Chapter 3
Psychometry as an Adjunct to Psychiatry: An Indian Perspective

R. Nehra, S. Sarkar and S. Mahajan

1 Introduction

Like other branches of medicine, psychiatric practice is benefitted by diagnostic tests to supplement the clinical examination and case formulation (Rapaport 1950). Diagnostic assessment in psychiatry is the process of appraising the patient's condition, and psychometry can serve as a vital adjunct to the process of diagnostic assessment and management (Venkatesan 2010). Psychometry involves research related to the construction of instruments and procedures for measurement, and the development and refinement of theoretical approaches to mental measurements. It includes measurement of knowledge, skills, abilities, aptitudes, attitudes, intelligence, memory, creativity, adjustment and personality. The field uses measuring instruments like questionnaires, schedules, inventories, checklists and objective performance tests to make inferences.

More recently, psychometry is also being applied to measure beliefs, interests, motivation, academic achievement and health-related issues. A related concept clinimetrics refers to the application of psychometric tests to psychiatric practice. Psychodiagnostics is another related phrase that refers to the process of psychological evaluation (Verma and Nehra 1997) and has two components: psychological evaluation and diagnosis.

The process of psychodiagnostics includes both qualitative and quantitative assessment and has diagnostic, prognostic and therapeutic implications.

Psychometric testing is not synonymous with psychological assessment as the latter is a broader, more encompassing term. Psychometric testing refers to a process

R. Nehra, Additional Professor of Clinical Psychology; S. Sarkar, Senior Resident; S. Mahajan, Senior Resident

R. Nehra (✉) · S. Sarkar · S. Mahajan
Clinical Psychology, Postgraduate Institute of Medical Education and Research, Chandigarh, India
e-mail: ritu_nehra@rediffmail.com

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wherein a particular scale is administered to obtain a specific score, and a descriptive meaning is applied to the score on the basis of normative, nomothetic findings. In contrast, psychological assessment is concerned with the clinician taking the test scores in the context of the history, referral information and behavioural observations to understand the patient as a whole and to relevantly answer the referral question.

It is a difficult task to classify psychometric tests, because there are a great variety of such tests, each with differences in domains looked into, the assessment protocol, requirements of instruments, scoring procedures and interpretation of results. For the sake of simplicity, we have classified the psychometric tests into tests of intelligence, neuropsychological tests and tests of personality characteristics. The representative tests are depicted in Table 1.

Table 1 Some representative psychometric tests

Intelligence tests
Verbal Adult Intelligence Scale (VAIS)
Bhatia Battery of Performance Tests of Intelligence (BBPT)
Malin's Intelligence Scale for Indian Children (MISIC)
Vineland social maturity scale (VSMS)
Gessell's Drawing Test (GDT)
Stanford-Binet Test (SFBT)
Raven's Coloured Progressive Matrices (CPM)
Neuropsychological assessments
PGI memory scale
PGI battery of brain dysfunction
AIIMS comprehensive neuropsychological battery in Hindi
NIMHANS neuropsychological battery
Bender Visual-Motor Gestalt Test
Block Design Test
Trail Making Test
Digit Span Test
Digit Symbol Substitution Test
Wisconsin Card Sorting Test (WCST)
Personality tests
Minnesota Multiphasic Personality Inventory
Multiphasic Personality Questionnaire
Eyesenck Personality Questionnaire
PEN Inventory
Rorschach Inkblot Test
Thematic Apperception Test
PGI Sentence Completion Test
Draw a person test
Others
PGI-Health Questionnaire (N_2)
Temperament Measurement Schedule
Social Support Questionnaire
Coping Checklist

