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Psychometric properties of Polish version of the Children's Eating Attitudes Test

Maciej Wojciech Pilecki, Małgorzata Kowal, Agnieszka Woronkowicz, Łukasz Kryst, Jan Sobiecki

Summary

Objectives. The aim of the present study was to assess the psychometric properties of the Polish version of Maloney's ChEAT-26. A decision was taken to base the Polish version of the tool on the translation of the Polish version of the EAT-26 with addition of colloquial phrases and syntax.
Method. The study group comprised 375 children from Kraków classes four to six (53.7% girls; 46.3% boys). The average age of those studied was 11.8 years (standard deviation 0.9).
The mean for girls was: 7.65 (SD 7.48), for boys: 7.55 (SD 5.91). A level equal to or greater than 20 points was exceeded by 7.6% of girls and 4.1% of boys. In the case of four of the ChEAT-26 statements, a statistically significant difference was observed between the genders.
Results. Based on a qualitative analysis of seven factors extracted by the principal components method with Varimax rotation and scree plot, seven scales for a test were created explaining 60.24% of the entire variance. The number of statements and scales correlated either positively and negatively with the BMI of the children in the study.
Conclusion. The coherence of the results and their consistency with other studies suggest that further research using the Polish version of the ChEAT26 questionnaire should be carried out.

disordered eating / children / primary school

BACKGROUND

Eating disorders in the Western world are becoming more frequent in children, producing a significant clinical burden on paediatric and mental health services [1, 2]. Furthermore, children do not always present the classical signs and symptoms that are seen in adult eating disorder patients. Also, children with eating disorders often present dangerously ill, requiring intensive and protracted treatment [3, 4].

Body shape and weight concerns are quite common among young children in the Western world [5]. A number of mutually interacting dependencies are observed between the somatic growth of children, eating disorders and disordered eating. The last may develope into an eating disorder later. Eating disorders are also connected with obesity which can be not only the consequence, but also the source of problems in the way body weight and shape are experienced [6, 7]. Obesity is a risk factor for the development of eating disorders in the future. Disordered eating is rarely an isolated problem. It is linked to other mental or behavioural problems such as anxiety, depressive disorders and the abuse of psychoactive

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The research took place with the consent of the Bioethics Committee of the Regional Association of the Medical Profession in Kraków, as well as of the family or legal guardians of the children.

drugs. For these reasons, preventive initiatives in early childhood are very important [8, 9, 10]. The early manifestations of eating disorders and disordered eating in a population of young children have not yet been systematically investigated in Poland. The hypothesis may be advanced that with the Westernisation of Poland, after the political changes of 1989, eating disorders in children will be increasing. Clinical and epidemiology studies are indicated to document these changes.

The aim of the present study is to assess the psychometric properties of the Polish version of Maloney's ChEAT as a prelude to further studies of the connections between disordered eating, socio-economic factors, and the somatic growth and development of children.

MATERIAL AND METHODS

The study group comprised 375 school children from classes four to six (53.7% girls; 46.3% boys). The average age of those studied was 11.8 years (standard deviation 0.9). The cohort represented each of the traditional districts of Kraków: Śródmieście, Podgórze, Krowodrza and Nowa Huta. The choice of schools was made randomly to preserve the representativeness of the sample. Permission was granted by 65% of the parents of children attending each school. The Polish version of the Children's Eating Attitudes Test (ChEAT-26) was used as an analytical tool in the study. The ChEAT-26 is a version of the Eating Attitudes Test (EAT-26) [11], adapted for use with younger children by Maloney [12]. Permission to use English version of ChEAT-26 was given by author. The ChEAT-26 is designed to measure a broad range of attitudes and behaviours concerning eating. It consists of twenty-six statements that describe behavior and emotional states connected with eating and body image. Answers are given by students using a six-point scale that refers to the frequency of the occurrence ("always, very often, often, sometimes, rarely, or never"). A decision was made to use colloquial phrases and syntax in the Polish version for females and males of the EAT-26. A calculation method based on that proposed by the author of the Polish version for adults [13] was also adopted. Separate versions of the tool were prepared for girls and boys. Numbers were assigned to the replies as follows: always – 3; very often – 2; often – 1; sometimes, rarely and never – 0.

