THE SLOVAK VERSION OF MMPI-A

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The study presents The Minnesota Multiphasic Personality Inventory for Adolescents - MMPI-A and describes the process of verifying the psychometric characteristics of its Slovak version. A sample of 931 adolescents aged 14 to 18 years was verified through content, criterion and construct validity, as well as reliability such as stability over time and internal consistency; and the applicability of US standards to the Slovak population was tested. The results confirmed the psychometric properties of the Slovak version of MMPI-A and pointed out the need to create their own standards.

Keywords: MMPI-A, adolescents, validity, reliability

1 Introduction

The Minnesota Multiphasic Personality Inventory for Adolescents - MMPI-A is currently one of the most widely used psychodiagnostic methods for the assessment of adolescent personalities in the USA and worldwide. The MMPI-A was established in 1992 as a version of the MMPI for adolescents from 1943. Archer et al. (1) report that the MMPI-A is the third most commonly reported method after the Wechsler Intelligence Scale and the Rorschach Test. Archer and News in 2000 (1) addressed 346 psychologists working in clinical and non-clinical conditions in the USA. The MMPI-A was among the ten most commonly used methods for the assessment of adolescents and was the only objective method in the top ten (2).

The reason for the extensive use of MMPI-A is the high validity of testing provided by validation scales and the wide diagnostic scope given by the 69 scales. It enables the complex understanding of adolescent personality in both normal and pathological conditions.

Personality testing of adolescents is crucial in psychology, it has also proven important in the examination of self-harm within the project "Self-Harm: The Definition, Prevalence, Influencing Factors and Implications for Clinical Interventions", which needed to examine this phenomenon in relation to personality (3). For this reason, it is necessary to validate the MMPI-A for our requirements.

1.1 Minnesota Multidimensional Personality Inventory for Adolescents: MMPI-A

The MMPI-A is a version of the original MMPI adapted for the adolescent population. The MMPI was first seen in the late 1930s as the work of Stark Hathaway, a clinical psychologist, and Charley McKinley, a neuropsychiatrist. The authors published the first study in 1940. The primary purpose of the MMPI was to diagnose psychiatric diseases. In the 1950s, it had already become the most commonly used inventory of personality in the USA. Its use has been extended to jobseeker diagnostics for jobs that require stable mental health such as police officers, airplane pilots, etc. At the same time, it has become widely used in education, research, neurology, medicine and forensic practice to assess drug and alcohol addicts, delinquent adolescents, prisoners, military personnel, medical patients, people with chronic pain and brain injuries, post-traumatic stress disorder, etc. The MMPI has also been widely used outside the USA. By 1992, 140 translations of the MMPI had been made in 46 countries. Butcher and Owen (1) report that the MMPI was used in 84% of personality research projects and Butcher (1) reports that over 10,000 books and articles on the MMPI have been published. Hathaway (1, 2, 4, 5, 6) lists the ease of administration, the high test validity given by validation scales that are capable of determining the tendency to provide a misrepresentative response, the large number of studies that confirm the psychometric quality of the inventory, the large number of publications that provide interpretative principles, and a set of MMPI items that is clinically relevant to different cultures and able to reflect the psychopathology of all cultures studied so far as the major reasons for the widespread use of the MMPI.

Since its inception, the MMPI has also been used to assess the personality of adolescents. However, gradually there arose a need to revise the test, so in 1980, a MMPI re-standardization committee was formed, consisting of W. G. Dahlstrom, J. N. Butcher and J. R. Graham. C. L. Williams was later invited to develop the adolescent version, as well as A. Tellegen to develop the T-score (7). The main reasons for the development of the MMPI version for adolescents was the need to develop standards for the adolescent population, as well as a need to update and specify the test items (8):

▪ some of the MMPI items were not suitable for adolescents, while other relevant items were missing,
▪ the need to develop scales focused on the problem areas specific to this developmental period – school and family problems, substance abuse problems, eating disorders, suicidal tendencies,
▪ the need to simplify the wording of items,
▪ the need to reduce the number of items.

After the re-standardization, a version of MMPI-A was developed consisting of 478 items, which form the following scales:

▪ 5 validation scales: L (Lie Scale), F (F Scale), K (K Scale), VRIN (Variable Response Inconsistency Scale), TRIN (True Response Inconsistency Scale);
▪ 10 standard clinical scales: Hs (Hypochondriasis), D (Depression), Hy (Hysteria), Pd (Psychopathic Deviate), Mf (Masculinity-Feminity), Pa (Paranoia), Pt (Psychasthenia), Sc (Schizophrenia), Ma (Hypomania), Si (Social Introversion);
▪ 15 content scales: A-anx (Anxiety), A-obs (Obsessiveness), A-dep (Depression), A-hea (Health Concerns), A-aln (Alienation), A-biz (Bizarre Mentation), A-ang (Anger), A-cyn (Cynicism), A-con (Conduct Problems), A-lse (Low Self-Esteem), A-las (Low Aspirations), A-sod (Social Discomfort), A-fam (Family Problems), A-sch (School Problems), A-trt (Negative Treatment Indicators);
▪ 6 supplementary scales: A (Anxiety), R (Repression), MAC-R (MacAndrew-Revised), ACK (Alcohol/Drug Problem Acknowledgement), PRO (Alcohol/Drug Problem Proneness), IMM (Immaturity);
▪ 28 Harris-Lingoes Subscales;
▪ 3 Social Introversion Subscales.

