

# Validation of the Japanese Version of the Childhood Trauma Questionnaire-Short Form (CTQ-J)

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## Research article

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# Abstract

**Background** In Japan, the number of child maltreatment reports has surged to almost ten folds during the last decade. Assessment tools which are concise and easy-to-use are called for, in order to facilitate the process of child maltreatment substantiation as well as to advance research on Japanese people. The Childhood Trauma Questionnaire (CTQ-SF) is accepted internationally as an instrument to assess and quantify experiences of childhood maltreatment and its impact. However, the Japanese version of CTQ-SF has not been validated. The present study examined validity of the Japanese version of the CTQ (CTQ-J).

**Methods** The CTQ-J was administered to Japanese adolescents institutionalized due to child maltreatment and other family issues (institutionalized group, n=31) and adolescents who had no experience of institutionalization (community group, n=46) from the greater Tokyo area. Analysis of Variance was conducted to compare CTQ-J scores among the institutionalized group with documented maltreatment, the institutionalized group without documented maltreatment, and the community group, for the total score and five subscale scores. Then the discrimination of scores assessed by the CTQ-J were calculated using receiver operating characteristic (ROC) curve analysis and compared with documented childhood maltreatment experiences from institutionalized adolescents.

**Results** Internal consistency was 'good' to 'acceptable' for the CTQ-J in the categories of emotional abuse, physical abuse, sexual abuse, and emotional neglect (Cronbach's alpha > 0.74). In each maltreatment type, the institutionalized group with documented maltreatment experiences showed significantly higher CTQ-J scores than the community group. The area under the curve (AUC) showed higher discrimination for the total score of the CTQ-J (0.95, 95% confidence interval: 0.90-0.99), and each type of child maltreatment (all AUC: 0.98-0.86).

**Conclusion** This study has demonstrated that the CTQ-J may be used as a reliable tool for childhood maltreatment experience assessment among Japanese adolescents. It is suggested that the CTQ-J has validity by predicting child maltreatment experiences documented in the child welfare records.

## Background

Child maltreatment is defined as "the abuse and neglect of children under 18 years of age" including physical, emotional, or sexual abuse, and neglect, which "results in actual or potential harm to the child's health, survival, development or dignity in the context of a relationship of responsibility, trust or power" (1). Detrimental and prolonged impacts of childhood maltreatment on both physical and mental health have been the focus of public health research in the past few decades (2, for review). The cost of child maltreatment has been estimated at 1.6 trillion yen (approximately US\$15 billion) in Japan, and the further unmeasured costs of services such as medical and mental health counseling into adulthood for the long-term effects of child maltreatment are much higher (3).

To assess child maltreatment history, various self-report questionnaires have been developed. The Childhood Trauma Questionnaire-Short Form (CTQ-SF; 4, 5) is one of the most commonly used self-report instruments in research on childhood maltreatment history (2, 6). The CTQ-SF consists of 28 questions that assess

subjects' past maltreatment experiences retrospectively, and has demonstrated good validity in various languages, including Dutch (7, 8), German (9), Italian (10, 11), Korean (12, 13), Norwegian (14), Portuguese (15, 16), Spanish (17), Swedish (18), and Turkish (19).

The CTQ-SF's construct validity was originally examined by Bernstein and colleagues (5, 20). The results indicated significant associations between psychiatric inpatients' CTQ-SF scores and child maltreatment history rated by their therapists, who had access to various data such as counseling case notes, medical records, and court documents. On the other hand, many validation studies of the CTQ-SF examined its five-factor structure (5, 7–11, 13–15, 17, 18, 21), associations with other self-report questionnaires such as the Trauma Antecedents Questionnaire (12), self-report interviews such as the Childhood Trauma Interview (21), and parenting practice (17). To date, studies that have utilized data collected from multiple sources for criterion validity are almost none, except for one longitudinal study using informants' reports (22). That is, studies that investigate the validity of the CTQ-SF by comparing children with child maltreatment histories living in institutional care with children who had no experience of being institutionalized, are rather scarce, although such studies would strengthen the validity of the CTQ-SF.