A lot of work has been done from India, at many centres on these tests. Institutions like the All India Institute of Medical Sciences, New Delhi (AIIMS), National Institute of Mental Health and Neurosciences, Bangalore (NIMHANS), and Central Institute of Psychiatry, Ranchi (CIP), have all been quite involved in development and validation of psychometric tests. The tests that have been developed notably include the AIIMS Battery and the NIMHANS Battery for neuropsychological testing (Gupta et al. 2000; Rao et al. 2004). However, the Division of Psychology of Department of Psychiatry at the Postgraduate Institute of Medical Education and Research, Chandigarh (PGIMER), has been the forerunner in the field of psychometry. A number of tests have been developed or adapted for Indian settings, both for clinical use and research. Keeping in mind the cultural variations and the different populace, norms have been created for local use. Clinical use of psychometrics has been expanded and consolidated as a consequence of research into the psychological testing. Psychologists are being increasingly involved in psychometric testing for clinical diagnosis and making management decisions. This chapter takes a look at the different psychometric tests available in India, especially those from the Department of Psychiatry in PGIMER, Chandigarh. This chapter also provides an overview of the challenges faced by the psychometric testing worldwide and answers the queries raised about relevance and importance of these tests.

2 The Need for Psychometric Testing

Psychological and psychometric tests are required for a variety of reasons. All mental health professionals rely on interviews and observations as the key sources of information to make a diagnosis. Although generic interviews are efficient and effective ways to obtain data, they have their own limitations. The patients may give poor histories and/or present biased information. For example, neurologically impaired patients frequently lack awareness of their deficits or personality changes, which can be brought into light by psychometric testing. Also, response styles, such as defensiveness or exaggeration, affect the way patients are viewed by clinical interviewers or observers. Taking assistance of psychometric tests would help patients being less misunderstood, mischaracterised or misdiagnosed, and hence less than optimally treated (Meyer et al. 2001).

Psychological testing is often done to confirm, refute or modify the impressions about the diagnosis and assists in the overall management of the patient. Testing aids in describing current functioning of the patients, including cognitive abilities, severity of disturbance and capacity for independent living. Psychometric tests can also monitor treatment over time to evaluate the success of interventions and identify new issues, which may require attention as original concerns are resolved. These tests can help in managing risks and in providing skilled and empathic feedback, which may work as a therapeutic intervention (Meyer et al. 2001).

3 Intelligence Tests

Intelligence tests are the most widely used psychometric tests in the clinical practice. A variety of intelligence tests have been used in a variety of clinical situations. Since there are different theoretical conceptualisations of what intelligence is, and each measure of intelligence looks at non-overlapping areas of functioning, 'intelligence' is at times subsumed as 'what the intelligence test measures'. Some of the intelligence tests that have been validated in India are the Verbal Adult Intelligence Scale (VAIS) (Pershad and Verma 1988), the Malin's Intelligence Scale For Children (MISIC) (Malin 1969), the Bhatia Battery of Performance Tests (BBPT) (Murthy 1966), the Wechsler Adult Performance Intelligence Scale (WAPIS) (Ramalingaswamy 1974) and others like the Draw a Person test for Indian children (Pathak 1966).

The VAIS (Pershad and Verma 1988) has been developed as an Indian adaptation of the Wechsler Adult Intelligence Scale, and it has only four subscales, i.e. Information, Digit span, Arithmetic and Comprehension. The test yields separate quotients for the four subscales, and a verbal quotient can be obtained from the mean of all subscales. Norms have been developed for age, gender and different educational achievement backgrounds. The Bhatia battery (BBPT) (Murthy 1966) comprises of 5 subtests which include the Koh's Block Design, the Alexander Pass Along test, the Pattern Drawing Test, the Immediate Memory for sounds and the Picture Construction Test. All these tests are time tested, and age correction is applied to the norms to obtain the performance quotient.

The MISIC (Malin 1969) is an Indian adaptation of Wechsler Intelligence Test for Children and comprises of 6 verbal and 5 performance scales. Norms are available for 6–15 years of age, and yield verbal and performance quotients, the mean of which is the intelligence quotient. The WAPIS (Ramalingaswamy 1974) comprises of 5 performance subtests, i.e. Picture Completion, Digit Symbol, Block Design, Picture Arrangement and Object Assembly. The reliability coefficients of these tests have been found to be good, and Indian norms are available. The Seguin Form Board Test (Verma et al. 1980) is a performance test, which can be used for children as young as 3½ years of age to 11 years of age. The performance can be converted into the mental age of the child.

