Rey complex figure test interpretation

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Over 68 years the RCFT has been used with great success for measuring visuospatial, memory, problems solving and motor skills. It compares well with other similar tests. It also has generally good reliability and validity, although this should be verified through further studies. Superior effects lower its test-retest reliability. Furthermore, other limitations include that different test versions have various administration criteria. Also, RCFT scoring is subjective and interpretation is complex due to the numerous skills the RCFT involves. Therefore, addressing these limitations, as well as biases in the test's normative data, is fundamental for improving the sensitivity, standardisation and utility of the RCFT.

Keywords: RCFT, Administration, Scoring, Interpretation, Reliability, Validity, Sensitivity, Recommendations

The RCFT assesses people's " non-verbal memory, visuospatial abilities, planning, organisational, problem-solving strategies, and perceptual, motor and visuoconstructional functions" (Caffarra et al., 2002; p. 443). This review presents the limitations of administrating, scoring and interpreting the RCFT and literature about its reliability, validity, sensitivity and responsiveness. The RCFT will be compared to similar tests and finally, recommendations will be given for improving it.

Administration

Different RCFT versions have been developed over time, each with specific administration and scoring criteria. Not all include Copy, Immediate Recall (IR), Delayed Recall (DR) and Recognition trials (Mitrushina et al., 2005) and different time periods are allowed to elapse between Copy and Recall

conditions. Even the Taylor test (an alternative to the RCFT) was altered whereby participants were shown the figure twice during Recall trials (Freifes & Avery, as cited in Lezak et al., 2004). This variability reduces the test's standardisation as results cannot be directly compared to the original RCFT (Groth-Marnat, 2000).

Scoring

The Rey figure has specific criteria for scoring its 18 lines. However, scoring is particularly subjective because drawings are often ambiguous (Groth-Marnat, 2000). Examiners may also have to decide whether drawing errors are attributed to the whole figure or to specific components (McConley et al., 2006).

Furthermore, scores differ depending on whether examiners score firmly or mercifully. This problem is remedied by scoring leniently during DR and IR trials, as otherwise inaccurate drawings may be overly attributed to memory problems (Lezak et al., 2004).

A qualitative scoring method was also devised. Although this is useful with distorted or incomplete drawings, limited normative data restricts its use (Groth-Marnat, 2000).

Interpretation

RCFT scores do not fall into normally distributed patterns due to ' superior effects'. Most people reproduce the figure well and achieve high Recognition scores. Consequently, good performance may be misinterpreted, since problems may be masked (Mitrushina et al., 2005). This prevented validation

of the 16th percentile as a reliable cut-off point for distinguishing between healthy and unhealthy people (Meyers & Meyers, 1995).

Poor performance does not necessarily signify visuospatial difficulties since the RCFT involves various skills, including, fine motor movements, attention, memory, organisation and visual perception. This reduces the test's specificity. Indeed, low scores may signify right, left or bilateral hemisphere damage (Groth-Marnat, 2000).

Reliability

The RCFT has high interrater reliability (Meyers & Meyers, 1995) despite its subjective scoring (Mitrushina et al., 2005). This may be because examiners abide to standardised administration, and score consistently leniently or harshly (Bennett-levy 1984 as cited in (Mitrushina et al., 2005).

Test-retest reliability is low since ceiling effects increase Copy and Recognition scores (Groth-Marnat, 2000). When tested after one month scores increased by 10% (Spreen & Strauss, 1998), possibly because participants recalled the figure and memorised its components (Meyers & Meyers, 1995). However, practice effects were not maintained as performance decreased after one year (Berry et al., as cited in Strauss et al., 2006).

Parallel forms reliability is moderate. The Taylor figure produces similar results to the RCFT Copy condition (Strauss & Spreen, 1990), yet higher scores during Recall trials. Unlike the RCFT, compensatory verbal rehearsal and memory aids are effective, making visuospatial problems less recognisable (Casey et al., as cited in Mitrushina et al., 2005).

Internal consistency reliability is not addressed in the RCFT manual. Yet, studies show that spit-half and alpha coefficients of the figure's 18 elements are consistent (Rapport et al., as cited in Groth-Marnat, 2000). They measure similar functions, signifying that parallel cognitive processes are activated (Groth-Marnat, 2000).

Validity

The RCFT has high construct validity. It identifies visuospatial, memory, speed of processing and visuoconstructional problems in healthy and unhealthy clients. IR and DR conditions also involve similar underlying cognitive functions. Contrary, lower correlations emerge between Recall and Recognition conditions (Meyers & Meyers, 1995).

Ecological validity is supported. Good performance reflects healthy people's functional memory (Ostrosky-Solis et al., as cited in Strauss et al., 2006) and high levels of daily functioning for psychiatric patients (Meyers & Lange, as cited in Strauss et al., 2006). Cognitive skills required on the RCFT also relate to stroke rehabilitation (Greve et al., 1999). Conversely, test precision does not reflect the spontaneity of impulsive clients during life (Strauss et al, 2006).

