# Test of Impulsivity in Adolescence

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**BACKGROUND:** Adolescence is one of the most important stages in a human life. This period is full of different stimuli and types of influence – from parents, peers, and society. It is related to greater susceptibility to problematic behaviour and to impulsivity. Because of that it is important to explore the topic of impulsivity and impulsive behaviour. **METHODS:** This study addresses impulsivity in adolescents using a Czech questionnaire survey method, the Scale of Impulsivity Dolejš & Skopal (SIDS). It also empirically verifies the functionality of the scale and points out its psychometric qualities. The research involved 13,676 adolescent participants aged 11–19. The sample consisted of schoolchildren attending years 6–9 (ISCED 2) of what is called in Czech 'basic school' a term that will be used throughout the text and students of general and specialized secondary schools (ISCED 3). **RESULTS:** The SIDS questionnaire data collected was subsequently subjected to statistical processing. We used Item Response Theory analysis, which depicted items that did not function correctly, and method revision was suggested. Confirmatory factor analysis demonstrated that the shorter version has a good factor structure and reliability. The raw score differences between age, sex, and schools were assessed with linear models. **CONCLUSION:** This research can help to understand the importance of research in the field of impulsivity. It introduces the new shorter version of the questionnaire of the Scale of Impulsivity Dolejš & Skopal (SIDS). A better understanding of this topic can help with the prevention of impulsive behaviour.

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## 1 INTRODUCTION

### 1.1 The relationship between adolescence and impulsivity

Adolescence is a very important developmental stage between childhood and adulthood. It brings numerous changes, as well as new impulses and experiences (Pfeifer & Allen, 2019). The influence of parental figures is gradually replaced with the influence of peers. Their influence can be positive – for instance, mutual motivation towards the achievement of good study results. In adolescence, however, teens are prone to various negative impulses such as risky behaviour, frequently encouraged by negative peer pressure (McCoy et al., 2019). This period is also related to greater susceptibility to problematic behaviour, which is frequently also associated with a greater rate of impulsivity (D'Acremont & Linden, 2005; Leshem & King, 2020).

There are a number of scholars looking into the phenomenon of impulsivity and its antecedents and consequences from various perspectives (Cross et al., 2011; Marvin et al., 2020). Eysenck and Eysenck (1985) define impulsivity as a constituent of tendencies supporting the seeking of spontaneous and thoughtless exciting experiences. It also seems that in some cases it may be a constituent of psychoticism. According to Cloninger et al. (1993), impulsivity is a super-factor in searching for the novel (new excitement, experiences, acts) which is not restricted by rules or limitations. Webster and Jackson (1997) argue that impulsivity is normally distributed in the population and individuals manifest a certain degree of it. Individuals with a high rate of impulsivity tend to prefer small immediate benefits to larger but delayed ones, and they are not able to save their reward for later (Kalina et al., 2015).

A common feature in individual definitions of impulsivity is the idea that impulsivity is a personality trait included in various personality theories that may be summed up as a propensity to act without thinking (Dolejš & Skopal, 2016). Impulsive individuals tend to conduct various activities that are not planned or premeditated and at the same time are risky either for the individual himself/herself or for others.

Impulsivity is also a contributory factor to certain mental diseases. In DSM-5 and ICD-11 (APA, 2013), impulsivity is listed as a separate category of control disorders that includes disorders such as kleptomania, pyromania, addiction to playing games, and gambling. Apart from this taxonomy, a link has been found between impulsivity and a propensity for risky behaviour or a tendency to indulge in risky activities such as the abuse of addictive substances and vandalism (Dolejš & Orel, 2017).

### 1.2 Measuring impulsivity

Impulsivity is a factor that may be efficiently measured especially through long-established single-factor quantitatively-oriented measurement tools. Impulsivity is also included as a constituent part of multi-factor methods. In this form, as part of a comprehensive scale for the measurement of personality traits, it is included, for instance, in the Substance Use Risk Profile Scale – SURPS (Woicik et al., 2009).

Examples of single-factor methods include the well-known I-7 scales (Eysenck et al., 1985), the Barratt Impulsivity Scale BIS-11 (Patton et al., 1995), the Personality Research Form, PRF (Jackson, 1984), UPPS-P (Whiteside & Lynam, 2001), the impulsivity scale EASI-III (Buss & Plomin, 1975), and others.