New scales developed for the adolescent population include e.g. Alienation (A-aln), Conduct Problems (A-con), Low Aspirations (A-las), School Problems (A-sch), Immaturity (IMM), Alcohol/Drug Problem Acknowledgement (ACK), and Alcohol/Drug Problem Proneness (PRO) (8).
The MMPI-A is for adolescents aged from 14 to 18. The basic prerequisites for administration are adequate reading skills, or 7th grade reading abilities, and the adolescent must be able to understand the content of items.

1.2 The Slovak Version of the MMPI-A

Two independent versions were developed during the translation of the MMPI-A into Slovak. The MMPI version for adolescents contains 419 modified items of the MMPI-2, whose psychometric characteristics have been verified on a sample set of Slovak university students. The most appropriate wording has been chosen based on a comparison of MMPI-A translations with MMPI-2 items. Subsequently, the translation went through

linguistic proofreading. The inventory translation includes two aspects: the preservation of literary and content equivalence. The literary equivalence, or literal translation of items, is not sufficient. Items should have the same wording, but maintaining content equivalence is essential. It is necessary for the translator to make an equivalent translation of the test stimuli, as the translated version must contain the same information as the original test to ensure its content validity (9). However, translated words can often have several possible explanations or translations, so it is difficult to capture the original meaning. The basic prerequisite for the applicability of the new version of the inventory in practice is to verify its psychometric properties. Without the validity of a measurement tool, its other characteristics become relatively insignificant (10). The subject of the study is a summary of the analyses of psychometric property verifications – the validity and reliability of the Slovak version of the Minnesota Multidimensional Personality Inventory for Adolescents. We focused on obtaining evidence of the content, criterion and construct validity. We do not perceive the individual sources of validity evidence as separate parts, but rather as single aspects of the whole, whose acquisition leads to the confirmation of the applicability of the method in practice. We have also focused on various aspects of reliability to confirm the reliability of measurement and to verify it is possible to apply US standards to the Slovak population. In the process of adapting the MMPI-A for the Slovak population, we have focused on the following research objectives:

A. verification of the validity of the Slovak version of MMPI-A:
- verification of the content validity
- verification of the criterion validity
- verification of the construct validity

B. verification of the reliability of the Slovak version of MMPI-A:
- verification of the stability of results over time
- verification of the internal consistency of the test

C. verification of the applicability of US standards to the Slovak adolescent population.

2 Methodology

2.1 Research Sample Characteristics

The selection of the research sample was guided by the requirement to create a representative sample of the Slovak adolescent population. The target set consisted of adolescents aged 14 to 18. The authors of the test required the (re)standardization sample to consist of 250 persons of each sex of the general population – a normative set and 200 people with psychiatric diagnosis – the criterion set (11). The age, place of residence and type of school of the adolescents studied were taken into account. Data collection was carried out in two phases. In the first phase, 109 protocols were collected for girls, on which we performed the initial content equivalence analysis. Based on the results, the inventory was adjusted and, in the next phase, the subjects were provided with a modified version of the MMPI-A. To verify the stability of the results over time, we repeated the measurements at an interval of a week on a set of 25 of the subjects. We obtained data from 931 people (706 from the normative set and 116 from the criterion set). Subsequently, we evaluated the validity of the individual protocols. We obtained 258 protocols from boys and 361 from girls in the normative set and 44 boys and 53 girls in the criterion set.

2.2 Data Analysis Methodology

The first step of the analysis was to calculate the gross score for all scales, to assess the validity of all protocols and to exclude those that did not meet the following criteria (12):

- more than 35 items with no response
- F scale score greater than 25

To verify the validity, reliability, and possibility of applying US standards to the Slovak population, we performed several analyses that are specified in more detail depending on the verified psychometric characteristic.

Content Validity Analysis Methods:
To evaluate the content validity of the Slovak version of the MMPI-A, we used the confirmation index – the percentage of affirmative responses to individual items. This index particularly applies to items of a dichotomous nature. We calculated a confirmation index for each of the 478 inventory items. We compared the resulting index with the confirmation indices of the US normative and criterion set. Butcher et al. (12, 4) reported that if the discrepancy concerning the confirmation index is equal to or greater than 25%, the new version item is not content equivalent and consideration should be given to possible causes. Another analysis method we used to verify content validity was the confirmatory factor analysis. Based on this, we applicated the extent, to which the individual scales feed four expected factors: General Maladjustment, Over-Control, Social Introversion, Masculinity-Femininity (Mf).

Criterion Validity Analysis Methods:
To evaluate the criterion validity of the Slovak version of the MMPI-A, we determined the presence of the diagnosed condition based on the score achieved on the respective scales for individual psychiatric patients. Subsequently, we determined the percentage match between the diagnosis determined by a physician and the diagnosis resulting from the MMPI-A profile.

