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## REHABİLİTASYON SÜRECİNDE YETENEKLERİN ÖLÇÜMÜ

### Özet

Yeteneklerin ölçümü rehabilitasyon değerlendirme sürecinin önemli bir parçasını oluşturmaktadır. Yeteneklerin ölçümü, rehabilitasyon sürecinin planlaması ve rehabilitasyon sonuçlarının değerlendirilmesi için bir temel sunmaktadır. Bu makalenin amacı, rehabilitasyon değerlendirmesi sürecince, yeteneklerin ölçümü ile ilgili kısa bir değerlendirme sunmaktır. Bu makale, güncel literatür kullanılarak, yeteneklerin ölçümünün tarihçesi ve yetenek ölçümünde kullanılan spesifik psikometrik ölçüm araçları ile ilgili bilgi vermektedir. Makalenin sonunda, bir özet ve yetenek ölçümü ile ilgili anahtar noktalar belirtilmiştir. Bu makalenin rehabilitasyon değerlendirme süreci ile ilgili daha fazla bilgi almak isteyen kişiler için giriş niteliğinde bilgi sunacağına inanılmaktadır.

**Anahtar Kelimeler:** Değerlendirme, danışmanlık, psikoloji, rehabilitasyon

## MEASUREMENT OF ABILITIES IN REHABILITATION PROCESS

### Abstract

Measurement of abilities is one of the main aspects of rehabilitation assessment. It provides a base to plan rehabilitation process and measure rehabilitation outcomes. The purpose of this article is to provide an overview of measurement of abilities in rehabilitation process. Using contemporary literature, this article discuss history of measurement of abilities, and provide information regarding specific psychometric tools that are used to measure abilities. At the end, a summary and key points regarding the measurement of abilities is provided. It is believed that this article provides introductory information to those who aim to learn more about rehabilitation assessment process.

**Keywords:** Measurement, counseling, psychology, rehabilitation

## MEASUREMENT OF ABILITIES IN REHABILITATION PROCESS

Measurement of abilities refers to assessing general or specific abilities required for particular occupations, training programs or other situations or to assess ability to master skills required in those situations (Berven, 1980). Measurement of abilities can be divided into groups, measurement of general abilities and measurement of specific abilities. Measurement of specific abilities can also be divided into two groups: measurement of multiple abilities, and measures of specific aptitudes in clerical and mechanical areas.

General ability tests that are commonly known intelligence tests measure general learning ability, reasoning, and ability to adapt new environment (Berven, 1980). Individual and group format of those test are present. Individual tests provide advantage of observing clients response style when they respond questions and thus provide further information about clients. Also, verbal and non-verbal general ability tests are present. Non-verbal tests are designed to measure general ability without influence of language (Mpfou & Oakland, 2010). Some of the intelligence tests that are used in rehabilitation are *Wechsler Adult Intelligence Scale*, *Wechsler Nonverbal Scale of Ability*, *Kaufman Assessment Battery for Children* and *Cognitive Assessment System*. Since intelligence tests are a large part of ability tests, those tests will be given relatively more space in this paper. Before explaining those tests, a brief history of intelligence tests will be provided.

Boake (2002) indicated although history of intelligence tests tracks back to early philosophers, the modern history talks about Alfred Binets work in early 1900's as the beginning of the intelligence tests. His colleague, Theodore Simon, and Binet developed an intelligence test called Simon-Binet Intelligence test primarily to distinguish kids with low abilities for purposes of schooling. They emphasized the concept of mental age and compared abilities of children within same age group. Later on Simon-Binet Intelligence tests was standardized by Lewis Terman to be used in the US, and now called Stanford-Binet Intelligence test. Terman, in contrast to concept of mental age, proposed intelligence quotient (IQ) to represent an individual's score on the test. IQ is calculated by dividing mental age with chronological age and multiplying by 100. Another stage for intelligence tests occurred during World War I. The U.S army officials decided to assign people to specific tasks based on their abilities; therefore, they developed Army Alpha and Army Beta tests. Army Alpha was a written ability test whereas Army Beta was administrated orally. The next stage for intelligence tests starts with David Wechsler. Wechsler was not satisfied with item construction and cultural biases of the Stanford-Binet Intelligence Test, therefore, he developed Wechsler Adult Intelligence Test (WAIS) to overcome such deficiencies.

