Turkish Adaptation of the Children's Anger Scale: Reliability and Validity Analyses

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Abstract

This study aims to establish a Turkish version of the Children's Inventory of Anger Scale (ChIA) developed by Nelson and Finch (2000) to evaluate the intensity of anger experienced in potentially anger-provoking situations in children. The research sample consists of 502 primary and secondary school students attending their education in Hatay province of Turkiye. In the study, the construct validity of the ChIA, correlations of subscales with each other, criterion relative validity, Cronbach's alpha internal consistency, item-total score correlation, and test-retest reliability coefficients were examined. As a result of the confirmatory factor analysis performed for the construct validity of the scale, it was observed that the ChIA was compatible in four sub-dimensions as in the original scale and all items were placed in the relevant sub-scale. In addition, Cronbach's alpha coefficient of the ChIA was found to be .87, .78, .82, .75, and .81 for the sub-scales of inhibition, physical aggression, peer relations, and authority relations, respectively; test-retest consistency was found to be .83, .80, .82, .87 and .81 for inhibition, physical aggression, peer relations, and authority subscales, respectively. Statistical analyses of the ChIA have shown that it is a valid and reliable scale that can be used to measure the expression of anger and the impact of anger on personal relationships while assessing specific situations that cause anger in children aged 8−11 years.

Keywords: anger in children, scale adaptation, anger scale

1. Introduction

In addition to being an emotion, anger exists in the lives of people of all ages from infancy to late adulthood, and is an experiential condition that includes cognitive, physiological, and sociocultural dimensions. The state of anger has evolutionarily meaningful functions that enable an individual to become ready to fight in the face of any threats and thus be able to save a person's life (Rothschild, 1999; Deffenbacher & McKay, 2000). Deffenbacher (1999) indicated that anger, especially in moderate severity, helps the individual to take action by motivating him to change. However, in addition to these significant functions, what makes anger such a subject that is discussed so much also stems from the fact that anger is a definition of a negative and destructive emotion often formed by rage, distress, sadness, and resentment (Modrcin-McCarthy et al., 1998).

Studies have revealed that anger is associated with many variables such as aggression (Buss & Perry, 1993; Rupp & Vodanovic, 1997; Pepler et al., 1998; Kesen et al., 2007; Stringaris & Goodman, 2009; Sukhodolsky et al., 2016; Rohlf et al., 2017; Ersan, 2019), empathy (Coie & Dodge, 1998; Roberts, 1999; Strayer & Roberts, 2004), self-perception and anxiety (Hisli Şahin et al., 2011), suicide (Durak Batıgün & Şahin, 2003; Şahin et al., 2008), eating attitude disorders (Oral, 2006), and problem-solving skills (Arslan, 2010). Although there is no defined anger disorder, there are a wide variety of studies and clinical studies that suggest that high-intensity anger is a serious personal problem in an individual's life and therefore there are many individuals who need help (Deffenbacher & McKay, 2000; Stringaris & Goodman, 2009; Burke et al., 2014). Kerr and Schneider (2008) indicate that in parallel with the negative effects of anger documented on physical and mental health in adults, high levels of anger are associated with poor health and maladjustment in children and adolescents. Recent studies have shown that intense and frequent anger problems in middle childhood have consequences

such as increased frequency of aggressive behavior, peer rejection, and problems in peer relationships (Hubbard, 2001; Dougherty, 2006; Oolup et al., 2015; Rohlf et al., 2017).

Given the problems caused by the severity of anger, as well as the large number of associated negative variables that it can bring, anger is something to be aware of and help to get before it reaches negative destructive consequences. Children, on the other hand, may be less likely than adults to seek help to eliminate these negative and destructive consequences. One of the reasons for this is that the child, unlike adults, does not have enough knowledge and experience to be aware of the cause of the problems he/she is experiencing. For this reason, it is important to identify the anger that exists in children to help them at the appropriate time.