Construct Validity Analysis Methods:
The construct validity of the MMPI-A is demonstrated by its ability to differentiate the set of boys and girls from the Masculinity-Femininity (Mf) Scale and the normative and criterion set for the other scales. Therefore, we used a comparative research plan for the analysis and compared the gross score of the individual scales of the criterion and normative set, or boys and girls for the Masculinity-Femininity (Mf) Scale. We used the Student T-Test and the Mann-Whitney U-Test on two independent sample sets to compare the data from the sets examined. The comparison of the data was preceded by a calculation of the statistical indicators of the distribution shape of individual variables. Based on the results, we chose to use the parametric (Student T-Test) or non-parametric test (Mann-Whitney U-Test).

Methods of Analysis of Reliability as the Stability of Results over Time:
A correlation research plan was used to assess the stability of the MMPI-A results over time. The aim of the analysis was to demonstrate the reliability of the MMPI-A measurement and the exclusion of results due to other factors. We administered the Slovak version of the MMPI-A to a set of the normative population at a week interval. We matched the first and second measurements using a correlation coefficient.

Methods of Analysis of Reliability as Internal Test Consistency:
To assess the internal consistency of the scales of the Slovak version of the MMPI-A, we calculated the Cronbach's α coefficient for the individual scales examined. The lower limit for internal consistency is considered to be .70 or more, but for the MMPI-A where one scale records various symptoms of a disease or manifestations of a single variable, the value of the coefficient for some scales is lower. Therefore, we used Cronbach's α coefficient values of the US normative set as an objective criterion.

Methods of Analysis for the Application of US Standards for the Slovak Population:
We used a comparative research plan to assess how the Slovak adolescent population scores against the US adolescent population. We used Student`s T-Test to compare the data of the sets examined.

3 Results

3.1 Validity of the Slovak Version of the MMPI-A

To verify the validity of the Slovak version of the MMPI-A, we obtained evidence of its content, criterion and construct validity.

When translating a method from one language to another, it is necessary to verify not only the literary but also the content equivalence between the original and translation is preserved. Idiomatic expressions, inversely formulated items or double negatives are particularly problematic. It is also necessary to cope with cultural differences, evaluate them and then adjust, exchange items or adjust the cut-off scores for the scales to which they belong. To verify the content validity of the Slovak version of the MMPI-A, we used a confirmation index, or the percentage of affirmative responses to each inventory item, which we then compared to the confirmation index of the US adolescent population. A difference of 25% or more indicates that the item is not equivalent in terms of content to the original inventory (4). Consequently, the reasons for the discrepancies should be considered, which may be caused by incorrect translation, but also by cultural differences between the original and new population. After evaluating the reasons, the items are adjusted or the cut-off scores for the scales, to which they belong, are adjusted.

The content validity analysis through the confirmation index was performed in two phases. First, the Slovak version was ⬚pplicab using a smaller sample of 100 girls from the Nitra Region. Differences equal to or greater than 25% were found in 44 items, representing 9% of the 478 items.

Subsequently, a modified version of the MMPI-A was administered to a set of 258 boys and 361 girls of the normative set. A confirmation index of$\geq$ 25% was found in the Slovak girls' sample in comparison to the US scores in 30 items, which is 6.3% of the 478 items. A confirmation index $\geq$ 25% was found in the set of Slovak boys in 15 items or 3.1%. To analyze the individual discrepancies in items, we determined which scale they belonged to and calculated the number and percentage of items for each scale. For the validation scales, the percentage of the items ranged from 3.3 to 13.3% in the set of girls and from 1.6 to 6.6% in the set of boys. Supplementary validation scales VRIN and TRIN were also included in the analysis. Values of 2% for the VRIN scale and 6.3% for the TRIN scale were found for both girls and boys. For standard clinical scales, values from 1.3 to 10.7% were found in the set of girls and 0% to 8.1%. in the set of boys. For content scales, the percentage values of non-equivalent items ranged from 0 to 12.5% for girls and from 0 to 6.3% for boys. For the supplementary scales, values ranging from 0 to 15.1% were found for the R - Repression Scale in the set of girls and from 0 to 6.1% in the set of boys.

The assessment of causes for the discrepancies, in particular, revealed the cultural conditionality of the responses. The Slovak population rated the family environment more positively than the US population, especially in areas such as family support, family cohesion, family conflicts, for example in the set of girls and boys:

79. I very rarely argue with family members.
119. I believe that at home, I feel as comfortable as most people I know.
204. Almost all relatives show me sufficient support.
451. In our family, we have no problem talking to each other.

For other items, the discrepancies were related to the preferred interests:
64. I like poetry.
131. I'm writing a diary.

Other items concerned emotional stability and somatic manifestations such as:
138. I have never had a seizure or convulsions.
226. I feel very upset once a week or more often.
284. Sometimes, I get so upset that I find it difficult to fall asleep.
374. I swallow without problems.

The Slovak population showed less somatic manifestations and higher emotional stability.

We reviewed all the items in that way. We assume that possible discrepancies due to translation can be found in the items, e.g.:
95. Someone is biased against me.
387. I have never had premonitions.