History of intelligence aligns with various theories of intelligence. Early theories of intelligence were based on a unitary concept of general ability which can be seen in Binet's work. With the development of factor analysis researchers were able to determine that general ability explained half of the variance in individuals' performance on intelligence tests (Kaplan & Sacuzzo, 2001). The other half was based on specific abilities of individuals. Later approaches divided intelligence into different sections. For instance, Cattell divided intelligence into two groups: fluid intelligence and crystallized intelligence; with fluid intelligence referring to ability

to reason quickly and to think abstractly, and crystallized intelligence referring to ability to use skills, knowledge and experience that is influenced by learning and environmental conditions (Gottfredson & Saklofske, 2009). This approach can be seen in various intelligence tests such as in WAIS and CAS. Recently, Howard Gardner recently provided construct of multiple intelligence. He indicated individuals instead of possessing a general ability, possess different types of intelligences. Those intelligence types were linguistic, logico-mathematical, musical, kinesthetic, spatial, naturalistic, and personal (intrapersonal and interpersonal) intelligence (Gardner & Hatch, 1989).

One of the most commonly used intelligence test in rehabilitation is WAIS (Berven, 1980). The most recent version of the WAIS is WAIS-IV. It contains 10 subtest and five supplemental tests. Those subtests are grouped into four general abilities: verbal comprehension, perceptual reasoning, working memory and processing speed. Based on those, two general scores are obtained: a Full IQ score that combine scores received from all the subtests and General Ability Index that combine scores from six subtests. Individual scores obtained from WAIS are compared to a norm group of people with same age range of the individuals. The average score for WAIS is 100 with standard deviation of 15. WAIS has been normed and standardized with a sample 2200 people. Strong reliability (i.e. internal consistency, test-retest reliability, inter-scorer agreement) and validity (i.e. content, factorial, convergent, divergent, and discriminant validity) results for WAIS were reported (Canivez, 2010).

*Wechsler Nonverbal Scale of Ability (WNV)* is one of the Wechsler's test designed to overcome influence of language on test scores. Naglieri, Goldstein, Conway, and Jansen, (2010) indicated WNV consists of six subtests taking into account developmental changes that naturally occur by age. The age range that WNV is designed for is 4:00-21:11 ages, including a two age bands 4:00-7:11 ages and 8:00-21:11 ages. For each age band there are different combinations of subtests that are either adapted from Wechsler tests, are newly developed or are modeled after Naglieri Nonverbal Ability tests. The WNV is appropriate for people with various linguistic and cultural backgrounds and for whom that use of language in administration may be problematic. The WNV uses pictorial direction throughout the administration of the test with minimal involvement of language for simple verbal directions. Pictorial directions are designed to communicate test directions with test takers in a nonverbal and engaging way. Like other Wechsler test series, WNV have strong psychometric properties. Strong internal consistency reliability and validity through inter-correlation studies, factor analytic studies, and correlation with external variables were reported. Overall, the research studies support that WNV is a reliable and valid measurement of ability for diverse populations

*Kaufman Assessment Battery for Children-II (KABC-II)* is another intelligences test that is designed to measure general abilities for children ages 3 to 18 years old. Two global scores can be obtained with administration of KABC-II: the mental processing index which is based the Cattell-Horn-Carrol model of broad and narrow abilities and the Fluid-Crystallized index which is based on Luria's processing model (Lichtenberger, Volker, Kaufman, & Kaufman, 2006). Both of the global scores have a mean of 100 and standard deviation of 15. In addition, KABC has a nonverbal scale that can be used with people with limited English proficiency and

people with disabilities such as hearing impairment, language and speech impairments. KABC has five scales. Based on Cattell-Horn-Carroll perspective they measure crystallized ability, fluid reasoning, visual processing, short-term memory, and long-term memory storage and retrieval, based on Luria's theory it measures learning ability, sequential processing, simultaneous processing, and planning ability. The names of the subtests reflect the both models: learning/long term storage and retrieval, sequential/short term memory, simultaneous/visual processing, and planning/fluid reasoning. The five subscales contain 18 subtests that reflect two categories: subtests that assess core qualities and subtest that assess supplementary qualities. Strong internal consistency reliability and validity results through factor analytic studies, correlational data and special clinical group studies were reported (Naglieri et al., 2010).

