT scores compared to American Association for Mental Disorders (AAMD) classification for mental retardation. A probability of less than .001 indicates that the RCCT score can discriminate between individuals classified as mild, moderate and severe/profound. Results support previous findings of the RCCT's ability to



discriminate between scales for the Reisburg and academic grade levels pre-school thru second.

Table 1 RCCT Scores Compared to AAMD* Classification

AAMD Classification n	Mean	RCCT Range	RCCT Standard Deviation		
Mild	65	52	36-66	7.9	
Moderate	43	40	23-52	7.2	F = 124**
Severe/Profound	09	11	04-23	6.5	P < .001**
Total	117	44	04-66	13.3	

* American Association on Mental Disorders

** Calculated using ANOVA with Tukey HSD

A Pearson's $r = .96$ indicated a strong relationship ($p < .001$) between the first and second administration of the RCCT. Test-retest reliability results support previous results of the RCCT used with individuals diagnosed with Alzheimer's Disease (Brock et al, 1999).

Conclusion

This study has confirmed the validity and reliability of the RCCT with individuals diagnosed with mental retardation. Previous studies (Brock et al, 1999; Olsson et al., 2000; & Olsson, Kucharewski, & Eichner, 2001) have confirmed the validity and reliability of the RCCT with individuals diagnosed with Alzheimer's Disease as well as the interrater reliability of the RCCT. Given the favorable findings that this research yielded, it is possible that the RCCT could also prove to be a useful and appropriate tool with mentally retarded adults, particularly those with Down's syndrome.

Future research will study the usefulness of the RCCT with individuals diagnosed with cardiovascular accident (CVA), traumatic brain injury (TBI) and psychiatric disabilities. Further research may also examine the use of the RCCT with individuals who speak Spanish and whose English is not sufficient to be evaluated by the MMSE. Lastly, another area of interest will be to evaluate the ability of the RCCT Spacial Placement score in predicting risk of falls in nursing home residents.



Programmatic Implications for Recreational Therapists

In order to gain a better understanding of the individual with mental retardation, the recreational therapist (RT) might choose to utilize the RCCT to gather some baseline information in order to assess reality orientation and comprehension. This information could prove useful to the RT in planning interventions related to recreation and leisure to determine if the person with mental retardation has limited potential to grow and develop or has significant problems which would impede his/her ability to participate. The RCCT might also yield information that would indicate that a client having difficulty with number awareness, orientation/memory, or visual spatial functioning might not be able to participate in specific games or tasks related to leisure due to these deficits. This being the case, the RT could offer more appropriate activities to assist the client in achieving the greatest degree of success possible. Additionally, the RT could develop interventions that assist the client in improving functional skills necessary for participation in leisure pursuits (Austin, 1996).

Typically persons with mental retardation have difficulty performing specific tasks. Some people require instructional prompts with multiple repetitions and require additional practice to become more proficient. In this case, the RT could provide opportunities for the individual with mental retardation utilizing similar techniques used in the RCCT. It should also be noted that individuals with mental retardation will have varying cognitive abilities based on the level of impairment. (Carter, Van Andel, & Robb, 1995).

The RCCT might assist the RT in developing functional rehabilitative and/or maintenance goals. An example of a treatment/habilitation plan to increase number awareness might be: the client will increase from 1.6 to ___ the average amount of numbers out of 12 he can identify correctly. The blank space is the treatment or habilitation plan's projected outcome based on assessment. The RT might predict that the client will increase to an average of 6 for the 30 day treatment plan and insert that number in the blank space.

If the goal is to assist the client in improving number sequencing, the RT might develop a plan such as: the client will increase from 3.7 to ___ the amount of numbers out of 12 sequenced correctly. Based on assessment, the blank space is the treatment plan's projected outcome.

As previously noted the RCCT can be used as an initial screening tool or may be used as a follow up to determine if there has been a deterioration of skills. Even if the client is not participating in rehabilitation, the RT still needs to understand the functional limitations of the client in order to ensure success in leisure endeavors. It can also be used to improve functional abilities to assist the client in developing skills to participate in meaningful leisure experiences.



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