The category of self-evaluative single-factor scales also includes SIDS (The Scale of Impulsivity Dolejš & Skopal; Dolejš & Skopal, 2016), which was used in this research. This method is the only one that was created in the Czech Republic and measures impulsivity in adolescence. The present study provides psychometric information about SIDS, but also describes the differences in impulsivity between the sexes and types of schools.

We established the goals of this study for all of the reasons above and because of the uniqueness of SIDS. The theoretical goal of the research is to point out the topic of impulsivity in adolescence and provide a brief overview of the area and the options for its investigation. The main goal of the study is to compare the impulsivity rate between girls and boys in the Czech Republic as measured by the long and short versions of SIDS. The main practical research goal is to determine the reliability and validity of the SIDS psychometric method and verify its psychometric properties. Another goal is to use statistical analysis to propose a revised and more suitable form of the questionnaire method in order to increase the efficiency of the measurement of impulsivity in adolescents.

### 1.3 Hypotheses

On the basis of previous knowledge and a literature search, we created one general hypothesis:

**Hypothesis 1:** the effect of independent variables (age, gender, and type of school) on a dependent variable (impulsivity).

## 2 METHODS

### 2.1 Participants and research procedure

The research sample comprised pupils and students of Czech basic (ISCED 2) and secondary (ISCED 3) schools ($N$ = 13,676). The research involved 7,344 girls (54%) and 6,332 boys (46%). The mean age of the participants was 15.40 years, with a standard deviation of 2.18 years, a median of 16, and the age range being 11–19. Data was collected in basic schools and general and specialized secondary schools around the Czech Republic, specifically from each region. As to the individual types of schools, 5,031 students (37%) attended general secondary schools (ISCED 3), lower general secondary schools (ISCED 2) were attended by 2,225 students (16%), secondary schools with the 'maturita' school-leaving exam (ISCED 3) by 2,397 students (18%), secondary schools without the 'maturita' exam (ISCED 3) by 681 students (5%), and 3,342 pupils (24%) attended basic schools (ISCED 2).

**Table 1 |** Means, standard deviations, kurtosis, and skewness for the total score and for the final proposal of the shortened version of the SIDS method

| | | Mean | Standard Deviation | Skewness | Kurtosis |
|---|---|---|---|---|---|
| **Age** | | 15.40 | 2.18 | -0.34 | -0.89 |
| **The full SIDS version** | | | | | |
| | The entire set (N = 13,676) | 57.39 | 9.73 | -0.02 | 0.14 |
| | Boys (n = 6,332) | 57.56 | 9.80 | -0.04 | 0.09 |
| | Girls (n = 7,344) | 57.24 | 9.66 | 0.00 | 0.19 |
| **The 19-item SIDS version** | | | | | |
| | The entire set | 44.61 | 8.36 | 0.00 | 0.13 |
| | Boys | 44.84 | 8.47 | -0.01 | 0.11 |
| | Girls | 44.42 | 8.26 | 0.01 | 0.14 |

The selection of schools participating in the research was random, stratified according to the type of institution. As part of this procedure, schools were chosen from lists provided by the Ministry of Education, Youth and Sports of the Czech Republic by random choice. Prior to the data collection, the individual schools were contacted and their agreement with involvement in the study was acquired. The legal representatives of the research participants were required to provide written agreement to their participation. The collection of data was conducted by trained researchers who visited each school. The research participants were given a set of questionnaires in paper form. The questionnaires were administered to individual students in groups in the respective classes.

## 2.2 Measures

### Sociodemographic Questionnaire

All the participants answered basic sociodemographic questions. These were related to their age, sex, and the type of school they attended (basic (ISCED 2) or secondary (ISCED 3)).

