



# Developing a scale of social attitude towards childhood epilepsies: a validity and reliability study

Çocukluk çağı epilepsilerine karşı toplumsal tutum ölçeği geliştirilmesi: geçerlik ve güvenilirlik çalışması

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## The known about this topic

Psychological and behavioral problems are observed frequently in patients with epilepsy. The society's perspective on epilepsy facilitates occurrence of this kind of problems. An attitude scale that was developed with the objective of evaluating social attitude and behaviors toward adult epilepsy patients, is currently being used and its validity and reliability studies have been completed. However, no such scale directed to pediatric epilepsy patients, is available.

## Contribution of the study

A scale composed of twelve items with confirmed validity and reliability, was developed. Use of this scale that was developed, will contribute to developing health and social politics and to obtaining objective data for increasing quality of life in children with epilepsy.

## Abstract

**Aim:** There is no scale of social attitude towards childhood epilepsies. In this research study, it was aimed to develop a valid and reliable scale based on three-component attitude model to measure society's attitudes towards childhood epilepsy.

**Material and Methods:** This study was conducted in a province in Central Anatolia with 314 participants (150 males and 164 females) aged between 18 and 68 years. The data in the study were obtained by applying a draft scale consisting of 52 items. Correlation analysis was performed to determine item discrimination of the items included in the draft scale; exploratory and confirmatory factor analyses were performed to determine the scale's structure validity and Cronbach alpha internal-consistency coefficients were used to determine the scale's measurement reliability.

**Results:** In the study, a two-factor structure with an eigenvalue above 1, which explained 52.39% of the variance, was obtained as a result of principal component analysis and Horn's parallel analysis. Following confirmatory factor analysis, the factor structure modeled in exploratory

## Öz

**Amaç:** Çocukluk çağı epilepsilerine karşı toplumsal tutum ölçeği bulunmamaktadır. Bu çalışmada, toplumun çocukluk çağı epilepsisine yönelik tutumlarını üç bileşenli tutum modeli temelinde geçerli ve güvenilir bir ölçek geliştirilmesi amaçlanmıştır.

**Gereç ve Yöntemler:** Bu araştırma İç Anadolu bölgesindeki bir ilde yaşları 18 ile 68 arasında değişen 150'si erkek, 164'ü kadın olmak üzere 314 katılımcı üzerinde yürütüldü. Araştırmada veriler, 52 maddeden oluşan taslak ölçeğin uygulanmasıyla elde edildi. Taslak ölçek maddelerinin madde ayırt ediciliğini belirlemek amacıyla korelasyon analizi; taslak ölçeğin yapı geçerliği için açımlayıcı ve doğrulayıcı faktör analizi; ölçeğin ölçüm güvenilirliği için Cronbach Alpha iç-tutarlılık katsayısı kullanıldı.

**Bulgular:** Araştırmada temel bileşenler ve Horn'un paralel analizi sonucunda varyansın %52,39'unu açıklayan öz-değeri 1'in üzerinde iki faktörlü yapı elde edildi. Doğrulayıcı faktör analizi sonrasında ise standart uyum değerleri kapsamında, açımlayıcı faktör analizinde modellenen faktör yapısı doğrulandı. Ölçeğin ölçüm güvenilirliği, Cronbach

Cont. ➔

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factor analysis was confirmed within the context of standard fit values. The Cronbach alpha internal consistency coefficient (measurement reliability of the scale) was between 0.75 and 0.85. The Childhood Epilepsy Attitude Scale consists of 12 items included in two factors: (i) Affective and Behavioral Attitude and (ii) Cognitive Attitude. The scale is a 5-point Likert-type scale.

**Conclusion:** According to the data obtained in the study, the scale is a valid and reliable data collection tool that can be used for measuring individuals' attitudes towards childhood epilepsy. It is thought that this scale can be used in studies related to childhood epilepsy.

