The Validity and Reliability Study of the Turkish Version of the Chedoke-McMaster Attitudes towards Children with Handicaps

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ABSTRACT

Background: The attitudes of children with normal development are effective in preventing negative attitudes and discrimination towards children with disabilities. So, it is important to use a valid measurement tool in determining the attitudes of their peers towards children with disabilities.

Purpose: The study aimed to evaluate the validity and reliability of the Turkish version of the Chedoke-McMaster Attitudes towards Children with Handicaps Scale.

Materials and Methods: This is a methodological study. Three hundred and ninety-three primary school students constituted the sample of the study. The SPSS 22.0 and the Amos 22.0 programs were used to analyze the data, and construct validity was

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tested using the Cronbach's alpha, exploratory factor analysis, confirmatory factor analysis, and Pearson correlation analysis.

Results: The Cronbach's alpha was .89 for the whole scale, .91 in the affective dimension, .71 in the behavioral dimension and .68 in the cognitive dimension. The fit indices of the scale with 30 items and three factors were at an acceptable level by RMSEA .062; GFI .85; $\chi 2/sd 2.701$ (*p*= .000).

Conclusions: It was determined that the Chedoke-McMaster Attitudes towards Children with Handicaps is a valid and reliable scale for the Turkish society.

Keywords: Attitude, children with disabilities, CATCH scale, reliability, and validity

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INTRODUCTION

Around one billion people experience some form of disability [1]. 95 million (5.1%) of the disability cases are experienced in childhood, between the ages of 0 and 14 years, and 13 million of these cases (0.7%) are categorized as severe disabilities [2].

Individuals with disabilities face different attitudes. Most of the children with disabilities in developing countries experience problems such as discrimination and stigma. Behaviors, attitudes, and perceptions towards individuals with disabilities directly affect the services and opportunities provided to them.

Children and adolescents with disabilities encounter barriers in accessing health, transportation, education, and other services. Negative attitudes are one of the major barriers individuals with disabilities are faced with while accessing services. It is argued that the acceptance of disabled children by their peers and other individuals and their coexistence with them can only be possible with the development of positive attitudes towards the individuals with disabilities [3].

Inclusion programs are recommended for children with disabilities to benefit from education services and to integrate into the society. The main idea of inclusion programs is to ensure that children with disabilities are accepted by normal children, become friends with normal children, and develop positive self-esteem [4].

Studies have revealed that positive attitudes towards individuals with disabilities support the academic and social development of disabled children [5,6].

However, studies have also revealed that the inclusion of children with disabilities in schools with normal students is not very easy [7,8]. It has been determined that the students in inclusive schools may exhibit negative attitudes towards students with disabilities [9].

Disabled children may not be accepted by the children with normal development [6,9,10].

Children with normal development have a significant role in the acceptance of children with disabilities [11]. It has been revealed that the attitudes of normal children towards disabled children is the key factor that prevents the disabled children from taking full advantage of the schools [12,13].

The disabled children may not even want to continue their education [14,15]. For this reason, it is significant to develop positive attitudes towards disabled children [16]. However, there is no measurement tool for evaluating the attitudes of children with normal development towards children with disabilities in the Turkish society.

The Chedoke-McMaster Attitudes towards Children with Handicaps (CATCH) Scale is considered to be the most appropriate scale to evaluate attitudes towards disabled children [17]. It is used in many countries such as France [17], the Netherlands [18], Belgium [19], Israel [20], Saudi Arabia [21] and Canada [22] as a valid and reliable tool.

Children and adolescents with disabilities cannot benefit from education and other services at the desired level in Turkey. Determining the attitudes towards children with disabilities by adapting the scale to the Turkish society may contribute to the planning of intervention programs that can help the disabled children to cope with the problems they encounter. The study aimed to investigate the validity and reliability of the Turkish version of the CATCH Scale developed by Rosenbaum et al. (1986), for the Turkish society [22].

MATERIALS AND METHODS

Design

The study has a methodological design. Permission was obtained both from Rosenbaum via email for the adaptation of the CATCH into Turkish and from Koç University Non-Interventional Research Ethics Committee (2015. 295.IRB3.167) and the Provincial Directorate of National Education.