We will carry out additional verification of these items. Overall, however, the analysis revealed a very low number of items with a confirmation index$\geq$ 25%, even when compared to foreign studies. Even with MMPI-2 standardization, values of 10.8% (13), and in the second study 11.6% (14), were found. Gillet et al. (15) report that if the discrepancy value is less than 10%, the results can be considered satisfactory. In Norway, for example, they found content discrepancy in 20% of items (16) and in Turkey in 29% of items (17). The low number of items with high confirmation indices is probably related to the fact that some of the MMPI-A items are the same as those in MMPI-2, while the Slovak version of the MMPI-2 was psychometrically verified. When translating the MMPI-A into Slovak, we also considered the Slovak version of the MMPI-2. Overall, the analysis confirmed the content validity of the Slovak version of the MMPI-A.

As the next step in the process of content validation, we examined the factor structure of the Slovak version of the MMPI-A scales. The factor analysis of the MMPI-A baseline scales, together with basic validation scales: L, F, and K identified 4 factors: Over-Control, Social Introversion, Masculinity-Femininity, and General Maladjustment, (Archer, Archer and Klinefelter (18), the same as those for the MMPI-2 version (12). The analysis was performed separately on the group of girls and boys in the normative set. In both groups, we found that the scales were saturated by 4 factors; the results supported the assumption of the existence of 4-factor structure scales of the Slovak version of the MMPI-A.

The data obtained from both analyses confirmed that, in terms of content, the items of individual scales of the Slovak version of the MMPI-A are equivalent to the original inventory. As further evidence of the validity of the Slovak version of the MMPI-A, we examined the criterion validity.

To obtain evidence of the validity of the Slovak version of the MMPI-A, we focused on verifying the match between the diagnosis by a physician and the score from the respective MMPI-A scales. Since the MMPI-A is also a psychodiagnostic tool, the verification of diagnostic capability is an essential step in its practical use. To investigate the criterion validity of the Slovak version of the MMPI-A, we assumed the existence of a match between the diagnosis by a physician in the criterion set with F 20-29 diagnoses and the scaling scores of Schizophrenia (Sc), Paranoia (Pa) and Bizarre Mentation (A-biz). There was an 83% match between the scores on the selected scales and the diagnosis made by a physician. In addition, there was the assumption there would be a match between the physician's diagnosis and the MMPI-A scaling scores for Depression (D), Psychasthenia (Pt), Anxiety (A-anx), Obsessiveness (A-obs) and Depression (A-dep) in the criterion set with F 30-39 and F 40-48 diagnoses. We found a 79% match for F 30-39 diagnoses and 78% for F 40-48 diagnoses. For the F 90-98 diagnosis set (except for F 93), we expected a match between the physician's diagnosis and the scaling scores on Psychopathic Deviate (Pd), Paranoia (Pa), Conduct Problems (A-con), Low Aspirations (A-las), Cynicism (A-cyn), Family Problems (A-fam), School Problems (A-sch), MacAndrew-Revised Scale (MAC-R), Alcohol / Drug Problem Acknowledgement (ACK) and Alcohol / Drug Problem Proneness (PRO). We found a 78% match.

In practice, we approach the evaluation on a case-by-case basis, assessing the scores of all scales, making their individual configurations and diagnostics more accurate. Even in our analysis, if we looked at individual cases and evaluated matches for individual diagnoses, and not for the whole range of diagnoses, the percentage match would likely increase. At the same time, an adolescent with a certain diagnosis may not have elevated scores on all reported scales, e.g. an adolescent with obsessive compulsive disorder will have an elevated score on the

Anxiety (A-anx) and Obsessiveness (A-obs) Scales, but may not have an elevated score on the Depression (DEP) or Depression (A-dep) Scales, and an adolescent with depressive disorder will have exactly the opposite score elevation. In the analysis, we took into account the set of scales and diagnoses, which automatically leads to a decrease in the percentage match value. Despite the simplification of the analysis, we found matches between 78 and 83%, and therefore we consider the results satisfactory.

Another objective was to verify the construct validity of the Slovak version of the MMPI-A. Construct validity is the degree to which a measuring tool measures the construct it purports to measure. From the results of the inventory construction, it was assumed that the Slovak version of the MMPI-A would differentiate adolescents of the general population – the normative set from adolescents with a psychiatric diagnosis – the criterion set. The MMPI was created using empirical criteria, where the appropriate items were those that differentiated the normative and criterion set.

A sample of 361 girls and 258 boys of the general population and 53 girls and 44 boys who had been diagnosed with a psychiatric condition were analyzed. The criterion set included several different types of psychiatric conditions. Although the sample is not homogeneous in terms of diagnosis, the presence of a diagnosed psychiatric condition leads to an overall increase in the outcome profile (19), therefore we can expect elevated scores on all standard clinical scales except Masculinity-Femininity (Mf) and Social Introversion (Si). From the validation scales, we focused on the F Scale score, which determines the presence of psychopathology. Significant differences in the F Scale scores between the normative and criterion set was expected with a higher average score in the group with a diagnosed psychiatric condition, and this assumption was confirmed.