**Keywords:** Attitude, childhood, epilepsy, reliability, scale, validity

## Introduction

Epilepsy is a chronic neurologic disease that affects more 70 million people worldwide (1). In a study conducted in Eskişehir in 2010, the incidence of epilepsy was found to be 37.5/100, 000 (2). In most cases, seizures begin in childhood. In children who have seizures, psychological negativities may also be observed in addition to neurologic problems. Epileptic episodes occur unexpectedly and may also be embarrassing and even dangerous for the child depending on specific conditions. Studies have shown that psychological and behavioral problems occur with a 4.8-fold higher rate in children with epilepsy (3). In addition, the attitude of society towards epilepsy also influences the occurrence of these kinds of problems. Aydemir et al. (4) developed an attitude scale to evaluate society's attitudes and behaviors towards adult patients with epilepsy; this scale has been shown to be valid and reliable and it is currently being used. In addition, we have the Epilepsy Stigmatization Scale and Epilepsy Self-Management Scale, which was developed in our country (5, 6). However, there is no attitude scale for pediatric patients with epilepsy. The specification of society's attitudes and behavioral characteristics towards pediatric patients will contribute to the development of health and social politics, which are required to increase patients' quality of life.

In this study, we aimed to develop a valid and reliable scale in order to determine the attitudes of individuals towards pediatric patients with epilepsy based on three-component (cognitive, affective, and behavioral) attitude model (7).

## Material and Methods

### Type of the research study

This study is a methodologic research study.

### Population and sample of the study

This study was conducted with participants aged over 18 years in the provincial center of Eskişehir. It has been stated that the sample size should be at least 5-10-fold higher than the scale item number in order to perform

Alpha iç-tutarlılık katsayısı 0,75 ile 0,85 arasındadır. Çocukluk Çağı Epilepsi Tutum Ölçeği, (i) Duygulanımsal ve Davranışsal Tutum ile (ii) Bilişsel Tutum olmak üzere iki faktör içinde yer alan 12 maddeden oluşmakta olup ölçek 5'li Likert skalasıdır.

**Çıkarımlar:** Araştırmada elde edilen verilere göre geliştirilen ölçek, bireylerin çocukluk çağı epilepsisine yönelik tutumlarını ölçmede kullanılabilir geçerli ve güvenilir bir veri toplama aracı olup çocukluk çağı epilepsisine yönelik çalışmalarda kullanılabilirliği düşünülmektedir.

**Anahtar sözcükler:** Çocukluk çağı, geçerlik, güvenilirlik, ölçek epilepsi, tutum

factor analysis in scale development studies. We aimed to recruit 260 participants because the draft scale used in the study consisted of 52 items. Participants who had epilepsy or whose relatives up to the third degree had epilepsy were not included in the study.

## Data collection tools

### Establishment of the Draft Scale

#### Theoretical Structure

In the literature, there are three different models including (i) the single-component model, (ii) the two-component model, and (iii) the three-component model related to the concept of attitude in the area of social psychology. The single-component model can be defined as the affect for or against a psychological object (8). Do you like or dislike the object? As simple as that. The main characteristics of the single-component model, which was first defined and measured by Thurstone LL (8), is centralization of affect. In the two-component model, attitude is judicatory reactions or a covered tendency (9). In the three-component model, the human attitude reflects the trichotomy of life, which is composed of emotions, thoughts, and actions, and probably the brain's three layers which have evolved (cortex, limbic system and old brain) (7). Up to this point, some classifications and models related to the concept of attitude have been mentioned. The scale developed in this study was constituted based on the three-component model and the details are explained below.

### Factors, the strategy used to constitute the items and item contents

Based on the three-component model, the scale was designed in a three-factor structure including (i) cognitive attitude, (ii) affectional attitude, and (iii) behavioral attitude.

- The first factor of the scale is Cognitive Attitude. The items included in the factor of cognitive attitude are based on the individual's beliefs and ideas related to childhood epilepsy.
- The second factor is Affectional Attitude. The items included in the factor of Affectional Attitude are based on the individual's emotions, feelings, and values related to childhood epilepsy rather than their beliefs.

- The final factor is Behavioral Attitude. The items included in the factor of Behavioral Attitude include the individual's behaviors or behavioral intentions related to childhood epilepsy.

