

Changes in self-reported emotional and behavioral problems of Polish adolescents in 2000 and 2013

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Summary

Aim. This study assesses 13-year changes in self-reported emotional and behavioral problems of Polish adolescents. Even though we already assessed time-related changes in emotional problems of Polish 16-year-olds, a comparison covering more age groups has been lacking.

Method. Youth Self Report (YSR) questionnaire was used to assess emotional and behavioral problems. We compared median scores and ran regression models to see whether age and gender influenced the observed changes. We ran a logistic regression analysis for deviant scores.

Results. We found that median scores on most scales were higher after 13 years albeit the differences were quite small. We found that gender moderated the effect of age on scale scores. Score on the deviant range in attention problems and thought problems were 1.5 more frequent in the 2013 group.

Conclusion. We did not detect significant differences in self-reported emotional and behavioral problems of Polish adolescents between 2000 and 2013. We detected different coping strategies for boys and girls: boys reported more problems with delinquency and more externalizing behaviors whereas girls reported more problems on each scale.

Key words: adolescents, behavioral problems, time-related changes

Introduction

The goal of this paper is to examine time-related changes in self-reported emotional and psychological problems of Polish adolescents. Current data from different countries show mixed results with many studies [1–17] reporting worsening of mental condition of adolescents, some of them reporting an improvement [7, 5, 8–10, 13, 14], and a few reporting no changes at all [11]. There are relatively few studies tracking multiple time fluctuations [3, 5, 17].

Even though we already looked into the changes in self-reported psychological problems of Polish 16-year-olds [18], we could not report data on a wider spectrum of

age groups. This study attempts to fill in this gap by comparing self-reported problems of Polish adolescents of different ages across a 13-year time period.

Method

The YSR

The YSR is a self-assessment questionnaire [19]. Problem items make up eight syndrome scales (withdrawn, anxious/depressed, somatic complaints, social problems, thought problems, attention problems, delinquent behaviors, aggressive behaviors), which in turn compose internalizing and externalizing broad band scales and a total problems score. Syndrome scales were developed empirically through factor analysis. The Polish version was translated and adapted by Wolańczyk [20]. It showed good reliability: Cronbach's alpha coefficients range from 0.62 to 0.95 ($M = 0.78$; $SD = 0.11$). Validity, measured as the power to discriminate between children with and without a psychiatric diagnosis, was also satisfying. Also the eight-factor structure of the Polish version of the questionnaire was confirmed [21].

Study sample

In this analysis, we included two groups of participants from previous studies (see further in text for a more detailed description of both groups). We removed observations with more than 8 missing answers and those where information on age and gender was not disclosed. In the remaining observations we replaced missing values with 0. We removed observations where age was lower than 13 years. Descriptive statistics are presented in Table 1.

Table 1. **Descriptive statistics of the study sample**

Year of study	Gender	N	M_{age}	SD_{age}	Min_{age}	Max_{age}
2000	M	778	15.73	1.74	13	20
	F	739	15.38	1.66	13	20
2013	M	261	14.74	1.06	13	19
	F	233	14.63	0.95	13	18

The age difference between the samples was significant as demonstrated by a Kruskal-Wallis test ($p < 0.01$).

2000 sample

The group from 2000 was extracted from a previous publication on standardization of the Polish version of the YSR [20]. That sample, counting 3,132 children in general, had been drawn from a school-attending population of Polish 7–19 year-olds. 100% of selected students returned the questionnaires but some returned empty sheets. Those were excluded from the analysis in step 1.