The Social Introversion Scale was developed in a different way, based on the ability to differentiate between female students, which were divided into two sets according to the results on the introversion-extroversion scale in the questionnaire: the Minnesota Thinking-Social-Emotional Inventory (11, 7), therefore it was not reasonable to expect differences between the sets examined on this scale and it was excluded from the analysis. The Masculinity-Femininity (Mf) Scale was also developed in a different way, based on the differentiation between groups of women and men, so it was expected to differentiate between the groups of girls and boys, from both the normative and criterion sets. Statistically significant differences between boys and girls were found for both the normative and the criterion sets.

For other standard clinical scales: Hypochondria (Hs), Depression (D), Hysteria (Hy), Psychopathic Deviation (Pd), Paranoia (Pa), Psychasthenia (Pt), Schizophrenia (Si) and Hypomania (Ma), we expected significant differences between the normative and criterion sets with higher average scores in the criterion set. In both cases, we found statistically significant differences in all the scales studied, with adolescents with a diagnosed psychiatric condition having a higher average score than adolescents without a diagnosed condition, except for the Hypomania (Ma) Scale. There were no statistically significant differences in either group, both girls and boys. Although an overall profile elevation would be expected in the heterogeneous sample in terms of diagnosis, an additional analysis was performed and subjects with the diagnosed psychiatric conditions F90-98 were excluded from the sample (except F93), and we compared this set with the normative set of adolescents. assumption was confirmed, as the additional analysis revealed a statistically significant difference between the F90-98 (except F93) criterion set and the normative set of the Slovak population. We therefore also deduce the construct validity of this scale. The analysis confirmed the ability of the Slovak version of the MMPI-A to differentiate on the standard clinical scales as well on the Masculinity-Femininity (Mf) and F Scales.

For the content and supplementary scales, an overall profile increase cannot be expected, as scales already create specific spheres. Therefore, the criterion set was divided in terms of established diagnoses. With regard to the number of people with each diagnosed condition, a group of adolescents diagnosed under categories F 30-39, F 40-48 and a group diagnosed under categories F 90-98 were formed, with the exclusion of those diagnosed under category F 93, which includes emotional disorders. For the sets including diagnoses F 30-39 and F 40-48, we expected a difference between the normative and criterion sets on the Depression (A-dep), Anxiety (A-anx), Obsessiveness (A-obs), Health Concerns (A-hea)), Alienation (A-aln), Low Self-esteem (A-lse), Social Discomfort (A-sod), Family Problems (A-fam) and School Problems (A-sch) Scales as they represent symptoms of affective and neurotic diseases and problems in school and the family environment. In the group of adolescents diagnosed conditions in categories F 90-98 (except F93), we expected a difference among the Conduct Problems (A-con), Family Problems (A-fam) and School Problems (A-sch) Scales. In all scales examined, the analysis pointed to statistically significant differences among the examined sets with a higher average score in the criterion sets.

For the supplementary scales, the criterion set was split into the same groups as were used for the content scales. We expected differences in the Anxiety (A) and Immaturity (IMM) scores between the normative and criterion sets within diagnosis categories F 30-48, with higher scores in the criterion set, and significant differences in the MacAndrew-Revised (MAC-R), Alcohol/Drug Problem Acknowledgement (ACK), Alcohol/Drug Problem Proneness (PRO) and Immaturity (IMM) Scales between the normative set and criterion set with diagnosis categories F 90-98 (except F 93), with the higher score in the criterion set. In both cases, the analysis pointed to statistically significant differences in the studied scales, with adolescents in the criterion set receiving a higher average gross score than adolescents without a diagnosed condition.

Based on the above results, we confirm the construct validity of the Slovak version of the MMPI-A in all examined scales.

3.2 The Reliability of the Slovak Version of the MMPI-A

In the process to obtain evidence of the Slovak version of MMPI-A reliability, we verified the stability of the results over time. The Slovak version of the MMPI-A was administered to a group of 25 adolescents twice with a one-week gap. The assumption was that there is a positive relationship between the scores of the scales examined for the first and second measurements. A correlation coefficient was found in the validation scales ranging from .63 to .84. For standard clinical scales, the observed correlation coefficient values ranged from .54 to .93. For content scales, we found a correlation coefficient from .54 to .96. For supplementary scales, the correlation coefficient values ranged from .71 to .98. The analysis confirmed that the measurement results are sufficiently determined by the subjects themselves and not by accidental influences.

Within the reliability analysis of the Slovak version of the MMPI-A, we also performed an internal consistency analysis of the standard validation, clinical, content and supplementary scales. The internal consistency of the scale indicates how the individual items of the scale are interrelated. For certain variables, a high internal consistency is desirable, as it indicates that the items in the scale represent the same latent variable. However, in the case of the MMPI-A, some scales represent different aspects of the same variable, e.g. different symptoms of a single disease, or different forms of a single problematic behavior. For example, The Family Problems (A-fam) Scale represents family conflicts, family feelings, communication, coherence and more, therefore we cannot expect a high internal consistency coefficient. To assess internal consistency, the value of the Cronbach's α coefficient of the Slovak version of the MMPI-A scales were compared with the coefficient values of the US sample. The standard validation, clinical, content and

supplementary scales were analyzed. For the validation scales of both the normative and criterion sets, we consider the difference in the L Scale in the normative set of boys, where the coefficient value was .48 in the Slovak sample, but up to .64 in the US sample, to be significant. In the criterion set, the coefficient value in the Slovak sample was higher (.59) than in the US sample (.54), and therefore, based on these results, we consider this scale to be internally consistent compared to the US sample, as well as other validation scales.

