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Issues in computerized art therapy assessment

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ABSTRACT

The purpose of this investigation was to explore some of the main issues springing from the computerized assessment of art-based instruments (CAABI). The results indicated that there were opposing viewpoints, limitations, and solutions regarding the limitations. Many art therapists believe that this technology will supplant their own expertise in assessment (Hartwich & Brandecker, 1997; Kim, Ryu, Hwang, & Kim, 2006). However, due to the prototypical and delineating nature of these programs, CAABI are incapable of replacing human assessment, particularly clinical intakes (Lichtenberger, 2006). Despite opposition and limitation, the author concluded that there is a need for increased research in CAABI based on the advantages it offers, such as ease-of-use, early detection, less scoring time, reduction of subjective human error, improved statistical measures, and resiliency in the face of healthcare reform (Kim, Ryu, et al., 2006; Kim, Kim, Lee, Lee, & Yoo, 2006; Kim, Kim, & Kim, 2008; Kim, Betts, Kim, & Kang, 2009). Overall, a hybridization of both subjective and objective methodologies will likely further art therapy assessment, but collaboration between clinicians and program developers is necessary for this to occur (Kapitan, 2007; Kim, Kang, & Kim, 2008; Mattson, 2009).

Issues in computerized art therapy assessment

The future of psychological assessment hinges on computerized technology adapted to the ever-changing healthcare system (Groth-Marnat, 2000). This technology features complex decision rules, reduces scoring time, presents novel stimuli for testing, and aids in generating clinical hypotheses (Lichtenberger, 2006). It plays an increasingly important role in the assessment field (Butcher, Perry, & Atlis, 2000; Garb, 2000; Lichtenberger, 2006; Reynolds, 2000; Snyder, 2000). However, because it is also an emergent application, it requires further investigation (Grove, Zald, Lebow, Snitz, & Nelson, 2000; Snyder, 2000).

In response, several researchers, over the past decade, began using computers to score patient artwork (Kim, Ryu, Hwang, & Kim, 2006; Kim, Kim, Lee, Lee, & Yoo, 2006; Mattson, 2009). A zeitgeist (Rychlak, 1981, p. 76) formed in both Korea and the United States. Several researchers outlined new techniques and outcomes of this technologic application, though none of these researchers discussed the emergent issues that surround it.

I examined these issues surrounding this technology, known as computerized assessment of art-based instruments (CAABI), and developed a case for increasing research in its area. It is important to note that there are few studies on CAABI, but many studies exist on subjective methods of art assessment (Betts, 2005; Kim, 2008b). Research in objective CAABI requires strengthening because of the advantages it offers, which this *investigation* indicates first (Kapitan, 2007; Kim, 2008a; Mattson, 2009). Because CAABI is new and problematic, opposing viewpoints and limitations follow as do possible remedies for these limitations.

This technology shows promise because it holds key advantages over conventional scoring. They include: ease-of-use, early detection, less scoring time, reduction of subjective human error, improved statistical measures, and resiliency in the face of healthcare reform. The next section outlines these advantages.

Advantages

Ease of use

Those who have hand-scored clinical assessment instruments understand that such scoring can be a complicated endeavor. Incidentally, user-friendly assessment tools are popular among clinicians (Goh, Teslow, & Fuller, 1981). Some assessments may be more attractive than others, if they are easy to use. Clinicians currently have access to such instruments like the Beck Depression Inventory in its second form [BDI-II] (Beck, Steer, & Brown, 1996; Denollet, Martens, Smith, & Burg, in press), the House-Tree-Person [H-T-P] (Buck, 1970), and the Draw-A-Person test [D-A-P] (Naglieri, McNeish, & Bardos, 1991). In the near future, trained laypersons acquainted with the client may also have the chance to assess adequately the situation before referral to a mental health professional (Lichtenberger, 2006). Many Internet-based screen-

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ing instruments designed for both professionals and laypersons recently emerged for the detection of a host of mental health conditions (Emmelkamp, 2005).

There is, however, controversy regarding the validity, norms, and security of such Internet-based assessment (Butcher, Perry, & Hahn, 2004). Nonetheless, there are websites such as EasyDiagnosis.com that offer suggestions to consumers for early detection of health problems (Rees, 2003, p. 5). It operates under the same premise as the Expert System for Diagnosis in Art Psychotherapy (ESDAP), which is a type of CAABI. Both use *expert system* technology, though the ESDAP uses it to analyze artwork in place of narrative information required in EasyDiagnosis.com.

Concerning definition, an *expert system* is a computer program that contains a database of professional knowledge that non-professionals can draw upon (Giarratano & Riley, 2005). In addition, its artificial intelligence component can learn correct decisions by taking into account frequent choices and mistakes through successive uses (Price et al., 2000). In short, the expert system acts like a surrogate therapist and brings all a professional's knowledge to the user, and it is available at any time.