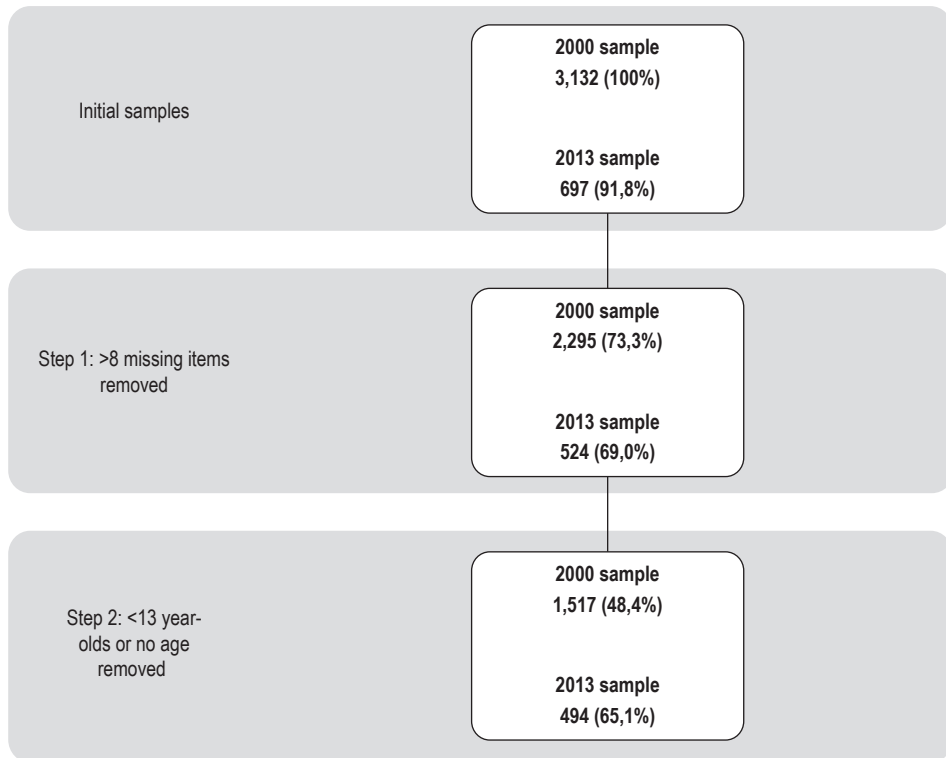


Figure 1. Flowchart of attrition (% of participants selected for each original study)

Schools were selected from an address list provided by the Ministry of Education. The list contained all types of schools except for special facilities for children with intellectual disabilities. The respondents were randomly selected taking into account demographic factors.

2013 sample

This sample was drawn from a research on the Polish adaptation of the *Inventory of Parent and Peer Attachment (IPPA)*. Originally, 759 junior secondary school students were randomly selected taking into account demographic factors. 697 students participated in the study.

Statistical analysis

Raw data produced very high skewness (percent of subgroups with skewness $>1 = 45.5\%$; $>2 = 0\%$) and kurtosis (percent of subgroups with kurtosis $>1 = 56.8\%$; $>2 = 25.0\%$; max. kurtosis = 6.77) among groups. Visual inspection of the histograms

suggested that log-transformed YSR scores would be a better fit for linear regression. Data were transformed using the following formula: $\log_{\text{score}} = \log_{10}(\text{raw score} + 1)$. This has already been done by some researchers in the field [22]. Log-scores produced better skewness (% of subgroups with skewness $>1 = 4.5\%$; $>2 = 0\%$) and kurtosis (% of subgroups with kurtosis $>1 = 34.1\%$; $>2 = 2.3\%$; max. kurtosis = 3.07). Figure 2 illustrates the effect of log-transformation on Internalizing scale scores distributions.

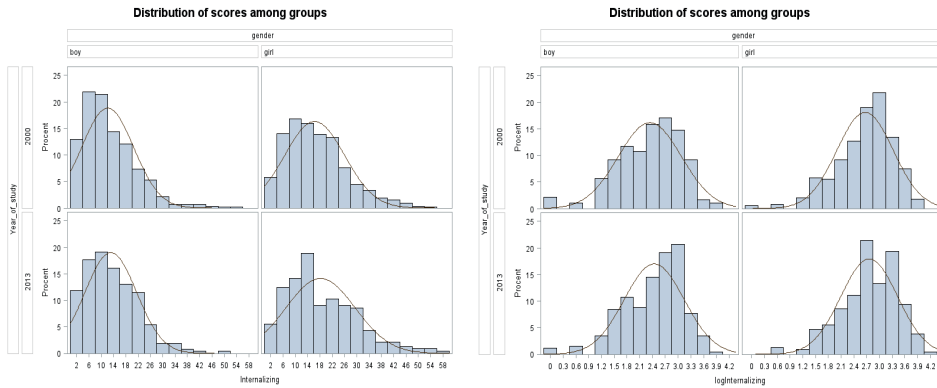


Figure 2. Comparison of distributions of Internalizing scale scores before and after log-transformation

Therefore, we ran non-parametrical Wilcoxon two-sample tests to check for differences in median scores between study years. Acceptable p values were set at $0.05/11 = 0.004$ (a Bonferroni correction for multiple comparisons).

Upon preliminary analysis, we found a significant interaction of age and gender in the whole sample. To account for this, we decided to conduct separate multivariate analyses of covariance (MANCOVAs) for boys and girls. In each MANCOVA we employed the following explanatory model: $\log_{\text{YSR scores}} = \text{year of study} + \text{age}$, where age was the continuous covariate. For post-hoc analyses, a Bonferroni type of adjustment for multiple comparisons was applied.

Finally, we performed a logistic regression model to find out which deviant scores predicted stage of assessment.

Statistical analysis was performed using SAS 9.4 64 bit version.

