TEST TO ASSESS THE FAMILIARITY WITH THE LEXIS OF THE POLISH SIGN LANGUAGE (TOZL PJM) – CONSTRUCTION AND PSYCHOMETRIC CHARACTERISTICS

The development and assessment of the psychometric properties of the Polish Sign Language Vocabulary Questionnaire (TOZL PJM) is presented in this article. The aim of the study was to create a quantitative test of Polish Sign Language lexical knowledge and establish its psychometric properties. TOZL PJM consists of two types of tasks: meaning recognition and form recognition. Data were collected over a sample of 64 deaf participants, all of whom were Polish Sign Language users. The results of the present study show that Polish Sign Language Vocabulary Questionnaire has a high reliability index. However, eighty-eight percent of total test items crossed the difficulty index of 70% percent indicating that those items were too easy for the participants. A consistent level of TOZL PJM’s difficulty and discrimination requires further examination in future.

Keywords: deaf, language testing, Polish Sign Language

INTRODUCTION

Main assumptions used to design TOZL PJM

A psychologist who must give a diagnosis of a deaf person finds himself in a difficult position. In most cases he does not know the sign language and does not understand the environmental specifics of the community of deaf people in Poland. He can only make an attempt to use the diagnostic tools at his disposal, instructions to which can only be explained by using a very simple language of commonly known gestures. The results obtained in this way should never be subject to quantitative assessment due to several reasons, e.g. the inability to accurately follow the test procedure, lack of standards for the population of Polish deaf people, and the fact that most of the existing tools are designed on the basis of the Polish language, which is unknown to some part of the deaf. In Poland there are no methods to assess the level of intellectual functioning of the deaf with regard to the verbal area, designed on the basis of the Polish Sign Language (Polski Język Migowy – PJM). Across the world, research on such tools began relatively recently, which is why they are not fit for commercial use (Haug, Mann, 2008). The so far designed methods can be divided into two groups: developmental scales and competency-based tests. Developmental scales are detailed charts of linguistic competencies that should be mastered by the studied person in the

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The advantage of such tools lies in the ability to conduct an accurate assessment of linguistic functioning of the respondents. Examples of different types of developmental scales in sign languages are: The Dutch Development Assessment Checklist Baker, American examples: Language Proficiency Profile – 2 (LLP 2), MacArthur CDI for American Sign Language (ASL CDI), American Sign Language Proficiency Assessment (ASL PA) (Haug, Mann, 2008) and Visual Communication and Sign Language (VCSL) (Simms, Baker, Clark, 2013). Examples of competency-based tests: British Sign Language Receptive Skills Test or Web-based British Sign Language Vocabulary Test. In most cases they are computer applications and consist of open and closed questions (Haug, Mann, 2008).

The main drawback of both developmental scales and competency-based tests is the necessity to monitor them by persons who are proficient in sign language and have the knowledge of its phonology, morphology, syntax, etc.

Test to Assess the Knowledge of the Lexis of the Polish Sign Language (TOZL PJM) is an attempt to design a tool to diagnose the verbal development of the deaf, whose first language (the so-called L1) is Polish (PJM). It was created mainly for psychologists who are unable to use the Polish sign language, but need to give a professional statement on the cognitive development of the deaf, for whom Polish is a foreign language (so-called L2). The scale of the problem is illustrated by the results of studies conducted at Wrocław University, according to which over 50% of higher secondary school students with impaired hearing know the Polish language at an elementary level (A1, A2 in the Common European Framework of Reference for Languages). Only 9% of the analysed students proved to have sufficient linguistic competencies to start education in higher secondary schools (Kowal, 2011).

As there are no systematized, complex studies on descriptive grammar and lexis of the Polish sign language, TOZL PJM is not a standard dictionary-based test like the Vocabulary sub-test of the WAIS or WISC. The test to assess the familiarity with the lexis of PJM was inspired by the already mentioned tools: British Sign Language Receptive Skills Test and Web-based British Sign Language Vocabulary Test, where in some of the questions respondent were to recognize meanings of given signs (meaning recognition – MRG) and identify sign words that matched the presented graphic material (form recognition – FRG) (Mann, Marshall, 2012).