### The Scale of Impulsivity Dolejš & Skopal (SIDS)

This questionnaire method, designed by Dolejš and Skopal (2016), is intended for individual and group testing. It is a single-factor scale. It contains 24 questions focused on behaviour in various situations (Dolejš & Skopal, 2016). It consists of two pages. The first page has three sections. The first section is the name of the questionnaire and the authors and instructions on how to fill out the questionnaire. The second section is reserved for sociodemographic information about the respondents. The third section is for the administrator (for calculating the score, for describing the situation, and for agreement to be a participant). The second page is the questionnaire itself, which contains 24 questions. The questionnaire provides a four-point response scale – "definitely disagree", "disagree", "agree", and "definitely agree". The time allowed for answering is not limited, but the majority of respondents are able to complete it in within ten minutes. The questionnaire method is standardized for the population of Czech adolescents which has been used to estab-

lish population norms. It has also been used in several research projects in the Czech Republic (Dolejš et al., 2014, Dolejš & Orel, 2017), as well as in Slovakia (Čerešník & Gatial, 2014; Tomšik et al., 2018). The internal consistency of SIDS expressed by the Cronbach's alpha ranges from .83 to .87 (Dolejš & Orel, 2017). SIDS correlates with many other questionnaires. It has a moderately strong correlation with impulsivity and sensation seeking in the Substance Use Risk Profile Scale (Woicik et al., 2009), with the present hedonic in the Zimbardo Time Perspective Inventory (Zimbardo & Boyd, 2009), and with urgency in the Impulsive Behaviour Scale (Whiteside at al., 2005). Impulsivity in SIDS also has a connection with anxiety (Dolejš et al., 2014). This connection can be seen, for example, with the Scale of Anxiety Dolejš & Skopal (SADS or SUDS) or with the Buss-Perry Aggression Questionnaire (Dolejš & Skopal, 2016).

## 2.3 Data analysis

After the data collection, the questionnaire sets were transformed from paper to electronic form using Microsoft Excel. The data was subsequently cleaned in this program. Data analysis was performed in R, version 4.0.4 (R Core Team, 2020). *Table 1* provides means, standard deviations, kurtosis, and skewness for the entire sample set as well as for the subsets of girls and boys for the total score in the full SIDS method and for the proposed shortened version.

The first step was the analysis of items with Item Response Theory (IRT) and assessment of reliability. The quality assessment of the properties of individual SIDS questionnaire items was performed using IRT, in particular the unidimensional Graded Response Model (GRM) for polytomous items that determine item difficulty (b) for every item and slope parameter (a) (Samejima, 1969; Toland, 2014). In order to determine the local dependency (LD) index, the G2 statistical method was used (Chen & Thissen, 1997). Non-conforming items were proposed for exclusion from the questionnaire. The GRM calculation was performed using the mirt package version 1.33.2 (Chalmers, 2012). Since a congeneric model was expected, the assessment of the internal consistency of the method was performed using the omega total coefficient. Unlike the Cronbach's alpha, this in-

**Table 2 |** A comparison of the SIDS method confirmatory factor analysis models

| Model | χ² | df | CFI | TLI | RMSEA | SMSR |
|---|---|---|---|---|---|---|
| **A: Full SIDS scale model (24 items)** | 20,168.112 | 252 | 0.924 | 0.916 | 0.076 | 0.070 |
| **B: 19-item SIDS** | 8,461.468 | 152 | 0.956 | 0.951 | 0.063 | 0.057 |

**Note.** Confirmatory factor analysis was used. CFI = comparative fit index; TLI = Tucker-Lewis index;
RMSEA = root-mean-square error of approximation, SRMR = standardized root mean residual

dicator of reliability does not presume tau-equivalence of items, i.e. it does not presume that individual items have identical factor loading (Dunn et al., 2014; Hayes & Coutts, 2020; McNeish, 2018). The indicator was calculated using the MBESS package version 4.8.0. (Kelley, 2020).

The second step was factor analysis. In order to verify the single-factor structure of the questionnaire, confirmatory factor analysis (CFA) was conducted using the lavaan package version 0.6-7 (Rosseel, 2012). Since the individual answers in the SIDS questionnaire are ordinal variables, the method of unweighted least squares (ULS) was used as a robust estimation method (Forero et al., 2009) and the calculation was performed using the polychoric correlation. We created multiple models with various adjustments so that they corresponded to the theory. In order to assess the fit of theoretical models with data, the following indicators were used: chi-squared, comparative fit index (CFI), Tucker-Lewis index (TLI), root mean square error of approximation (RMSEA), and standardized root mean residual (SRMR). The following values of goodness of fit indicators were chosen: CFI and TLI > 0.95, RMSEA < 0.08, SRMR < 0.07 (Hu & Bentler, 1999).