Results

YSR median scores

Median scores and the results of Wilcoxon two-sample tests are presented in Table 2.

Table 2. Median and Wilcoxon test statistics

Scale	Year	Median	IQR	Z	P
Withdrawn	2000	5.0	3.0–7.0	0.90	n.s.
	2013	5.0	3.0–8.0		
Somatic problems	2000	2.0	1.0–4.0	2.87	0.004
	2013	3.0	1.0–5.0		
Anxious/Depressed	2000	5.0	2.0–9.0	2.16	n.s.
	2013	6.0	2.0–10.0		
Social problems	2000	1.0	0.0–3.0	5.54	<0.001
	2013	2.0	1.0–4.0		
Thought problems	2000	2.0	1.0–3.0	6.07	<0.001
	2013	2.0	1.0–4.0		
Attention problems	2000	6.0	4.0–9.0	3.79	<0.001
	2013	7.0	5.0–10.0		
Delinquent behaviors	2000	5.0	3.0–8.0	2.28	n.s.
	2013	5.5	4.0–8.0		
Aggressive behaviors	2000	8.0	4.0–12.0	3.40	<0.001
	2013	9.0	5.0–14.0		
Internalizing	2000	12.0	7.0–20.0	2.48	n.s.
	2013	13.0	8.0–21.0		
Externalizing	2000	14.0	8.0–19.0	3.40	<0.001
	2013	15.0	10.0–21.0		
Total problems	2000	32.0	21.0–46.0	4.08	<0.001
	2013	37.0	24.0–52.0		

IQR – interquartile range; Z – Wilcoxon's Z; n.s. – not significant

Significant differences on problem scales never exceeded one point. On total problems the difference in median was 5 points, which is less than a clinically significant difference of 7 points. Whenever a difference was present, it was in the direction of increased scores in 2013.

Influence of year of study and age on behavioral/emotional problems among genders

MANCOVA yielded significant overall effects of year of study in boys (Pillai's trace = 0.06; $F(11, 1026) = 6.12$; $p < 0.001$) and girls (Pillai's trace = 0.07; $F(11, 959) = 6.79$; $p < 0.001$) as well as significant effects of age in boys (Pillai's trace = 0.09; $F(11, 1026) = 9.01$; $p < 0.001$) and girls (Pillai's trace = 0.06; $F(11, 959) = 5.83$; $p < 0.001$). Beta coefficients and p -values are presented in Table 3.

Table 3. Coefficients for linear regression

Boys		Year of study			Age		R ²
Scale		standard error	p		standard error	p	
Withdrawn	0.10	0.04	0.014	0.04	0.01	<0.001	0.01
Somatic problems	0.14	0.05	0.006	-0.02	0.01	n.s.	0.01
Anxious/Depressed	0.08	0.06	n.s.	0.01	0.01	n.s.	0.00 ^a
Social problems	0.11	0.05	0.019	-0.03	0.01	0.008	0.02
Thought problems	0.23	0.04	<0.001	0.04	0.01	<0.001	0.04
Attention problems	0.17	0.04	<0.001	0.02	0.01	0.027	0.02
Delinquent behaviors	0.18	0.04	<0.001	0.06	0.01	<0.001	0.04
Aggressive behaviors	0.21	0.06	<0.001	0.01	0.01	n.s.	0.01
Internalizing	0.12	0.05	0.027	0.02	0.01	n.s.	0.00 ^a
Externalizing	0.20	0.05	<0.001	0.04	0.01	0.002	0.02
Total problems	0.21	0.05	<0.001	0.02	0.01	n.s.	0.02
Girls		Year of study			Age		R ²
Scale		standard error	p		standard error	p	
Withdrawn	0.08	0.04	0.035	0.07	0.01	<0.001	0.04
Somatic	0.11	0.05	0.045	0.07	0.01	<0.001	0.02
Anxious/Depressed	0.21	0.06	<0.001	0.10	0.02	<0.001	0.04
Social problems	0.28	0.06	<0.001	0.03	0.01	0.016	0.03
Thought problems	0.23	0.04	<0.001	0.04	0.01	<0.001	0.04
Attention problems	0.11	0.04	0.002	0.05	0.01	<0.001	0.03
Delinquent behaviors	0.08	0.04	0.027	0.06	0.01	<0.001	0.03
Aggressive behaviors	0.16	0.05	0.001	0.06	0.01	<0.001	0.03
Internalizing	0.16	0.05	0.001	0.09	0.01	<0.001	0.05
Externalizing	0.13	0.04	0.002	0.06	0.01	<0.001	0.03
Total problems	0.18	0.04	<0.001	0.07	0.01	<0.001	0.05

In "Year of study" positive values mean that year 2013 predicted higher log-scores; ^a – model statistically insignificant; n.s. – not significant

All scale log-scores were predicted by year of study in a way that participants from 2013 had higher log-scores, except for Anxious/Depressed scale in boys, for which the effect of year of study was not significant.