Sample

The study was conducted in 12 schools in one district of Istanbul. It is recommended in the literature to perform the adaptation and the validity testing of a scale with a participant group that equals to 5–10 times the number of items in the scale. It is also recommended to have a total of 300–500 participants when Confirmatory Factor Analysis is to be performed [23].

Based on these recommend-dations, it was planned to reach a participant group that was at least 10 times the number of items in the CATCH Scale, which is 36. The researchers were able to reach 393 participants in total.

Data Collection

The data were collected between January 01-30, 2016 using the Introductory Information Form and the CATCH Scale.Introductory Information Form: It includes questions examining students' socio-demographic information such as age, gender, and grade, as well as their disability status, the status of having a handicapped friend at school or outside of school, and the presence of a handicapped individual in the family. Chedoke-McMaster Attitudes Towards Children with Handicaps Scale (CATCH): The scale was developed by Rosenbaum et al. (1986) for children aged between 9-13 years; however, it is also used for children aged 16 years in many countries [4,17].

The scale consists of 36 items and is based on the self-reports of children.

The responses are scored on a five-point Likert type scale from 0 (strongly disagree) to 4 (strongly agree).

The scale has three sub-dimensions, i.e., affective, behavioral, and cognitive domains.

Each sub-dimension consists of 12 items, and the items with a negative meaning are reverse coded. The sub-dimensions are scored between 0-40.

The Cronbach's alpha was 0.91 for affective attitudes, 0.74 for behavioral attitudes, 0.65 for cognitive attitudes, and 0.91 for the whole scale [22].

Stages of the study

The study was conducted in five stages. At the first stage, the CATCH was translated into Turkish and then back-translated into English. At the second stage, expert opinions were received to test the content validity of the scale. The study continued with the stages of pilot testing, procedure, and psychometric testing.

Stage 1: Language Adaptation

Two native speakers of Turkish who are fluent in English were requested to translate the scale from English to Turkish independently. The researchers evaluated these translations, focusing on the wording of the items. Next, the Turkish translations were back-translated into English by two different translators. The original and backtranslated versions of the CATCH Scale were compared by the researchers, and they were found to have items with similar meaning.

Stage 2: Content Validity

The opinions of ten experts were obtained using the Davis technique to test the content validity of the Turkish CATCH Scale.

Based on the Davis technique, the number of experts who marked (1) and (2) options in the rating scale was divided by the total number of experts to calculate the content validity index. The rating statements used in the Davis technique are as follows:

- the adaptation of the item is appropriate (1);
- the adaptation of the item is appropriate, but some correction is required (2);
- the adaptation of the item is appropriate but serious correction is required (3);
- and the adaptation of the item is not appropriate (4).

The expert opinions were evaluated based on the Davis technique, and the Turkish trial version of the scale was obtained.

Stage 3: Pilot Test

At this stage, the scale was tested on 20 children aged between 10-16 years who met the inclusion criteria, and the comprehensibility of the items was examined.

The participants were requested to comment on any statement, word, or content they had difficulty understanding. No changes were made in the scale since the items were found to be comprehensible by the participants.

Stage 4: Procedure

The criteria for inclusion in the sample were being between the ages of 10-16, receiving education together with handicapped children, volunteering to participate in the study, knowing Turkish, and having no visual and speech impairment. The participants were informed about the aim of the study. They were further informed that participation was voluntary, they could withdraw from the study whenever they wanted, and the data gathered would be kept confidential and used only for scientific purposes. Then, their informed verbal consent was obtained, and the data were collected from the students by the researchers through the face-to-face survey method, which took approximately 15-20 minutes.

Stage 5: Psychometric Tests

The SPSS 22.0 (IBM Corporation, Armork, NY, USA) and the Amos 22.0 were used to conduct the validity and reliability analyses of the scale.

Validity Analysis

In the item analysis, the independentsamples t-test was used to determine whether the 27% lower and 27% upper scores were distinctive. Construct validity was tested using the Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA).

The Principal Components Analysis was employed for the EFA, and the varimax rotation method was utilized for data analysis.

