

Validation of the Georgian version of stress in children questionnaire: translation equivalence and psychometric properties among orphaned children

Gedenidze L.¹, Tsitaishvili L.², Manjavidze N.¹, Devadze K.³, Tananashvili D.⁴

Abstract

Background: The Stress in Children is a short, easily administered, self-reported questionnaire, constructed to assess stress in younger children.

Aim: The purpose of this study was to validate a Georgian version of The Stress in Children questionnaire and to assess its psychometric qualities in a Georgian sample of Children from orphanages and the surrounding area.

Methods: The cross-sectional study was carried out in several orphanages of Georgia. A total of 116 orphaned children aged of 7 to 18 years from 11 orphanages (study group). An equal number of schoolchildren from nearby communities were selected as a comparison group. Translation and adaptation of The Stress in Children was carried out by forward-backward translation method. Pilot test-retest study (time interval between test and retest was 7 days) with 30 bilingual children age of 7 to 18 years. Association of responses considered acceptable if Pearson's $R \geq 0.7$. Based on this pilot study translated version The Stress in Children -Georgia was adapted by correct comprehension, grammar correctness and comprehensibility.

Results: Final stage showed acceptable association of test and re-test responses was $R=0.769$. The association of Test and Re-Test responses on The Stress in Children original and translated versions was significant for all questions, and internal consistencies for both methods were acceptable. Cronbach's alpha for internal consistency of test responses was 0.883 (95%CI – 0.796-0.970). The comparison of mean total and subscale scores of The Stress in Children -Georgia in the study group (orphaned children) were significantly higher compared to control group – for factor 1 (distress) - 19.8 ± 4.3 vs. 13.9 ± 3.1 , respectively, $p < 0.001$; for factor 2 (wellbeing) - 15.2 ± 3.8 vs. 10.0 ± 2.3 , respectively, $p < 0.001$; for factor 3 (social support) - 9.3 ± 2.9 vs. 6.1 ± 1.6 , respectively, $p < 0.001$; Total - 48.1 ± 8.7 vs. 33.1 ± 6.1 , respectively, $p < 0.001$.

Conclusions: The Georgian version of The Stress in Children Questionnaire used in the present study, demonstrated satisfactory psychometric properties (content validity, internal reliability) that support its use as a valid screening measure for childhood stress. This easily administered tool could be used in future studies of childhood stress in Georgia. (TCM-GMJ June 2026; 12 (2): P46-P50)

Keywords: Distress; Wellbeing; Orphaned Children; Social Support; Stress.

Introduction

Stress is a state in which homeostasis is disturbed by a stressor i.e. a real or perceived threat [1]. Increased vulnerability to stressors is observed during periods of continuous growth and great brain plasticity such as the prenatal period, infancy, childhood and adolescence. Extreme activation of the stress system during these critical periods of life has been related to adverse endocrine and metabolic sequel as well as negative effects on brain development and behavior [2,3]. A well-known study measuring the impact of stress on child health is the World Health Organization survey on Health Behaviour of Schoolaged Children [4]. Widely used instruments measuring childhood and adolescent internalizing and externalizing disorders are the Achenbach's Child Behavior Checklist (CBCL), which is a caregiver re-

port measure, and the Achenbach's Youth Self-Report (YSR), which is an adolescent (11-18 years) report measure [5]. The State-Trait Anxiety Inventory for Children (STAIC) is another selfreport valid instrument of 40 items, measuring anxiety in children, which has been translated into the Greek language [6,7]. Childhood is a period of increased vulnerability to stressors, therefore brief, self-reported and easily scored screening measures of stress are of particular value in young children. The Stress in Children The Stress in Children (SiC) is a short, easily administered, self-reported questionnaire, constructed to assess stress in younger children up to the age of 12 years [8]. Since SiC has not been validated in Georgia, the purpose of this study was to validate a Georgian version of the SiC Questionnaire and to assess its psychometric qualities in a Georgian sample of Children from orphanages and the surrounding area.