Intelligence tests have many applications. Formal diagnosis of mental retardation is still based on the intelligence quotient (IQ). The overall IQ is a good measure of intellectual functioning, but the indices and subtest scores are perhaps of even more practical help. For example, high scores on the Verbal Comprehension Index indicate good verbal abilities and suggest that the person could benefit from formal education. In contrast, a slower processing speed suggests that the person would have difficulty in processing information quickly, and difficulties are likely to be encountered when training such individuals. IQ scores have implications in predicting future academic and occupational achievement. They also provide standardised procedures for assessing a person's performance in various areas, which can be compared with that of age-related peers. The IQ score can aid the clinician in assessing improvement in different functions with time, or with treatment.

The tests of intelligence have certain limitations too. The usefulness of these tests is quite limited in predicting non-test or non-academic skills like creativity, motivational level, problem-solving abilities, social acumen and success in dealing with people. IQ Scores are not measures of an innate and fixed ability, and the performance on these tests may change with time. Their use in classifying minority groups has been questioned, as these are based on norms based on majority population. These tests lay emphasis on understanding the end product of cognitive functioning and show a relative neglect in appreciating underlying cognitive processes. Irrespective of the above limitations, IQ tests are a robust measure of overall cognitive functioning.

4 Personality Assessment

Personality assessment attempts to understand the personality of an individual, i.e. the deeply ingrained and enduring behaviour patterns, manifesting themselves as inflexible responses to a broad range of personal and social situations. Assessment of personality can be carried out using tests, which can be objective and subjective in the way interpretations are made. In objective personality tests, patients are asked specific and standard questions in a structured format. Each patient is typically asked the same questions, and data obtained from a given patient is compared to that of a normative group. The degree to which the patient deviates from the norm is noted and is used for interpretation. Patients' responses are scored according to certain agreed-upon criteria.

The Minnesota Multiphasic Personality Inventory (MMPI; Hathaway and McKinley 1940) and the Multiphasic Personality Questionnaire (MPQ; Murthy 1970) are some of the well-known objective personality tests. Subjective tests often give ambiguous or open-ended stimuli to the individual, and responses are subjectively graded. These tests are based on the phenomenon of projection, i.e. the unconscious tendency of ascribing repressed mental processes to the external world. These tests provide ambiguous stimuli and require the subject to respond with his own constructions and responses in accordance with his basic personality traits. The test takers are unaware of the type of interpretation that will be made of their responses, and trying to feign the test is difficult as the test bypasses the conscious defences of the respondents. The Rorschach Inkblot Test and the Thematic Apperception Test (TAT) are commonly used subjective tests.

Various objective tests of personality assessment are also available. Of these, the MMPI is the most well-known objective psychometric test (Hathaway and McKinley 1940). The test had been designed originally as an aid to psychiatric diagnosis. The test has 10 clinical scales and 4 validity scales and is useful both in psychiatric assessment and the description of normal personality. The MPQ (Murthy 1970) had been derived from the MMPI and contains 100 true-or-false-type questions. It measures personality profile for anxiety, depression, mania, paranoia, schizophrenia, hysteria and psychopathic deviation and has indicators for lie scale and repressor sensitizer. The Personality Trait Inventory is based on the MMPI and has been adapted by in Indian settings (Sen 1966).

It has 90 dichotomous items. It measures 8 general personality traits activity, cyclothymia, superego, dominance, paranoid tendency, depressive tendency, emotional instability, introversion and social desirability. The Eysenck Personality Questionnaire (EPQ) measures major dimensions of personality, i.e. psychoticism, extraversion and neuroticism. The PEN Inventory (Menon and Verma 1988) is the Indian adaptation of the EPQ and is available in Hindi. The inventory has four dimensions of psychoticism, neuroticism, extraversion and lie scale.

Projective tests are those that are based upon the phenomenon of projection, i.e. ascribing one's own ideas and feelings onto another object. They can be of many types based on the response required. These tests use association with inkblots or words, e.g. the Rorschach Inkblot Test and the Sentence Completion Test. They can be based upon construction of stories or sequences, e.g. the TAT or the Childhood Apperception Test. It can be based upon completion of sentences or stories, e.g. Sentence Completion Test and Picture frustration study. They can alternatively be based upon arrangement or selection of pictures or verbal choices (e.g. the Szondi test), or on expression with drawings or play, e.g. the Draw a Person Test, or the House–Tree–Person Test.

