

The Reliability and Validity of the Children's Negative Cognitive Errors Questionnaire

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Abstract

Objective: The Children's Negative Cognitive Errors Questionnaire (CNCEQ) is a self-report scale measuring negative cognitive errors in children. The aim of this study was to examine its reliability and validity, and to obtain its norms for Turkish children.

Method: The study was carried out at 3 public schools representing 3 different socioeconomic statuses. The sample of 538 children was selected randomly among third-eighth grade elementary school students. The students were evaluated by the CNCEQ, Children Depression Inventory (CDI), State-Trait Anxiety Inventory for Children (STAIC), and Coopersmith Self-Esteem Inventory (SEI). For test-retest reliability, the CNCEQ was readministered to the students 7 days after its first administration.

Results: In the reliability analysis, the Cronbach's alpha coefficient was calculated as 0.82 and 0.79. Test-retest reliability of the total score was 0.87. In comparing the CNCEQ to CDI, SAIC, TAIC, and SEI, correlations were $r = 0.77$, $r = 0.57$, $r = 0.50$, and $r = -0.65$, respectively ($P < 0.001$). Construct validity factors had eigenvalues > 1 . These factors were related to catastrophizing, personalizing, and selective abstraction.

Conclusion: The Turkish version of the CNCEQ has appropriate reliability and validity for assessing negative cognitive errors in Turkish children; however, additional reliability and validity studies should include patient groups with specific disorders.

Key Words: Cognitive error, psychopathology, children, reliability, validity

INTRODUCTION

The need for reliable scales for use with high-risk groups has increased in the areas of early assessment and prevention. The Children's Negative Cognitive Errors Questionnaire (CNCEQ), developed by Leitenberg et al. (1986, 2002), is based on Beck's cognitive theory and on Lefebvre's (1981) Adult Cognitive Errors Questionnaire.

As with personality characteristics, cognitive structure is evaluated as a factor that contributes to susceptibility to psychiatric problems (Gibb, 2002). Studies show that cognitive structure becomes stable with age and that most important changes occur before 12 years of age; therefore, childhood is considered a critical period for investigating the factors that contribute to the development of a negative cognitive structure (Garber and

Flynn, 2001; Gotlib et al., 1993; Nolen et al., 1992). There are studies showing that negative life events experienced in childhood contribute to the development of a negative cognitive structure. Theories point out the relationship between negative life events experienced in childhood with cognitive structure and psychopathology in adulthood (Beck, 1976; 1985; Rose et al., 1994). Cognitive theory is based on this understanding.

According to Beck's cognitive model, there is an interaction between how individuals feel and act towards themselves and perceptions of self, environment, and the future. And emotional reactions are related to how individuals perceive and make sense of events. There are 4 main elements of this theory. These are the cognitive triad (strong negative view about self, the environment, and the future), automatic negative thoughts, systematic errors in information processing and perception, and the

occurrence of dysfunctional basic assumptions. According to Beck's (1967, 1976) definition systematic errors are selective abstraction, exaggeration and minimization, and overgeneralization, thinking dichotomously, catastrophizing, personalizing and presuming temporal causality or predicting without sufficient evidence.

According to Beck, psychopathological conditions are exaggerated and chronic forms of perceptions that are the foundation of basic emotional reactions are formed. There is a specific explanation for every mental disorder. Fundamentally, psychopathology is based on faulty perceptions, evaluations, and thoughts acquired during childhood. Psychopathology occurs when individuals display faults in perception of self, the environment, and the future, and evaluating them negatively (Beck, 1967).

The CNCEQ was developed by Leitenberg et al., who grouped 7 systematic errors defined by Beck and developed 4 cognitive error categories: catastrophizing, overgeneralization, personalization, and selective abstraction. Each item in the scale involves 2-3 sentences that define a fictional event or a condition. Leitenberg et al. reduced 49 original items that evaluated 4 cognitive errors in 3 domains (athletic, social, and academic) to 24 items (Leitenberg et al., 1986). The CNCEQ has been used to determine the cognitive errors accompanying depression, anxiety, and other psychiatric disorders in order to evaluate pre- and post-treatment in various studies (Silverman et al., 1999; Brent et al., 1999; Weems et al., 2001).

The present study aimed to collect normative data related to the reliability and validity of the Turkish version of the CNCEQ.

METHODS

Sample

The study was carried out at 3 public primary schools representative of 3 different socioeconomic statuses (SESs), as determined by Turkey's Ministry of Education. The sample of 538 children was selected randomly among third-eighth grade elementary school students. Students were evaluated in 3 age groups (9-10, 11-12, and 13-14 years).