Methods

Study design and subjects

The cross-sectional study was carried out in several orphanages of Georgia and their surrounding area. Study protocol was approved by Ethics Committee of National Center of Disease Control of Georgia (Approval No.

From the ¹Ivane Javakishvili Tbilisi State University, Georgia; ²Caucasus International University, Georgia; ³Batumi Shota Rustaveli State University, Georgia; ⁴University of Georgia;
Received May 1, 2026; accepted May 29, 2026.
Address requests to: Gedenidze Lana
E-mail: Lanagedenidze8@gmail.com
Copyright © 2026 Translational and Clinical Medicine-Georgian Medical Journal

2022-040, dated 27.04.2022) which gave us informed consent for the study fulfillment.

Inclusion criteria:

- Children aged of 7 to 18 years from orphanages (study group) and nearby communities (control group);
- 30 Bilingual children for pilot study;
- Informed consent from National Center of Disease Control of Georgia, parents and/or guardians of children.

Exclusion criteria:

- comprised children younger than 7 or older than 18 years;
- lack of cooperation during dental examination;
- systemic or psychological disorders;
- congenital or developmental enamel or dentin defects unrelated to dental caries;
- current use of orthodontic appliances;
- Refusal for the participation in the study.

Following statistical formula has been used to calculate sample size:

$$n = \frac{z^2 \times \hat{p} (1 - \hat{p})}{\epsilon^2}$$

In this formula, Z represents the standard normal value corresponding to a 95% confidence interval ($Z = 1.96$), $\hat{p}$ denotes the expected proportion of the condition within the population ($\hat{p} = 0.07$), and ϵ refers to the permissible margin of error, which was set at 5%. Based on these parameters, the calculated minimum sample size was 101 participants. To accommodate a potential 10% non-response rate, the final estimated sample was at least 110 children.

The study encompassed children from 11 Georgian orphanages—nine located in western regions and two in eastern Georgia—who met the predefined inclusion criteria. A total of 116 orphaned children, aged 7 to 18 years and permanently residing in these facilities, were enrolled. An equal number of schoolchildren from nearby communities were selected as a comparison group. No significant differences in age distribution or gender ratio were observed between the two groups (Table 1).

SiC Translation, Adaptation and Validation

Translation and Adaptation of SiC was carried out by forward-backward translation method according the guidelines of Beaton et al. [9]. Translation in Georgian provided two independent group of interpreters. Then, a consensus meeting among the two translators and the bilingual researchers have been achieved an agreement on the final Georgian version SiC (SiC-GEO) taking into account Georgian cultural environment. Next, the Georgian version was sent to two bilingual experienced researchers in the field of public health and psychology to examine the translation equivalence between the SiC-GEO and original English version. After that, the Georgian version was back translated into English by another two independent translators, and again consensus and agreement were achieved on the English back-translation version. Finally, the back-translation version was compared with the original English version by two independent English-speaking experts. Next stage was the pilot test-retest study (time interval

between test and retest was 7 days) with 30 bilingual children age of 7 to 18 years. Association of responses considered acceptable if Pearson's $R \geq 0.7$. Based on this pilot study translated version SiC-GEO was adapted by correct comprehension, grammar correctness and comprehensibility.

Statistics

All scores of SiC-GEO were assessed after calculation of the responses obtained from the survey of participants. The statistical treatment was performed by SPSS 22.0 (IBM, Chicago, IL, USA). Continuous variables are presented as Means $\pm$ SD, Medians, and Min-Max range.

Reliability of internal consistency was measured by using the Cronbach alpha coefficient (α) with a range of 0–1 and corresponding 95% confidence intervals (95%CI).

Internal validity was performed by executing computation of Pearson's R correlation coefficients. These Pearson's R correlation coefficient was used for all responses on each question, subscale and total score of original and translated versions of SiC. The R of > 0.100 and higher was considered as statistically significant – $p < 0.05$.

