Traditionally, the neuropsychological clinical practice has been associated with usage of instruments for assessment. Such instruments could be divided in two main groups: batteries or tests for assessment of specific areas or cognitive aspects and procedures of clinical evaluation. On the bases of the first of mentioned groups it is possible to found psychometric assessment which we can call as quantitative approach (Reitan & Wolfson, 1993; Benson & Ardila, 1996). On the bases of the second group we found the neurological clinical methods and observation of reactions and responds of patients which we may call as qualitative approach (Sacks, 1985; Glozman, 1999; Luria, 1977; Xomskaya, 1987, 2002).

Nowadays, in modern neuropsychology it is possible to find the followers of both approaches and their combination as well. However, the majority of popular and broadly used instruments are related the quantitative approach.

It is necessary to mention that the data obtained by each kind of instrument of assessment is not of the same kind. This phenomenon is expressed in different diagnostics which could be given to the patients with brain damage. It is often rather difficult to compare the diagnostics established on the bases of the usage of quantitative and qualitative instruments. The example of such situation can be
classification of types of aphasia proposed by Goodglass and Caplan (1972) and by Luria (1973). There is no direct correlation between types of aphasia in these two classifications.

The instruments or tests for neuropsychological assessment of quantitative approach normally consider isolated processes or cognitive abilities. For example, in the case of verbal activity, since the beginnings of neuropsychology, only expressive and receptive language disturbances have been considered. Such disturbances or types of aphasia were related to two classic zones of the language (Dejerine, 1926): the Broca zone and the Wernicke zone respectively. These brain zones were proposed as the material substrate of each one of these processes (Benson & Ardila, 1996; Ardila, 2005). Other difficulties, such as problems with spatial orientation or memory were considered separately from verbal deficits.

Some authors (Goodglass, 1992; Bsalasubramanian, 2005) have tried to analyze specific errors in written language associated with particular kind of aphasia, the initial conception of isolated verbal deficits still remains in cognitive neuropsychology. When the patient presents any other difficulties, these are interpreted as ‘associated alterations’, i.e., in the cases of patients who, besides language problems, present oral and written problems, the diagnosis might be motor aphasia with alexia or agraphia (Goodglass & Kaplan, 1972; LaPointe, 2005).

According to our opinion, the psychometric background of the majority of neuropsychological tests has an impact on the conception of “adaptation” of tests for other languages or dialects. The items of the tests are only translated directly from one language to another and not elaborated especially inside particular language according to its phonological, semantic and syntactic structure (Golden, Purisch & Hammecke, 1978; Christensen, 1979). During neuropsychological assessment, among the most frequently used tests for Spanish Speaking patients is Boston test for Aphasia. We claim, as neuropsychologists constantly attending patients and teaching at university level, that the usage of such tests in countries or regions with spanish speaking population do not guarantee the information necessary for accurate diagnostic.

From the point of view of qualitative approach, with its background of neurological
clinical assessment, the process of creation and elaboration of specific items for neuropsychological verbal tests should be carried out. We consider that the neuropsychological assessment should not be limited to the descriptions of the symptoms or deficits of the patient. The objective of this analysis is to discover the causes and to establish the systemic effect of brain injury on psychological activity of the patient. It is possible to achieve this goal only by proposing and creation of original procedures and items for tests for neuropsychological assessment according to specific features of each concrete language. It is also important to mention that the analysis and interpretation of the results of assessment should be done according to the knowledge not only of the theory of neuropsychology, but also on qualitative features of types of answers and types of characteristic errors of normal subjects within each population.

The objective of the present study is to show the necessity of creation of specific items for neuropsychological assessment for Spanish speaking patients instead of its adaptation or translation.

To carry out the work of assessment and diagnosis of Spanish speaking patients our group has incorporated, in addition to the concepts of neuropsychology developed by Luria (1977) y Tsvetkova (1985), the contributions of the diverse areas of the historical-cultural psychology established by Vigotsky (1995). Based on this approach, none of the functions (language, reading, writing, etc.) is located in a restricted area of the brain. Each verbal action requires the participation of a diverse number of brain zones which contribute with their specific work.

For example, let us consider the functional work fulfilled by the superior temporary secondary zones of the left hemisphere which consists on analyzing and synthesizing the language sounds. This work allows the discrimination of opposite phonemes and consequently it is directly related to the comprehension of oral language. But in addition, this analytical-synthetic work is necessary for the accomplishment of other functions or actions: spontaneous language, denomination, repetition, reading aloud and dictation. Therefore, an injury in these cerebral sectors will affect not only the understanding of the oral language, but all the functions that we have mentioned as well. This form of analysis allows us to point out that the difficulties observed in oral language comprehension, the spontaneous language, the denomination, the repetition, the reading aloud and
dictation, all have the same cause.

In the case of brain damage, verbal action can be altered by diverse causes. For example, the comprehension of oral language might be at risk by the disturbance of the following factors: (1) the ‘Analysis and synthesis of the language sounds or phonematic factor’, which disturbance makes rather difficult, or even impossible the discrimination of the phonematic opposite sounds (“cold – gold”, “put – boot”); (2) the ‘audio-verbal retention factor’, which disturbance makes difficult or disables the understanding of long sentences or the speech itself; (3) the ‘spatial integration’ factor, which disturbance makes impossible to comprehend complex logical-grammatical structures (“the father’s son” - “the son’s father”); (4) the ‘kinesthetic factor’, which disturbance makes difficult or impedes the understanding of words that contain similar sounds by point and mode of oral articulation (“bay – may”; size – rise”). The goal of neuropsychological assessment is to identify the affected factor or factors responsible for the difficulties that the patient undergoes. It is easy to see that direct translation of the examples presented above will immediately lose their specific features in another language. If we translate “cold” and “gold” into Spanish, we get “frio” and “oro”. These words do not serve for assessment of phonematic analysis and synthesis of Spanish speaking patients. The similar situation happens with the other examples mentioned above. The problem is that this is precise situation with all traditional neuropsychological tests which are used for Spanish speaking patients: the items of the tests are translated instead of being created specifically.