After the theoretical structure and factors of the draft scale were determined, interviews were conducted with four academic members experienced in the area of medicine and one academic member in the areas of social psychology and assessment and evaluation. Fifty-two items were constituted for the draft scale based on the interviews and the literature.

### Content validity

The content validity of the draft scale was realized with the opinions of one specialist who was working in the area of psychology, assessment, and evaluation, and five specialists working in the area of medicine. In the content validity, the specialists were asked to read the items included in the draft scale and to evaluate each item (if the item was an expression of attitude towards childhood epilepsy and which of the components [cognitive, affective or behavioral] the relevant attitude represented). The content validity of the draft scale was completed following the obtained assessments.

### Response options

The draft scale was arranged as 52 items on a 5-point Likert scale. There are four different rating systems that are frequently preferred in scoring Likert scales. These include triplet, tetrad, quintet, and septet scale scoring systems (10). The items in Likert-type scales have item types with mutual options, and triplet, quintet or septet scores are used mostly. Although there is no clear consensus on this issue, the original type has quintet scores. Therefore, the quintet option was preferred for the draft scale.

### Ethical aspect of the study

The research protocol was approved by Eskişehir Osmangazi University Ethics Committee (25.10.2018; Decision No.: 262). This study was conducted in accordance with the Declaration of Helsinki.

### Assessment of the data

The data in this study were obtained by applying the draft scale to the participants under supervision. The participants responded the first part of the data collection tool, which consisted of demographic questions, and then marked their degree of agreement with the items included in the scale. In this study, the draft scale's (i) item distinctiveness, (ii) structure validity, and (iii) reliability were analyzed. Pearson correlation analysis was used to determine item distinctiveness of the items included in

the draft scale, exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were used to determine structure validity of the draft scale, and Cronbach alpha internal consistency coefficient was used to determine the scale's reliability for measurement.

## Results

### Sociodemographic characteristics of the participants

The study was conducted with a total of 314 participants, comprising 164 women (47.8%) and 150 men (52.2%). The mean age of the participants was  $37.96 \pm 11.13$  (min: 19, max: 68) years. The majority (66.2%) of the study group was married and 32.8% was single. Most of the participants (67.9%) had an education level of high-school and above and 186 (59.2%) had children.

### Item discrimination, exploratory, and confirmatory factor analyses

The data obtained from 314 participants were used to determine the item discrimination of 52 items included in the draft scale. However, the data obtained from 314 participants were randomly divided into two parts in order to perform EFA and CFA with the objective of determining factor structure of the draft scale; the first data group was used for EFA (n=157) and the second data group was used for CFA (n=157).

### Item discrimination

In the data group that belonged to 314 individuals, group mean values were assigned to lost data. Subsequently, the normality of the data was tested and extreme values were removed from the data group using z-scores (11). In the final stage, item-total correlations were calculated in order to determine the adequacy of the items included in the draft scale to differentiate individuals (Table 1). The correlation coefficients found in the item-total ranged between -0.18 and 0.71 and all items except for 11 items (I1, I6, I10, I11, I13, I14, I22, I28, I39, I40, I41) were statistically significant ( $P < 0.05$ ). Eleven items with insignificant item-total correlations were removed from the draft scale before conducting factor analyses.

### Exploratory factor analysis (EFA)

In the first stage, principal analysis and Horn's parallel analysis (Horn, 1965) were conducted with the objective of specifying factor structure following item discrimination. In the second stage, EFA was performed using principal axis factor analysis with Oblim oblique factor rotation. Oblim oblique factor rotation was preferred in EFA assuming that the factors obtained from the scale might be correlated. In the third stage, the items' factor loads were examined and the theoretical structure, which the research study was

