



ISSN: 2319-5967

ISO 9001:2008 Certified

International Journal of Engineering Science and Innovative Technology (IJESIT)

Volume 2, Issue 4, July 2013

# The Adaptation of Translation Psychological Test as a Necessary Condition for Ensuring the Reliability of Scientific Research

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*Abstract— In order for the translation psychological tests to be reliable tools for ensuring accurate research data, as a precondition for the reliability of scientific research, their adaptation to the particular national, religious and social conditions of application is necessary. The current amplification describes the nature, the stages and the procedures of the process of psychological tests adaptation.*

*Index Terms— Reliability of Scientific Research, Test Adaptation, Factor Analysis, Item Analysis, Validity, Reliability.*

## I. INTRODUCTION

Measurement is one of the most frequently used methods for providing information in scientific research, since it submits accurate quantitative information for the researched objects. In the psychological amplifications a widely applied measurement instrument is the test. In order for the results of the research to be reliable, the tests must possess certain psychometric characteristics, guaranteeing their accuracy and reliability as a measurement tool. These characteristics are dependent on the particular social, historical, national and religious conditions, which is why before applying translation tests to another population a performance of certain procedures for their adaptation to the new conditions is necessary. Otherwise, i.e. during direct application of a test, without its adaptation one can make harsh factual mistakes due to the inaccuracy of the measurement instrument.

## II. ADAPTATION OF TRANSLATION PSYCHOLOGICAL TESTS

**Test adaptation** (from Latin adaptatio - adjustment) is a complex of procedures, which ensure the adequacy of the test in the new conditions of its application. [1]. In the recent past not enough importance was attached to the necessity of translation psychological tests adaptation. The process was limited to translation of the test items and instructions and an eventual verification of the normative distribution of the test indexes. The theoretical formulations of the author were not analyzed, the original data for the psychometrical characteristics of the test was accepted as valid in the new conditions of application [1], [2]. Such an approach is considered unacceptable in terms of the metrological requirements for the tests as measurement instruments, since it questions their reliability as tools for providing accurate information in psychological research. The reduction of the adaptation processes and their relegation frequently only to translation of the test, according to some authors is due to "the test hunger" during the 60s and 70s of the 20<sup>th</sup> century [2], as well as to the intensity and the duration of some of the procedures comprising the adaptation, which under the existing at that time tools for statistical treatment lasted for months [3]. Somewhere about the middle of the 80s of the 20<sup>th</sup> century the issue of the necessity of a thorough and correct translation tests adaptation started to be discussed more and more frequently [1]. With the progress in computer technique and technologies the tools for mathematical and statistical treatment of data are improving, too. This largely facilitates the technical part of the processes for verification of the psychometrical test characteristics, whereby the work of the psychologist is lightened and the time and resources necessary for the adaptation of translation tests to the new conditions of application are abbreviated. Under these circumstances the mechanic transportation of test methods designed for other populations and cultures can no longer be considered acceptable.

## III. STAGES OF THE TEST ADAPTATION

The adaptation process of translation psychological tests to the particular socio-cultural conditions involves the following stages:



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- A. Analysis of the starting theoretical positions of the author;
- B. Translation of the indications for test operation, the test items, the instructions and the name of the test in the language of the users;
- C. Approbation of the test and verification of the psychometrical characteristics of the individual items;
- D. Formation of the final test version and evaluation of its reliability and validity;
- E. Standardization of the test to the respective population;
- F. Verification of the structural relations between the scales comprising the test (only about multifactorial questionnaires);
- G. Elaboration of methodical indications for application of the test by creating a manual [1], [2], [4].

#### **A. Analysis of the starting theoretical positions of the author**

This stage is rather informative than empirical. By means of it psychologists performing adaptation acquire information about the nature of the psychic phenomenon researched with the respective test, which consequently provides them important guidelines in the stages of translation and validation.

#### ***B. Translation of the indications for test operation, the test items, the instructions and the name of the test in the language of the users***

The aim of this stage is adjustment of the test vocabulary and grammar to the age and socio-cultural characteristics of the population contingent to which it will be applied, which is why an important condition during translation is abiding not by the items' literal meanings, but by their notional contents. I. e. it is necessary to achieve substantial and psychological equivalence with the original rather than semantic equivalence [1].

These requirements regarding the precision of the translation enforce that it is done not by a single person, but by a group of professionals including researchers – psychologists, as well as linguists. It is necessary to prepare at least two translations by independent teams, while after discussion a common version is reached. Some psychologists recommend also the performance of a reverse translation in the language of the original test for elimination of eventually occurred inaccuracies [3].

#### ***C. Test approbation and verification of the psychometrical characteristics of the items***

The approbation requires that the test is presented for the replenishment of at least 100 [3], and according to some authors 300 to 500 researched individuals with similar characteristics. The results are statistically processed through the so called **item analysis**. It is an aggregation of statistical procedures and it aims at establishing the psychometrical characteristics of each item. Items with unsatisfactory parameters are either eliminated from the test or remade. After this stage the final version of the test is reached.

Through the item analysis three characteristics of the items are evaluated: difficulty, discriminatory (differential) power and functionality of the distractors.

- **The difficulty** of the items is determined through analysis of the percentage distribution of the answers about the respective item;

- **Discriminatory (differential) power** is indicative of the extent to which the item differentiates the individuals with high achievements from those with low achievements;

- **functionality of the distractors** – this characteristic is also called “attractiveness of the alternatives”, because it is a quantitative valuation of the attractiveness of the proposed answer versions; it is determined by calculating and analyzing the percentage of researched individuals who chose each of the alternatives as an answer [4], [5].