The basic psychometric properties of the English version of ChEAT-26 are similar to those of the adult EAT-26. The usefulness of the tool is limited by high rates of false positives and false negatives and by its inability to distinguish between cases of anorexia nervosa and bulimia nervosa. The ChEAT-26 is more suitable for use in epidemiological studies [14] than as a diagnostic tool in clinical settings. The ChEAT-26 can be helpful in studying the development of disordered eating behaviours and attitudes in chldren and identifying correlates of this risk [5].

RESULTS

A description of the individual questions based on statistics such as the median along with quartiles, the mode, and minimum and maximum values is included in Tab. 1. *on next page.*

In our survey, most of the children (65.7%) thought that they could easily control what they eat ("could show self-control around food") (the answers: always, very often and often); while 50.9% want high-calorie foods ("enjoy trying new rich foods"); and 26.9% thought about burning-off calories while doing physical exercise. 23.4% of the children thought others regarded them as thin while 20.6% thought they were seen as excessively overweight. An identical percentage thought that others would want them to eat more. 20% of the children wanted to be thinner. Tab. 2 contains descriptive characteristics and a p value for the ChEAT-26 results among gender. As there was no normal distribution for the two groups the Mann-Whitney test was used to compare their median values.

238 children replied 'always', 'very often' or 'often' to four or less of the statements in the questionnaire (Tab. 3). Because of the doubt expressed by Włodarczyk-Bisaga [13] regarding whether it describes pathological behaviour in a Polish cultural context, the statement about "liking to try high-calorie foods" was not included in this analysis.

Table 1. Overall descriptive statistics

	Mean	Standard error of the mean	Mode	SD	Min	Max	Percentile		
							25	50	75
I am scared about being overweight	0.32	0.04	0.00	0.79	0.00	3.00	0.00	0.00	0.00
I stay away from eating when I am hungry	0.19	0.03	0.00	0.60	0.00	3.00	0.00	0.00	0.00
I think about food a lot of the time	0.06	0.02	0.00	0.36	0.00	3.00	0.00	0.00	0.00
I have gone on eating binges where I feel that I might not be able to stop	0.05	0.02	0.00	0.32	0.00	3.00	0.00	0.00	0.00
I cut my food into small pieces	0.33	0.04	0.00	0.80	0.00	3.00	0.00	0.00	0.00
I am aware of the energy (calorie) content in foods that I eat	0.31	0.04	0.00	0.76	0.00	3.00	0.00	0.00	0.00
I try to stay away from foods such as breads, potatoes, and rice	0.06	0.02	0.00	0.29	0.00	3.00	0.00	0.00	0.00
I feel that others would like me to eat more	0.34	0.04	0.00	0.82	0.00	3.00	0.00	0.00	0.00
I feel very guilty after eating	0.03	0.01	0.00	0.24	0.00	3.00	0.00	0.00	0.00
I think a lot about wanting to be thinner	0.46	0.05	0.00	0.98	0.00	3.00	0.00	0.00	0.00
I think about burning up energy (calories) when I exercise	0.55	0.05	0.00	1.00	0.00	3.00	0.00	0.00	1.00
Other people think I am too thin	0.41	0.04	0.00	0.82	0.00	3.00	0.00	0.00	0.00
I think a lot about having fat on my body	0.41	0.05	0.00	0.89	0.00	3.00	0.00	0.00	0.00
I take longer than others to eat my meals	0.37	0.04	0.00	0.82	0.00	3.00	0.00	0.00	0.00
I stay away from foods with sugar in them	0.14	0.03	0.00	0.49	0.00	3.00	0.00	0.00	0.00
I eat diet foods	0.15	0.03	0.00	0.48	0.00	3.00	0.00	0.00	0.00
I think that food controls my life	0.11	0.02	0.00	0.46	0.00	3.00	0.00	0.00	0.00
I can show self-control around food	1.51	0.07	0.00	1.28	0.00	3.00	0.00	2.00	3.00
I feel that others pressure me to eat	0.39	0.05	0.00	0.86	0.00	3.00	0.00	0.00	0.00
I give too much time and thought to food	0.10	0.03	0.00	0.47	0.00	3.00	0.00	0.00	0.00
I feel uncomfortable after eating sweets	0.13	0.02	0.00	0.47	0.00	3.00	0.00	0.00	0.00
I have been dieting	0.10	0.02	0.00	0.43	0.00	3.00	0.00	0.00	0.00
I like my stomach to be empty	0.13	0.03	0.00	0.55	0.00	3.00	0.00	0.00	0.00
I have the urge to vomit after eating	0.04	0.02	0.00	0.30	0.00	3.00	0.00	0.00	0.00
I vomit after I have eaten	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I enjoy trying new rich foods	1.01	0.06	0.00	1.13	0.00	3.00	0.00	1.00	2.00