In the last part, to understand how different variables have an impact on impulsivity, an analysis of group differences was performed using a general linear model with interactions. The total score of the revised SIDS was used as a dependent variable and the sociodemographic variables sex, school, and age were predictors.

## 3 RESULTS

### 3.1 IRT results and determination of reliability

We created a unidimensional graded response model which provided us with the values of difficulty and the slope parameters for all the items. First, local dependency according to G2 statistics was investigated. Several mutually dependent pairs of items were identified, with the highest value of Cramér's V being 0.27 for the pair constituted by item 14 and item 24. Indexes higher than 0.15 were also identified for pairs of items 15 and 13, 7 and 6, 16 and 7, 16 and 5, and 24 and 9. On the basis of these values and the values of the CFA modification indexes, we decided to exclude items nos. 24, 15, and 7. The values of difficulty and slope parameters were also analysed. A table presenting a complete overview of all the items of the scale is provided in Appendix 1. The values of parameter a ranged

from 0.01 (item 23) to 1.61 (item 9). The values of parameter b1 (i.e. the probability that a participant would choose the second or higher answer option for a particular item) ranged from -0.29 (item 5) to -16.01 (item 23); values for b2 ranged from -1.56 (item 21) to 13.44 (item 23), and values of b3 ranged from 1.56 (item 24) to 31.27 (item 23). This data and the item characteristic curve of the graphs demonstrated that items 21 and 23 do not work well and, according to the item information function, do not provide sufficient information input into the whole method; these items were subsequently proposed for exclusion. This procedure resulted in the final 19-item version. According to the test information function, this version has the greatest information value for participants, with a standard deviation from the mean between -2 and +2. The estimated reliability of the SIDS questionnaire using the omega total coefficient was 0.86 for the whole original scale; after exclusion of the items its value did not change significantly.

### 3.2 Confirmatory factor analysis

CFA was performed for the entire set. *Table 2* provides an overview of all the models and results. The single-factor congeneric model for the whole scale was calculated using ULS on polychoric correlations. The fit measures, mainly CFI and TLI, did not indicate a good fit with the data. This was expectable, as five items did not function well for the scale. Since a revised version was suggested, the second CFA was performed with only 19 items and the same estimation technique. This improved the fit and all the fit measures are in the acceptable range. Since χ² is dependent on the sample size, this indicator has a higher value for both models.

### 3.3 Comparison of groups on the basis of sociodemographic data

The next step was the preparation and execution of the general linear model. The dependent variable was the total score of the shortened SIDS method, and the independent variables were sex, age, type of school, and the interaction between sex and school.

The effect of the interaction between sex and school was statistically significant: $F(4, 13,665) = 3.34$, $p = .016$; for this reason, we decided to include it in the analysis. *Table 3* shows that at basic schools (ISCED 2), the girls reached on average 0.83 points less than the boys, with a 95% CI [-1.4, -0.3]; this effect was statistically significant at $t(13,665) = -2.87$, $p = .004$.

**Table 3 |** Results of the linear model

| Variable | | B | SE B | t | 95% CI for B | p |
|---|---|---|---|---|---|---|
| | Intercept | 45.83 | 0.25 | 186.45 | [45.4, 46.3] | < .001 |
| **Demography** | | | | | | |
| | Sex | -0.83 | 0.29 | -2.87 | [-1.4, -0.3] | .004 |
| | Age | 0.20 | 0.06 | 3.27 | [0.1, 0.3] | .001 |
| **School** | | | | | | |
| | General secondary | -1.33 | 0.36 | -3.68 | [-2, -0.6] | < .001 |
| | Lower general secondary | -0.39 | 0.33 | -1.16 | [-1, 0.3] | .247 |
| | Secondary without the 'maturita' exam | -3.05 | 0.45 | -6.14 | [-4, -2.1] | < .001 |
| | Secondary with the 'maturita' exam | -1.55 | 0.40 | -3.93 | [-2.3, -0.8] | < .001 |
| **Interaction sex x school** | | | | F (4, 13,665) = 3.34 | | .009 |
| | Sex x General secondary | 0.46 | 0.37 | 1.22 | [-0.3, 1.2] | .223 |
| | Sex x Lower general secondary | -0.12 | 0.46 | -0.26 | [-1, 0.8] | .793 |
| | Sex x Secondary without the 'maturita' exam | 2.27 | 0.73 | 3.11 | [0.8, 3.7] | .002 |
| | Sex x Secondary with the 'maturita' exam | 0.82 | 0.45 | 1.83 | [-0.1, 1.7] | .067 |