External validity was assessed by measuring the association of SiC total and subscale scores with the clinical and demographic variables [age, gender, education, smoking, alcohol consumption, number of teeth with caries, number of missed teeth, DMFT for permanent dentition and DFT (decayed and filled teeth) for primary dentition, etc.].

Results and discussion

Translation, Adaptation and Validation

Final stage of translation, adaptation and validation process was the pilot study of 30 bilingual children. This stage consisted of test-retest study. Acceptable association of test and re-test responses was $R=0.7$. The results of this study are given in Table 2. As it seen from Table 2, the association of Test and Re-Test responses on SiC original and translated versions is significant for all questions, and internal consistencies for both methods are acceptable.

Mean total and subscale scores, and scores for each SiC-GEO question in study and control groups are presented in Table 3.

As it seen from Table 3, the association of mean total and subscale scores of SiC-GEO in the study group (orphaned children), also the mean score of responses on each question was significantly higher compared to control group.

Correlation analysis between SiC-GEO total and subscale (factor) scores in the study group has shown that:

- Age of orphaned children positively correlated with SiC-GEO total score ($R=0.233$, $p=0.012$); Factor 1 – distress ($R=0.239$, $p=0.010$), and Factor 3 – presence of social support ($R=0.204$, $p=0.028$).
- Education level, living conditions, gender did not show significant association with SiC-GEO characteristics.

From oral health characteristics the number of missed teeth positively associated with the SiC-GEO Distress score ($R=0.187$, $p=0.045$). Sane pattern revealed for the association of OHI-S and SiC-GEO Distress score ($R=0.203$, $p=0.029$).

During the past decades, special emphasis has been at-

tributed to the relationship of psychological distress with the physical and psychological health of children [1,10,11].

Results support the reliability and validity of the Georgian version of the SiC Questionnaire, used in this study. The adaptation was performed with the use of common component analysis of data collected from 116 orphaned and same number of family-lived children residing in same urban regions. The three-component structure, also used elsewhere [8], in the present study accounted for 48.5% of the tool's variance. Most questions' loadings onto the factors were satisfactory, including four negative loadings which had to be reversed during score calculation. Two questions of the original questionnaire ("The other kids tease me" and "When I have a hard time it helps being with my friends") were excluded due to low loading onto the three factors as in other versions of SiC [12,13]. This result could be justified by both the relatively small study population and some social-cultural factors, e.g. different structure of interpersonal relationships. The internal reliability of the three factors was satisfactory too.

This tool was designed to assess the degree and symptoms of perceived distress, or lower levels of well-being and main aspects of coping and social support [8]. Social skills were associated with greater well-being and lower degree of perceived stress. The lower perception of stress that accompanies enhanced social skills mediates the relationship of social skills with depression and life satisfaction [14]. According to our results, "Distress", "Presence of Well-being" and "Presence of Social support" were major parameters of perceived stress and therefore could be used in predicting the development of psychological and somatic symptoms in children.

We did not find any association between female gender and elevated levels of distress are not consistent with the results of previous studies [6,15] demonstrating higher levels of state-anxiety in girls. Sex differences in both neuroendocrine and behavioral stress responses do exist [16]. Neuropsychiatric disorders are more prevalent in women than men [17]. Depression in particular, is twice more

prevalent in females than in males. According to some researchers, this sex difference does not manifest in childhood, but emerges during puberty [18]. However, a recent study from the U.S. demonstrated that this sex-related difference in depression has its origins in childhood and becomes significant in adolescence [19]. Social anxiety disorder and post-traumatic stress disorder are also more likely to develop in women during adolescence [20,21]. Gender differences in the prevalence of stress-related psychiatric disorders seem to be mediated by differences in the function and regulation of the stress response system between men and women. Several clinical studies have identified gender differences in the stress response and at the same time many preclinical studies have revealed cellular and molecular sex differences in the stress response system [22]. Furthermore, our finding of higher levels of social support among girls is consistent with previous studies suggesting that women compared to men, are more likely to use emotion-focused coping strategies and talk about their feelings [23,24].