Some of the hypothetical measures of difficulty of TOZL PJM items are: how often a sign word is used (e.g. the word mama (mum) is used considerably more often in everyday communication among the deaf than proper names of towns, such as, e.g., Racibórz) and to what extent a sign word, which is the correct answer, resembles the distractors in a given item, considering such parameters as: hand configuration, position and movement.

PROCEDURE OF DESIGNING THE TOOL

Selection of a representative set of sign words of the Polish Sign Language (PJM)

Constructing dictionary tests should usually begin with choosing a representative set of words for the language that will be used as the foundation to create the research tool. Typically, this role is served by a monolingual dictionary chosen by the researcher. In the case of the Polish Sign Language, however, no monolingual (PJM) nor bilingual (PJM-Polish; Polish-PJM) dictionaries have been created (Kowal, 2008). Therefore, selecting a representative set of sign words appeared to be one of the most difficult tasks encountered while creating TOZL PJM. So far only three relatively comprehensive and valuable books that could serve as Polish-Sign Language dictionaries have been published: Slownik polskiego języka miganego (Dictionary of Polish Sign Language) by Józef Hendzel (first issue 1986, fifth and latest issue 2006) – 2138 entries; (Hendzel, 2008) Polski Język Migowy – Slownik

All of these publications have, however, one common drawback – every word in Polish has only one equivalent in the sign language. Sign words are presented as photographs with arrows indicating how to manually perform them. These publications lack definitions and descriptions of etymologies, synonyms and examples of usage. Moreover, no corpus study on the Polish sign language has ever been completed and therefore it is difficult to unequivocally determine if the lexicographic content of these publications is a representative sample of the Polish sign language, signed Polish, or a signed pidgin with regionalisms only used in the area its authors come from. It must be remembered that due to various perturbations in the history of Poland (partitions, world wars, etc.), the contemporary PJM was formed under the influence of many different sign languages, such as: Österreichische Gebärdensprache (ÖGS) – Austrian sign language, Deutsche Gebärdensprache (DGS) – German sign language, Русский жестовый язык – Russian sign language. As a result, in spite of unification attempts, to this day, depending on the region, original signs used only in specific areas can be observed. The issue of regionalisms in sign language is, however, new and virtually unexplored (Romanowska, 2007). Beside the above mentioned publications, there are also various on-line and multimedia dictionaries of the Polish sign language and the sign-supported system, as well as printed thematic dictionaries, such as *Słownik Liturgiczny Języka Migowego* (Liturgical Sign Language Dictionary) by Bogdan Szczepankowski. They have not been listed, however, as sources of representative sets of signs due to the limited number of words and overly specialist scope of vocabulary. No multimedia dictionaries available on CDs or DVDs and no websites were taken into account either, as the sign words they include are presented as videos, which would make it technically impossible to use them in constructing the *Test do Assess the Familiarity with the Lexis of the Polish Sign Language*. Eventually, taking account of all the advantages and disadvantages of the selection, it has been decided to rely on *Leksykon Języka Migowego* (Lexicon of Sign Language) by Olgierd Kosiba and Piotr Grenda as a representative selection of signs, because:

(a) It includes more words than any other available publication;
(b) In comparison with other available publications of this type, words contained therein are presented in the most graphically legible way;
(c) It generates less controversy in the community of the deaf than, for instance, *Słownik Łódzki* (Kowal, 2008).

At this stage of designing TOZL PJM the same procedure as the one used in creating the Polish version of the Vocabulary sub-test of the WAIS-R (Hornowska, 1993) was followed. It was established that the number of words to draw should amount to 60; starting with the first Lexicon entry (the number with which the counting was to be started was randomly chosen with a cubical dice), every 46th out of 2,800 signs was qualified. The next step was to remove such signs as: CIĘ (you), NASZ (our): NAS (to us), OPRÓCZ (besides), RAZ (once), etc., because it was established that they are part of the sign-supported system and/or do not have their independent meanings.