The Rorschach Inkblot Test is the most widely utilised projective test and was developed by Hermann Rorschach in 1910. It consists of 10 inkblots (bilaterally symmetrical), each printed on a separate card. The patient is handed the cards one at a time and asked what each blot resembles.

The examiner writes down verbatim what the patient says during the above 'free association' or 'response proper' phase. After the patient has given responses to all ten cards, an enquiry phase of administration begins. Different scoring systems are available and include those of Beck, Klopfer, Pitrowski, Hertz, Rapaport and Exner. There are some pathognomonic signs of schizophrenia and organicity (Pitrowsky signs), and indices for schizophrenia, depression, hypomania, hysteria, anxiety and obsessions can be calculated. Applications of the Rorschach test include diagnosis, clarifying treatment targets, identifying potential obstacles to progress, and providing a basis for evaluating treatment change and outcome (Weiner 1994). Indian norms have been developed for this test (Asthana 1971), and a manual has been developed from the PGIMER (Pershad and Parekh 2010).

Certain controversies have also emerged with respect to the use of the Rorschach test. Doubts have been raised about accuracy and cultural generalisability of the norms. There is little research on differential validity across different racial or cultural groups. The adequacy of norms has been doubted as they are outdated and are based on small samples. The discrepancies in the norms tend to overpathologise normal individuals. The use of the test itself has been suggested to harm clients and be contrary to the ethical principles (Wood and Lilienfeld 1999). The reliability of this test has been questioned as only about half of the variables attain acceptable threshold of reliability criteria (Acklin et al. 2000). The field reliability as well as test–retest reliability remains questionable, and the validity has been low (Hunsley and Michael 1999; Wood et al. 1996).

The TAT is another test to assess reactions to ambiguous interpersonal stimuli. The term 'apperception' denotes that respondents actively interpret the TAT

stimuli in accordance with their personality traits and life experiences. The Indian Adaptation was developed by Chawdhury (1967). It is useful, primarily for hypothesising the subjects' personality dynamics, and for contributing to treatment planning. However, scoring systems are rarely used for TAT, and the test suffers from lack of stimulus standardisation. The test may not differentiate between a person's present attribute and fantasy. Other potential issues with the test are lack of norms, questionable test–retest reliability, untested field reliability and the effect of cultural bias in responses (Groth-Marnat 2009). The Children's Apperception Test and the Seniors' Apperception Test are also available for use in the Indian population (Chowdhury 1960a, b).

The PGI Sentence Completion Test (Verma et al. 1985) is an indirect, disguised and relatively understudied method for finding out subjective realities, i.e. attitudes, fears, aspirations, conflicts and frustrations. It is based on the Rotter's Incomplete Sentence Blanks. Three forms of the test are available, the G form (general form, 35 items), the M form (married form, 25 items) and the S form (student form, 20 items). The test can be used effectively with children to diagnose intellectual difficulties, attention deficit disorder and stress, depression, anxiety, thought disturbance, and defensiveness. However, the test does not have a standard scoring procedure, interpretation is subjective, responses can be fabricated, and there is a lack of reliability and validity studies.

5 Neuropsychological Tests

Neuropsychology is concerned with understanding the relationship between brain structure and human function. The aim of a neuropsychologist is to diagnose brain damage by quantifying the cognitive status and interpreting these changes in terms of the models of brain function (Hallett 1994). Two approaches have been used in the field of neuropsychology to diagnose brain damage: the unitary approach and multifactorial approach. The unitary approach is based on the assumption of functional unity of the brain as a whole and is assessed by tests of unitary functions, e.g. tests for memory, intelligence and perceptuo-motor functions. The Bender Visual-Motor Gestalt Test and the Trail Making Tests are among the commonly used tests for assessing unitary functions. The multifactorial approach is based on assumption that different parts of brain have adaptability, equipotentiality, and compensatory function and that they are governed by mass action rather than localisation. The multifactorial approach is assessed by comprehensive batteries of tests such as the Halsted-Reitan Neuropsychological Battery and the Luria Nebraska Neuropsychological Battery.