Table 2. ChEAT-26: Descriptive statistics according to gender

Statistics	N		SD	median	mode	min-max	Q1-Q3	p
Overall	375	7.60	6.79	6.00	3.00	0-44	3-11	
Girls	201	7.65	7.48	6.00	3.00	0-44	3-10	0.361
Boys	174	7.55	5.91	6.00	3.00	0-36	3-11	

Table 3. ChEAT-26: the number of children selecting 'always' and 'very often' in response to the individual statements

Number of statements	Number of children
1	116
2	54
3	34
4	34
5	12
6	11
7	8
8	5
9	3
10	2
11	1
12	1
13	0
14	2

A score of 20 or higher was taken as the cut-off point for screening when using the adult version of EAT-26 (high risk of eating disorders). This level was exceeded by 7.6% girls and 4.1% boys). The comparative analysis of the replies of the boys and girls to the statements was based on a chi-squared independence test, while the overall result of ChEAT-26 was based on a Mann-Whitney test because of the ordinal nature of the data. In the case of four of the statements, a statistically significant difference was observed between the genders. Tab. 4 includes the frequency of the responses where the differences were statistically significant.

As the differences in the responses given by the boys and girls only differed significantly for four of the responses, a decision was made to carry out a factor analysis with no division by gender. The legitimacy of employing a factor analysis was based on the result of a Kaiser-Mayer-Olkin test (Tab. 5).

When extracting the number of factors the principal components method was used and it was assumed that the eigenvalue for each of the factors should be more than 1. In addition, a screen plot was generated (Fig. 1).

Table 4. ChEAT-26: Statements differentiating the genders

No.	Statement	Gender	Percentage of responses*				p
			0	1	2	3	
1	I am scared about being overweight	Girls	78.5	8.5	7.5	5.5	0.005
		Boys	89.5	4.1	1.7	4.7	
5	I cut my food into small pieces	Girls	88.4	4.0	3.0	4.5	0.003
		Boys	76.3	11.0	6.4	6.4	
11	I think a lot about wanting to be thinner	Girls	75.4	5.5	7.5	11.6	0.032
		Boys	84.5	3.4	4.6	7.5	
19	I can show self-control around food	Girls	42.6	15.7	13.2	28.4	0.000
		Boys	24.7	12.9	21.1	41.2	

Table 5. Kaiser-Mayer-Olkin Test and Bartlett's Test

KMO measure of sampling adequacy		0.77
Bartlett's test of sphericity	approximated chi-squared	2646.88
	df intrinsic accuracy	300
	significance	0.00