Due to the limited access to the study group, at this stage of designing TOZL PJM it was decided not to conduct pilot studies and to subject a list of 54 remaining experimental signs to expert evaluation. Much effort was put to form a commission of competent judges comprising deaf and hearing people, as well as CODA (non-deaf children of deaf parents) who lived in the province of Wielkopolska. The expert group
included: an expert sign language interpreter at the Circuit Court in Poznań, a translator and teacher of sign language who was a non-deaf child of deaf parents, three prelingually deaf persons with a vocational education degree (aged 24, 55 and 60) and a prelingually deaf person with a higher education degree (aged 25). Each of the commission members was presented with the TOZL PJM experimental list of signs. Next, they were asked to think if they knew the meanings of the signs contained therein and whether they thought the words were used in communication among deaf people using the Polish sign language. The instruction was given both in writing and (depending on how well a judge knew the Polish language) in the Polish sign language. The task set for the competent judges was to give a simple answer (yes or no) and possibly to explain their choice. In order to choose which signs will be used in the further stages of creating the tools, it was decided that only the sign words that have been given a positive opinion by all experts would qualify. Twenty two sign words were then qualified to the further stages of creating the Test to Assess the Familiarity with the Lexis of the Polish Sign Language: BRAT (brother), CZUĆ-SIĘ (to feel), DUŻO (a lot), EKSPRES (express/express train/espresso coffee maker), KAMERA VIDEO (camcorder), KURS (course), LISTOPAD (November), ŁZAWIĆ (to shed tears), MATKA (mother), MIÓD (honey), MYĆ SIĘ (to get washed), OBRAZIĆ (to offend), PANI (Mrs), PIEC (to bake), RODZINA (family), RYSOWAĆ (to draw), SERCE (heart), SŁAWNO (name of town), WIĘCEJ (more), WPISAĆ (to write in), ZAMYKAĆ (to close), ZNACZEK (stamp).

### Graphic design of TOZL PJM

Designing the graphic content of the test sheets was preceded by a discussion on how to do it. As the Test to Assess the Familiarity with the Lexis of the Polish Sign Language is to serve its role by checking the ability of respondents to correctly recognize meaning of the presented sign words (meaning recognition – MRG) and their ability to identify a sign that matches the presented graphic material in meaning (form recognition – FRG), the decision was made to divide the Test into two parts.

Part 1 of TOZL PJM was meant to only check how accurately a respondent identifies the meaning of a sign word. On the left side of the test sheet there were photographs taken from the Lexicon of Sign Language by Kosiba and Grenda (2011), illustrating a given sign word. On the right side there were deliberately chosen illustrations. The task given to respondents was to identify the graphic illustrating the meaning of the presented sign word, which ultimately was aimed to evaluate their competencies in recognizing the meaning of a given sign word (MRG). In part 2 of TOZL PJM, the tasks were reversed – on the left side of the sheet there were illustrations, whereas on the right side there were four photographs presenting different, also meticulously chosen, sign words to evaluate respondents’ ability to recognize signs reflecting the presented graphic material in meaning (FRG). The accepted way to design test items made it impossible to create a chart for the word EKSPRES due to its multiple meanings. During a consultation with native users of PJM it appeared that the sign word “EKSPRES” may have a number of meanings, such as train or a person dealing with matters quickly. It was impossible to create an illustration for the sign word, CZUĆ-SIĘ (to feel) due to its overly abstract nature. No sheets for the words DUŻY (big) and WIĘCEJ (more) were designed either. It was decided that it was impossible to create graphic representations of these notions that would not require a verification of the ability of a respondent to conduct inductive reasoning. It would therefore become a measure of general intelligence, as understood by Spearman, and not a measure of familiarity with the lexis of PJM (Nęcka, 2003). Eventually, 18 test sheets were created (nine in each part) and 2 instruction sheets (one in each part) to assess the level
of familiarity with the lexis of the Polish sign language concerning verbs and nouns.