Within standard clinical scales, compared to the US sample, lower values for the Cronbach's α coefficient were found in several scales, but the differences were no greater than .10, except for the Masculinity-Femininity (Mf) Scale in the normative set, where the coefficient value was .21 in the Slovak sample and .40 in the US sample. In the process of the MMPI-2 standardization for the Slovak population, we found that the Masculinity-Femininity (Mf) Scale is difficult to translate as it represents interests and leisure preferences, activities that can be described as typically female or male. Since the MMPI originated in a different culture, what is considered to be typically male or female activity in our culture may be understood differently in American culture. E.g. in Italy, they had to completely modify the item "I like cooking", which in the original test represents a typically feminine interest (Pancheri, 1996 by Butcher in 13). In Italian culture cooking is not perceived in the same way, so the item would not obtain the score that would be expected. However, if we look at the confirmation index values of the Masculinity-Femininity (Mf) Scale, we find the content discrepancy in 3 of the 44 items in the group of girls and in only 1 item in the group of boys. In the set of boys, no differences greater than .10 were found in any of the scales in the normative and criterion sets when compared to the US sets, and in some scales, the coefficient values of the Slovak set were higher than in the US set. Therefore, we evaluate the items of this and other standard clinical scales for sets of girls and boys as internally consistent.

There were significant differences between the Cronbach's α coefficient values for the content scales in the normative set of girls, but .34 was measured on Low-Aspiration (A-las) in the criterion set, while the coefficient in the US set was .63. The same results were found for the boys' group. There were no significant differences in the normative set, but in the criterion set, the coefficient value was .26 in the Slovak sample and .63 in the US sample. In view of the result, we analyzed a number of scale items that were found to be non-equivalent in content analysis. In the girls' set, it was two items, and in the boys' set, it was only one item on the Low-Aspiration (A-las) Scale. At the same time, the values of Cronbach's α coefficient in the normative set were identical with the values of the US sample. Statistical analysis did not point to scale items that could be changed or omitted to increase the coefficient value. E.g. when verifying the Slovak version of the MMPI-2, the analysis showed low values in the Anxiety (ANX) .43 and Work Interference (WRK) .56 Scales. Upon a closer analysis of these items, we found that this low value was due to a single item, and for both scales the same item, The statistical analysis also showed that by omitting it the coefficient value in the Anxiety (ANX) Scale would increase to .78 and the Work Interference (WRK) to .79 (14). The item translation was modified. However, for the Low-Aspiration (A-las) Scale, no item appears to be problematic and the internal consistency of the items was confirmed in the normative set. In view of this, it is necessary to verify the internal consistency of the scale on a new sample of adolescents with a diagnosed psychiatric condition.

There were no differences in the Cronbach's α coefficient greater than .10 for all the scales in both the groups of girls and boys and in some scales the coefficient value was higher in the Slovak sample than in the US sample. The supplementary scales of the Slovak version of the MMPI-A can, therefore, be assessed as internally consistent in comparison with the US sample.

3.3 Verification of the Usability of US Standards for the Slovak Adolescent Population

The authors of the test, Hathaway, and McKinley (1943 by Butcher (4), argued that standards developed for the US population were applicable to the population of other countries. The same view is taken by the MMPI-A author, Butcher (4). As part of the standardization process, a number of countries researched these claims for both the MMPI and MMPI-2. However, individual studies pointed to a need to develop standards for the new target population and that it was not possible to apply standards developed in the USA to other populations. For example, Wuts (2002 in (20)) in the standardization of the MMPI-2 in Singapore, found that the new population scored differently in all standard clinical scales except for the Hypomania (Ma) Scale, and similar conclusions were reached by Cheung et al., Savasir, Culha (21, 17), as well as Vavrová and Štefániková (14) in the standardization of the MMPI-2 for the Slovak adult population. Only US standards developed for the Hispanic population of the USA proved to be applicable to other cultures, namely the Hispanic populations in other countries, e.g. Peru, Mexico, Colombia, Spain (22, 23). In the analyses, we conducted we were also interested in how the Slovak adolescent population would score compared to the US adolescent population. The differences in the scoring point to the cultural differences between the populations, which is an important piece of information for the interpretation of the results of other analyses and the consequent inferences and adjustments of the Slovak version. In the standardization of the MMPI-2 for the Slovak population, the researches pointed to the cultural conditionality of, for example, the Negative Treatment Indicators (TRT) Scale. Melišková (9) found that the attitude of Slovak society towards psychotherapeutic treatment is more negative than in the US population, which was reflected by differences in the scoring. Standard validation and clinical, content and supplementary scales were included in the analysis. In most of the scales examined, we found statistically highly significant differences between the Slovak and US sets of adolescents. The results confirmed the need to develop standards for the Slovak population and refuted the claims of the authors of the MMPI for the intercultural applicability of US standards to the Slovak population.