Anger and tendencies to express anger have been identified as important factors in physical and psychological health in children and adults (Kerr & Schneider, 2008). Middle childhood is a period in which children have developmental tasks such as gaining personal independence, learning to make friends with their peers, regulating their emotions and excitement, and beginning to empathize (Gander & Gardiner, 1993; Hawkins et al., 1999; Bowen, 2005; Harold & Hay, 2005). High-intensity anger problems experienced during this period may harm the child's ability to establish healthy relationships with his peers, leading to antisocial behaviors such as violence and aggression, and difficulties in academic achievement (Hootman et al., 2003; Loveland et al., 2007; Hawes et al., 2016; Rohlf et al., 2017). For this reason, support should be provided to detect and control anger in children during middle childhood. Detecting and intervening in problems starting from an early age before they turn into continuous incompatibilities is important for the child's both present life and adult life (Yörükoğlu, 2016; Forehand & Wierson, 1993; Anselmi et al., 2008). There are few studies on anger in middle childhood that have been neglected by researchers in Turkey (Kırımer et al., 2014). The lack of any measurement tools to assess anger in children under the age of 11 in Turkey may be one of the reasons for the lack of studies on anger.

In light of all this information, this study aims to adapt the Children's Inventory of Anger Scale (ChIA), the original form of which was developed in the United States by Nelson and Finch (2000) to be used in children between the ages of 8-11, into Turkish for use in Turkey, and to analyze the reliability and validity of the scale.

2. Method

2.1 Study Group

This study was carried out in six primary and secondary schools in Hatay by using the data obtained from three different samples. The samples of the study were determined by simple random sampling. The first sample consisted of 502 students between the ages of 8-11 who were studying in the 3rd, 4th and 5th, and 6th grades of primary school included in the research voluntarily. Of the students, 249 (49.6%) were girls, and 253 (50.4%) were boys, with a mean age of 9.8 years. The second sample of the study, which was conducted to test the validity of the similar scale of the ChIA, consisted of 182 students who continued their education in the 3rd, 4th and 5th, and 6th grades of primary school and filled the scale voluntarily. Of the students, 87 (47.8%) were girls and 95 (52.2%) were boys, with an average age of 9.4 years. In the third sample of the study, which was conducted to determine the reliability of the ChIA against time, 223 students were applied. Of the students, 109 (48.9%) were girls, and 114 (51.1%) were boys, with a mean age of 9.6 years.

2.2 Data Collection Tools

2.2.1 Children's Anger Scale (ChIA)

Originally called Children's Inventory of Anger (ChIA), the scale was developed by Nelson and Finch in 2000. Scale items based on cognitive-behavioral approaches were developed to evaluate the intensity of anger experienced in potentially anger-provoking situations in children. The scale allows us to measure the impact of anger on expression and personal relationships when assessing specific situations that cause anger in children and adolescents aged 6−16 years. The scale is a similar version of the Novaco Anger Inventory (NAI) designed for children and adolescents, which was developed to assess anger in adults, and when it was first developed, the scale was designed as a self-report scale based on the subjective assessment of the child's anger consisting of 71 items, and only the total score was obtained. As a result of years of research and use in clinical settings, the number of items on the scale, which has taken its current form, has been reduced from 71 to 39 in its final form. In addition to the total score, four sub-scales (inhibition (I), physical aggression (PA), peer relations (PR), authority relations (AR)) scores can be obtained.

The scoring of scale items is of the four-point Likert type such as "I do not care, it does not bother me at all (1)", "I get uncomfortable. But I do not get too angry or angry. I forget (2)", "I get very angry or angry. But I think I can control myself (3)", "I cannot stand it! I will go crazy! I feel like I am going to beat and kill the person who makes me angry! I want to smash what makes me angry! (4)". At the same time, Nelson and Finch (2000),

drawing on their previous research that aggressive children think in visuals rather than words, matched each numerical choice on the scale to an illustrated presentation.