In order to graphically develop the sheets of the Test to Assess the Familiarity with the Lexis of the Polish Sign Language we used GIMP 2.6 software, available under the GNU General Public License. Photographs illustrating sign words were taken from the Lexicon of Sign Language by Kosiba and Grenda (2011) after obtaining the authors’ and publishers’ (Silentium based in Bogatynia) consent. The graphic material used in TOZL PJM comprised clip art pictures found on the Internet, fit for use under Act 33 of the Act on copyrights and related rights of 4 February 1994.

Due to the limited access to the study group comprising deaf people, the content validity of the used illustrations was verified by hearing competent judges with deliberately prepared sheets, in which the proposed answers were similar (only translated into Polish) to the original sign language sheets contained in the TOZL PJM. The study involved five people at different ages and different education levels. Ratings given by all competent judges appeared to be 100% similar and confirmed the content validity of all the used illustrations. As the graphic material was considerably diverse, it was decided that TOZL PJM should be in the form of a test notebook, designed not to expose the respondents to graphic materials from more than one sheet at a time.

**Determining the order of test items in TOZL PJM**

Lack of an elaborate sign language corpus and relatively limited resources on PJM lexis appeared to be the major obstacle while establishing the order of TOZL PJM test items. There is no data on how often sign words are used in everyday communication. It is, therefore, difficult to make a hypothesis on the level of familiarity with specific sign words among the deaf otherwise than intuitively. Ultimately, it was decided to subject the prepared TOZL PJM sheets to another review by the competent judges. They were given sets of sheets from parts 1 and 2 of TOZL PJM and a set of nine adhesive sheets with numbers from 1 to 9. Their task was to order the tables according to the principle that table number 1 was the easiest in their opinion, and table number 9 was the most difficult. Detailed results are presented in table 2.

Eventually, in the pilot edition of the Test to Assess the Familiarity with the Lexis of the Polish Sign Language, the order of test items was consistent with the average rating given by competent judges (expert interpreter of the Polish sign language at the Circuit Court in Poznań and two prelingually deaf persons – one with a vocational education degree and one with a higher education degree). When designing TOZL PJM, it was assumed, however, that the selection of specific multiple-choice answers in items must not be random. References were made to the classic works of William Stokoe, the creator of sign linguistics, who in 1960s proved that sign languages feature all the attributes of spoken languages – they are arbitrary and two-component systems (with vocabulary and grammar). Stokoe also distinguished three parameters that define a sign word: hand configuration, position and movement, consequently revolutionizing the way of thinking of indivisibility of signed language signs (Tomaszewski, Bielak, Rosik, 2009). The field that deals with the analysis of internal structure of a sign word and therefore with the above mentioned parameters is visual phonology. In the Polish environment, visual phonology of the Polish sign language has been explored by Tomaszewski (2010), who referred to the Hand Tier Model by Sandler and Movement-Hold Model by Liddel and Johnson, and attempted to devise methodologies to describe sign words, taking account of many more parameters than only those distinguished by Stokoe, such as: hand orientation (parameter determining the position of hand’s edge against the body of the signing person), non-manual signs (facial expressions, movement of the body, head and eyes, shape of the...
lips). In this case, in spite of the awareness that the Polish visual phonology uses considerably more complex models than Stokoe did, for the purpose of TOZL PJM it was decided to use the classic model because of its simplicity. Analysing all sign words from the perspective of the parameters they comprise (according to Stokoe), the following references were used:

Preliminary inventory of hand configurations in the Polish sign language created by Piotr Tomaszewski (PARAMETER: HAND CONFIGURATION);

Encoding system created by Bogdan Szczechankowski, adapted for the Lexicon of Sign Language by Kosiba and Grenda (2011) (PARAMETERS: POSITION and MOVEMENT).

When creating specific test items, it was assumed that they should differ in terms of difficulty, determined by the number of signs appearing per one item with one or more identical parameters.

METHOD

TOZL PJM study was anonymous and it was conducted in keeping with the following guidelines:

1. The researcher puts a test notebook in front of the respondent and hands him or her the answer sheets;
2. The researcher turns to page two of TOZL PJM test and stops at sheet 0. The task of the researcher is to point at the photograph illustrating a sign of the Polish sign language on the left side of the test sheet and then to move his or her hand and draw the respondent’s attention to the pictures located on the right side of the sheet. Next, the researcher taps his finger twice on the picture marked as the correct answer and moves his or her hand and repeats the procedure, pointing to the answer sheet (the same correct answer is highlighted in line marked with number 0 as in the sheet).