**Note.** CI = confidence interval; the variable of age was centred for the analysis

To observe the differences between the sexes at lower general secondary schools (ISCED 2), we created a new model with the lower general secondary school as a reference group: here, the average girl reaches 0.95 points less than the average boy, with a 95% CI [-1.6, -0.3]. This effect is statistically significant: $t(13,665) = -2.66$, $p = .007$. At general secondary schools (ISCED 3), the average girl reached 0.37 points less than the average boy, with a 95% CI [-0.8, 0.1], and this effect is not statistically significant: $t(13,665)=$ 1.556, $p = .119$. At secondary schools without the 'maturita' exam (ISCED 3), the average girl reaches 1.44 points more than the average boy, with a 95% CI [0.1, 2.8], and this effect was statistically significant: $t(13,665) = 2.147$, $p = .031$. At secondary schools with the 'maturita' exam (ISCED 3), there is no difference between the sexes: (< 0.01 point), $t(13,665) = -0.02$, $p = 0.983$. The general effect of sex across the individual types of schools may be obtained from the test of the sub-model while omitting all predictors with sex; the values achieved are as follows: $t(13,670) = 2.11$, $p < .001$, i.e. there is a statistically significant difference between the sexes ($M_{boys} = 44.84$, $SD_{boys} = 8.47$, $M_{girls} = 44.42$, $SD_{girls} = 8.26$); Cohen's d = 0.05. Age is also a statistically significant predictor of the SIDS score: B = 0.2, 95% CI [0.1, 0.3], $t(13,665) = 3.27$, $p = .001$.

## ● 4 DISCUSSION

The aim of the article was to empirically test impulsivity and impulsive behaviour in the period of adolescence with a sample of Czech adolescents. The research employed the psychodiagnostic method SIDS – the Scale of Impulsivity Dolejš & Skopal. The method was standardized for the population of Czech adolescents; in addition, population norms were also created for it (Dolejš & Skopal, 2016). We also proposed a revised version of the method shortened to a 19-item version.

The first step of the research was verification of the SIDS method from the perspective of psychometrics. The original 24-item version was tested with the aim of verifying its reliability and possibly revising it. This step employed the IRT model and factor analysis. On the basis of these statistical procedures, it was possible to exclude five items from the original 24-item version (items nos. 7, 15, 21, 23, and 24). These items did not saturate the factor of impulsivity sufficiently – it was proved that they are similar to other items and do not provide the expected robust data for the psychometric method. The similarity of the individual items was identified for the following ones: items 7 ("I like to take risks.") and 16 ("I seek an experience as such even if it is illegal."); items 15 ("I focus easily.") and 13 ("I cannot focus my attention on one thing for a longer time."), and items 24 ("I often say something without thinking it through.") and 9 ("I often do not think through the consequences of my behaviour."). The full wording of all the items of the psychometric method is provided in *Appendix 2;* excluded items are marked to allow for comparison. A revised version of the SIDS method was designed, resulting in the 19-item form with increased internal consistency for measurement of the factor of impulsivity.

The next step was identification of the differences between the sexes regarding impulsivity in combination with the type of school the participants attended. It is common that boys and girls are significantly different in their impulsivity rate. This difference may be caused by multiple factors. It may depend on socialization or parental upbringing (Chen et al., 2019). Additional research projects point out the possible influence of cognitive and motor deficiencies at early developmental stages (Chapple & Johnson, 2007), which may be transformed, for instance in the period of adolescence, into an increased rate of the factor under investigation, which may be manifested as

a higher propensity to seek and abuse addictive substances of various kinds and forms, and also as a higher tendency to risky behaviour (Smith et al., 2013; Vavrysová, 2018).