The highest score that can be achieved from the original form of the scale is 156 while the lowest score is 39. Cronbach's alpha internal coefficient of the scale is .95. Scale items were collected under four factors as a result of factor analysis including Factor I—Inhibition (I) (11 items, = .85), Factor II—Physical Aggression (PA) (9 items, = .86), Factor III—Peer Relations (PR) (9 items, = .86), Factor IV—Authority Relations (AR) (10 items, = .85). The reliability of the test-retest applied at 1-week intervals of the scale was found to be .75 (Nelson & Finch, 2000).

2.2.2 State-Trait Anxiety Inventory for Children (STAI-Ch)

The scale was developed by Spielberger in 1973 and adapted in Turkish by Özusta (1995) to measure anxiety in children and adolescents. This scale can be used on children and adolescents aged 9−12 years. Inventory is a type of self-assessment-based scale consisting of two sub-dimensions: state anxiety (20 items) and trait anxiety (20 items). The state anxiety dimension determines how the child feels under certain conditions of a particular moment, while the trait anxiety dimension determines how the child feels regardless of the situation and conditions, he/she is in. The rating of the scale, which consists of a total of 40 items, is in the form of a 3-item Likert type. The dimension of persistent anxiety is evaluated as "Almost none (1 point)", "Sometimes (2 points)" and "Often (3 points)". In the dimension of state anxiety, there are usually options that vary in each item related to clarity anxiety such as tension, nervousness, and haste.

The Cronbach's Alpha internal consistency coefficients of the State Anxiety Scale and Trait Anxiety Scale sub-dimensions of the scale were found to be .82 and .81, respectively. The test-retest reliability coefficient obtained at six weeks intervals was .60 in the dimension of state anxiety, and .65 in the dimension of trait anxiety. Corrected item release correlations were found to rank between .20 and .30. In this study, the STAI-Ch criterion was used to test the relative validity. The reason why it is preferred for criterion-relative validity is that there is no other scale in Turkey that can measure anger in 8−11 years old children whose validity and reliability have been examined, and there is a significant relationship between anger and anxiety in the field literature (Özmen et al., 2016).

2.2.3 Evaluating Negative Thoughts in Childhood Scale (ENTCS)

It was developed by Leitenberg et al., in 1986 to assess cognitive distortions in children. The Turkish adaptation of the scale was made by Karakaya et al. (2007). The scale is a self-assessment-based scale that can be applied to children and adolescents aged 8−16 years. The rating is of 5-item Likert type from "I never think like that (1)" to "Almost exactly what I think (5)". The scale consists of a total of 24 items and three sub-dimensions. These sub-dimensions are catastrophizing (8 items), individuation (9 items), and selective perception (7 items). Cronbach's alpha internal reliability coefficient of the scale is .82. The test-retest reliability coefficient obtained at intervals of one week is .87. Corrected item-total correlations were ranked between .28 and .56. In this study, ENTCS criterion was used to test the relative validity. The reason why it is preferred for criterion-relative validity is that there is no other scale in Turkey that has been tested for validity and reliability, that can measure anger in 8−11-year-old children, and that the Children's Anger Scale is compatible with the theoretical infrastructure of the feeling of anger related to cognitive distortions.

3. Results

3.1 Validity

The validity study of the ChIA was examined by using construct validity, the correlations of the subscales with each other, and the criterion-related validity method.