In order to propose accurate items for neuropsychological assessment of Spanish-speaking patients it is necessary, first of all, to analyse, phonological, lexical and syntactical structure of Spanish language.

Let us revise the items for assessment of phonematic discrimination. Phonematic discrimination is formed during the first 3 years of life inside cultural communication (Tseitlin, 2000; Ushakova, 2006; Mejía & Eslava, 2008). Phonematic discrimination is related to perception of acoustic oppositions significant for comprehension of each language. Such discrimination is not separated from acquisition of words in oral speech and depends on efficient functioning of temporal zones of left hemisphere (for Indo-European group of languages). Brain injury in these zones conduct to lost of phonematic discrimination and to sensory
aphasia, according to Luria’s classification. In order to verify the efficiency of phonematic discrimination it is necessary to find fine examples of words and syllables which include significant acoustic oppositions for each language. For instance, as for phonematic features of Spanish language we can found the following differentiations: 1) voiced – unvoiced (b – p in words beso - peso); 2) long – short (rr – r in words perra - pera); 3) soft – sharp (ñ – n in words peña - pena); 4) stressed – unstressed (in words esta – está).

In order to accomplish proper assessment of phonematic discrimination typical for Spanish we have created specific items. These items are used as part of neuropsychological Assessment for Adults (Quintanar & Solovieva, 2009).

**Tasks for assessment of phonematic discrimination:**

- Repetition of pairs of words
- Repetition of syllables
- Identification of verbal sounds (phonemes)

**Tasks for kinesthetic Integration:**

- Repetition of series of syllables and sounds

Our tests are constantly applied to Spanish speaking patients with brain injury in Mexico in different hospitals and in private neuropsychological service. As an illustration of disturbance of phonematic integration the case of a Spanish speaking patient with brain injury in temporal zones of left hemisphere is presented below. Masculine patient of 40 years old, right handed, with eleven years of formal education had suffered TCE as a consequence of arterial venous malformation. In the Hospital the patient received a diagnostic of aphasia. The patient was sent for neuropsychological assessment 4 months after TCE in order to precise the form of aphasia.

The results of neuropsychological assessment pointed out deficit in phonematic discrimination which conducted to severe difficulties in both verbal production and comprehension on level of sounds, words, sentences and texts. The patient failed
in tasks for repetition, denomination, identification of words and comprehension of sentences and texts.

The table 1 shows the errors of patients during neuropsychological assessment of phonematic and kinesthetic integration. The patient shows impossibility for recognition of verbal sounds. These difficulties are especially severe in items of phonematic integration. Verbal sounds which form phonematic oppositions are not accessible for the patient. In the case of items for kinesthetic integration, the patient can fill, with the help of tactil perception; the sounds with are close to each other by point and mode of articulation (afferent motor production). The patient tries to find the sound by articulation and not by acoustic audio-verbal perception which suffer as consequence of brain injury in temporal zones of left hemisphere. The patient received diagnostic of sensorial aphasia according to Luria’s classification (Quintanar, 2000; Quintanar & Cols., 2002; Quintanar, Solovieva & León-Carrión, 2002).

Table 1. Examples of tasks for phonematic and kinesthetic integration by the patient. All examples correspond to Spanish language.

<table>
<thead>
<tr>
<th>Phonematic integration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task: Repetition of pairs of words</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Item</th>
<th>First repetition</th>
<th>Second Repetition (as a help for patient)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DÍA - TÍA</td>
<td>en dosi – no – so</td>
<td>seis – seis</td>
</tr>
<tr>
<td>PESO - BESO</td>
<td>ai – aeso</td>
<td>pasen – umio</td>
</tr>
<tr>
<td>FINO - VINO</td>
<td>ou – nefi</td>
<td>su – seis</td>
</tr>
<tr>
<td>DONA - DOÑA</td>
<td>jo – en bo</td>
<td>seis- siete</td>
</tr>
<tr>
<td>PERO - PERRO</td>
<td>u – u</td>
<td>pei – oviu</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Task: Repetition of syllables</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA - PA - BA</td>
</tr>
<tr>
<td>TO - DO - TO</td>
</tr>
</tbody>
</table>
## Kinesthetic integration

**Task: Repetition of pairs of syllables and verbal sounds**

<table>
<thead>
<tr>
<th>Task</th>
<th>Pair 1</th>
<th>Pair 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>LA – NA – LA</td>
<td>a – e – i</td>
<td>a – ou- a</td>
</tr>
<tr>
<td>RO – SO – RO</td>
<td>o – u – o</td>
<td>o – u – u</td>
</tr>
<tr>
<td>ME – BE – ME</td>
<td>ma – u - ma</td>
<td>ma – ma - ma</td>
</tr>
</tbody>
</table>

The example shows the necessity of usage of sensible tasks created according to phonematic structure of Spanish language. None of translated tests could serve to this purpose. The accurate neuropsychological diagnostic with the help of tests in Spanish language, detection of the form of aphasia, can help to create specific strategies for rehabilitation of Spanish speaking patients with brain injury.

### References


Luria A.R. (1973) *Bases of neuropsychology*. Moscow, Moscow State University.
Tsvetkova L.S. (1985) *Neuropsychological rehabilitation of patients*. Moscow, Moscow State University.