As is obvious from the linear model, it was found that girls attain a lower score for the impulsivity factor compared to boys. This reflects the expected results based on the theories of impulsivity presented in the first part of this article. The results were also confirmed for its combination with certain types of schools. At basic schools, lower general secondary schools, and secondary schools, the boys achieved a higher impulsivity factor score than the girls; at secondary schools without the 'maturita' exam, however, the girls achieved a higher impulsivity score than the boys. It may be presumed that at these types of schools, girls need to be more vigorous and therefore also more impulsive to maintain their position within their class and their social group. Secondary schools with the 'maturita' exam did not show a statistically significant difference between the sexes; the impulsivity rate did not therefore differ significantly between the sexes.

Impulsivity may also be influenced by the particular school and its organization. Schools with lower internal coherence are linked to a higher impulsivity rate among their students, which may even result in delinquent behaviour. If a school manifests higher coherence, the higher impulsivity rate is associated with a lower probability of delinquent behaviour (Liu et al., 2016).

Impulsivity is related to risky behaviour, inappropriate use of the internet, and a propensity to abuse addictive substances (Bos et al., 2019). A better understanding of this phenomenon enables the implementation of more effective preventive measures and early interventions in the event of risky behaviour (Di Nicola et al., 2017). For this reason, the research was focused on the investigation of impulsivity. Another benefit is the revision and effectivization of the measurement of impulsivity using the SIDS psychodiagnostic method.

Every research project has its limitations. Our primary research was conducted in the Czech Republic only and the norms were established on the basis of this research. The subsequent thorough analysis of the data resulted in a revision of the method; it is desirable that the revised method be verified through another research project in the future. The research results may also have been affected by the size and composition of the research sample.

## 5 CONCLUSION AND IMPLICATIONS

The article describes the phenomenon of impulsivity from both the theoretical and the practical perspective. The research focused on impulsivity in the period of adolescence and differences in its rate between girls and boys at different types of secondary schools. The research results demonstrated that there is a difference in impulsivity between the girls and boys at the various types of schools they attend. The research also analysed the psychodiagnostic method SIDS, i.e. the Scale of Impulsivity Dolejš & Skopal, which was transformed from the original 24-item version to a 19-item version.

The present research may serve as an example of the utilization of an efficient psychodiagnostic method for single-factor measurement of impulsivity. It demonstrates the importance of research into impulsivity in adolescents and suggests further options for investigation in this important and topical matter. The SIDS psychodiagnostic method may be used by psychologists at schools and in educational-psychological counselling and prevention centres, as well as for the prevention and diagnosis of, and interventions in, impulsive behaviour by the professional public.