The appropriateness of the EFA was determined with the The Kaiser-Meyer-Olkin (KMO).

The meaningfulness of inter-variable correlation coefficients was determined using the Bartlett sphericity test.

The Groningen Frailty Indicator (GFI), Adjusted Goodness of Fit Index (AGFI), Content Validity of The Cultural Formulation Interview (CFI), Root Mean Square Error of Approximation (RMSEA), Root Mean Square Residual (RMR), Normed Fit Index (NFI), The Chi-square test (χ^2) and χ^2 /sd goodness of fit indexes were used for the CFA.

The validity and reliability analyses conducted are presented in Table 1.

Table 1. Statistical Methods Used in Examining the Psycholinguistic and Psychometric Properties of the
Chedoke-McMaster Attitudes towards Children with Handicaps Scale

Psychol	sycholinguistic and psychometric properties						
Validity	Language validity	English to Turkish translation Back translation from Turkish to English					
	Content validity	Receiving expert opinions (10 experts) Calculation using the Davis technique and Kendall' coefficient of concordance					
	Appropriateness of the sample size	Kaiser-Meyer-Olkin analysis					
	Internal criterion validity	Examining the mean scores of the lower and upper groups using the independent samples t test					
	Construct validity	Exploratory Factor Analysis Confirmatory Factor Analysis					
Reliability	Internal consistency reliability coefficient	Calculation of the Cronbach's Alpha					
	Item analysis	Pearson correlation analysis					

Reliability Analysis

The internal consistency of the scale and the factors that emerged with the factor analysis was tested with the Cronbach's Alpha. The Pearson correlation analysis was performed to examine the correlation between scale scores.

RESULTS

Descriptive Characteristics

The mean age of the students was 12.38 ± 1.98 (min:11, max:14). 32.3% of the students were 5th graders, 16.5% were 6th graders, 31.6% were

7th graders, and 19.6% were 8th graders. It was found that 0.8% of the students had a physical disability and 32.1% had one handicapped friend. Furthermore, 7.9% of the students had handicapped individuals in their families.

Descriptive statistics

The total mean score of the scale was 27.48 ± 4.95 (min:13.67, max:39.33). The mean score was found to be 27.39 ± 6.26 (min:10, max:40) for the affective sub-dimension, 30.89 ± 5.89 (min:7.14, max:40) for the behavioral sub-dimension, and 21.92 ± 6.72 (min:5, max:40) for the cognitive sub-dimension (Table 2).

CATCH Scale	x ±SD	Min	Max
Affective	27.39±6.26	10.00	40.00
Behavioral	30.89±5.89	7.14	40.00
Cognitive	21.92±6.72	5.00	40.00
Total	27.48±4.95	13.67	39.33

Table 2. Descriptive statistics for the CATCH Scale

* The score that can be obtained from the total scale and the sub-dimensions is between 0 and 40.

Validity and Reliability Analysis Results

Language Content Validity

The validity and reliability analysis stages are presented in Table 1. According to Davis, the content validity index values should be greater than .80 [24].

In our study, the values ranged between .82 and 1.00, which indicates that the content validity indices of the scale were adequate. Once the scale was finalized, it was administered to 20 individuals who would not be included in the main study, and it was found to be comprehensible.

Validity Analysis

The Kendall W analysis was used to evaluate the scores given by ten experts. The analysis revealed no statistically significant difference between the scores (Kendall W= .47, p= .16). According to the EFA, the KMO was .899, and the Barlett test result was χ^2 =3847.666, p= .000. The factor loadings ranged from .72 to .33. The total variance explained was 40.653 (Table 3).