4 Discussion

The MMPI is currently one of the best objective personality assessment methods in the world. The MMPI-A has been equally effective since its inception in 1992. The popularity and widespread use of these instruments is due both to the width of the diagnostic scope of the inventory and the possibility for differential diagnosis, but mainly to the quality of the instrument in terms of its psychometric characteristics. The psychometric properties of the MMPI have been proven many times, as evidenced by the thousands of published studies and their number is steadily increasing. As the authors of the MMPI-A maintained the maximum possible continuity between the original inventory and the new version for adolescents, the study results are aplicable to the MMPI-A.

Since the MMPI-A provides a wealth of information about adolescent personality, both in norm and pathology; it is a measurement tool that helps psychology professionals recognize and evaluate adolescents aged 14 – 18. While the MMPI-A is time-consuming to administer, it provides a wealth of information with the use of a single tool. Its potential use extends to all areas of psychological practice. The validity of the results obtained is verifiable through the configuration of the score of the validation scales. Based on these, we can assess whether the protocol is valid and if it is not, it is also possible to determine the type of tendency that has distorted the answers. An elevated score on certain scales of the MMPI-A is a reliable indicator of the tendency towards problematic behavior or the emergence of various problems and diseases. For example, an elevated score on the scales: Conduct Problems (A-con), Hypomania (Ma), Psychopathic Deviate (Pd), Immaturity (IMM), Anger (A-ang) indicate a probability for problematic

behavior. In contrast, a low score on certain scales indicates a low likelihood they will be manifested, e.g. low scores on the Social Introversion (Si) and Psychopathic Deviation (Pd) Scales indicate a low probability of problematic delinquent behavior (8, 12, 24, 7). The MMPI-A also includes a scale that is specifically designed to represent tendencies for alcohol and drug use – Alcohol/Drug Problem Proneness (PRO). The scale represents the expressions of personality and lifestyles associated with alcohol and drug use (25). Other scales state the presence of alcohol and drug use problems, such as an elevated score on the MacAndrew-Revised (MAC-R), Alcohol/Drug Problem Acknowledgement (ACK), or the presence of other problems, symptoms of depression, family conflicts, peer group pressure, delinquent behaviour, eating disorders, symptoms of anxiety and many more. It is the width of the diagnostic image that makes the MMPI one of the world's most widely used measuring instruments. At the same time, the MMPI-A makes it possible to assess the extent, to which the observed phenomena are beyond the norm, which is particularly important in depressive disorders. It also contains items that indicate the possibility of suicide. In addition to the standard MMPI-A scales, it also contains subscales that further refine the analysis. For example, the Psychopathic Deviation (Pd) Scale contains 5 subscales. An adolescent with an elevated score on this scale may also have a high score on the Social Alienation (Pd4) Scale, indicating a rebellion against social rules, but a low score on the Familial Discord (Pd1) Scale and hence have no family-related issues. This conclusion is then supplemented by the results of the Family Problems (A-fam) (1). The MMPI-A allows a detailed analysis of the adolescent's personality and the knowledge of their personality, and this has led to an interest in the development of a Slovak version of the MMPI-A. The verification of the psychometric characteristics of the Slovak version of the MMPI-A was carried out on a representative sample of the Slovak adolescent population with the aim of subsequently establishing a standard for the Slovak population. The criteria for age, type of school and region were monitored. In doing so, we focused on the verification of the content, criterion and construct validity and reliability as indicators of the internal consistency of the inventory and the stability of the measurement results over time. We also carried out an analysis of the applicability of US standards to the Slovak population.

The work includes a psychometric evaluation of the Slovak version of the MMPI-A on a sample of the Slovak adolescent population that is representative in terms of age, type of school and region. When collecting data from psychiatric patients, a sufficiently large number of adolescents were obtained for the main diagnostic sets. The analyses provided evidence of the validity and reliability of the Slovak version of the MMPI-A. Through the use of a confirmation index, the content analysis identified the content-discrepant items, but their number was very low, with the discrepancies found predominantly culturally conditioned and not due to incorrect inventory translations. The verification of the MMPI-A content structure confirmed that the standard validation and clinical scales create a 4-factor model in accordance with the original inventory. We also focused on the evaluation of the concurrent criterion validity; in particular, we assessed the conformity between the diagnosis of a physician and scores on the selected scales. A percentage match of more than 77% was found for all established psychiatric diagnoses. The verification of the construct validity was based on the analysis of the ability of the Slovak version of the MMPI-A to differentiate the population diagnosed with a psychiatric condition from those without. The only exception was in the Masculinity-Femininity (Mf) Scale, where the confirmation of the construct validity meant the confirmation of the ability to differentiate between girls and boys. The analysis showed the construct validity of the standard validation, clinical, content and supplementary scales. The ability to differentiate these sets is a basic proof of the validity of the MMPI-A since it was created using empirical criteria to differentiate between the general population and the population diagnosed with a psychiatric condition. In terms of reliability, we observed the stability of the test results over time, showing the reliability of the Slovak version of the MMPI-A. Verification of the internal consistency of the scales confirmed their internal consistency, except for the

Low Aspirations (A-las) Scale in a set of adolescents with a diagnosed psychiatric condition. Additionally, an analysis of the possibility of applying US standards for the Slovak population was performed. However, the analysis also provided useful information on the differences in the scoring of the Slovak and US populations, which also indicate the cultural diversity of these populations. The results confirmed that the Slovak population of adolescents scores differently to the US normative set on a number of scales which implies it is necessary to develop standards for the Slovak population.