In Japan, approximately 45,000 children aged less than 18 years old have been living in out-of-home care, 85% of whom are placed in residential care institutions, mostly due to child maltreatment (23). In order to examine the validity of self-report questionnaires of child maltreatment history, collecting data from adolescents who are placed in out-of-home care has several advantages. First, sampling from children living in residential care institutions allows the inclusion of children who have experienced maltreatment in the past. Second, unlike younger children, adolescents usually have sufficient cognitive ability to complete a self-report questionnaire by themselves or with minimal support from adults. Thus, their responses to the questionnaire could be less contaminated and more likely to reflect their memories. Third, for those adolescents in the institutionalized group, their maltreatment experiences are documented in their welfare records prepared by the Child Guidance Center (similar to the Child Protection Service in the United States and other countries). Availability of such records allows comparisons to be made between the adolescents' own self-report and their welfare records, which include reports from other informants.

Thus, the aim of this study is to examine the Japanese version of the CTQ-SF (CTQ-J) by comparing CTQ-J scores with the presence of documented child maltreatment among Japanese adolescents either placed in an institution or living with intact family at home.

## **Materials And Methods**

### **Participants**

The institutionalized group consisted of 31 children, aged between 13 and 19 years old, from a residential care institution located in the greater Tokyo area. All of them were placed before age of 18. With the consent of the head of the institution, a member of the research team visited the institution to explain the study to the children individually in addition to distributing the flyers. Out of 33 children recruited, 32 children agreed to participate in the study and signed their consent; one child stated a lack of interest (response rate: 96.9%). Taking into consideration the children's emotional and behavioral conditions, informed consent for each

child was individually provided by the head of the institution. In addition, demographic information for each participant was provided by the care worker in charge of the participants' daily care.

The community group consisted of 46 children also from the greater Tokyo area. They were recruited via snowball sampling, online recruitment, flyers and word of mouth. The inclusion criteria were as follows: children aged between 13 and 19 years old, living with two biological parents, and no history of separation from their families recorded at the Child Guidance Center. Interested parents gave signed informed consent and their contact information to the research team. The researchers visited families at home and obtained consent from each participating child before the data collection phase.

In the data collection session, the researchers introduced their study and described the consent procedure to the groups, and participants filled out a questionnaire. In the community group, the parent of each participant filled out a face sheet on their family environment and demographic information, including any involvement with the welfare system.

## Measures

**Childhood Trauma Questionnaire.** The Childhood Trauma Questionnaire-Short Form (CTQ-SF) is a self-report questionnaire composed of 28 items to assess childhood maltreatment history (4, 5). The CTQ-SF was developed to measure five dimensions of child maltreatment as subscales: emotional abuse, physical abuse, sexual abuse, physical neglect, and emotional neglect. In this questionnaire, respondents retrospectively answer questions that assess their experiences of maltreatment in childhood: e.g. 'I felt that someone in my family hated me'. The answer key is based on a 5-point Likert scale (1= 'never true'; 5='very often true'). For each dimension, scores range from 5 to 25 and severity can be categorized by the respective cutoff scores into 'none', 'low', 'moderate', or 'severe'.

The reliability and validity of the original English version has been reported (4, 5){Bernstein, 1998 #33;Bernstein, 2003 #34}. The internal consistency was 0.89 for emotional abuse, 0.82 for physical abuse, 0.92 for sexual abuse, 0.89 for emotional neglect, and 0.66 for physical neglect. Convergent validity was reported with the ratings of other trauma measures, including therapists' trauma ratings (5) and trauma-related psychological symptoms (4).