Table 3. Reliability and validity results for the Chedoke-McMaster Attitudes towards Children with Handicaps

Prog Health Sci 2023, Vol 13, No J	! Turkish version of the CATCH Scale
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Item	Scale Items	Factor loading	X±SD	Min % 27*-Max %27*		Cronbach Alpha if item deleted	Exp. variance	
Factor 1	: Affective (α=.909)						23.559	
1	I do not worry if a handicapped child sits next to me in the classroom	.464	2.88±1.11	-8.327	.000**	.886		
7	I invite a handicapped child to my birthday	.649	2.93±.99	-15.096	.000**	.882		
8	I am scared of a handicapped child	.336	2.96±1.12	-5.567		.888		
9	I talk to a handicapped child I do not know	.546	$2.20{\pm}1.07$	-12.348	.000**	.884		
11	I want a handicapped child to be our neighbor	.523	2.56±.92	-10.222	.000**	.884		
12	I would be happy to have a handicapped child as a special friend	.671	2.85±1.01	-14.766	.000**	.881		
13	I try to stay away from a handicapped child	.649	3.15±.98	-16.785	.000**	.881		
15	I do not like a handicapped friend as much as my other friends	.507	2.79±1.06	-10.882	.000**	.885		
16	I do not sit next to a handicapped child in the classroom	.662	2.88±.96	-13.538	.000**	.883		
17	I would be happy if a handicapped child invites me to his/her home	.717	2.78±.99	-16.019	.000**	.881		
18	I would be happy to work with a handicapped child for a school project	.643	2.88±.97	-16.165	.000**	.882		
19	Handicapped children are not fun	.531	3.13±.93	-13.921	.000**	.883		
20	I invite a handicapped child to my home as an overnight guest	.610	2.31±1.05	-10.487	.000**	.884		
21	Being with a handicapped individual scare me	.602	2.95±.99	-12.933	.000**	.883		
23	I hesitate when a handicapped child invites me to his/her birthday	.573	2.69±1.07	-13.204	.000**	.884		
24	I share my secrets with a handicapped child	.614	2.38±1.06	-11.887	.000**	.884		
26	I enjoy being with a handicapped child	.640	$2.62 \pm .97$	-11.688	.000**	.884		
27	I do not go to a handicapped child's house to	.609	2.55 ± 1.10	-	.000**	.884		
20	play	575	2.54+1.00	12.2489	000**	002		
Eactor 2	T miss the mendship of a handicapped child P: Behavioral ($q = 712$)	.375	2.34±1.00	-12.000	.000**	.005	9.807	
3	Handicapped children love to play games	509	3 04+ 99	-7 445	000**	887	9.007	
4	I feel sorry for handicapped children	.330	2.96±1.13	-3.947	.000**	.892		
5	I defend a handicapped child who is ridiculed	.654	3.45±.90	-8.510	.000**	.885		
6	Handicapped children expect a lot of interest from adults	.428	2.84±1.04	-4.061	.000**	.891		
10	Handicapped children do not like to make friends	.517	3.16±.96	-8.120	.000**	.886		
28	Handicapped children can make new friends	.557	3.09±.93	-9.290	.000**	.885		
30	Handicapped children need help to do many things	.334	3.07±1.06	-3.333	.001**	.892		
Factor 3: Cognitive (α =.676)								
2	Handicapped children can do many things by themselves	.494	2.10±1.10	-4,774	.000**	.891		
14	Handicapped children are as happy as me	.551	1.89±1.11	-4,798	.000**	.891		
22	Handicapped children are interested in many things	.517	2.52±.85	-5,250	.000**	.889		
25	Handicapped children are usually sad	.410	2.56±1.02	-4,774	.000**	.891		
Total Cronbach Alpha α=.892								
Total Explained Variance (%)							40.653	

n= 393, *n1= n2= 106, ** significant values for p < .05.

Reliability Analysis

The Cronbach's Alpha was .89 for the scale, and it was .91, .71, and .68 for the affective, behavioral, and cognitive sub-dimensions, respectively (Table 3).

The reliability for the sub-dimensions was acceptable, and the correlation between the affective and behavioral dimensions was .57, between affective and cognitive dimensions was .29, between behavioral and cognitive was .28, and a positive relationship was found between them.

The raw scores obtained from the scale were ranked in a descending order in order to determine how distinctive the items in the scale were, and the mean scores of the groups in the 27% lower and 27% upper were compared using the independent group t-test. The comparison revealed no statistically significant difference between the mean item scores of the lower and upper groups. Thus, it can be said that the scale was distinctive in terms of measuring the desired characteristic (Table 3).