The researcher repeats the above described step twice;
3. The researcher once again turns the pages of the test sheet and using his hand and eyes he encourages the respondent to do the further part of the test on their own.

RESPONDENTS AND COURSE OF STUDY

Pilot study to assess the familiarity with the lexis of PJM was conducted on a group of 64 people (30 men and 34 women) based in the province of Wielkopolska. At this stage the main criterion to participate in the study was whether one suffered from a hearing impairment and freely used the Polish sign language in everyday communication. Most of the respondents (approximately 70%) stated Poznań or its vicinity as their place of residence. The rest (approximately 30% of respondents) declared to be based in Konin or its vicinity. The study was conducted on an age group between 19 and 66. Age average in the group of respondents amounted to 37. The largest group of persons at the same age consisted of 25-year-olds. Standard deviation of the age variable amounted to 15.18. Over half of the respondents (56.3%) were prelingually deaf. The second largest group (28.1%) consisted of people who lost hearing in their early childhoods. The remaining respondents were hard of hearing. The vast majority of the respondents (68.8%) had no deaf relatives and only 7.8% were deaf children of deaf parents. 20.3% stated that they had at least one deaf family member. Most of the respondents (59.4%) ended their education after graduating vocational schools; 39.1% graduated from secondary schools (which is not equivalent to having Polish matriculation certificates). Only one person had a higher education degree. None of the participants had ended their education after graduating from elementary school. The study was conducted in Poznań (with the help of Association of the Deaf TON) and in Konin (with the help of Deaf Sport Club GS KONIN).
RESULTS OF THE TEST TO ASSESS THE FAMILIARITY WITH THE LEXIS OF THE POLISH SIGN LANGUAGE

Psychometric analysis involved assessing the reliability and construct validity of TOZL PJM and its sub-scales: meaning recognition (MRG) and form recognition (FRG). An analysis of test item difficulty was conducted along with a theoretical verification of sub-scales using the exploratory factor analysis with the principal component method.

TOZL PJM descriptive statistics

Descriptive statistics of the Test to Assess the Familiarity with the Lexis of the Polish Sign Language are presented in table 1.

The variable overall score of the Test to Assess the Familiarity with the Lexis of the Polish Sign Language (TOZL PJM) is the total of points obtained in two parts of the test. The lowest possible score was 0; the highest – 18. Half of the respondents received scores lower than or equal to 16. Scores of 25% of respondents who performed the worst ranged from 7 to 12. Scores of 25% of respondents who performed the best ranged from 17 to 18. The level of skewness (−0.90) and the fact that the average (14.54) was lower than the median (16) indicates that the distribution of scores in the studied group is left-skewed, which means that high scores prevailed. Furthermore, the value of kurtosis (−0.29) indicates that the distribution is platykurtic – many of the respondents obtained extreme scores (both low and high ones). Standard deviation amounted to 3.18. Similarly to the variable overall score in TOZL PJM, the variables: Overall score in part 1 of TOZL PJM (MRG) – meaning recognition and Overall score in part 2 of TOZL PJM (FRG) – identifying the sign that matches the presented graphic material in meaning, are totals of the obtained points. The lowest possible score was 0; the highest – 9. In parts 1 and 2 of TOZL PJM, half of the respondents received scores lower than or equal to 8, whereas 25% of the respondents who performed the best obtained the maximum possible score (9). Scores obtained by 25% of the respondents who performed the worst differed in specific parts of TOZL PJM. In the case of part 1 they ranged from 3 to 6 points, whereas in part 2 they ranged from 2 to 6. Variable distributions of overall scores in parts 1 and 2 of TOZL PJM were left-skewed (skewness value in part 1 amounted to: −0.99; in part 2: −0.96). In both cases the average was larger than the median, which means that high scores prevailed. In the case of part 1 of TOZL PJM (MRG) the value of kurtosis (0.41) indicated that the variable distribution in the studied group was leptokurtic – too many respondents obtained scores approximate to the average. Standard deviation amounted to 1.54. In part 2 of TOZL PJM (FRG), the value of kurtosis (−0.05) was approximate to zero, which indicates that the results in the studied group revolved around the central value in a way that was similar to normal distribution. Standard deviation amounted to 1.89.