The CTQ-SF was translated by Goto (24) into Japanese under the supervision of clinical psychologists with English fluency, and it was then back-translated by a native English speaker with Japanese ability. The current study adopted Goto's CTQ as the Japanese version of the CTQ-SF (CTQ-J), with the author's permission.

**Documented Child Maltreatment.** The researchers visited the institution and coded the presence of maltreatment history that was documented in child welfare records for each participant. In addition to participants' reports on family environment, the records usually incorporated testimony by other informants, such as school teachers and neighbors, as well as statements from parents. The coding of maltreatment histories was designated into five types, which correspond to the CTQ's five dimensions.

## Analysis

First, internal consistency for the total CTQ score and five subscale scores was examined using Cronbach's alpha statistic.

Second, for each maltreatment type, the participants were divided into three groups based on the presence of any documented maltreatment experience in their welfare records, and placement status. The first group consisted of adolescents who were institutionalized with documented experience of a specific type of maltreatment in their welfare records. The second group consisted of adolescents who were institutionalized without documented experience of a specific type of maltreatment. The third group consisted of adolescents who were living with their parents at home without documented experience of a specific type of maltreatment; this was the community group. For example, with respect to emotional abuse, an adolescent whose record indicated that his parents had emotionally abused him and who was placed in the institution was classified into the first group for emotional abuse, while another adolescent living in the institution whose welfare records had no indication of emotional abuse was classified into the second group. An adolescent from the community group, without placement in an institution and documented maltreatment, was categorized in the third group. The same categorization was applied for each maltreatment type. One-way analysis of variance (ANOVA) was performed to compare the mean scores of CTQ-J for five types of maltreatment and the total score among the three groups. Post-hoc tests using the Bonferroni method were also conducted.

Third, receiver operating characteristics (ROC) analysis was performed and sensitivity, specificity, and the area under the curve (AUC) of the CTQ-J were calculated to determine the capacity of each CTQ-J maltreatment type score, as well as the CTQ-J total score to predict respective types of documented maltreatment and the presence of any documented maltreatment. All statistical analyses were conducted with STATA (version 14.2; Stata Corp College Station, TX, United States). The level of statistical significance was set at  $p < .05$  (two-tailed).

## Results

The sample characteristics are shown in Table 1. The mean age was 15.8 years (SD = 1.71) for the institutionalized group and 15.6 years (SD = 1.84) for the community group. Boys represented 61.3% of the institutionalized and 54.4% of the community groups. No significant difference in age and sex between groups was observed.

**Table 1**  
**Sample characteristics (n = 77)**

		Institutionalized (n = 31)			Community (n = 46)		
		N/Mean	%/SD	Range	N/Mean	%/SD	Range
Age	(years)	15.8	1.71	13, 19	15.6	1.84	13, 19
Sex	(Boy)	19	61.3		25	54.4	
Bio. Mother's age (years)		43.1*	6.5	33, 58	45.7	3.3	39, 52
Bio. Father's age (years)		43.7**	5.7	36, 55	47.9	4.0	37, 55
Birth place (prefecture)							
	Tokyo	25	80.7		25	54.4	
	Other	4	12.9		21	45.7	
	unknown	2	6.5		0	0.0	
Placement duration (years)		4.4	5.0	1, 18	-	-	-
Documented maltreatment							
	Emotional abuse	12	38.7		0	0.0	
	Physical abuse	20	64.5		0	0.0	
	Sexual abuse	8	25.8		0	0.0	
	Emotional neglect	7	22.6		0	0.0	
	Physical neglect	18	58.1		0	0.0	
Documented maltreatment count							
	0	3	9.7				
	1	7	22.6				
	2	11	35.5				
	3	5	16.1				
	4	4	12.9				
	5	1	3.2				
Any documented maltreatment		28	90.3				
CTQ (score)							
	Emotional abuse	12.3	6.1	5, 25	6.6	1.9	5, 14
	Physical abuse	12.9	7.0	5, 25	5.5	1.5	5, 13

**Table 1**  
**Sample characteristics (n = 77)**

Sexual abuse	9.0	6.0	5, 25	5.0	0.3	5, 7
Emotional neglect	17.0	5.7	5, 25	9.4	3.2	5, 16
Physical neglect	11.4	4.2	5, 19	6.8	2.4	5, 14
Total	62.6	20.2	25, 99	33.3	6.2	25, 52
*n = 24. **n = 17.						