Data Collection Tools

Children's Negative Cognitive Error Questionnaire (CNCEQ)

This scale evaluates 4 cognitive errors (catastrophic

thinking, overgeneralization, personalizing and selective abstraction in 3 different domains (social, academic, and athletic). The items present hypothetical situations, such as, "you are the goalkeeper of a football team, the final score was 1-1, and after the match you heard one of your team mates saying the team should have won today". In this situation you think, "they think our failure was my fault". The CNCEQ is a Likert-type self-report scale in which each questions has 5 potential answers. Each item is scored between 1 and 5 (5: exactly similar to my thought; 1: I never think this way). Total scale score ranges between 24 and 120. Higher scores indicate higher levels of cognitive distortion.

State Trait Anxiety Inventory for Children (STAIC)

The STAIC is a self-report questionnaire developed by Spielberger et al. (1973) and includes 2 subscales, each with 20 questions. The reliability and validity study of the Turkish version of the scale was conducted by Özusta (1995), and although it was conducted with children who were 9-12 years old, it is used with adolescents up to 17 years old.

Children Depression Inventory (CDI)

The CDI is a 27-item self-report questionnaire developed by Kovacs (1981 for children aged 6-12 years. The reliability and validity study of the Turkish version of the scale was conducted by Öy (1991) and the cut-off score was determined to be 19.

Coopersmith Self-Esteem Inventory (SEI)

The SEI is a 57-item self-report questionnaire developed by Coopersmith (1967). The reliability and validity study of the Turkish version of the scale was conducted by Güçray (1989). The scale is used for children that are in 11th grade and younger.

Procedure

In order to adapt the CNCEQ for the Turkish population, the authors' permission was obtained. The scale was translated independently into Turkish by 2 research assistants fluent in English and was then back-translated by an instructor fluent in English. The scale was administered in the clinic-authors before the study began in order to determine the language compatibility of the translated version.

The scales were then administered in the classrooms after parents gave their informed consent. All of the stu-

Table I. Demographic findings

	n (%)
Sex	
Female	266 (49.44 %)
Male	272 (50.55%)
Socioeconomic status	
Low	193 (35.87%)
Medium	142 (26.39%)
High	203 (37.73%)
Age (years)	
9-10	168 (31.2%)
11-12	134 (24.9%)
13-14	236 (43.9%)

dents agreed to participate in the study. The scales were administered in the following order: CNCEQ, CDI, SEI, and then STAIC. It took about 45 min to complete all the scales. For test-retest reliability, the CNCEQ was administered a second time to students 7 days after the first administration.

Evaluation of the data

Data were evaluated using the SPSS 10.0 package program. In addition to descriptive statistics (mean and standard deviation), one-way ANOVA was used for the analysis of quantitative data when there were 3 or more groups. A post hoc test (Tukey’s) with Bonferoni adjustment was used in order to make differentiations between groups. Student’s t test was used in making comparisons

between 2 groups. Cronbach’s alpha coefficients and item total score correlations were computed for the reliability of the scale. Test-retest correlation was calculated with Spearman’s correlation method. For the validity of the scale, correlations between the scales were calculated with Pearson’s correlation method. To evaluate the factor structure of the CNCEQ, principle components factor analysis method was used. The significance level was accepted as $P \leq 0.05$.

FINDINGS

General Findings

The CNCEQ was administered to 564 students in 18 classes from 3 schools and 538 completed the scale a second time. The 26 students that did not complete the CNCEQ a second time were excluded from the study.

The mean age of the students was 11.4 ± 1.7 years (range: 9-14 years). Among the students, 266 (49.4%) were girls and 272 (50.6%) were boys. Demographic findings are presented in Table I.

The mean total CNCEQ score was 54.66 ± 18.59 . Mean scores are presented in Table II. There were no statistical differences in terms of gender between total mean score of the, CDI, SEI, trait anxiety and state anxiety ($P > 0.05$). Mean total CNCEQ score for boys was lower than for girls and the difference was statistically significant ($t = 3.98$; $P < 0.05$). While there were no statistical differences in terms of SES between the total mean score of the CDI, trait anxiety and state anxiety, the difference between the SEI and CNCEQ was significant ($F = 4.873$; $P < 0.05$, $F = 5.347$; $P < 0.05$, respectively).