**Table 1. Item-total and item-remainder correlation coefficients belonging to the the draft scale**

Item number	Item-total	Item number	Item-total
Item 1	-0.03	Item 27	0.21 <sup>a</sup>
Item 2	0.22 <sup>a</sup>	Item 28	0.06
Item 3	-0.18 <sup>a</sup>	Item 29	0.71 <sup>a</sup>
Item 4	0.38 <sup>a</sup>	Item 30	0.26 <sup>a</sup>
Item 5	0.46 <sup>a</sup>	Item 31	0.46 <sup>a</sup>
Item 6	-0.06	Item 32	0.41 <sup>a</sup>
Item 7	0.50 <sup>a</sup>	Item 33	0.23 <sup>a</sup>
Item 8	0.09	Item 34	0.48 <sup>a</sup>
Item 9	0.45 <sup>a</sup>	Item 35	0.37 <sup>a</sup>
Item 10	0.00	Item 36	0.51 <sup>a</sup>
Item 11	0.10	Item 37	0.45 <sup>a</sup>
Item 12	0.33 <sup>a</sup>	Item 38	0.20 <sup>a</sup>
Item 13	0.01	Item 39	-0.10
Item 14	0.08	Item 40	-0.02
Item 15	0.27 <sup>a</sup>	Item 41	-0.08
Item 16	0.22 <sup>a</sup>	Item 42	0.33 <sup>a</sup>
Item 17	0.35 <sup>a</sup>	Item 43	0.44 <sup>a</sup>
Item 18	0.41 <sup>a</sup>	Item 44	0.40 <sup>a</sup>
Item 19	0.50 <sup>a</sup>	Item 45	0.48 <sup>a</sup>
Item 20	0.27 <sup>a</sup>	Item 46	0.39 <sup>a</sup>
Item 21	0.25 <sup>a</sup>	Item 47	0.49 <sup>a</sup>
Item 22	-0.06	Item 48	0.35 <sup>a</sup>
Item 23	0.39 <sup>a</sup>	Item 49	0.56 <sup>a</sup>
Item 24	0.26 <sup>a</sup>	Item 50	0.51 <sup>a</sup>
Item 25	0.49 <sup>a</sup>	Item 51	0.43 <sup>a</sup>
Item 26	0.21 <sup>a</sup>	Item 52	0.55 <sup>a</sup>

a: p<0.01

based on, was considered. In addition, items that had a factor load below |.40| or items with a factor load above |.40| in multiple factors were not included in the factor.

Three extreme data points were removed from the first data group (n=157) using z-scores because the data did not show normal distribution, and the analysis was performed with the data of 154 participants. It was found that the data group was appropriate for performing EFA according to the results obtained from the Bartlett test (P<0.01) and KMO =0.78. A three- factor structure with an eigenvalue above 1 that explained 52.39% of the variance for the scale was obtained according to the principal component analysis and Horn's parallel analysis. When deciding the factor number of the scale, five different structures including (i) theoretical structure, (ii) Horn's parallel analysis, (iii) scree plot graph, (iv) eigenvalue, and (v) explained variance, were considered. The analysis was continued with

**Table 2. Exploratory factor analysis results belonging to the draft scale**

Factors	Affective and behavioral attitude	Cognitive attitude
Item number	Factor load	Factor load
Item 25	0.83	–
Item 32	0.81	–
Item 23	0.78	–
Item 31	0.74	–
Item 19	0.69	–
Item 36	–	0.79
Item 35	–	0.69
Item 29	–	0.61
Item 4	–	0.55
Item 33	–	0.54
Item 5	–	0.51
Item 7	–	0.47
Eigenvalue	<b>4.30</b>	<b>1.97</b>
Explained variance	<b>35.91</b>	<b>16.48</b>

the two-factor structure because the two-factor structure obtained both in Horn's parallel analysis and EFA corresponded to the theoretical three-factor structure.

When EFA was performed using Oblim principal axis rotation, it was found that 12 items among 41 items were loaded above |.50| in only one factor. While 7 of the items that were removed (I18 I34, I37, I42, I44, I48, I52) had a factor load below |.40|, 17 items (I2, I3, I8, I9, I12, I15, I17, I20, I21, I24, I 26, I 27, I 30, I 38, I 43, I 45, I 51) had a factor load above |.40| in multiple factors. The total eigenvalue of the scale factors was 7.04, the total explained variance percentage was 52.39%, and the items' factor loads ranged between |0.47| and |0.83|. When EFA was repeated for the remaining 12 items, it was observed that the factor loads belonging to the items were increased only in one factor (Table 2).