Assessment of test item difficulty

In order to assess the difficulty of specific test items, item difficulty index (Hornowska, 2009) was used. It was calculated by following the formula: \( T = \frac{ni}{N} \), where \( T \) is the item difficulty index, \( ni \) is the number of persons who gave correct answers to a given test item, and \( N \) is the total number of respondents. The obtained results are presented in table 2.

At this stage of the analysis the values of the item difficulty index appeared to be inconsistent with the expectations based on the evaluation conducted by competent judges and with the hypothetical measures of difficulty related to the number of sign words per item that had common parameters. It was difficult to identify any regularities in the discord between the expected and obtained results.
Analysis of reliability of TOZL PJM

In order to verify the reliability of TOZL PJM, Cronbach’s $\alpha$ method was used. The value of the coefficient for all test items amounted to 0.78, so it could be concluded that TOZL PJM was reliable to a sufficient extent. The results of the conducted analysis indicate that removing 17 out of 18 test items could lower the $\alpha$ value for the entire test. Only in the case of removing the item BRAT (brother), the value of the $\alpha$ coefficient could amount to 0.80. Therefore, after conducting further analyses, removing this item from the test could prove worth considering.

Reliability of two parts of TOZL PJM (1 and 2) was assessed by using the $\alpha$ coefficient. However, the results were considerably lower than for the entire test (part 1: $\alpha = 0.70$; part 2: $\alpha = 0.55$ in comparison with $\alpha$ for the entire test = 0.78). Table 2 presents the value of $\alpha$ after removing successive test items. It suggests that removing any test item from part 1 could lower the value of the reliability coefficient. Similarly, removing 8 out of 9 items in part 2 of TOZL PJM would negatively affect the value of the reliability coefficient. Similarly to the reliability analysis of the entire Test to Assess The Familiarity with the Lexis of the Polish Sign Language, removing the item BRAT (brother) could increase the $\alpha$ value in part 2 by 0.091. Because of the lower value of the $\alpha$ coefficient in parts 1 and 2 of the

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1 Signs and expressions in Polish sign language are written down by means of glossing. A gloss of a Polish sign language sentence is a sequence of Polish words, written in capital letters. These sequences correspond to signs occurring in PJM sentence. Signs which need to be notated by using more than one Polish word are written using dashes between the relevant words.

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Tabella 1. TOZL PJM descriptive statistics

<table>
<thead>
<tr>
<th></th>
<th>Overall score of the TOZL PJM</th>
<th>Overall score in part 1 (MRG)</th>
<th>Overall score in part 2 (FRG)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>Valid</td>
<td>61.00</td>
<td>62.00</td>
</tr>
<tr>
<td></td>
<td>Missing</td>
<td>3.00</td>
<td>2.00</td>
</tr>
<tr>
<td>Mean</td>
<td></td>
<td>14.54</td>
<td>7.39</td>
</tr>
<tr>
<td>Median</td>
<td></td>
<td>16.00</td>
<td>8.00</td>
</tr>
<tr>
<td>Mode</td>
<td></td>
<td>16.00</td>
<td>8.00</td>
</tr>
<tr>
<td>Std. Deviation</td>
<td></td>
<td>3.19</td>
<td>1.54</td>
</tr>
<tr>
<td>Variance</td>
<td></td>
<td>10.15</td>
<td>2.37</td>
</tr>
<tr>
<td>Skewness</td>
<td></td>
<td>-0.90</td>
<td>-0.99</td>
</tr>
<tr>
<td>Std. Error of Skewness</td>
<td></td>
<td>0.31</td>
<td>0.30</td>
</tr>
<tr>
<td>Kurtosis</td>
<td></td>
<td>-0.29</td>
<td>0.41</td>
</tr>
<tr>
<td>Std. Error of Kurtosis</td>
<td></td>
<td>0.60</td>
<td>0.60</td>
</tr>
<tr>
<td>Minimum</td>
<td></td>
<td>7.00</td>
<td>3.00</td>
</tr>
<tr>
<td>Maximum</td>
<td></td>
<td>18.00</td>
<td>9.00</td>
</tr>
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<td>Percentile</td>
<td></td>
<td>25</td>
<td>12.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50</td>
<td>16.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>75</td>
<td>17.00</td>
</tr>
</tbody>
</table>