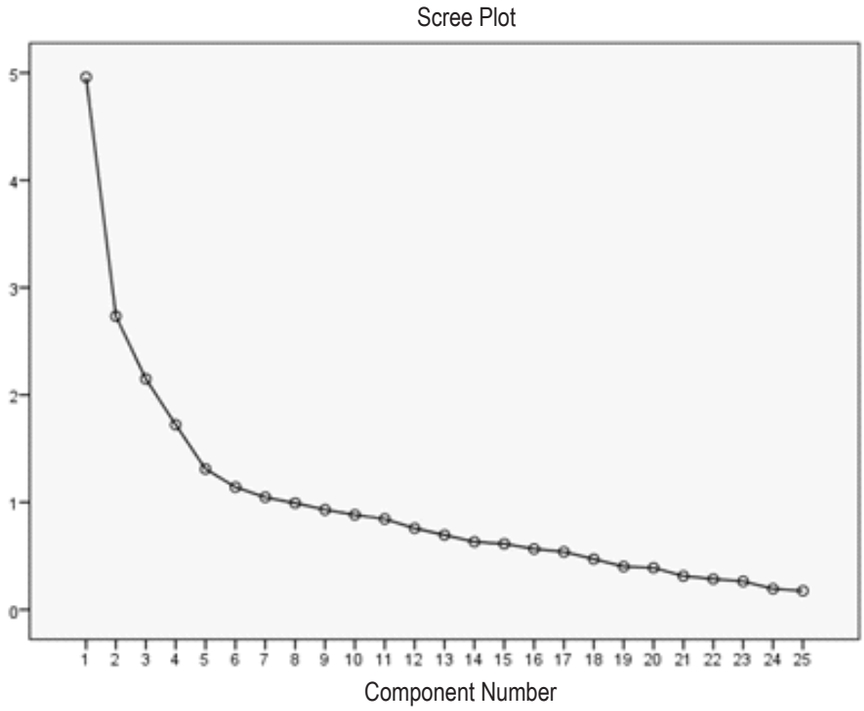

Figure 1. Scree plot

With the aim of increasing the interpretative potential of the extracted factors a Varimax rotation was employed which distinguished 7 factors explaining 60.24% of the entire variance. Statement 9 was not taken into account because it took only zero values (Tab. 6 – *next page*). Despite the low values for the Cronbach's Alpha coefficient of reliability for the final scales it was not decided to reduce the number of factors, since this would have involved a significant reduction in the amount of information conveyed by them. For example, the 7 extracted factors carry 60.24% of the entire variance of the results and 5 factors only 51.49% of the entire variance of the results.

Based on a qualitative analysis of the results of the factor analysis 7 scales for a test were produced using 7 factors obtained. The reliability values for the test are presented in Tab. 7 – *next page*.

In addition, a correlation analysis of each of the statements, the 7 scales and BMI of the children in the study was conducted. It was found that a number of statements correlated both positively and negatively with the BMI of the children in the study (Tab. 8 – *next page*). There were no statistically significant relationship between the overall result of the ChEAT-26 and BMI.

An analysis was also conducted of the relationships between BMI and the 7 scales. A negative correlation was observed in the case of scales I and II, while in the case of scales III and IV a positive correlation was observed (Tab. 9 – *next page*).

DISCUSSION

It appears that certain statements in the ChEAT-26 are understood among our population of children as describing healthy eating patterns rather than disordered eating. This is especially true of the statement: "I can show self-control around food". Smolak and Levine [5] raised similar concerns with this question in their analysis. Despite reservations about this one question, our survey of children's eating attitudes indicated the presence of problematic issues with food, eating and body image among the population studied.

A score greater than 19, which is taken as the cut-off point in the adult version of the EAT-26, was recorded by twice as many girls as boys. The cut-off point in the present study was exceeded by a smaller percentage of children than in the American population in the study at the end of the 1980s that launched the

Table 6. ChEAT-26: Factor analysis across the whole group

No.	Statement	I	II	III	IV	V	VI	VII
11	I think a lot about wanting to be thinner	0.84						
1	I am scared about being overweight	0.80						
14	I think a lot about having fat on my body	0.79						
12	I think about burning up energy (calories) when I excercise	0.73						
2	I stay away from eating when I am hungry	0.53						
15	I take longer than others to eat my meals		0.39					
13	Other people think I am too thin		0.86					
8	I feel that others would like me to eat more		0.86					
20	I feel that others pressure me to eat		0.91					
4	I have gone on eating binges where I feel that I might not be able to stop			0.85				
3	I think about food a lot of the time			0.79				
21	I give too much time and thought to food			0.60				
16	I stay away from foods with sugar in them				0.74			
7	I try to stay away from foods such as breads, potatoes, and rice				0.62			
23	I have been dieting				0.49			
22	I feel uncomfortable after eating sweets				0.38			
5	I cut my food into small pieces					0.68		
6	I am aware of the energy (calorie) content in foods that I eat					0.63		
18	I think that food controls my life					0.51		
17	I eat diet foods					0.45		
19	I can show self-control around food					0.39		
10	I feel very guilty after eating						0.76	
26	I have the urge to vomit after eating						0.44	
24	I like my stomach to be empty							-0.42
25	I enjoy trying new rich foods							0.78

Table 7. The reliability values calculated for the statements of the ChEAT questionnaire

Scale	Reliability Cronbach's alpha	Eliminated item	Reliability Cronbach's alpha (after elimination of the item)
I	0.844	I stay away from eating when I am hungry	0.86
II	0.779	I take longer than others to eat my meals	0.85
III	0.703	I give too much time and thought to food	0.76
IV	0.497	-	-
V	0.467	I can show self-control around food	0.54
VI	0.338	-	-
VII	0.002	-	-

Table 8. Correlation of BMI with the statements of the ChEAT-26

No.	Statement	BMI
1	I am scared about being overweight	0.31**
2	I stay away from eating when I am hungry	0.31**
8	I feel that others would like me to eat more	-0.31**
10	I feel very guilty after eating	0.13*
11	I think a lot about wanting to be thinner	0.43**
12	I think about burning up energy (calories) when I excercise	0.36**
13	Other people think I am too thin	-0.41**
14	I think a lot about having fat on my body	0.40**
15	I take longer than others to eat my meals	-0.16**
18	I think that food controls my life	0.12*
20	I feel that others pressure me to eat	-0.38**
21	I give too much time and thought to food	0.11*
22	I feel uncomfortable after eating sweets	0.16**
23	I have been dieting	0.24**
24	I like my stomach to be empty	0.19**