The CFA revealed that the SEM results of the scale were significant at p=.000, and the 30 items and the three sub-dimensions in the scale were related to the scale structure.

In the established model, the fit index values obtained were as follows: RMSEA= .066, NFI= .726, CFI= .806, Incremental fit index (IFI)= .808, GFI= .836, Tucker-Lewis fit index (TLI)= .811, Adjusted goodness of fit index (AGFI)= .811, Chi-square (CMIN)= 1085.749, and Chi-square to degrees of freedom ratio (CMIN/DF) = 2.70.

The modification indices of the model were examined, and the covariance structure was proposed between e5-e16; e7-e12; e8-e9; e20-e22. Table 4 shows that the accepted values were achieved when the relevant structure was created, and the model was analyzed again. When the goodness of fit indexes of the CATCH Scale were examined according to the first-order multi-factor analysis results, it was found that 2.484 (*p*=.000) values were at an acceptable level when RMSEA = .062; GFI = .851; and χ^2 /sd (Table 4).

Table 4. Pre and Post Modification Multifactor Confirmatory Factor Fit Indexes of the Chedoke-McMaster

 Attitudes towards Children with Handicaps Scale

RMSEA	NFI	CFI	ÎFI	GFI	TLI	AGFI	CMIN	CMIN/DF
.066	.726	.806	.808	.836	.811	.811	1085.749	2.701
.062	.750	.832	.834	.851	.817	.826	988.589	2.484

RMSEA = Root mean square error of approximation; NFI = Non-normed fit index; CFI = Comparative fit index; IFI= Incremental fit index; GFI = Goodness of fit index; TLI= Tucker-Lewis fit index; AGFI = Adjusted goodness of fit index; CMIN= Chi-square; CMIN/DF= Chi-square to degrees of freedom ratio

The three-factor structure of the scale was examined. In this structure, there were 25 items for the affective dimension, 6 items for the behavioral dimension, and 5 items for the cognitive dimension, and the variance explained was low. Furthermore, the CFA model fit indexes were not within the desired limits. As a result, 6 items with low explanation variance in the affective dimension were removed from the model, and with the solution obtained, the model fit was found to be within the limits and acceptable (2.484 (p=.000) when RMSEA=.062; GFI=.851; and χ^2 /sd).

The CATCH Scale first-order multi-factor CFA results are presented in Figure 1. The scale was determined to have three factors and 30 items. The lowest and highest factor loadings of the items were .33 and .72, respectively.

The correlation between the total score of the CATCH scale and the mean scores of the subdimensions. The correlation between all the subdimensions of the scale and the total score was found to be positive (p<.05).

DISCUSSION

Based on the opinions of 10 experts, the content validity of the scale was found to be high. The EFA showed the total variance of the scale as KMO=.899. Furthermore, the sample size was found to be perfectly adequate for factor analysis and the data were found to have multivariate normal distribution based on the Bartlett sphericity test results [25]. The total variance explained by the scale was found as 40.653. An variance ratio between 40% and 60% is considered to be adequate in the literature [26]. While the total variance explained by the original scale was 41.7%, the affective dimension had 29.3% explanation variance, the behavioral dimension had 8.1% explanation variance, and the cognitive dimension had 4.3% explanation variance [22]. The variances explained by the original scale are consistent with the results obtained in the Turkish adaptation study.

The item analysis revealed that the items in the scale have a good distinctiveness in terms of determining the attitudes towards children with disabilities. As stated in the literature, the factor loading of an item in a scale should be at least .30 or .40 [26]. Based on the item analysis, 6 items (2, 4, 14, 19, 22, 34) with a factor loading of less than .30 were removed from the scale, and no statistically significant difference was observed between the mean item scores of the 27% lower and 27% upper groups of the remaining items, which suggested that the final version of the scale was distinctive in measuring the desired quality. It was observed that the lowest and highest factor loadings of the scale were .33 and .72, respectively. In the original study, Rosenbaum et al. (1986) reported that the factor loadings of the 36-item scale varied between .36 and .76. It is remarkable that the single-factor seven-item structure of the Belgian version of the scale included the items under the affective and behavioral subdimensions and the items related to the cognitive dimension were not included in this single-factor structure [19]. The Turkish adaptation of the scale is similar to the Belgian version in that most of the items that were removed from the original scale (14 and 19) and replaced among other factors (5, 8, 12, 24, 33 and 36) are under the cognitive dimension of the original scale.