#### ***D. Formation of the final test version and evaluation of its reliability and validity***

After verification of the psychometrical characteristics of the items it may be necessary to eliminate some of them or replace them with new ones. On this basis the final test version is formed, which is subjected to statistical procedures for verification of the psychometrical features reliability and validity.

**The reliability** is a characteristic of the test methods, which reflects its measurement accuracy and its resistance to random factors [1]. There are two types of reliability – such related to the stability of the test in time and to its meaningful and operational nature [2].

For determination of the test resistance in time most often a repeated testing of the same researched individuals with the same methods is performed after a certain period. Due to the time difference between the two measurements this method is applied when the psychic characteristics are relatively stable. The correlation coefficient between the marks of the researched individuals according to the two testing is an indicator of the test reliability [6].



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For verification of the meaningful reliability the method of dividing the test into two equivalent halves is applied (most often into an even and an odd half, i.e. items with an even and an odd number). Indicative of the test reliability is the correlation coefficient between the marks of the researched individuals according to the two halves of the test [2].

Another way for reliability verification is the analysis of the inner coherence of the test. For the purpose one calculates and analyzes the homogeneity coefficient Cronbach's Alpha and the correlation coefficients between the results from each item and the general test result [6].

**The validity** is the empirically established ability of a particular instrument to evaluate certain behavioral tendencies, competences or talents and to predict the future behavior. The validity reflects the correspondence between the conceptual design for the purpose of the test and the actual result, i.e. it shows whether the test really measures what it is determined for [2].

There are several types of validity: meaningful (obvious); criterion, which according to the chosen criterion type is coincident, prognostic and diagnostic; and constructive validity, subdivided into convergent and discriminatory [1], [5].

Most often about psychological questionnaires one verifies the convergent constructive validity. For its evaluation it is necessary to make a parallel testing of the researched individuals with another test, which measures the same psychic phenomenon or one that is closely related to it. One calculates the correlation coefficient between the two excerpts and it is accepted as a criterion for the validity of the test [6].

#### *E. Standardization of the test to the respective population*

Standardization is the process of unification, regulation and adduction of the test indicators to united normative procedures [5]. This includes determination of the exact conditions for the application of the test, the given instructions, work time, etc. The aim is to achieve identity of the procedure during the conduction of the testing and the evaluation of the test indicators. If the conduction conditions of a particular research are not identical to the ones set according to the standard, the data and conclusions out of it may turn out to be untrustworthy.

Part of the standardization is the derivation of norms. The norming requires establishment of the average test results for a certain group. This allows through comparison of the individual mark of a certain researched individual to these average results to establish whether he/she is below or above the norm. For the derivation of norms it is necessary to research a sufficient number of individuals from a particular group (over 100, and according to other authors over 500). An important requirement in this process is the homogeneity of the excerpt, i.e. the individuals it includes to be with similar socio-demographic characteristics [6].

The most frequently used subgroup norms are the **percentile norms** and **standard indicators**.

**The percentile norms** provide information about the relative position of the particularly researched individual among all the rest, without objectifying the value of the difference between the results.

Through the **standard indicators** one establishes the diversion of the individual results from the average quantity in units, proportional to the standard diversion of the distribution. These indicators are obtained through linear transformation of the primary results (the raw mark on the test) [4].

#### *F. Verification of the structural relations between the scales comprising the test*

This process is performed only about multifactorial questionnaires by means of the statistical methods applied to the original test. Most often for derivation of scales a **factorial analysis** is applied. It is a complex of statistical procedures, which allow the expression of the hidden (latent) symptoms of a certain phenomenon, the reasons for their manifestation and their interactions [1].

One of the most widespread methods for factors search is the method of the main components, where independent on each other factors, which include different variables, are gradually derived. The process requires primary establishment of one factor, which explains the largest part of the dispersion of the starting variables; then an independent on it factor, which explains the largest part of the remaining dispersion, is sought and so on. This procedure lasts until the newly derived factor explains more than one variable [4].

The factorial analysis is a complex mathematical and statistical method, difficult to implement without the presence of specialized statistical software. It requires analyzing of data and coefficients from different statistical procedures and it passes through several stages: analytical verification for the application adequacy of the method, determination of the number and the content of the significant factors; reliability verification and establishment of norms about each derived factor [4], [6].



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**G. Elaboration of methodical indications for application of the test through creation of a user manual (guide).**

The test guide must include: a short description by the author about the aim and designation of the test, including the conception which is used as a basis for its elaboration; number and description of the subscales (if there are any); data about the psychometrical characteristics of the test; norms by age and other socio-demographic indicators; user indications for researchers; instructions to the researched individuals; form of the prepared test [4], [5].

#### IV. CONCLUSION

A test which has not passed through all described stages and procedures for adaptation and demonstration of the psychometrical characteristics gives rise to doubt in terms of its qualities as a measurement tool. The responsibility for the publication of such tests belongs to the author (translator), as well as to the publishing house. This problem has a pointedly ethical nature, since it may lead to distortion of the scientific conclusions of every researcher who used the respective methods [7]. The unreliable measurement instruments affect the reliability of the amplifications, which is qualified as one of the main characteristics of every scientific work. In this regard the translation psychological tests adaptation is an important condition for the correctness of the results and a precondition for the significance and expedience of the conclusions in scientific research.

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