Based on child welfare records of the adolescents in placement, the rate of physical abuse (64.5%) was highest, followed by physical neglect (58.1%), emotional abuse (38.7%), and sexual abuse (25.8%). Emotional neglect was lowest at 22.6%. Adolescents who had experienced three or more maltreatment types accounted for 32.2% of participants. Those who experienced two types and one type were 35.5% and 22.6%, respectively. Approximately one in ten of the institutionalized adolescents did not experience any of the five maltreatment types and were in placement due to other family issues such as parental psychiatric illness and loss of the caregiving parent through divorce.

The mean CTQ-J scores for the five maltreatment types and the total score were much higher in the institutionalized group than in the community group, as shown in Table 1. The institutionalized group had 12.3 (SD = 6.1) for emotional abuse, 12.9 (SD = 7.0) for physical abuse, 9.0 (SD = 6.0) for sexual abuse, 17.0 (SD = 5.7) for emotional neglect, and 11.4 (SD = 4.2) for physical neglect. In contrast, the community group scored 6.6 (SD = 1.9) for emotional abuse, 5.5 (SD = 1.5) for physical abuse, 5.0 (SD = 0.3) for sexual abuse, 9.4 (SD = 3.2) for emotional neglect, and 6.8 (SD = 2.4) for physical neglect. The total score of the institutionalized group was 62.6 (SD = 20.2), which was almost double the score of the community group (mean = 33.3; SD = 6.2).

Internal consistency was examined using Cronbach's alpha. The CTQ-J total score presented excellent internal consistency ( $\alpha = .94$ ). The results of the analysis by item ranged from 0.939 and 0.945. For the five subscales, Cronbach's alpha scores were 0.87 (range: 0.817 and 0.861) for emotional abuse, 0.90 (range: 0.861 and 0.886) for physical abuse, 0.89 (range: 0.854 and 0.894) for sexual abuse, 0.89 (range: 0.878 and 0.847) for emotional neglect, and 0.74 (range: 0.615 and 0.745) for physical neglect. Good internal consistency was indicated except for physical neglect, which resulted in an acceptable level.

The results of ANOVA with multiple comparisons are shown in Table 2. Significant differences in emotional abuse ( $F = 37.72, p < .0001$ ) among the three groups were observed; those who had experienced emotional abuse and had been institutionalized (mean = 16.4) scored significantly higher than either of the other two groups. Also, adolescents in the institutionalized group whose documents recorded no emotional abuse (mean = 9.7) had a significantly higher score than the community group (mean = 6.6).

For physical abuse, ANOVA showed significant differences among the three groups ( $F = 36.66, p < .0001$ ). The institutionalized group with documented physical abuse had a significantly higher score (mean = 15.2) than either of the other two groups ( $p < .01$ ). No significant difference was found between the institutionalized group whose documents recorded no physical abuse (mean = 8.8) and the community group (mean = 5.5).

For sexual abuse, the three groups differed significantly ( $F = 87.44, p < .0001$ ). While the scores of the institutionalized group with documented sexual abuse (mean = 17.0) were significantly higher than the other groups ( $p < .001$ ), the institutionalized group with no

documented sexual abuse (mean = 6.3) and the community group (mean = 5.0) did not significantly differ.

For emotional neglect, the three groups differed significantly ( $F = 32.78, p < .0001$ ). The institutionalized group with documented experience of emotional neglect (mean = 20.6) had a significantly higher score than the other two groups ( $p < .05$ ). Also, the institutionalized group without documented emotional neglect (mean = 15.9) had a significantly higher score than the comparison (mean = 9.4) ( $p < .001$ ).