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1 Signs and expressions in Polish sign language are written down by means of glossing. A gloss of a Polish sign language sentence is a sequence of Polish words, written in capital letters. These sequences correspond to signs occurring in PJM sentence. Signs which need to be notated by using more than one Polish word are written using dashes between the relevant words.

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test, in comparison with its value for the entire test, it was decided to calculate the interclass correlation coefficient (ICC). In part 1 the value of ICC amounted to 0.695; in part 2 it amounted to 0.545. Basing on the obtained results, it was concluded that the diverse ways in which the respondents dealt with test items could have been related to their various linguistic experiences with PJM resulting, e.g., from past educational experiences. Moreover, lower level of reliability in part 2 of the test may have related to the fact that most test items in the scale did not differ in terms of difficulty and had low discriminatory power (see table 2).

**Analysis of the most common mistakes**

In order to deepen the analysis of construct validity of the assumptions made while creating TOZL PJM, a qualitative analysis of the most common mistakes made by respondents was

<table>
<thead>
<tr>
<th>L.p.</th>
<th>TOSZL PJM (MRG) Part I</th>
<th>Item difficulty index</th>
<th>Competent judges' assessment (scale 1 to 9)</th>
<th>TOSZL PJM (FRG) Part II</th>
<th>Item difficulty index</th>
<th>Competent judges' assessment (scale 1 to 9)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. MYĆ-SIĘ (to get washed)</td>
<td>0.92</td>
<td>4</td>
<td>ZAMYKAĆ (to close)</td>
<td>0.95</td>
<td>6.3</td>
<td></td>
</tr>
<tr>
<td>2. KURS (course)</td>
<td>0.92</td>
<td>5.7</td>
<td>PANI (Mrs)</td>
<td>0.94</td>
<td>4.7</td>
<td></td>
</tr>
<tr>
<td>3. PIEC (to bake)</td>
<td>0.88</td>
<td>2.7</td>
<td>ZNACZEK (stamp)</td>
<td>0.87</td>
<td>6.7</td>
<td></td>
</tr>
<tr>
<td>4. KAMERA (camcorder)</td>
<td>0.88</td>
<td>3</td>
<td>SERCE (heart)</td>
<td>0.85</td>
<td>3.7</td>
<td></td>
</tr>
<tr>
<td>5. SŁAWNO</td>
<td>0.87</td>
<td>5.7</td>
<td>RODZINA (family)</td>
<td>0.84</td>
<td>3.3</td>
<td></td>
</tr>
<tr>
<td>6. MIÓD (honey)</td>
<td>0.77</td>
<td>5</td>
<td>WPISAĆ (to write in)</td>
<td>0.84</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>7. ŁZAWIĆ (to shed tears)</td>
<td>0.73</td>
<td>5.3</td>
<td>MATKA (mother)</td>
<td>0.80</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>8. RYSOWAĆ (to draw)</td>
<td>0.71</td>
<td>5.3</td>
<td>OBRAZIĆ (to offend)</td>
<td>0.74</td>
<td>5.7</td>
<td></td>
</tr>
<tr>
<td>9. LISTOPAD (November)</td>
<td>0.54</td>
<td>8.3</td>
<td>BRAT (brother)</td>
<td>0.67</td>
<td>4.7</td>
<td></td>
</tr>
<tr>
<td>TOSZL PJM (MRG) Part I item-difficulty-index</td>
<td>0.80</td>
<td></td>
<td></td>
<td>TOSZL PJM (MRG) Part II item-difficulty-index</td>
<td>0.83</td>
<td></td>
</tr>
</tbody>
</table>

TOZL PJM item difficulty index: 0.82.