Scales for which beta coefficients +/- standard errors for the effect of year of study did not overlap across genders are: Anxious/Depressed and Social problems (higher effect among girls) and Delinquent behaviors and Externalizing (higher effect among boys).

Higher age predicted higher log-scores on all scales in girls, whereas in boys only on Withdrawn, Thought problems, Attention, Delinquent problems, and Externalizing. In fact, on Social problems higher age predicted lower log-scores for boys.

Post-hoc analyses showed that all least-square mean differences between stages of assessment were significant at $p < 0.05$, adjusted for multiple comparisons and controlling for age.

Proportions of variance explained by our models varied between 0% and 5%.

Deviant range

Deviant Attention problem scores (above 70 ten) (OR = 1.50; 95% CI = (1.06–2.14), $p = 0.023$) and deviant Thought problem scores (OR = 1.62; 95% CI = (1.22–2.14), $p < 0.001$) predicted later study sample. Other scales did not enter the model. For comparison, we presented frequencies of deviant scores by year of study in Table 4.

Table 4. Percentages of deviant scale scores by year of study

	2000	2013
Withdrawn	12.46%	14.78%
Somatic problems	3.82%	6.28%
Anxious/Depressed	7.05%	10.32%
Social problems	2.04%	4.25%
Thought problems	6.86%	11.34%
Attention problems	12.13%	19.43%
Delinquent behaviors	11.01%	13.16%
Aggressive behaviors	2.37%	4.45%
Internalizing	20.63%	25.30%
Externalizing	30.92%	37.04%
Total problems	5.67%	8.30%

Discussion

Median scores for individual scales remained largely unchanged after 13 years. Even statistically significant changes were clinically irrelevant. The percentages of participants in the clinical range were significantly higher in two domains (problems with attention and thinking), both of which are related to cognitive functions of the youth.

Our work's main contribution is the possibility to assess the effect of age on the dynamics of self-reported behavioral and emotional problems. Above all, we would like to indicate that our models, including the effects of year of study and age, accounted for only a small portion of the score variance, which means that the "objective" variables affected the responses only to a small extent. Of course, one could point out that we

failed to include other objective variables such as socio-economic status, however, data from the literature support the claim that this kind of variables account for less than 10% of the variance. Secondly, the girls in our sample showed to be more sensible to the effect of age than the boys did. This goes against the popular opinion that boys have a harder time going through puberty than girls and could be linked to different courses of puberty and socialization among adolescent girls. Thirdly and lastly, in the domains where both girls and boys showed sensibility to age, it seems to exert different effects according to gender. In the case of boys, it acts as a protective factor against social problems but remains a risk factor for delinquent behaviors and withdrawal. In the case of girls it is neutral as far as social problems are concerned but remains a risk factor on all other scales. The only explanation that we have thought of makes reference to a hypothesis that boys have a stronger tendency to rule breaking behavior as they socialize within their peer groups. This in turn renders those groups more cohesive.

Conclusions

Our results could lead to two types of conclusions. The first one being that years 2000 and 2013 did not differ very much in terms of factors hampering psychological and emotional growth of the youth and that over the 13 years no significant social changes took place that would influence the well-being of the children. On the other hand, it seems that the children from our samples had a similar level of psychological resilience.

In light of our findings, the cognitive functioning of adolescents may give grounds for concern. In Poland, from 2000 to 2013, access to the Internet and new technologies increased, deeply changing the way in which the developing cognitive systems are stimulated. The educational system, however, failed to undergo such drastic changes. It is true that year 2000 was a period of transition to a new type of schools (junior secondary school), but in 2000, just as in 2013, education was based on 45 minute lessons with a very modest application of new technologies with a possible exception of computer science classes. We suspect that this discord between cognitive development stimulated by technology and school still rooted in tradition could have resulted in more self-reported attention and thinking problems.

Further research is required to explain the different effects of growing up on reported behavioral and emotional problems. Progress in this field should result in new policies aimed at alleviating the difficult process of growing up for girls.

Dataset availability: The datasets are available from the corresponding author on reasonable request.

The 2000 study received funding from the Polish Ministry of Science and Higher Education (Grant No. 4P05D0116).

Ethical approval: Both researches were approved by the Bioethics Committee of the Medical University of Warsaw.

Conflicts of interest: The authors declare no conflict of interest.

Informed consent was collected from all participants.

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