3.1.1 Construct Validity

Confirmatory factor analysis is a type of analysis in which a previously defined and limited structure is tested whether it is validated as a model (Çokluk et al., 2018). To accept the confirmatory factor analysis results as valid, the goodness of fit indices of the model must be sufficient. The first-level factorial structure of the Children Anger Scale (11-item inhibition dimension, 9-item physical aggression dimension, 9-item peer relations dimension, and 10-item authority relations dimension) consisting of foursub-dimensions and a total of 39 items was tested using LISREL 8.7 (Scientific Software International). On the 4-item Likert scale, a covariance matrix was created using the maximum probability calculation method due to the normal distribution of data collected from 502 participants (Kline, 2016). The first level confirmatory factor analysis of the scale, the path diagram with the parameter values for the DFA results is presented in Figure 1.
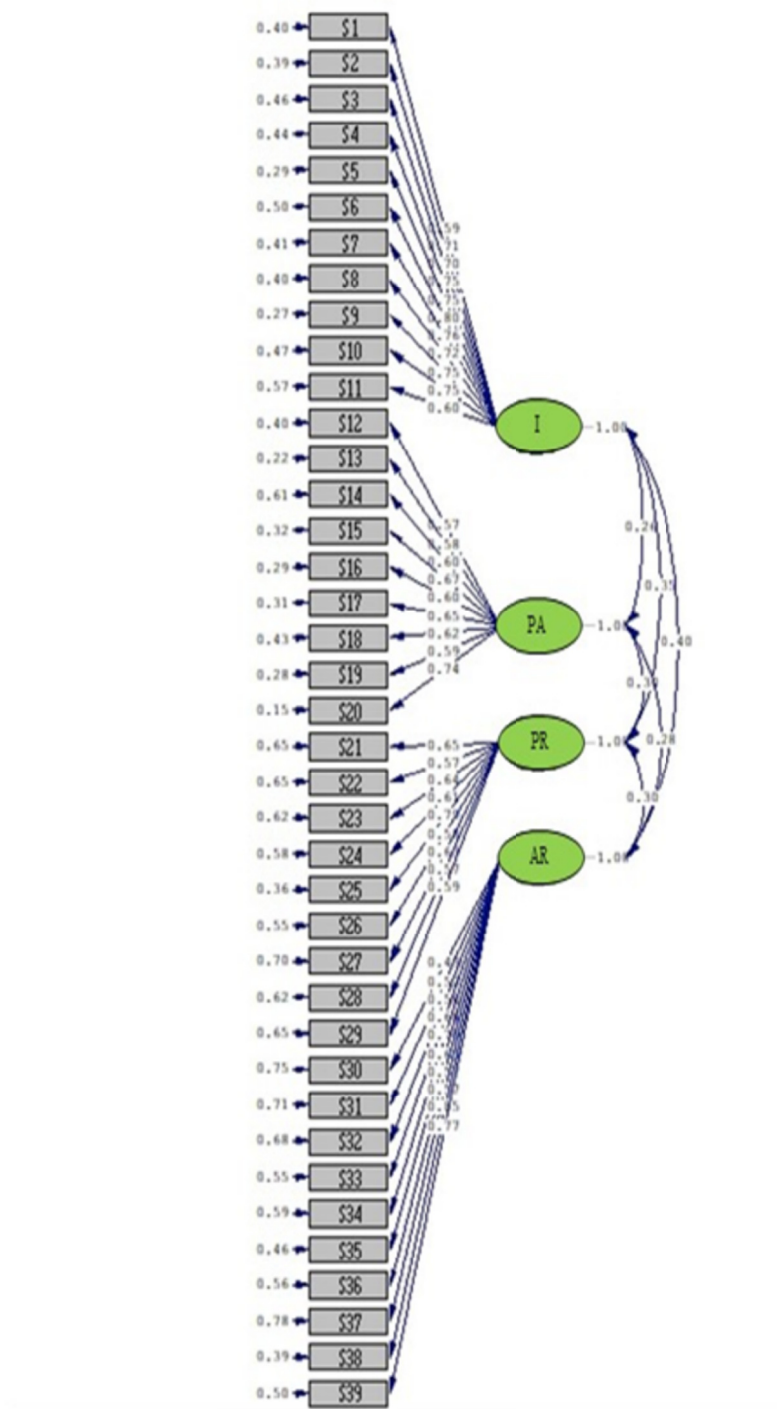
Figure 1. First-level DFA results on the children's anger scale

Note. Chi-Square = 2042.10 sd = 696 p = 0.00. RMSEA = 0.062.