**Appendix 1 |** Descriptive characteristics of items including GRM parameters for the whole scale

| # | M | SD | 24-item SIDS version | | | | 19-item SIDS version | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | a | b1 | b2 | b3 | a | b1 | b2 | b3 |
| 1 | 2.03 | 0.92 | 0.78 | -1.05 | 1.39 | 3.45 | 0.80 | -1.02 | 1.36 | 3.37 |
| 2 | 2.35 | 0.87 | 1.10 | -1.81 | 0.41 | 2.31 | 1.15 | -1.75 | 0.40 | 2.25 |
| 3 | 1.92 | 0.73 | 0.99 | -1.14 | 1.88 | 3.92 | 1.01 | -1.12 | 1.85 | 3.85 |
| 4 | 2.22 | 0.83 | 1.26 | -1.41 | 0.59 | 2.66 | 1.31 | -1.38 | 0.58 | 2.60 |
| 5 | 1.83 | 0.87 | 1.15 | -0.29 | 1.41 | 3.05 | 1.19 | -0.29 | 1.38 | 2.98 |
| 6 | 2.70 | 0.84 | 1.29 | -2.19 | -0.58 | 1.70 | 1.19 | -2.30 | -0.61 | 1.79 |
| 7 | 2.65 | 0.87 | 0.69 | -3.43 | -0.55 | 2.58 | | | | |
| 8 | 2.03 | 0.81 | 1.31 | -1.03 | 1.08 | 2.78 | 1.29 | -1.04 | 1.10 | 2.81 |
| 9 | 2.39 | 0.86 | 1.61 | -1.42 | 0.13 | 1.96 | 1.52 | -1.46 | 0.14 | 2.03 |
| 10 | 2.28 | 0.92 | 1.46 | -1.20 | 0.43 | 1.91 | 1.54 | -1.16 | 0.42 | 1.86 |
| 11 | 2.13 | 0.76 | 1.39 | -1.40 | 0.92 | 2.79 | 1.45 | -1.36 | 0.90 | 2.71 |
| 12 | 2.48 | 0.79 | 0.92 | -2.61 | 0.00 | 2.96 | 0.94 | -2.55 | 0.01 | 2.90 |
| 13 | 2.30 | 0.86 | 1.34 | -1.49 | 0.46 | 2.21 | 1.31 | -1.52 | 0.47 | 2.25 |
| 14 | 2.58 | 0.79 | 1.14 | -2.55 | -0.23 | 2.22 | 0.99 | -2.82 | -0.25 | 2.45 |
| 15 | 2.50 | 0.76 | 1.14 | -2.60 | 0.07 | 2.44 | | | | |
| 16 | 2.36 | 0.92 | 1.05 | -1.64 | 0.27 | 2.30 | 1.06 | -1.62 | 0.28 | 2.28 |
| 17 | 2.66 | 0.84 | 1.10 | -2.48 | -0.44 | 1.92 | 1.06 | -2.55 | -0.45 | 1.97 |
| 18 | 2.68 | 0.86 | 1.12 | -2.44 | -0.50 | 1.76 | 1.15 | -2.40 | -0.49 | 1.73 |
| 19 | 2.67 | 0.81 | 0.75 | -3.52 | -0.67 | 2.74 | 0.77 | -3.45 | -0.66 | 2.70 |
| 20 | 2.58 | 0.76 | 1.14 | -2.72 | -0.23 | 2.37 | 1.16 | -2.69 | -0.23 | 2.34 |
| 21 | 2.81 | 0.84 | 0.47 | -5.70 | -1.56 | 2.92 | | | | |
| 22 | 2.41 | 0.95 | 0.95 | -1.80 | 0.20 | 2.18 | 0.94 | -1.81 | 0.21 | 2.21 |
| 23 | 2.08 | 0.71 | 0.10 | -16.02 | 13.44 | 31.27 | | | | |
| 24 | 2.73 | 0.84 | 1.25 | -2.44 | -0.54 | 1.56 | | | | |

**Appendix 1 |** The Scale of Impulsivity Dolejš & Skopal

| | |
|---|---|
| **1** | I like winning over others, although I do not always play according to the agreed rules. |
| **2** | I do not like tasks that require carefulness and persistence. |
| **3** | School requirements are beyond my capabilities. |
| **4** | I often do not finish the work that I start. |
| **5** | I often violate the school rules and regulations. |
| **6** | I sometimes throw myself into something without thinking. |
| **7** | I like to take risks.* |
| **8** | I find it difficult to control myself. |
| **9** | I often do not think through the consequences of my behaviour. |
| **10** | My attitude to responsibilities can often be described as "I don't care". |
| **11** | It is difficult for me to adapt to the rules that others require me to follow. |
| **12** | Any difficulties in achieving given goals annoy me. |
| **13** | I cannot focus my attention on one thing for a longer time. |
| **14** | Before I say anything, I think it through carefully. |
| **15** | I focus easily.* |
| **16** | I seek an experience as such even if it is illegal. |
| **17** | I am impatient. |
| **18** | I follow the rule "business before pleasure". |
| **19** | A stroke of luck often brings better results than hard work. |
| **20** | Thanks to systematic work, I finish tasks on time. |
| **21** | I am annoyed when I do not get recognition for a job well done.* |
| **22** | When my plans collapse, I want to hit someone. |
| **23** | I try to avoid crises and difficulties.* |
| **24** | I often say something without thinking it through.* |

**Note.** * the shorter version is without the marked items

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