As a result of EFA, the Childhood Epilepsy Attitude Scale consisted of 12 items and two factors including (i) Affective and Behavioral Attitude and (ii) Cognitive Attitude. In this context:

- (i) Affective and Behavioral Attitude: This factor is composed of five negative items and a high score obtained from this factor indicates that the individual has a high affective and behavioral attitude towards childhood epilepsy.

Item examples

- (1) A child with epilepsy is a punishment given to the parents.

**Table 3. Fit parameters related to confirmatory factor analysis model belonging to the Childhood Epilepsy Attitude Scale**

Fit parameters	Coefficient
GFI	0.91
AGFI	0.89
PGFI	0.78
RMSEA	0.06
CFI	0.94
NFI	0.91
Sd	53
$\chi^2$	151.82
$\chi^2/sd$	2.86

- (2) I would not like my child to be friends with an individual with epilepsy.
- (ii) Cognitive Attitude: This factor is composed of seven items including one positive item and six negative items. A high score obtained from this factor indicates that the individual has a high cognitive attitude towards childhood epilepsy.

**Item examples**

- (1) Epilepsy impairs a child's normal development.
- (2) Excessive light increases seizures in all children with epilepsy.

**Confirmatory factor analysis (CFA)**

Confirmatory factor analysis was performed based on the factors determined in EFA using the second data group. The normality of the data group was examined before CFA and extreme values were removed using z-scores. The method of maximum likelihood was preferred for CFA and compatibility parameters were determined. Confirmatory factor analysis of the scale was performed in two stages: (i) In the first stage, it was found that the factors specified as a result of EFA did not exceed the theoretical limits of the values estimated before CFA. (ii) In the second stage, the Chi-square ( $\chi^2$ ) value related to CFA and significance levels were determined [ $\chi^2=151.82$ ,  $sd=53$ ,  $P<0.01$ ]. Depending on the degree of freedom, a low Chi-square value indicates that the recommended model is compatible with the data collected. In addition, compatibility measurements [GFI=0.91, AGFI=0.89, PGFI=0.78, RMSEA=0.94, CFI=0.94, NFI=0.91] related to the model also showed that the model recommended in EFA was appropriate (Table 3). The standardized coefficients obtained in CFA showing the relationship of the factors with the items ranged between 0.41 and 0.85. When the results found were examined according to standard fit parameters, it can be stated that the data confirmed the modeled factor structure.

**Table 4. The scale's inter-factor correlation and internal consistency coefficients**

Factor	Item number	Alpha	1	2	3
1- Affective and behavioral attitude	5	0.85	–	0.45 <sup>a</sup>	0.89 <sup>a</sup>
2- Cognitive attitude	7	0.75		–	0.79 <sup>a</sup>
Total	12	0.81			

**Correlations between the factors and reliability analysis**

The measurement reliability of the scale was examined using the internal-consistency coefficient. The Cronbach alpha internal-consistency coefficient of the Childhood Epilepsy Attitude Scale ranged between 0.75 and 0.85, and the correlation coefficient between the scale's factors was 0.45 (Table 4).

**Discussion**

In this study, the validity and reliability of the Childhood Epilepsy Attitude Scale, which was developed based on the three-component attitude model, was tested in 314 adults. With this objective, the study was conducted in five stages: (i) item discrimination, (ii) EFA, (iii) CFA, (iv) internal consistency, and (v) correlation coefficients between the factors.

With the objective of specifying item discrimination of the items included in the draft scale, the item-total correlation coefficients were calculated. As a result of the analysis, it was found that after excluding 11 items, the other 41 items had item discrimination. In the second stage, the structure of the scale was examined using EFA; it was observed that the scale was composed of two factors (affective and behavioral factors were combined) similar to the theoretical structure: Affective and Behavioral Attitude (5 items) and Cognitive Attitude (7 items). The factors obtained also overlapped with the three-component attitude model.