The PGI Bhatia Battery of Brain Dysfunction (Pershad and Verma 1990) is a comprehensive assessment tool for measuring a range of neuropsychological dysfunctions. It comprises of the PGI Memory Scale, the Revised Bhatia Short Scale of Intelligence, the Verbal Adult Intelligence Scale, the Nahor Benson test and the Bender Visual-Motor Gestalt Test.

The test is fully validated and well acclaimed. Norms are available for age group 20–50 years with respect to age, education and gender. The PGI Memory Scale (Pershad and Wig 1977) measures memory function comprehensively and has 10 subtests: remote memory, recent memory, mental balance, attention and concentration, delayed recall, immediate recall, retention for similar pairs, retention for dissimilar pairs, visual retention and recognition. The scale assesses various aspects of memory and can be used with ease in an illiterate population. The Bender Visual-Motor Gestalt test measures visuo-constructive ability and is a screening instrument for assessing brain damage. The test involves 3 broad stages, i.e. sensory reception, interpretation and organisation, and motor performance of the figure. In general, patients with lesions in their right hemispheres tend to approach visuo-constructive tasks in a fragmented, piecemeal fashion in which they often lose the overall gestalt of the design. In contrast, patients with left hemisphere lesion are likely to duplicate the overall gestalt of the design, but often omit important details of the drawing. Many studies have demonstrated the test's ability to discriminate brain damaged from non-brain-damaged populations with fair diagnostic accuracy (Piotrowski 1995). The Wisconsin Card Sorting Test has also been validated in the Indian setting (Kohli and Kaur 2006).

Batteries for neuropsychological evaluation have also been developed at the AIIMS and the NIMHANS (Gupta et al. 2000; Rao et al. 2004). The AIIMS battery has 160 items and 10 subscales. It is useful for both diagnosis and rehabilitation and can help in detection, and lateralisation and localisation of discrete brain lesions in patients.

The NIMHANS battery has 19 subtests, which measure different neuropsychological deficits. The test has been validated in the age range of 16–65 years, and factorial and criterion-related validity of the battery is well established.

Neuropsychological tests have many uses. One of the most important uses of neuropsychological testing is for differential diagnosis. Many neurological and psychiatric disorders have similar clusters of symptoms. For example, impaired attention and concentration are commonly found among patients who present with a history of psychiatric disorders (e.g. depression, posttraumatic stress disorder or anxiety), or any of several types of neurological disorders that are associated with subcortical involvement (e.g. Parkinson's disease, multiple sclerosis or HIV-related cognitive decline). These tests can be used to identify pseudodementia, which may mimic presentation of dementia. Neuropsychological testing gives an objective measure of different aspects of attention and memory and can help in differentiating normalcy, minimal cognitive impairment and dementia. These tests can help in detecting early dementia, so that prompt treatment can be instituted, and rapid deterioration is avoided to the extent possible. Neuropsychological testing can help in diagnosing certain disorders like specific learning disabilities. Neuropsychological testing can also be of use in documenting cognitive deterioration and provide an objective means of monitoring treatment efficacy. When used appropriately in skilled hands, this is an invaluable tool for diagnostic, prognostic and therapeutic decision-making.

Follow-up assessments can help to objectively examine improvement or worsening of cognitive sequelae and any deviation from the expected trajectory. Such

testing is also useful for evaluation of decision-making capacity and judgment, when assessments are made for financial and legal matters, health care and medical treatment, and the ability to work or practice in a given profession (e.g. air traffic controllers, surgeons or financial advisors). Neuropsychologists may also be called in for forensic evaluation to evaluate deficits and opine about possibility of malingering.

There are certain advantages of the psychometric approach to neuropsychological assessment. Neuropsychological tests lay emphasis on standardisation and normative data and thus rely less on clinical intuition. These tests offer objectivity and focus on individual strengths and weaknesses. These aid to correct diagnosis and offer amenability for statistical analysis and are attractive tools for comparative research (Hallett 1994). The psychometric approach to neuropsychological assessment has some disadvantages too. Findings from these tests may not correlate exactly with brain lesions or pathology. It takes quite a long time to administer these tests, and patient's adequate cooperation is required for the results to be dependable (Hallett 1994). It fosters the idea that a poor score on a certain test is invariably related to specific damage, which may not be the case. Complex cognitive processing in the brain reflecting networked interactions between separate cortical and subcortical areas of the brain means that interpretations should be made with caution.