Table II. Mean scale scores

Scale	Sex			Socioeconomic status				Age groups (years)			Total score	
	Female	Male	P*	Low SES	Medium SES	High SES	P**	9-10	11-12	13-14		P**
CNCEQ	57.25 ± 13.2	52.01 ± 9.7	0.032	58.03 ± 9.1	54.23 ± 2.0	52.34 ± 3.2	0.023	57.44 ± 3.9	53.21 ± 2.1	52.56 ± 6.1	0.034	54.66 ± 18.6
CDI	13.08 ± 7.6	12.03 ± 7.0	0.096	13.46 ± 6.9	12.05 ± 7.5	12.15 ± 7.6	0.087	11.79 ± 8.9	12.47 ± 3.2	12.34 ± 6.7	0.087	12.55 ± 7.9
State anxiety	33.56 ± 6.1	32.23 ± 7.0	0.092	33.45 ± 5.6	33.42 ± 3.2	31.71 ± 6.7	0.067	32.74 ± 3.8	31.63 ± 9.0	33.57 ± 4.5	0.056	32.91 ± 7.2
Trait anxiety	35.01 ± 7.2	34.18 ± 7.4	0.068	35.01 ± 8.0	34.86 ± 3.1	33.32 ± 4.5	0.078	34.56 ± 5.1	34.78 ± 6.2	34.67 ± 2.3	0.261	34.60 ± 8.0
SEI	36.57 ± 8.2	37.34 ± 8.3	0.276	35.75 ± 7.8	37.11 ± 8.6	37.97 ± 8.3	0.043	34.75 ± 1.3	36.95 ± 4.1	37.01 ± 4.3	0.038	36.96 ± 8.2

*Student’s t test
*One-way variance analysis

Table III. Test-retest correlations

ITEM	Domain	Content	Test-retest correlation*
1	Social	Catastrophizing	0.59
2	Athletic	Personalizing	0.55
3	Athletic	Selective abstraction	0.50
4	Academic	Personalizing	0.53
5	Athletic	Personalizing	0.47
6	Academic	Personalizing	0.60
7	Academic	Personalizing	0.49
8	Social	Personalizing	0.54
9	Athletic	Catastrophizing	0.53
10	Social	Selective abstraction	0.51
11	Academic	Catastrophizing	0.53
12	Social	Selective abstraction	0.61
13	Athletic	Selective abstraction	0.45
14	Academic	Catastrophizing	0.51
15	Social	Selective abstraction	0.49
16	Athletic	Personalizing	0.50
17	Academic	Personalizing	0.23
18	Social	Catastrophizing	0.55
19	Social	Selective abstraction	0.48
20	Academic	Catastrophizing	0.58
21	Social	Personalizing	0.56
22	Athletic	Catastrophizing	0.52
23	Academic	Selective abstraction	0.52
24	Athletic	Personalizing	0.54

*Spearman's correlation test

Correlations are significant at the $P \leq 0.001$ level.

Similarly, the difference between the SEI and CNCEQ was significant when compared in terms of age groups ($F = 7.547$; $P < 0.05$, $F = 8.322$; $P < 0.05$, respectively) (Table II).

Variance analysis was applied to the total CNCEQ scores in order to determine the effects of sociodemographic variables. The effects of SES ($F = 6.891$; $P < 0.001$) and age ($F = 2.559$; $P < 0.05$) were significant. According to the findings of the Tukey's test, low SES students and students in the 9-10-year-old age group scored significantly higher in comparison to the other groups ($P < 0.05$).

Reliability findings

Internal consistency of the test

The Cronbach's alpha coefficient of CNCEQ was 0.82 for the first administration. When the alpha score is considered, the scale is acceptable in terms of internal validity. Statistically significant ($P \leq 0.001$) and direct correlations that ranged between 0.28 and 0.56 were found between each item of the CNCEQ and total score.

Test retest findings

The CNCEQ was administered a second time approxi-

Table IV. Scale correlations

Scale	CNCEQ	SEI	State Anxiety	Trait Anxiety
CDI	0.77*	-0.64*	0.45*	0.34*
State Anxiety	0.57*	-0.25*	0.27*	
Trait Anxiety	0.50*	-0.38*		
SEI	-0.65*			

*Pearson's correlation test

Correlations are significant at the $P \leq 0.05$ level.

mately one week after the first administration and the test-retest correlation was 0.87 ($P \leq 0.001$). Item total statistics are presented in Table III. The lowest test-retest correlation was for item 17, whereas item 6 displayed the highest correlation.

Validity findings

Correlations with other scales

The correlation between the CNCEQ and CDI was $r = 0.77$ ($P < 0.001$), between the CNCEQ and the state anxiety subscale of the STAIC it was $r = 0.57$ ($P < 0.001$), between the CNCEQ and the trait anxiety subscale of the STAIC it was $r = 0.50$ ($P < 0.001$), and between the CNCEQ and SEI it was $r = -0.65$ ($P < 0.001$). Correlations between the scales are presented in Table IV.

Factor analysis

The principle components factor analysis revealed 3 factors with eigenvalues > 1 . The distributions of the items in the factor analysis are presented in Table V. With 3 factors, 59.3% of the total variance was explained. The factor distributions of the items are presented in Table VI.