Our study has some limitations. The study sample comprised of children from all regions of Georgia. Therefore, the results of presented can be generalized in the whole Georgian pediatric population. Nevertheless, our results allow recommendation of this tool for use in future studies in the Georgia territory. The lack of test-retest performance is another limitation of this study. Finally, there has been no prior study using SiC as a psychometric instrument in Georgia, to allow better control of the validity criterion.

Conclusion

The Georgian version of the SiC Questionnaire used in the present study, demonstrated satisfactory psychometric properties (content validity, internal reliability) that support its use as a valid screening measure for childhood stress. This easily administered tool could be used in future studies of childhood stress in Georgia.

Table 1. Characterization of the study and control groups.

	Study group (n=116)		Control group (n=116)	
	Mean or N	SD or %	Mean or N	SD or %
Age, years	14.4	2.4	14.5	2.4
	t-test = 0.311, p = 0.756			
Age groups				
7-9	5	4.3%	5	4.3%
10-12	17	14.7%	19	16.4%
13+	94	81.0%	92	79.3%
	Chi2-test = 0.133, p = 0.936			
Gender				
Female	48	41.4%	49	42.2%
Male	68	58.6%	67	57.8%
	Chi2-test = 0.018, p = 0.894			
Residence				
Eastern Georgia	39	6.0%	39	6.0%
Western Georgia	77	8.6%	77	8.6%
	Chi2-test = 0.000, p = 1.000			
Living conditions				
Moderate	19	16.4%	26	22.4%
Good	97	83.6%	90	77.6%
	Chi2-test = 1.345, p = 0.246			

Table 2. The results of the association of test and re-test responses.

Question	Pearson's R (p)
Q1. I get angry	R=0.751
Q2. I get headaches	R=0.727
Q3. I like going to school	R=0.788
Q4. I feel calm and happy	R=0.759
Q5. I get stomach pains	R=0.818
Q6. I feel lonely	R=0.792
Q7. I get sad	R=0.726
Q8. I like to be at school	R=0.755
Q9. The other kids tease me	R=0.788
Q10. I fall asleep easily at night	R=0.755
Q11. I feel calm	R=0.777
Q12. Things work out as I have planned	R=0.789
Q13. I feel happy	R=0.772
Q14. When I am happy I show it	R=0.767
Q15. Sometimes I do not reach the goal I have planned for	R=0.822
Q16. When I have a hard time it helps being with my friends	R=0.794
Q17. When I am sad I show it	R=0.728
Q18. Sometimes I can't manage with the things I have to do	R=0.749
Q19. When I have a hard time there is an adult to talk to	R=0.781
Q20. If anyone teases me I will react	R=0.757
Q21. It is easy to concentrate during lessons at school	R=0.758
Subscale 1 – Factor 1. Distress	R=0.773
Subscale 2 – Factor 2. Presence of Wellbeing	R=0.764
Subscale 3 – Factor 3. Presence of Social Support	R=0.758
Total	R=0.769
Internal Consistency of Test Responses	Cronbach's Alpha – 0.883 (95%CI – 0.796-0.970)
Internal Consistency in Re-Test Responses	Cronbach's Alpha – 0.818 (95%CI – 0.731-0.906)

Table 3. Mean total and subscale scores and scores for each SiC-GEO question in the study and control groups.