6 Other Relevant Psychological Scales of Clinical Use

Many other tests have been developed in India for psychological assessment. It is difficult to succinctly enumerate all such tests; hence, the focus is upon tests that have been developed or adapted at the PGIMER for assessment of psychological functioning.

The PGI Well-Being Scale is an instrument to measure the subjective well-being of individuals (Verma et al. 1983). It is a 20-item scale with good inter-rater reliability and is applicable to all educational levels. The PGI Quality of Life Scale-Revised is a 26-item scale rated on 5-point Likert scale that measures quality of life (Moudgil et al. 1983).

The PRIME-MD Patient Health Questionnaire is an instrument to diagnose common mental disorders in the primary health care. The Indian adaptation (Avasthi et al. 2008) includes 8 diagnostic categories, and there is a high degree of correlation with the psychiatrists' diagnoses. The disorders covered include major depressive disorder, panic disorder, other anxiety disorder, bulimia nervosa and other subthreshold disorders such as other depressive disorder, probable alcohol dependence, somatoform and binge eating disorder. A 26-item scale has also been developed to assess eating attitudes (Nehra et al. 2001) and has good reliability and validity. Similarly, a scale has been developed to assess the attitude, cognition and reaction towards body shape, which has 34 items and is available in Hindi (Nehra et al. 2006).

To assess the sexual knowledge and attitudes, the Sexual Knowledge and Attitudes Questionnaire (SKAQ) has been developed (Avasthi et al. 1992).

The questionnaire has 35 items in the knowledge part and 20 items assessing the attitude. It is a simple test and shows a high degree of reliability. A scale for assessing the knowledge and attitudes towards use of condoms has been also developed which consists of 62 items, and tested in the clinical setting (Avasthi et al. 1998).

A coping checklist in Hindi has been adapted from the scale of Scazufca and Kuipers (1999) for use in the Indian population (Nehra et al. 2002). The scale has 14 items divided into 5 domains: problem focused, seeking social support, avoidance, collusion and coercion. Significant correlation has been found between the English and the Hindi versions.

The Social Support Questionnaire has been developed as a measure for social support (Nehra et al. 1998). It is an 18-item questionnaire which has both positively and negatively worded items. The scale is a short, simple and easy to score instrument that can be used in variety of clinical population. The total score ranges from 18 to 72 with higher scores reflecting a greater social support. The test retest reliability of the modified version is found to be high.

The temperament measurement schedule is a 15-item scale that measures the temperament of the children (Malhotra et al. 1983). The scale is applicable with patients as well with healthy population. The test shows a good test–retest validity and inter-rater reliability. Factorial and construct validity are found to be satisfactory.

Instruments have also been made available for assessing patients with substance use disorders. The Sensation Seeking Scale (Basu et al. 1993) is self-administered scale with 40 items, which evaluates the inclination to seek new sensations and the willingness to take risk for the same. The Motivation for Addiction Treatment is an 18-item self-rated Likert-type scale in Hindi for assessing motivation for treatment of substance use disorders (Mattoo et al. 2002). The Hindi adaptation of the Relapse Precipitant Inventory has been developed at PGIMER and has shown robust psychometric properties (Mattoo and Malhotra 2000). The Attitudes Towards Drinking and Alcoholism scale is a 29-item scale that assesses attitudes towards alcohol use. Satisfactory results have been obtained regarding stability of attitudes, and the test takes around 15 min to complete (Basu et al. 1998). A similar scale has been developed about attitudes to drug-taking behaviour (Basu et al. 1997). Thus, many tests have been developed at PGIMER with wide variety of applicability and clinical utility as adjuncts to usual clinical practice.

7 Usefulness of Psychometric Tests in Psychiatry

The 1990s saw a declining trend of use of psychometric tests in the United States as they were considered time-consuming, and their validity and utility in clinical health care setting was increasingly challenged. It was also difficult to obtain authorisation and reimbursement for psychological assessments from third-party payers (Meyer et al. 2001). In response, a Psychological Assessment Work Group

(PAWG) was established in 1996 and commissioned to evaluate contemporary threats to psychological and neuropsychological assessment services.