The ESDAP is a model that non-mental health professionals such as parents and teachers can use (Kim, Ryu, et al., 2006). Numerous fields, including medicine, already employ expert systems to determine diagnoses with high degrees of accuracy (Giarratano & Riley, 2005). Expert systems could potentially open the channels for home or school assessment whereby early detection of psychological disorders will require fewer steps. With the emergence of one-touch technology, such as cellular phones and other consumer-driven portable devices that are easy to use, this technology may hold a distinct advantage in the consumer healthcare market (Fogg, 2003, p. 188). In addition, in an age where society is making more of its own decisions on healthcare (Jensen & Mooney, 1990, p. 136), programs based on the ESDAP can accommodate them, though much of this technology still requires revision to flourish.

The ESDAP underwent some degree of revision, making it an even more useful asset to non-professional users (Kim, Kim, et al., 2006). Using an improved decision making process, the authors connected drawing characteristics with diagnoses, determined relationships between drawing factors, and included the individual's environmental factors. All of these factors could otherwise confound subjective art assessment.

From the ESDAP, programmers developed a computer system that could also rate mandalas, which are important sources of psychological information (Jung, 1973; Kim, Kim, & Kim, 2008). They used knowledge base technology and client color preference to build the system. It is capable of analyzing, interpreting, and detecting changes in structured mandala colorings. Tracking changes in art therapy progress is essential for best practice care (Betts, 2006). The user interface system fosters easy communication between user and computer, allows input of personal color preference through questionnaires, and displays results in the form of easy-to-read tables and graphics. The results may be stored in a computer database, which is an increasing trend in current healthcare. The software designers built the system for real life applications and eventual release to the public (Ludwick & Doucette, 2009).

A recent study demonstrated that components of this technology are not exclusive, and most any interested professional may use them (Mattson, 2009). The analysis of artwork does not require the use of a proprietary system. Public domain image analysis software (PDIAS) is downloadable to interested colleagues free of charge, making it available to a wide audience interested in its applications.

Early detection

According to the American Psychological Association (APA), one of the main priorities of recent healthcare reform includes early screening of individuals at risk for mental health conditions (APA, 2009). Early detection of mental illness is important for many populations and conditions (Boonstra, Wunderink, Sytema, & Wiersma, 2008). It is crucial for effective medical care under the auspices of a reformed health care system. With computerized assessment, teachers, nurses, or classroom assistants, who are most likely to see mental health problems arise at early stages, may now have the tools to actuate early detection (Kim, Ryu, et al., 2006). Non-professional users surrounding the client can determine the need for professional help based on initial computerized assessment results. These tools offer a measure of direction to steer the course of subsequent professional treatment by an appropriate mental health practitioner after initial assessment by these non-professionals.

Less scoring time

Computers offer the clinician a means to score assessments quickly (Allard, Butler, Faust, & Shea, 1995). Historically, hand-scored versions of the Rorschach, H-T-P, Thematic Apperception Test (TAT), and the D-A-P tests have been among the top 10 instruments used by clinicians since 1935 (Lubin, Larsen, & Matarazzo, 1984; Watkins, Campbell, Nieberding, & Hallmark, 1995). Only a small portion of the instruments was objective in nature, and many clinicians used projective techniques. Administering, scoring, and interpreting the Rorshach may take more than 2–3 h; for many clinicians it takes longer (Campbell-Olzszewski, personal communication, December 23, 2009). The long scoring time does not necessarily lead to increased validity, even when combined with other sources (Lilienfeld, Wood, & Garb, 2000). The time required to administer, score, and interpret the results of the TAT was 1.5 h (Ball, Archer, & Imhoff, 1994). The mean time for administration and scoring of the D-A-P varies according to which method of scoring the assessor chooses; however, 10 min is a typical scoring time for experienced clinicians (Kamphaus & Pleiss, 1999).

In a survey of 1002 members of the National Association of Neuropsychology (NAN) and 1500 clinical psychologists from the APA, more than 80% of clinical psychologists reported spending at least 5 h per week on assessment, and more than 80% of neuropsychologists spent 5 h or more per week conducting assessments (Camara, Nathan, & Puente, 2000). There are many implications for third-party payers concerned with such large amounts of time spent on assessment. Some of the greatest include the time and cost of services. Groth-Marnat (2009) stressed the importance of brief, symptom-focused assessment through including a chapter on the topic in the *Handbook for Psychological Assessment*. The rationale for this inclusion was because the increased requirement of symptom monitoring in a cost and time-conscious modern medical system. Economic barriers instituted by managed care often limit assessment to 2 h or fewer a week, and its billing normally falls under the code of individual care (Camara et al., 2000). This, in turn, cuts into valuable treatment time for the client. To date, computerized assessment is billable under certain health insurance codes, so its application is one possible remedy to this problem (Craven, personal communication, April 27, 2009).

One of the most significant advantages of computer scoring is the amount of time it saves on scoring (Butcher et al., 2004). Computer technology enables the user to manage many art variables and diagnostic information in a short time (Kim, Ryu, et al., 2006; Kim, Kim, et al., 2006). For placement and color-related formal elements in the D-A-P, the expert system required 20 s to scan each image and 45 s to analyze it. This is clearly an advantage over conventional hand scoring (Kim, Bae, & Lee, 2007; Kim, Kang, & Kim, 2008). For determining basic and main colors within crayon drawings from two other case drawings, the ESDAP required an average of 35 s for scanning and 42 s for analysis (Kim, 2008b). In the anal-