Examining the Figure 1, it can be seen that the compliance indices obtained as a result of the first level DFA of the ChIA, which consisted of 39 items and four subscales, were significant (χ^2 = 2042.10, sd = 696, p = .00, χ^2/sd = 2.93). The fit index values were found as follows: RMSEA = 0.062, RMR = 0.048, NFI = 0.93, CFI = .95, IFI = .95, AGFI = .81, GFI = .83. When values of the goodness of fit were examined, it was seen that all other fit index values except AGFI and GFI values were within the acceptable threshold value. In addition, factor loads range from .59 to .80 for the inhibition sub-dimension; these loads range from .57 to .74 for the physical

aggression sub-dimension, from .57 to .79 for the peer relations sub-dimension, and from .49 to .85 for the authority relations sub-dimension. After the standard solutions, t values between items and sub-dimensions were examined. The fact that none of the arrows from the sub-dimensions towards the substances were red showed that all substances were significant at a .05 level (Jöreskog & Sörbom, 1996).

The proposed four-factor model of the scale was found to be compatible and acceptable with the data collected from the students. As a result of the first-level DFA analysis, there was no need for any modification between the substances due to the good fit of the tested model. Considering these results, it was seen that the data collected in the study were compatible with four subscales as in the original scale of the Children's Anger Scale, and all items were placed in the relevant sub-scale.

To examine the relationships between the subscales of the ChIA, the correlation coefficients between the total scores of the items loaded on each sub-scale and between the total score and each sub-scale were calculated. The findings obtained are presented in Table 1.

Table 1. Correlation values of the sub-scales of the ChIA with each other (N=502)

Sub-scale	I	PA	PR	AR
Inhibition (I)	- - - - - -			
Physical Aggression (PA)	.26**	- - - - - -		
Peer Relations (PR)	.35**	.30**	- - - - - -	
Authority Relations (AR)	.40**	.28**	.30**	- - - - - -

Note. **P < 0.01.

When the values in Table 1 are examined, it is seen that there is a significant positive relationship between the inhibition sub-scale and the physical aggression sub-scale at a weak level (.26). It is seen that there is a significant positive relationship between the inhibition sub-scale and the peer relations and authority relations subscales at a moderate level (.35 and .40). It is seen that there is a significant positive relationship between the physical aggression sub-scale and the peer relations and authority relations subscales at a weak level (.30 and .28). It is seen that there is a significant positive relationship between the family relations sub-scale and authority relations at a weak level (.30).

3.1.2 Criterion Relative Validity

To test the criterion-related validity of the Children Anger Scale, the correlation coefficients between the total score of the ChIA and the scores of the Children's State Anxiety Inventory (CSAI), the Children-Trait Anxiety Inventory (CTAI) and the Negative Thoughts in Childhood Assessment Scale (NTCAS) were calculated. These measurements are shown in Tablo 2.

Table 2. Correlations between the ChIA total score and assessment of negative thoughts in childhood and state-trait anxiety inventory scores for children (N = 182)

Scales	ChIA
NTCAS	.75**
CSAI	.75**
CTAI	.71**

Note. **P < 0.01.

As seen in Table 2, a significant positive-oriented relationship was found between the total score of the Negative Thoughts in Childhood Assessment Scale and the total score of the Children Anger Scale (p < 0.01). There was also a significant positive level relationship found between the Inventory of State Anxiety for Children and Trait Anxiety for Children and the Children's Anger Scale (p < 0.01).

3.2 Reliability

After the validity of the ChIA, the adaptation study was followed by reliability analyses. Reliability is defined as the measurement tool's consistent reflection of the structure it measures (Field, 2009). The reliability study of ChIA in research; Cronbach's alpha coefficient was analysed using item-total correlations and test-retest method. The internal consistency of a measurement tool is related to the extent to which the questions are consistent with each other or among all the questions that try to measure the same thing. The Cronbach Alpha coefficient is one

of the most well-known methods used to calculate the internal consistency of the measurement tool (Punch, 2014). The Cronbach's alpha internal consistency coefficient of the scale is .87 for the total score; .78 for the Inhibition sub-scale; .82 for the Physical Aggression sub-scale; .83 for the Peer Relations sub-scale; .81 for the Authority Relations sub-scale.