DISCUSSION

Although negative thoughts were first used to explain depression in the cognitive model, today, cognitive formulations of the majority of psychiatric disorders are made with this model. It was proposed that there are systematic information processing errors in psychiatric disorders besides depression (Beck, 1976, 1985; Ellis, 1962). The latest research suggests that the evaluation of cognitive errors is also important in understanding anxiety disorders (Epkins, 1996; Leung and Wong 1998; Weems et al., 2001; Alfano et al., 2002).

The CNCEQ was developed in order to detect cognitive distortions in children. The mean total score of the CNCEQ in our study was 54.66 ± 18.59 . In the study of the original scale, the mean total score was 57.42 (Leitenberg et al., 1986). According to our results, girls scored higher than boys,

children 9-10 years old scored higher than older children, and the scores of children of low SES were higher than scores of children of higher SES. It is known that girls are more prone

Table V. Item loads in the factor analysis

Item	Factor	Factor II	Factor III
1	0.354		
2		0.317	
3			0.212
4		0.293	
5		0.307	
6		0.375	
7		0.392	
8	0.442		
9	0.537		
10			0.207
11	0.413		
12			0.371
13			0.421
14	0.362		
15			0.367
16		0.362	
17		0.492	
18	0.387		
19			0.312
20	0.470		
21		0.253	
22	0.513		
23			0.471
24		0.503	

Basic principles factor analysis

Table VI. Factor distribution

Name of the factor	Variance	Included items
Factor I: Catastrophizing	13.7%	1,8,9,11,14,18,20,22
Factor II: Personalizing	20.9%	2,4,5,6,7,16,17,21,24
Factor III: Selective abstraction	24.7%	3,10,12,13,15,19,23

to internalizing psychiatric disorders than boys. In the meantime, the unacceptability of externalizing behavioral disorders in Turkey can be viewed as a cultural factor that increases the susceptibility to develop psychopathology. The higher CNCEQ scores that were observed among the girls in our study can be explained by these factors. However, further studies are needed in order to explain the gender difference. Total scores were not affected by gender in the scale's original study, but similar to our findings, younger children scored higher (Leitenberg et al., 1986). This can be related to that younger children personalizing described events, as they did not have such experiences before and therefore chose the negative answers. In addition, it is possible that the students of low SES experienced negative life events more frequently than the other students in our study, which may have influenced their CNCEQ scores.

Internal consistency and test-retest results showed that the Turkish version of the CNCEQ is acceptable and appropriate for use with Turkish children. Internal consistency of the Turkish version of the CNCEQ was high both times it was administered. In the first administration, the internal consistency was 0.89. When the scale's items were evaluated, the lowest test-retest correlation was for item 17 and the highest was for item 6. Both items are in the personalizing group. Item 17, which questions the academic domain and displayed the lowest correlation, evokes the idea that children's perceptions about academic performance are open to change over time. Item 6, which questions the social domain and displayed the highest correlation, evokes the idea that the social domain might be related more to personality characteristics and less open to external influences.

It was reported that although the CNCEQ detects cognitive errors related to depression and anxiety, it fails to discriminate cognitive distortions accompanying aggression (Ostrander, 1995). In addition to anxiety and depression, the scale can help in predicting low self-esteem and hopelessness. Yet, as cognitive distortions can

accompany various psychiatric conditions in children and adolescents, the scale cannot differentiate among psychiatric disorders (Kempton et al., 1994). Furthermore, the CNCEQ is accepted as a valid instrument in identifying adolescents with internalizing and externalizing problems, as well as susceptibility to suicide (Leung and Wong, 1998; Brent et al., 1990). Based on our findings, it can be proposed that the CNCEQ can determine cognitive distortions accompanying depression, anxiety, and low self-esteem. This will provide an advantage in treatment planning and treatment evaluation. In the original CNCEQ study its validity was not evaluated.

Factor analysis of the CNCEQ identified 3 factors: catastrophizing, selective abstracti, on, and personalizing. The overgeneralizing factor of the original scale was found to accumulate under these 3 factors in our study. Different findings in different cultures might point out methodological problems related to translation, since language plays an important role in the shaping and expression of thought. Although cognitive processes are thought to be universal, local cultural meaning of cognitions can vary. This situation was reported in scale adaptation studies conducted in different cultures. Different subscales might develop in different cultures or sometimes items stay insufficient in reflecting the characteristics of that culture (Fombone, 1991). In this regard, realizing the norm studies of the scales will contribute to the adaptation of the scales to Turkish and gaining information specific to our culture.

CONCLUSION

This study revealed that the Turkish version of the 24-item CNCEQ is a reliable and valid self-report scale that is useful in identifying cognitive distortions of those with childhood psychiatric problems. However, further evaluation of its factor structure with patient groups will be useful. As with all scales, the CNCEQ is believed to be an important tool that provides support and additional information to clinical observations and interviews.

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