The scale's Chi-square value, which was appropriate for the model formed as a result of EFA in CFA, was found to be significant. An insignificant Chi-square value was expected in the CFA, but the Chi-square value was found to be significant because of the large sample size in the study. On the other hand, the low value obtained as a result of  $\chi^2/sd$ , which is a fit measurement, proved that the recommended model was compatible with the data collected (12). The fit parameters belonging to the CFA model [GFI=0.91, AGFI=0.89, PGFI=0.78, RMSEA=0.94, CFI=0.94, NFI=0.91] indicated the appropriateness of the model. In

addition, the standardized coefficients obtained in CFA were also sufficient.

The Childhood Epilepsy Attitude Scale's reliability coefficients are sufficient for both general measurement and factor-based measurement. The validity and reliability values obtained in the study are considered evidence for use of the scale in the evaluation of the attitudes of individuals towards childhood epilepsy.

### Conclusion, scoring system, and recommendations

The Childhood Epilepsy Attitude Scale consists of 12 items that are included in two factors including affective and behavioral factor, and cognitive factor. The scale is a 5-point Likert-type scale. In the scale, 11 items require reverse scoring. The minimum score is 5 and the maximum score is 25 for the "Affective and Behavioral Attitude" factor. The minimum score is 7 and the maximum score is 35 for the "Cognitive Attitude" factor. The minimum total score is 12 and the maximum total score is 60 for the whole scale. The Childhood Epilepsy Attitude Scale developed according to the analysis results has sufficient validity and measurement reliability.

Children with epilepsy and their families live in their communities like all other people and are in interaction with other individuals who constitute the community. Potential negative experiences will influence the health and quality of life of children who have epilepsy. The use of this scale that we developed will contribute to the development of health and social politics, and to obtaining and using objective data in order to increase quality of life.

In conclusion, this scale is a valid and reliable tool for measuring individuals' attitudes. It is thought that it can be used in studies related to attitudes towards childhood epilepsy.

**Ethics Committee Approval:** The study protocol was approved by the Ethics Committee of Eskişehir Osmangazi University (date: 25.10.2018, decision number: 262).

**Informed Consent:** Written informed consent was obtained from the participants.

**Peer-review:** Externally peer-reviewed.

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**Appendix 1. Childhood Epilepsy Attitude Scale**

Draft	Adjusted	Item statement
4.	1.	Epilepsy is an absolutely fatal disease <sup>b</sup>
5.	2.	Epilepsy impairs a child's normal development <sup>b</sup>
7.	3.	Children with epilepsy have retarded intelligence compared with their peers <sup>b</sup>
19.	4.	I would not like my child to be friends with an individual with epilepsy <sup>b</sup>
23.	5.	Families who have a child with epilepsy are mistreated <sup>b</sup>
25.	6.	A child with epilepsy is a punishment given to the parents <sup>b</sup>
29.	7.	What children with epilepsy say, is incomprehensible <sup>b</sup>
31.	8.	A child with epilepsy should not be in the same place with my child <sup>b</sup>
32.	9.	A child with epilepsy should carry an amulet to prevent seizure <sup>b</sup>
33.	10.	Excessive light increases seizures in all children with epilepsy <sup>b</sup>
35.	11.	What the child eats influences occurrence of seizures <sup>b</sup>
36.	12.	Excessive consumption of sugar increases the the child's frequency of seizures <sup>b</sup>

b: Items which should be scored

**Appendix 2. Social Attitude Towards Childhood Epilepsy Scale (SATCES)**

		I completely agree	I agree	I don't know	I disagree	I completely disagree
1	Epilepsy is an absolutely fatal disease					
2	Epilepsy impairs a child's normal development					
3	Children with epilepsy have retarded intelligence compared to peers					
4	I would not like my child to be friends with an individual with epilepsy					
5	Families who have a child with epilepsy are mistreated					
6	A child with epilepsy is a punishment given to the parents					
7	What children with epilepsy say, is incomprehensible					
8	A child with epilepsy should not be in the same place with my child					
9	A child with epilepsy should carry an amulet to prevent seizure					
10	Excessive light increases seizures in all children with epilepsy					
11	What the child eats influences occurrence of seizures					
12	Excessive consumption of sugar increases the the child's frequency of seizures					