The item analyses of the ChIA were examined by considering the item-total correlations and the differences between the 27% upper-subgroup items. Item-total correlation explains the relationship between the scores obtained from the test items and the total score of the test. A positive and high item-total correlation indicates that the item exemplifies similar behaviors and the internal consistency of the test is high. It can be said that items with an item-total correlation of .30 and above distinguish individuals successfully (Büyüköztürk, 2010). Item-total correlations range from .21 to .41 in the Inhibition sub-scale; from .30 to .53 in the Physical Aggression sub-scale; from .32 to .44 in the Peer Relations sub-scale; from .27 to .41 in the Authority Relations sub-scale.

Test-retest measurements were carried out to test the stability of the ChIA against time. Test-retest reliability is explained by the correlation between the scores obtained by administering a test to the same group twice at regular intervals. It can be said that an average of four weeks is appropriate, and when it meets the assumptions, it is calculated using the Pearson correlation coefficient (Büyüköztürk, 2010). For this reason, the ChIA was applied twice at intervals of four weeks to 223 primary school 3rd, 4th, and secondary school 5th and 6th-grade students between the ages of 8 and 11. The test-retest reliability coefficients obtained as a result of these applications were calculated as .80 for the Inhibition sub-scale; .82 for the Physical Aggression sub-scale; .87 for the Peer Relations sub-scale; as .81 for the Authority Relations sub-scale. These findings show that the scale is a reliable measurement tool.

4. Discussion

The main purpose of this study is to adapt the Children's Anger Scale developed by Nelson & Finch (2000) into Turkish in a sample of primary and secondary school children aged 8–11 in Turkey and to test its validity and reliability. First-level DFA was applied to verify the four-factor structure of the original scale. Since the data collected from a total of 502 children show a normal distribution, as a result of the DFA made using the maximum likelihood calculation method, it was seen that the scale was compatible in four sub-dimensions as in the original and all items were placed in the relevant sub-dimension.

When the compliance indices of the study were examined, it was observed that the indices other than AGFI and GFI indices were within the acceptable threshold value. From these indices, AGFI was found to be .81, and GFI was found to be .83. According to Hooper et al. (2008), AGFI and GFI indices above .95 are considered a perfect fit, while AGFI and GFI indices above .90 are considered a good fit. According to the results of the analysis conducted accordingly, it was seen that AGFI and GFI indices correspond to poor compliance. On the other hand, some researchers reported that these values are suitable for a good fit when they are between .80 and .90 (Corral & Calvete, 2000).

Gürbüz and Şahin (2016) have indicated that the correctness of the model fit should not be judged by considering only one of the fit indices used in the DFA. One of the reasons for this is that each of the fit indices used in DFA provides information on a different aspect of model fit. Although AGFI and GFI values are often used to test the accuracy of model fit, some researchers state that their performance is poor, so they are not recommended (Marsh et al., 1988). From this point of view, it can be said that only the models of the DO with the relevant structures, regardless of the AGFI and GFI indices, are well-compatible. According to the obtained DFA results, the tested model shows that the ChIA measures four implicit variables. This suggests that the sub-scales of the ChIA can also be scored on their own and that these scores can be used for the level of anger in the relevant sub-scale.

Although the measurement model put forward by Nelson & Finch (2000) has been confirmed by the DFA performed, Kline (2016) states that two more conditions need to be examined. One of them is that the correlation coefficients between the sub-scale factors are not very high (for example, > .85). The fact that the correlation between the sub-scales is very high shows that these scales do not measure different psychological states from each other, this means that the scale has no distinctive validity (Çokluk et al., 2018). When the correlation coefficients calculated between the four subscales of the ChIA were examined, it was seen that there were significant positive-oriented relationships between the sub-scales at a weak level (I-PA = .26, PA-PR = .30, PA-PR = .28, PR-AR = .30), and significant positive relationship was found between the inhibition sub-scale and the peer relations and authority relations subscales, (I-PR = .35, I-AR = .40) at a moderate level of .001. According to these results, it can be said that the ChIA has distinctive validity.