Question	Study group n=116	Control group n=116	Independent t-test, p
	Mean $\pm$ SD	Mean $\pm$ SD	
Q1.	2.6 $\pm$ 0.8	1.7 $\pm$ 0.7	9.12, <0.001*
Q2.	2.1 $\pm$ 0.8	1.3 $\pm$ 1.1	9.12, <0.001*
Q3.	2.5 $\pm$ 1.0	1.6 $\pm$ 0.6	8.31, <0.001*
Q4.	2.1 $\pm$ 0.8	1.4 $\pm$ 0.5	7.99, <0.001*
Q5.	1.9 $\pm$ 0.7	1.4 $\pm$ 0.6	5.84, <0.001*
Q6.	2.1 $\pm$ 0.9	1.4 $\pm$ 0.6	6.97, <0.001*
Q7.	2.0 $\pm$ 0.8	1.6 $\pm$ 0.7	4.05, <0.001*
Q8.	2.6 $\pm$ 1.0	1.5 $\pm$ 0.6	10.16, <0.001*
Q9.	1.7 $\pm$ 0.8	1.5 $\pm$ 0.6	2.15, 0.032*
Q10.	2.6 $\pm$ 1.0	1.8 $\pm$ 0.7	7.06, <0.001*
Q11.	2.2 $\pm$ 0.9	1.7 $\pm$ 0.7	4.72, <0.001*
Q12.	2.7 $\pm$ 0.8	1.7 $\pm$ 0.6	10.77, <0.001*
Q13.	2.4 $\pm$ 0.9	1.6 $\pm$ 0.7	7.56, <0.001*
Q14.	2.2 $\pm$ 0.9	1.6 $\pm$ 0.7	5.67, <0.001*
Q15.	2.3 $\pm$ 0.9	1.7 $\pm$ 0.7	5.67, <0.001*
Q16.	2.1 $\pm$ 0.9	1.6 $\pm$ 0.6	4.98, <0.001*
Q17.	2.7 $\pm$ 1.0	1.6 $\pm$ 0.7	9.71, <0.001*
Q18.	2.2 $\pm$ 0.9	1.6 $\pm$ 0.7	5.67, <0.001*
Q19.	2.0 $\pm$ 1.1	1.6 $\pm$ 0.6	3.44, <0.001*
Q20.	2.4 $\pm$ 1.0	1.4 $\pm$ 0.6	9.24, <0.001*
Q21.	2.8 $\pm$ 1.0	1.8 $\pm$ 0.7	8.82, <0.001*
Subscale 1 – Factor 1. Distress = Q2+Q4+Q5+Q6+Q7+Q12+Q13+Q15+Q18	19.8 $\pm$ 4.3	13.9 $\pm$ 3.1	11.99, <0.001*
Subscale 2 – Factor 2. Presence of Wellbeing = Q1+Q3+Q8+Q10+Q11+Q21	15.2 $\pm$ 3.8	10.0 $\pm$ 2.3	12.61, <0.001*
Subscale 3 – Factor 3. Presence of Social Support Q14+Q17+Q19+Q20	9.3 $\pm$ 2.9	6.1 $\pm$ 1.6	10.41, <0.001*
Total	48.1 $\pm$ 8.7	33.1 $\pm$ 6.1	15.21, <0.001*