5 Conclusions

Based on the results, we can conclude that the analyses provided evidence of the validity and reliability of the Slovak version of the MMPI-A for the Slovak population and its applicability in practice, once standards and interpretative principles have been developed.

Literature:

1. Archer, R. P., Krishnamurthy, R.: Essentials of MMPI-A assessment. New York: Wiley, 2002.
2. Archer, R. P.: Assessing Adolescent Psychopathology. 4th Edition, 2016.
3. Démuth, A., Démuthová, S.: Forms of Deliberate Self-Harm and Their Prevalence in Adolescence. International Conference on Research in Psychology. London: Diamond Scientific Publication, 2019. p.23-38.
4. Butcher, J. N. et al.: International adaptations of the MMPI-2: Research and clinical applications. Minneapolis: University of Minnesota Press, 1996.
5. Butcher, J. N.: Personality assessment without borders: Adaptation of the MMPI-2 across cultures. Journal of Personality Assessment. 2004, 83 (2): 90-104.
6. Butcher, J. N.: A Beginner's Guide to the MMPI–2, Third Edition. USA, 2011.
7. Williams, C. L., Butcher, J. N.: A beginner´s guide to the MMPI-A. Washington: American Psychological Association, 2011.
8. Archer, R. P.: MMPI-A: Assessing adolescent psychopatholgy. New Jersey: Lawrence Erlbaum Associates, 2005.
9. Melišková, M.: Príspevok k štandardizácii MMPI-2. Diploma thesis. Consultant: Máthé, R. Nitra: UKF, 2009.
10. Hogan, T. P., Agnello, J.: An empirical study of reporting practices concerning measurement validity. Educational and Psychological Measurement. 2004. 64 (4), 802-812.
11. University of Minnesota press: Test Translation Procedures. Praha: Testcentrum, 2006.
12. Butcher, J. N. et al.: MMPI - Minnesota Multiphasic Personality Inventory - Adolescent. Manual for administration, scoring, and interpretation. Minneapolis: University of Minnesota Press, 1992.
13. Vavrová, M.: Analýza psychometrických vlastností slovenskej verzie Minnesotského multidimenzionálneho osobnostného inventória pre adolescentov. Dissertation Thesis. Consultant: Máthé, R. Nitra: UKF, 2012.
14. Vavrová, M., Štefániková, J.: Overenie validity slovenskej verzie MMPI-2 v klinických podmienkach a možnosti adaptácie amerických noriem pre slovenskú populáciu. In: Popelková, M., Juhásová, A., Pohánka, M. editors. V. Medzinárodná konferencia doktorandov odborov psychológia a sociálna práca. Nitra: UKF, 2010. p. 124-132.
15. Gillet, I., Simon, M., Guelfi, J. D., Brun-Eberentz, A., Monier, C.: The MMPI-2 in France. In: Butcher, J. N. et al. editors. International adaptations of the MMPI-2: Research and clinical applications. Minneapolis: University of Minnesota Press, 1996. p. 448- 462.
16. Ellersten, B., Havik, O. E., Skavhellen, R. R.: The Norwegian MMPI-2. In: Butcher, J. N. et al. editors. International adaptations of the MMPI-2: Research and clinical applications. Minneapolis: University of Minnesota Press, 1996. p. 448- 462.
17. Savasir, I., Culha, M.: Development of the MMPI-2 in Turkey. In: Butcher, J. N. et al., editors. International adaptations

of the MMPI-2: Research and clinical applications. Minneapolis: University of Minnesota Press, 1996. p. 448- 462.

18. Archer, R. P., Klinefelter, D.: Relationships between MMPI codetypes and MAC scale elevations in adolescent psychiatric sample. Journal of personality assessment. 1992, 58 (1): 149-159.

19. Strack, S.: Differentiating normal and abnormal personality. USA: Springer Publishing Company, 2006.

20. Dana, R. H.: Multicultural Assessment: Principles, Applications, and Examples. USA: Routledge, 2005.

21. Cheung, M. F., Weizheng, S., Zhang, J.: The Chinese MMPI-2: Research and applications in Hongkong and the Peoples' Republic of China. In: Butcher, J. N. et al., editors. International adaptations of the MMPI-2: Research and clinical applications. Minneapolis: University of Minnesota Press, 1996. p. 2632-4.

22. Scott, R. L., Mamani-Pampa, W.: MMPI-A for Peru: Adaptation and normalization. International Journal of Clinical and Health Psychology. 2008, 8 (3): 719-732.

23. Scott, R. L., Butcher, J. N., Young, T. L., Gomez, N.: The hispanic MMPI-A across five countries. Journal of Clinical Psychology. 2002, 58 (4): 407-417.

24. Williams, C. L., Butcher, J. N., Ben-Porath, Y. S., Graham, J. R. (1992). MMPI-A content scale: assessing psychopathology in adolescents. Minneapolis: Univerity of Minnesota Press.

25. Groth-Marnat, G.: Handbook of Psychological Assessment. New Yersey: Wiley Desktop editions. 2009.

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