With regard to model fit, while an χ^2/sd value below 3 indicates a perfect fit, an RMSEA value of .08 and below indicates a good fit, NFI and CFI values of .90 and above and .95 and above indicate good fit and perfect fit, respectively, an IFI value of .90 and above indicates a good fit, and GFI and AGFI values of .85 and above indicate an acceptable fit [23,27]. The CFA reveals more than one fit index, which are used to evaluate the model accuracy [28]. In our study, the RMSEA, GFI, CMIN and CMIN/CF values indicate an acceptable fit. When the fit values and the factor loadings of the items are evaluated together, the three-factor 30-item structure of the scale is confirmed, and it can be stated that the model has sufficient fit values [29]. It was further determined that the RMSEA (.062), GFI (.851), χ^2 /sd (2.484) fit indices of the CATCH scale are acceptable in the three-factor structure. The CFA results were not provided in the original study [22]. In the Belgian version of the scale, the fit index values of the structure consisting of a single factor and seven items are as follows: SBS-x2 (28, n=2217) = 59.548, p<.001, RMSEA= .033, CFI= .998, Standardized root mean square residual (SRMR)= .021 [19]. Similar to our study, the factor structure of the scale did not change in the Israeli adaptation study [20], and the two-factor structure was accepted in the Dutch version [18].

The Cronbach's Alpha is used to evaluate internal consistency. A coefficient between .60- and .79 points to relative reliability, while a coefficient between .80- and 1 refers to high levels of reliability [30]. The CATCH is used in countries such as France (Vignes et al., 2008), the Netherlands [18], Belgium [17], and Israel [20], and it was shown to be a valid and a reliable scale in all these countries. In the validity and reliability study conducted in the Netherlands, the internal consistency was found to be .92 in the affective and behavioral dimensions and .77 in the cognitive dimension. The total internal consistency was found to be .93 [18]. In our study, the Cronbach's alpha of the whole scale was found to be.89, .91 in the affective dimension, .71 in the behavioral dimension, and .68 in the cognitive dimension. The Cronbach's Alpha was .90 for the original scale and between .91 and .65 for the sub-dimensions [22]. The Cronbach's alpha values of the scale and the sub-dimensions are within the acceptable range and coincide with those of the original scale [30].

Limitations of the study

The validity and reliability study of the CATCH was conducted to evaluate the attitudes of children with normal development towards children with disabilities within Turkish society. However, our study has some limitations. One limitation is that the test-retest reliability could not be verified due to the study design. Our results can only be generalized to the primary school students in the research group.

CONCLUSIONS

The study introduced the Turkish adaptation of the CATCH scale into the literature by examining its psychometric properties. The scale was found to be valid and reliable in terms of revealing the attitudes of the Turkish society towards children with disabilities. It is an important tool that can be used in the studies on the inclusion of children with disabilities in general schools. Future studies may perform the validity and reliability studies of the scale with participants of a wider age-range.

SUMMARY STATEMENT

What is already known about this topic?

- Children with disabilities may be exposed to discrimination and negative attitudes by their peers.
- In order to prevent these negative attitudes, first of all, it is necessary to determine the attitudes towards them. However, there is no scale in our country to determine this.
- The Chedoke-McMaster Attitudes towards Children with Handicaps Scale (The CATCH) is a measurement tool to evaluate attitudes towards disabled children.
- The Chedoke-McMaster Attitudes towards Children with Handicaps Scale is used frequently across the world, and validity and reliability studies have been conducted by many researchers.

What this paper adds?

• The Turkish version of The CATCH showed statistically acceptable levels of reliability and validity for use in the Turkish population.

The implications of this paper:

- It can be used to determine the attitudes of children with normal development towards children with disabilities in Turkey.
- This scale can be used in future studies that can be used to measure efforts to develop positive attitudes towards children.

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Conflict of interest

The authors declare they have no conflict of interest.

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