For physical neglect, the three groups differed significantly ( $F = 29.31, p < .0001$ ). The institutionalized group with documented physical neglect (mean = 13.2) was significantly higher than either the institutionalized group without documented physical neglect (mean = 9.0,  $p < .005$ ) or the community group (mean = 6.8,  $p < .001$ ). However, no significant difference was found between the institutionalized group without documented physical neglect and the community group.

For the total score of the CTQ-J, a significant difference was observed among the three groups ( $F = 48.51, p < .0001$ ). The institutionalized group with any documented maltreatment (mean = 64.5) had a significantly higher score than the other two groups ( $p < .05$ ). No significant difference was observed between the institutionalized group without any documented maltreatment (mean = 44.7) and the community group (mean = 33.3).

Sensitivity and specificity of the five maltreatment types with the respective child welfare records used as the criterion are shown in Table 3. The optimal cutoff point to determine the documented emotional abuse was 8/9 with sensitivity of 91.7% and specificity of 78.9%. With this cutoff point, 76.62% were correctly classified. For physical abuse, the optimal cutoff point was 6/7 with sensitivity of 90.0% and specificity of 82.5%, with which 84.4% were correctly classified. For sexual abuse, the optimal cutoff point was 8/9 with sensitivity of 100% and specificity of 92.8%, with which 93.5% were correctly classified. For emotional neglect, the optimal cutoff point was 16 with sensitivity of 100% and specificity of 77.1%. With this point, 79.22% were correctly classified. For physical neglect, the optimal cutoff point was 9/10 with sensitivity of 83.3% and specificity of 79.7%. With this point, 80.5% were correctly classified. The optimal cutoff point to determine any documented maltreatment was 48 with sensitivity of 82.14% and specificity of 95.92%, as shown in Table 4. With this cutoff point, 90.91% was correctly classified.

The analyses of the AUC resulted in 0.92 (95% confidence interval [CI]: 0.86–0.99) for emotional abuse, 0.92 (95% CI: 0.84–0.99) for physical abuse, 0.99 (95% CI: 0.97–1.00) for sexual abuse, and 0.91 (95% CI: 0.83–0.98) for emotional neglect, 86 (95% CI: 0.74–0.98) for physical neglect, and 0.95 (95% CI: 0.90–0.99) for any maltreatment (Fig. 1). High values of the AUC over 0.90 indicated markedly high predictive functions of

CTQ-J scores for the presence of documented emotional abuse, physical abuse, sexual abuse, emotional neglect, and any of the five types of maltreatment. Even for physical neglect, the value of AUC over 0.85 denoted an adequate discrimination function for the presence of documented physical neglect.

Table 2  
*CTQ score mean comparison by documented maltreatment experiences and groups (n=77)*

		n	CTQ-J score mean	SD	F	P
Emotional abuse	experienced, institutionalized	12	16.4	5.76	37.72	<.0001
	not experienced, institutionalized	19	9.7	4.73		
	not experienced, not institutionalized	46	6.6	1.86		
Physical abuse	experienced, institutionalized	20	15.2	6.54	36.66	<.0001
	not experienced, institutionalized	11	8.8	6.23		
	not experienced, not institutionalized	46	5.5	1.49		
Sexual abuse	experienced, institutionalized	8	17.0	6.48	87.44	<.0001
	not experienced, institutionalized	23	6.3	2.30		
	not experienced, not institutionalized	46	5.0	0.29		
Emotional neglect	experienced, institutionalized	7	20.6	3.21	32.78	<.0001
	not experienced, institutionalized	24	15.9	5.93		
	not experienced, not institutionalized	46	9.4	3.16		
Physical neglect	experienced, institutionalized	18	13.2	4.02	29.31	<.0001
	not experienced, institutionalized	13	9.0	3.37		
	not experienced, not institutionalized	46	6.8	2.41		
Any maltreatment	experienced, institutionalized	28	64.5	18.92	48.51	<.0001
	not experienced, institutionalized	3	44.7	27.43		
	not experienced, not institutionalized	46	33.3	6.28		

Note. CTQ-J: Japanese version of Childhood Trauma Questionnaire.