According to Kline (2016), another noteworthy thing is that all of the items collected at the sub-scales have very high loads at that sub-scale. The factor load values of the ChIA were found to range from .59 to .80 in the inhibition sub-dimension, from .57 and .74 in the physical aggression sub-dimension, from .57 and .79 for the peer relations sub-dimension, and from .49 and .85 for the authority relations sub-dimension. Büyüköztürk (2002) indicates that a factor load value of .45 is a good measure, but this value can be reduced to .30. Kline (2016) also stated that substances with .30 and above can be used. From this, it can be concluded that the factor load values of the scale are at a sufficient level.

In the literature, the level of anger and anger expression style in children are found to be effective in the emergence of generalized anxiety disorders and the level of anxiety (Erdem et al., 2008; Walsh et al., 2018). Based on this finding, the State-Trait Anxiety Inventory for Children was used to test criterion-related validity. The positive and significant relationship between the total score of state and persistent anxiety of children and adolescents and the total scores of the ChIA at the level of .01 is important evidence of the validity of the ChIA. In parallel with this finding, there is a finding in the literature that trait anxiety is one of the most effective factors in the formation and expression of anger in secondary school children (Suveg & Zeman, 2004; Puskar et al., 2008; Özmen et al., 2016).

In this research, the Negative Thoughts in Children Evaluation Scale was used to test the criterion-related validity. The reason for using this scale is the views suggesting that anger emerges as a result of both cognitive distortions (Beck, 1999; Burns, 2017; Kishida et al., 2022) and irrational thinking (James & Seager, 2006; Baker et al., 2008). Another important piece of evidence of the validity of the ChIA is the fact that a significant relationship was found between the total score of the Negative Thoughts Assessment Scale in children and the total scores of the ChIA in a positive direction and at the level of .01. This conclusion is in line with the expected results in terms of cognitive behavioral theories (Kendall et al., 1990; Kempes et al., 2005; Healy & O'Donnell, 2006). Cognitive-behavioral theories state that the way individuals interpret their experiences influences their mood and behavior. It can be said that a child who perceives his/her life and oneself in a predominantly negative way, one of the negative emotions he/she will have as a result of this may be the disturbing feeling of anger.

Information on the reliability of the ChIA was obtained by Cronbach's Alpha internal consistency coefficient, item-total score correlations, and test-retest stability coefficient. All coefficients obtained as a result of the analyzes are statistically significant. Cronbach's Alpha values calculated from the total score (.87), physical aggression (.82), and authority relations (.81) subscales of the ChIA were found to be highly reliable, while values for the inhibition and peer relations sub-scales were found to be quite reliable (Kalaycı, 2010; Uzunsakal & Yıldız, 2018). In the original scale, the total score of the scale and the Cronbach's Alpha coefficients of all sub-scales were found at the level of "high reliability". The reason for this situation can be shown that the sample to which the ChIA is applied is more homogeneous compared to the sample to which the original form of the ChIA is applied. It is observed that Nelson and Finch (2000) have worked with a more heterogeneous sample group of 1604 people from different ethnic backgrounds (3% Asian, 8% Black, 6% Hispanic, 1% Native American, 63% White, 3% other, and 17% missing data) as part of their scale development studies. It is known that the homogeneity or heterogeneity of the sample structures has effects such as increasing or decreasing the reliability of the measurement results (Bademci, 2004; Büyüköztürk et al., 2013). This makes it possible for the same measurement instrument to give unreliable results in a homogeneous group while giving reliable results in a more heterogeneous group.

In this study, it was concluded that the ChIA has sufficient validity and reliability in assessing certain situations that cause anger in children, in measuring the expression patterns of anger, and in the effect of anger on personal relationships. In future studies, the validity of the criterion correlation of the ChIA may be tested by examining the validity of the criteria correlation with gender, age, and socio-economic level. The validity of similar structures can be supported with qualitative and quantitative data collected from different social information sources such as parents, friends, and teachers.

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