* 1 – the easiest; 9 – the most difficult.
conducted. It was decided, however, that conducting this type of analyses on items with lower level of difficulty was pointless, as single mistakes can be considered as accidental. Therefore, it was decided that only the test items with item difficulty index lower then or equal to 0.85 would be subjected to thorough analysis.

During the analysis of the test items with item difficulty index equal to or lower than 0.85, it was observed that in every item most of multiple-choice answers had at least one common parameter. It can be concluded that the assumption concerning the expected difficulty of successive test items depending on the number of common parameters in a given item’s set of multiple-choice answers was correct.

DISCUSSION

The goal of the study was to make an attempt to create a tool to assess the level of familiarity with the lexis of the Polish sign language as the chosen aspect of verbal functioning of deaf people in Poland. While working on TOZL PJM, there was a number of difficulties related to the lack of complex studies on the structure of PJM and limited access to a representative set of sign words. Problems also lied in the small number of available publications on the rules of constructing such tools and a small number of ready-made test with verified and satisfactory psychometric parameters that could be used as a source of inspiration. The created tool – Test to Assess the Familiarity with the Lexis of the Polish Sign Language (TOZL PJM) appeared to have a satisfactory level of the reliability coefficient for the entire test, but a relatively low level of the difficulty. TOZL PJM can thus be considered too simple for the studied group. It did not discriminate it in terms of the level of familiarity with the Polish sign language. Juxtaposed with the item difficulty index for specific items, the results of the qualitative analysis of mistakes made by respondents of TOZL PJM may indicate that the idea to design items with the assumption that the more multiple-choice answers there are on a sheet, the fewer respondent give correct answers was worthwhile. Most likely, in future studies the simplified model of describing sign words according to Stokoe should be replaced with methods allowing for conducting more detailed analyses of similarities and differences between signs. It appears that not only phonological specifics of sign words should be taken into account. It also matters how often specific signs are used in the Polish sign language communication and to what extend specific sign words are iconic (i.e. how much their physical form relates to the meaning they convey, making them legible also to people who do not know the sign language). How difficult recognizing meanings of presented sign words against other words is for a given person might be affected by the number of eye fixations necessary to perform a thorough analysis of the presented graphic material. Verifying this hypothesis in the future could be possible with the help of the eye tracking method.

In its future editions the test should involve a larger number of items, so that sub-scales could be distinguished.

Taking account of the unsatisfactory value of the interclass correlation coefficient in parts 1 and 2, the criteria for choosing respondents should also be reconsidered. A lot of essential information could be obtained by analysing the results in the following sub-groups: native speakers, nearly-native speakers, non-native but fluent speakers (S.D. Fisher, after: Podgórska – Jachnik D. (2013)).

In the case of conducting pilot studies on a larger group, it might be reasonable to perform screenings with neuropsychological tests to check the functioning of respondents in the area of a visual analyser. The respondents behaving in non-standard ways should be removed from the study group, as the overall test score obtained by these people would not accurately reflect their level of familiarity with the language.
Devising the tools to assess the familiarity with the lexis of the Polish sign language, it is worth considering how to present sign words – as videos or perhaps as photographs. It seems that static graphic presentation may lead people with poor spatial imagination to perform worse, regardless of their level of familiarity with the sign language.

Creating a method to assess the level of how the deaf function linguistically in the sign language is a difficult task that requires an original approach. The difficulty also lies in the fact that it requires the researcher to have knowledge of two seemingly unrelated fields of science – sign linguistics and psychometrics. It may be the reason why at the moment so few people across the world deal with the problem.

REFERENCES


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TEST DO OCENY ZNAJOMOŚCI LEKSYKI W POLSKIM JĘZYKU MIGOWYM (TOZL PJM)
– KONSTRUKCJA I CHARAKTERYSTYKA PSYCHOMETRYCZNA

ABSTRAKT


Słowa kluczowe: badanie kompetencji językowych, głuchota, polski język migowy