Table3

*Cumulative percentages of sensitivity and specificity for documented maltreatment (n=77)*

Cut Scores	Emotional Abuse		Physical Abuse		Sexual Abuse		Emotional Neglect		Physical Neglect	
	Sens.	Spec.	Sens.	Spec.	Sens.	Spec.	Sens.	Spec.	Sens.	Spec.
5	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0
6	100.0	33.9	95.0	75.4	100.0	88.4	100.0	8.6	88.9	40.0
7	100.0	55.4	90.0	82.5	100.0	89.9	100.0	15.7	88.9	55.9
8	100.0	64.6	75.0	84.2	-	-	100.0	27.1	88.9	66.1
9	91.7	78.9	75.0	86.0	100.0	92.8	100.0	37.1	83.3	76.3
10	-	-	-	-	-	-	100.0	40.0	83.3	79.7
11	83.3	86.2	75.0	94.7	75.0	97.1	100.0	48.6	77.8	83.1
12	75.0	89.2	-	-	-	-	100.0	55.7	77.8	88.1
13	75.0	90.8	65.0	94.7	75.0	98.6	100.0	60.0	72.2	91.5
14	66.7	90.8	-	-	75.0	100.0	100.0	71.4	50.0	96.6
15	58.3	93.9	60.0	96.5	62.5	100.0	100.0	72.9	44.4	98.3
16	50.0	95.4	60.0	98.3	-	-	100.0	77.1	22.2	100.0
17	41.7	95.4	40.0	98.3	50.0	100.0	85.7	82.9	-	-
18	-	-	35.0	98.3	-	-	71.4	85.7	16.7	100.0
19	41.7	98.5	-	-	-	-	71.4	88.6	5.6	100.0
20	-	-	30.0	98.3	-	-	57.1	90.0	0.0	100.0
21	33.3	100.0	25.0	98.3	-	-	57.1	91.4	-	-
22	25.0	100.0	-	-	37.5	100.0	57.1	92.9	-	-
23	-	-	20.0	98.3	-	-	42.9	92.9	-	-
24	16.7	100.0	15.0	98.3	-	-	14.3	97.1	-	-
25	8.3	100.0	5.0	98.3	25.0	100.0	0.0	98.6	-	-
26	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	-	-

Note. Sens.=sensitivity, Spec.=Specificity.

Table4

*Cumulative percentages of sensitivity and specificity of CTQ total score for documented any maltreatment (n=77)*

Cut Scores	Any Maltreatment	
	Sensitivity %	Specificity %
25	100.0	0.0
26	100.0	8.2
27	100.0	10.2
28	100.0	16.3
29	100.0	26.5
30	100.0	30.6
31	100.0	34.7
32	100.0	49.0
33	100.0	53.1
34	100.0	61.2
35	96.4	67.4
37	92.9	71.4
38	89.3	73.5
39	89.3	77.6
41	89.3	83.7
43	85.7	85.7
44	85.7	87.8
48	82.1	95.9
51	78.6	95.9
52	71.4	95.9
55	71.4	98.0
57	67.9	98.0
60	57.1	98.0
61	53.6	98.0
64	50.0	98.0
67	42.9	98.0
70	39.3	98.0
73	35.7	98.0
74	32.1	98.0
76	28.6	98.0
79	28.6	100.0
80	25.0	100.0
82	21.4	100.0
85	17.9	100.0
90	14.3	100.0
94	10.7	100.0
98	7.1	100.0
99	3.6	100.0