References

- Chrousos GP, Gold PW 1992 The concepts of stress and stress system disorders. Overview of physical and behavioral homeostasis. *JAMA*. 1992;267:1244-1252.
- Charmandari E, Achermann JC, Carel JC, Soder O, Chrousos GP. Stress response and child health. *Sci Signal*. 2012;5:mr1.
- Pervanidou P, Chrousos GP. Stress and obesity/metabolic syndrome in childhood and adolescence. *Int J Pediatr Obes*. 2011;6(Suppl 1):21-28.
- King A, Wold B, Tudor-Smith C, Harel Y. The health of youth. A cross-national survey. *WHO Reg Publ Eur Ser*. 1996;69:1-222.
- Achenbach TM, Rescorla LA. *Manual for the ASEBA School-Age Forms & Profiles*. Burlington, VT: University of Vermont, Research Center for Children, Youth, & Families (Achenbach), 2001.
- Psychountaki M, Zervas Y, Karteroliotis K, Spielberger C. Reliability and Validity of the Greek Version of the STAIC. *Eur J Psychol Assess*. 2003;19:124-130.
- Spielberger CD, Edwards CD. *STAIC Preliminary Manual for the State-Trait Anxiety Inventory for Children ("How I Feel Questionnaire")* Consulting Psychologists Press; 1973.
- Osika W, Friberg P, Wahrborg P. A new short self-rating questionnaire to assess stress in children. *Int J Behav Med*. 2007;14:108-117.
- Beaton DE, Bombardier C, Guillemin F, Ferraz MB. Guidelines for the Process of Cross-Cultural Adaptation of Self-Report Measures. *Spine*. 2000; 25(24):3186-3191. doi: 10.1097/00007632-200012150-00014.
- Charmandari E, Kino T, Souvatzoglou E, Chrousos GP. Pediatric stress: hormonal mediators and human development. *Horm Res*. 2003;59:161-179.
- Nicolaides NC, Kyratzi E, Lamprokostopoulou A, Chrousos GP, Charmandari E. Stress, the stress system and the role of glucocorticoids. *Neuroimmunomodulation*. 2015;22:6-19.
- Osika W, Friberg P, Wahrborg P. New short self-rating questionnaire to assess stress in children. *Int J Behav Med*. 2007;14(2):108-117.
- Emmanouil C, Bacopoulou F, Vlachakis D, Chrousos GP, Darviri C. Validation of the Stress in Children (SiC) Questionnaire in a Sample of Greek Pupils. *J Mol Biochem*. 2020;9(1):74-79.
- Segrin C, Hanzal A, Donnerstein C, Taylor M, Domschke TJ. Social skills, psychological well-being, and the mediating role of perceived stress. *Anxiety Stress Coping*. 2007;20:321-329.
- Pervanidou P, Bastaki D, Choularas G, Papanikolaou K, Laios E, Kanaka-Gantenbein C, Chrousos GP. Circadian cortisol profiles, anxiety and depressive symptomatology, and body mass index in a clinical population of obese children. *Stress*. 2013;16:34-43.
- Novais A, Monteiro S, Roque S, Correia-Neves M & Sousa N 2017. How age, sex and genotype shape the stress response. *Neurobiol Stress*. 2017;6:44-56.
- WHO 2012. Depression: A Global Crisis. Retrieved from http://www.who.int/mental_health/management/depression/wfmh_paper_depression_wmhd_2012. Assessed on February 18, 2018.
- Wade TJ, Cairney J, Pevalin DJ. Emergence of gender differences in depression during adolescence: national panel results from three countries. *J Am Acad Child Adolesc Psychiatry*. 2002;41:190-198.
- Breslau J, Gilman SE, Stein BD, Ruder T, Gmelin T, Miller E. Sex differences in recent first-onset depression in an epidemiological sample of adolescents. *Transl Psychiatry*. 2017;7:e1139.
- Asher M, Asnaani A, Aderka IM. Gender differences in social anxiety disorder: A review. *Clin Psychol Rev*. 2017;56:1-12.
- Garza K, Jovanovic T. Impact of Gender on Child and Adolescent PTSD. *Curr Psychiatry Rep*. 2017;19:87.
- Bangasser DA, Valentino RJ. Sex differences in stress-related psychiatric disorders: neurobiological perspectives. *Front Neuroendocrinol*. 2014;35:303-319.
- Tamres LK, Janicki D, Helgeson VS. Sex Differences in Coping Behavior: A Meta-Analytic Review and an Examination of Relative Coping. *Pers Soc Psychol Rev*. 2002;6:2-30.
- Taylor SE, Klein LC, Lewis BP, Gruenewald TL, Gurung RA, Updegraff JA. Biobehavioral responses to stress in females: tend-and-befriend, not fight-or-flight. *Psychol Rev*. 2000;107:411-429.