The Work Group reviewed the evidence about validity and utility of psychological assessment in clinical practice.

Several clinical and health care applications of psychometric tests were judged to be best supported by evidence gathered by the PAWG. These included description of clinical symptomatology and differential diagnosis; description and prediction of functional behaviour; prediction of psychotherapy, forensic and mental health outcomes; and identification of patient characteristics that affect treatment.

Psychometric tests have been evaluated for their ability to identify, describe and quantify important patient characteristics and have been shown to be useful for differential diagnosis (Kubiszyn et al. 2000). In a meta-analysis of 77 studies, neuropsychological tests were found to be effective in differentiating the normal elderly from patients with mild, moderate or severe dementia (Christensen et al. 1991). Meta-analytic and narrative reviews have also shown that neuropsychologists make reliable and accurate judgments when they use a battery of test data to make inferences about cognitive impairment due to brain damage (Garb and Schramke 1996; Russell 1995), which cannot be obtained simply through interviews or informal observation (Roca et al. 1982; Schwartz and Wiedel 1981). Among the personality tests, the MMPI was found to have strong validity as a descriptor of personality in meta-analyses (Atkinson 1986; Parker et al. 1988).

The MMPI and MMPI-2 helped with differential diagnosis between neurotic and psychotic disorders, depression and anxiety disorders, schizophrenia and affective disorders, and between non-patients and patients with psychiatric disorders (Ben-Porath et al. 1991; Zalewski and Gottesman 1991). In diagnosing depression, the MMPI had been found to have good positive and negative predictive power (Ganellen 1996). The test also differentiates various conditions on Axis I (clinical disorders) or Axis II (personality disorders) of the DSM-IV.

Among the projective tests, the Rorschach test and the TAT seem to be the best studied. Several meta-analytic reviews have demonstrated the utility of the Rorschach test in describing symptomatology (Atkinson 1986; Parker et al. 1988). Rorschach produces fairly large validity coefficients when used in research conducted with a sound rationale. The utility of the Rorschach test or the TAT for descriptive and diagnostic purposes is also reported to be fair (Exner 1986; Gartner et al. 1989). A strong relationship was found between ego deficits as measured by the Rorschach test and general impairment in social and occupational functioning (Perry et al. 1995). Personality test scores from this test predict behaviours such as absenteeism from work, success on the job, problem-solving ability, creativity, disciplinary problems, irresponsible behaviour, and initiative in both non-clinical settings and medical or psychiatric settings (Robertson and Kinder 1993).

Psychometric tests can be used for prediction of psychotherapy outcomes. A meta-analysis showed that the Rorschach test had a powerful ability to predict psychotherapy outcomes at 1 year after baseline testing (Meyer and Handler 1997). In adults, Rorschach test scores have predicted ratings of the ability to engage in short-term dynamic therapy as well as its outcome (Alpher et al. 1990). The

Rorschach test also measures ego strength and could predict response to antidepressant and outcome (Perry et al. 1995).

Psychometric tests also have a role in prediction of mental health outcomes. In children, baseline self-reports of negative emotionality predicted behaviour problems and subsequent clinical outcomes (Mattison et al. 1990). In adults, baseline self-reported neuroticism is a better predictor of long-term clinical outcome in depression (Hirschfeld et al. 1986). In general, elevated baseline neuroticism scores predispose people to negative outcomes in individual and marital therapy (Luborsky et al. 1993). Baseline neuropsychological testing can usefully predict the subsequent onset of dementia in otherwise asymptomatic patients, or patients who had age-associated memory impairment on initial evaluation (Crystal et al. 1996).

Psychometric tests have a role in prediction of forensic outcomes. The Hare Psychopathy Checklist (PCL) is used to predict outcomes in a criminal context (Salekin et al. 1997). The instrument is able to predict subsequent violent behaviour, recidivism and sexual sadism or deviant sexual arousal.

In addition, the PCL has proved to be a better predictor of these outcomes than virtually all other variables or procedures, including criminal history, psychiatric history, age, substance use or a diagnosis of antisocial personality disorder (Bonta et al. 1998; Hanson and Bussiere 1998).