*Cognitive assessment system (CAS)* is another type of intelligence measure that is based on a cognitive processing theory classed as Planning, Attention, Simultaneous, and Successive (PASS) (Keith, Kranzler, & Flanagan, 2001). Naglieri et al., (2010) indicated the PASS derived from neuropsychological work and contemporary research on cognitive processing that include executive functioning (planning), selective attention (attention), visual-spatial ability (simultaneous), and language and memory (successive). Planning refers to a cognitive process with which an individual identifies, determines and uses a strategy to solve problems. With planning individuals find solutions to problems for which no immediate solution is apparent. Planning subsets require impulse control and utilization of knowledge, and application of strategies to solve problems. Attention refers to a cognitive process in which individuals direct their focus on stimuli and disregard other stimuli that are around or unrelated. Attention subset requires selective, sustained and effortful attention. Simultaneous processing refers to integrating stimuli into interrelated groups or a whole. In addition to seeing parts as a whole, it requires understanding language-grammatical relationships. Simultaneous processing tasks ask to integrate interrelated separated stimuli into a whole. Successive refers to working with things in a specific serial order that form a chain like progression. It involves both perception of stimuli in a sequence and formation of sounds and movements in order. Successive subtests require reproducing sequence of stimuli or responding questions using syntactic relationships. The four scales and the full scale have a mean score of 100 with standard deviation of 15. The scale was standardized with a sample of 2200 children aged 5 to 17. Like other intelligence test, strong reliability and validity through factor analytic studies, relationship with other constructs and special clinical group studies was reported.

In addition to general ability/intelligence measurements, there are specific ability measurements that can be grouped into two categories: measures of multitude aptitudes and measures of specific aptitudes in clerical and mechanical areas. Berven, (1980) indicated *General Aptitude Test Battery* is one of the most commonly used assessment battery that measures multiple aptitudes. GATB can be useful in determining various abilities of clients required for various occupations. It consists of 12 tests which measure 9 aptitudes: general learning ability, verbal aptitude, numerical aptitude, spatial aptitude, spatial aptitude, form perception, clerical perception, motor coordination, finger dexterity and manual dexterity. GATB has a mean score of 100 and a standard deviation of 20. Clients' scores are compared to multiple cut-off scores

identified in *Occupational Aptitude Patterns* that are required to perform a particular job. If a client passes cut-off criteria determined for a particular occupation, then clients is seen as capable of performing the occupation.

Berven, (1980) indicated there are also tests that measure specific aptitudes such as mechanical and clerical skills. In addition to that, various dexterity tests that measures potential success in jobs that require manual abilities are available. However, research indicated there are not high correlations between the manual skills. For instance some researchers found 11 distinct manual abilities through factor analytic studies. Given that specific jobs may require specific manual abilities, several manual abilities should be identified to make most accurate prediction in terms of match between job and individual's manual abilities. In addition, those manual dexterity tests measure individual performance for a short period of time; therefore, it is not definite that the measured skills will correlate with a long term performance. Some of the tests that measure specific abilities are *Minnesota Clerical Test*, *General Clerical Test*, *Revised Minnesota Paper Form Board* and the *Bennett Test of Mechanical Comprehension*.

#### Summary

In summary, variety of ability measurements exists in the literature. Ability measurements can be divided into two groups: general ability measurements and specific ability measurements. General ability measurements are known as intelligence tests. Both verbal and non-verbal intelligence tests are available in the literature with non-verbal ability intelligence tests are designed to overcome influence of language on test scores. Some examples of intelligence tests are WAIS, CAS, and KABC-II. Although the intelligence tests have low predictive validity for job satisfaction, they can be used to determine potential success in training, and academic settings. There are also specific ability measurements. Those can be grouped as measures of multiple aptitudes and measures of specific aptitudes. Both multiple and specific aptitude tests are useful to determine a match between clients' skills and skills required to perform specific jobs.

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