Where: * – a correlation significant at the level 0.05, ** – a correlation significant at the level 0.0

Table 9. Correlation of BMI with the factors of the ChEAT-26

Factors	BMI
Factor I	0.48 **
Factor II	-0.40 **
Factor III	0.13 *
Factor IV	0.24 *

Where: * – a correlation significant at the level 0.05, ** – a correlation significant at the level 0.01

tool [11] and by a smaller percentage of children than in the more recent studies of De Leel et al. [15]. In neither of these studies was the gender of the population studied taken into account.

It is also worth noting that in a study of 1.458 pupils in class one at Kraków secondary schools conducted in 1998 the mean result for the EAT-26 for girls was 9.7 (SD 8.5) and for boys 4.82 (SD 5.4). A score greater than 19 points was recorded by 89 (11.7%) girls and 21 (2.94%) boys [16]. It would seem that, with age, the growth of problems with eating among girls is accompanied by a similar change among boys.

Based on our factor analysis of the statements of the ChEAT-26, the following names for the factors are proposed:

Scale I: Desire to slim (Des-slim)
Scale II: Pressure to gain weight (Press-gain)
Scale III: Compulsive-bulimic (Comp-bul)
Scale IV: Diet-weight loss (Diet-loss)
Scale V: Excessively healthy eating (Excess-healthy)
Scale VI: Pre-compensatory-bulimic (Pre-com-bul)
Scale VII: Pleasure in overeating (Pleasure-over)

This factor analysis led to a result similar to those observed in the case of Polish teenagers, though a greater number of factors observed among the children [13]. Factor VII, which may be termed the factor of pleasure in overeating, is particularly distinct in the present study. In the research conducted by Smolak and Levine [5] on an American population the goodness of

fit between the results for teenagers and children was greater. Only the first three factors have an acceptable reliability. It would appear that the factors that follow them supplement the major factors.

In the present study there was a limited number of questions from the ChEAT-26 that stratified the group with respect to gender. It was found that girls were more focused on thinness and fear of gaining weight. Also, they were apprehensive about how they could exercise to gain control over their eating.

The correlation of the factor scales of the ChEAT-26 with BMI tend to reflect the accuracy of the observations and fears of some of the children. In this context, children who are thinner than others experience anxiety and pressure from those close to them (Factor II). As weight is gained there is:

- a greater desire to be slim (Factor I),
- an increased awareness of dietary rules and willingness to follow them (Factor IV)
- and a stronger incidence of compulsive eating (Factor III).

This analyses shows the importance of collating the childrens' responses on the ChEAT-26 with their actual weight.

LIMITATIONS OF THIS SURVEY

The study has a number of methodological limitations that make it difficult to draw unambiguous conclusions. The results may be associated in different ways: not only with the distinct features of the population studied, but also with the method of calculation for the results or the statistical methods and procedures employed.

There are some statements in the questionnaire of which children in classes four to six have only a limited understanding. The extent to which they are capable of introspection may also be questioned. At this juncture it is also worth taking special note of the specific nature of the population under investigation. The questionnaire included children whose parents had agreed to their taking part in the whole study. About 60% of the families we asked to take part in the research put their children forward. It was not possible to establish the reasons for the absence of the remaining 40%, but it cannot be ruled out that that variable could significantly have modified the composition of the group under investigation. A further reservation that should be raised here concerns the limitations arising from the nature of the tools employed. ChEAT-26 has not yet been standardized in Polish conditions.

Despite these reservations, the internal coherence of the data obtained, as well as the similarity with the results of many other studies, renders the results obtained credible.

CONCLUSIONS

Based on our survey of 375 students using the Children's Eating Attitudes Test (ChEAT-26), these epidemiologic findings may have clinical relevance:

Many of the pupils from classes IV, V and VI at Polish primary schools admitted having disordered eating attitudes and habits.

The incidence of these problems and the inter-gender differences found are less than in the rates reported in teenagers.

Perhaps further research with children can lead to interventions with high risk pupils to help prevent the development of eating disorders later.

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PSYCHIATRIA POLSKA
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CONTENT