Psychological testing probably has the greatest predictive value for individual or group psychotherapy for identifying the best match between patient characteristics and therapist–treatment characteristics (Garfield 1994; Piper et al. 1998). Patients with externalising symptoms (e.g. acting out, projecting, avoidant defences) do better in treatment that is more structured or therapist directed. Patients with internalising symptoms (e.g. self-punishment, anxiousness, worry) do better in treatments where they set the pace and determine the structure (Blatt 1992).

It is interesting to draw comparisons of psychological tests to medical tests. Both psychological and medical tests have varying degrees of validity ranging from tests that are essentially uninformative for a given criterion, to tests that are strongly predictive of appropriate criteria. Validity coefficients for many psychological tests are indistinguishable from those observed for many medical tests; for example, the ability to detect dementia is at least as good with neuropsychological tests ($r = 0.68$) as it is with magnetic resonance imaging ($r = 0.57$) (Meyer et al. 2001). However, it should be mentioned that results from the medical tests (e.g. X-Ray or biochemical tests) do not depend on certain individual factors like motivation or rapport, unlike psychological assessments.

8 Current Perspective and Future Directions

A wide variety of psychometric tests and instruments are in use. Some of these tests are validated across strict criteria, while some are not. Further references to the individual tests are available from other sources (Nehra and Kulhara 2011; Venkatesan 2010).

There are some limitations in clinical utility of psychometric tests in the Indian population. Most of these assessments have been developed in Western countries and have been subsequently adapted for the Indian population. Their applicability to a culturally distant and different setting is a matter of concern and consideration. Biases inherent in the test due to cultural factors need to be eliminated, or controlled for. Testers continue to use antiquated norms, which would hardly be applicable for the present generation. The wide variability of language across India, even with usage of different forms of Hindi, limits the applicability of these tests across the country. Many of these tests do not have adaptable norms for the mentally ill, for those with special needs and for minority groups; this, thus, restricts the inferences made from these tests. Non-availability of well-trained and experienced professional also limits the use of these tests, as they are best delivered in experienced hands. Moreover, due to the cost and time spent on testing, and the shortage of trained clinical psychologists in the country, these may not be feasible or appear as an exciting proposition in the busy Indian clinical settings.

Nonetheless, it should be emphasised that psychometric tests function as an important part of the therapeutic armamentarium in clinical practice.

However, interpretations from these tests should be made with a few caveats in mind. Clinicians should take decisions after taking into consideration the case history, clinical observation, mental status examination and inputs from family members. They should not base their decisions solely on psychometric test conducted only once in the course of the illness. It is important to judge the expected benefits of psychometric assessments relative to the costs incurred. The latest available and culturally appropriate norms should be used for making interpretations of the test findings. Psychometric assessment is likely to yield the greatest yield when treating clinician or patient has salient questions. Thereafter, relevant testing procedures can be utilised, and a hypothesis can be made, which can be put to test subsequently (Finn and Tonsager 1997).

In the future, there is a need for shift in the research focus from microlevel testing (testing psychometric reliability and validity of tests) to a macrolevel testing (practical value of these tests to clinician). There is a need for periodic revalidation of psychometric tests. Norms need to be periodically revised for different subgroups of population, so that they give valid and clinically useful results. Research of relationship of these tests in concurrence with neuroimaging may help develop better prognostic markers. The search for a brief and concise test with high sensitivity and specificity still continues. Developing an instrument, which reduces the time required for administration without compromising on range and depth of information gleaned, may be of a greater assistance to clinicians. There is a need for proper training of professionals for applying the psychometric tests correctly.

Professionals need to update their knowledge, especially when using the newer versions or revisions of the older tests.

An extensive research base exists by now, which supports the validity and utility of psychological assessment instruments for a range of applications in psychometric testing. But, it needs to be understood that they are only tools analogous to medical tests like the X-ray or the MRI. Thus, they can only act as aids to the

diagnosis, and they are not substitutes for clinical interviews. Tests do not think for themselves, nor do they directly communicate with patients. Their worth cannot be separated from the sophistication of the clinician who draws inferences from them, and then communicates with patients and other professionals. The application of the tests requires critical appraisal of the method of the test, the way findings are obtained and the meaning of the results.

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