Sensitivity

RCFT is sensitive to visual-spatial impairments in healthy and clinical populations such as Alzheimer's disease patients (Zec, as cited in Groth-Marnat, 2000). Certain drawing systems, such as, perceiving the figure as a whole, are more popular than others (Akshoomoff et al., 2002), making

unusual methods and visuospatial problems easily identifiable (Mitrushina et al., 2005).

Furthermore, the test's complexity renders memory and verbal aids ineffective. This makes it sensitive to memory problems as it is taxing on memory (Strauss & Spreen, as cited in Strauss et al., 2006). Indeed, encoding, storage and recovery of memory could be evaluated during the test's four trials (Shin et al., 2006). These four trials are also sensitive to diverse impairments. People who developed amnesia due to different causes displayed different organisation, perceptions and memories of the figure (Kixmiller et al., as cited in Strauss et al 2006).

Responsiveness

The RCFT identifies right cerebral hemisphere problems, as this hemisphere is dominant for visuospatial abilities (Lezak, 1995). It distinguishes between left and right temporal lobe patients (Frank & Landeira-Fernandez, 2008), identifies people with Huntington's (Brouwers et al, as cited in Groth-Marnat, 2000) and Parkinson's disease (Ogen, et al., as cited in Groth-Marnat, 2000). It is also used as a screening measure for visuospatial problems in stroke patients (Mitrushina et al., 2005).

Conversely, the RCFT is ineffective with people with traumatic brain injury suggesting the need to sensitize it to this population (Zappala & Trexler, as cited in Groth-Marnat, 2000). Neither does it distinguish between right and left temporal lobe damage since these patients demonstrate similar memory declines during Recall conditions (McConley et al., 2006).

Relation with other tests

The RCFT relates to other memory and visual constructional tests, such as the Token Test, BVRT total correct and RAVLT Trial 5. It assesses similar abilities and functions as the Hooper Visual Organisation Test (HVOT), Line Orientation, and Raven's Standard Progressive Matrices. However, unlike the RCFT, the latter test does not require motor skills (Strauss et al., 2006).

Its effectiveness is superior over easier drawing tasks assessing similar functions, such as spatial construction skills in Block design of the WAIS-III, copying in the Bender-Gestalt test, and visual integration in the HVOT (Meyers & Meyers, 1995). Yet, RCFT scores are often more similar to Block Design than HVOT scores (Jassal & Hubley, 2003).

The RCFT does not measure verbal ability or memory and was expectedly not related to language tests. Indeed, no relationship was found between the RCFT and the Verbal Comprehension subtest on the WAIS-R (Sherman et al., 1995). Additionally, the RCFT had no relation to tests measuring selection and inhibition, signifying its selectivity for certain functions (Freeman et al., 2000).

Recommendations

RCFT reliability and validity can be improved by reviewing several flaws of the normative data. The sample's educational level was higher than that of the US population. This was based on the year 1993, making it also outdated (Meyers & Meyers, 1995). Reviewing this is important as education relates to inefficient copying techniques for patients with schizophrenia (Silverstein, et al., 1998). Additionally, information about the sample's gender, occupation

and ethnicity was omitted. However, research about whether these factors impact RCFT performance is needed (Mitrushina, et al., 2005).

Additional research is also important to clarify the test's test-retest, interrater, and internal consistency reliability (Mitrushina et al., 2005). The utility of the qualitative scoring system may also be increased with more information about its benefits and limitations. Normative data is also needed to ensure its standardisation (Groth-Marnat, 2000).

Furthermore, during testing participants' performance may be recorded by using the ' coloured pencil' or ' flowchart' system. Although Meyers and Meyers (1995) support the flowchart method, Ruffolo et al., (2001) found that these methods did not influence RCFT performance. Therefore, clarifying whether these two systems may be used interchangeably is important.

Devising simpler instructions in the manual may also facilitate scoring of abstract drawings and maintain standardisation. Establishing a reference point against which to mark the figure may be important with patients with visuospatial inattention who often displace drawings to one side (Lezak et al., 2004).

It would also be helpful to develop a scoring system which differentiates between errors made of the global figure or of its specific features. This may be particularly helpful for differentiating clients with right and left temporal epilepsy (McConley et al., 2006).

Given that the RCFT excludes people with physical disabilities, it may be appropriate to adapt the test for this population. Rather than drawing, clients

may reproduce the Rey figure by joining pieces of a jigsaw, by verbally stating where they want to put the pieces.

Conclusion

Different administration and scoring criteria of RCFT versions decreases its standardisation. Scoring is subjective and interpretation complicated as the test involves various skills. Nevertheless, it remains sensitive to visuospatial skills and memory, and relates well to similar tests. Its validity and reliability, apart from test-rest reliability, are generally supported, although research contradictions should be verified. Additionally, reviewing its normative data, standardising administration and simplifying scoring may improve the RCFT and increase its use.

Word Count: 1527 words