## Discussion

In this study, good internal consistency of the Japanese version of the CTQ-J was obtained with Cronbach alpha scores greater than 0.80 for the areas of emotional abuse, physical abuse, sexual abuse, and emotional neglect. For physical neglect, an acceptable level of internal consistency, 0.74, was observed. Despite overall acceptable levels of reliability, the alpha value of physical neglect was 0.74, which was lower compared with the alpha values of other subscales. Such a low alpha value for physical neglect was consistent with the results of variant samples (4). In other studies, even lower alpha values for physical neglect were observed and the possibility of poor construct validity of the original question items for physical neglect was highlighted (12, 25). However, the acceptable alpha values of the Japanese version, even for physical neglect, in the current study supported internal consistency of the subscale.

The results of mean score comparisons, as well as ROC analyses, suggested that the CTQ-J reflected the accuracy of adolescents' recollections of child maltreatment, which were in agreement with the child maltreatment records prepared by the child welfare system. The institutionalized group with documented maltreatment experience agreed with the corresponding CTQ-J items the most frequently. This could be partially attributed to the fact that many of the institutionalized group had been removed from their homes at a relatively older age, meaning they were more likely to have clearer memories of the maltreatment. For these participants, their reports of victimization could have constituted the key evidence to substantiate their cases of maltreatment by the Child Guidance Center. Thus, the highest CTQ-J score of the institutionalized group with documented maltreatment was consistent with their welfare records, which might have simply reflected their self-report of maltreatment. Alternately, despite the lack of records, the institutionalized group without documented maltreatment experience reported maltreatment experiences on the CTQ-J, which was higher than the community group. This is consistent with lower prevalence rates of child maltreatment in studies using cases confirmed by CPS than the rates measured with self-report instruments (26, 27). This could mean that these adolescents might not have disclosed some of their maltreatment experiences to the Child Guidance Center, or their statements might not be sufficiently corroborated by information collected from other sources during the process of maltreatment investigation before the child's removal. Since occurrence of multiple types of child maltreatment as well as family dysfunction was often observed (e.g. 28, 29, 30), it was likely that the institutionalized group, whose members were removed from home due to one type of maltreatment, described other types of maltreatment for the first time during CTQ-J screening. Use of a concise and self-report measure, such as CTQ-J, is likely to benefit adolescents who have underdone maltreatment, by complementing case workers' face-to-face interviews with children and other informants, particularly in Japan where child maltreatment reports to the Child Guidance Center has surged to over 10 folds from 1999 to 2016 (23).

Furthermore, ROC analyses revealed that using the CTQ-J as a self-report instrument of child maltreatment among adolescents had good sensitivity and specificity for determining the presence of the five documented child maltreatment types and the presence of any maltreatment. Particularly, high values of AUC exceeding

0.90 indicated high validities for emotional abuse, physical abuse, sexual abuse, and emotional neglect, while 0.862 as the AUC suggested good validity for physical neglect. Such high sensitivities fulfill the function of the CTQ-J as an efficient screening tool for child maltreatment history.

The cutoff scores for sexual abuse and for physical neglect were higher than both the adolescent psychiatric inpatients and the nonclinical sample of female members of a health management organization (HMO) in the United States, both of which were used in the original validity study by Bernstein and his colleagues (4). The emotional neglect cutoff score was also much higher than the cutoff for HMO members. These higher cutoff scores may reflect the insidious nature of sexual abuse, emotional neglect and physical neglect in Japan. Compared with emotional and physical abuse, the reduced visibility of sexual abuse and neglect could prevent people outside of the family from reporting it, or caseworkers at the Child Guidance Center from substantiating sexual abuse and neglect. Since the criterion of the current study was the child welfare records, we may have captured more 'severe' cases of sexual abuse and neglect, and thus, the cutoff score might be higher than the original validity study.

On the other hand, the cutoff score for physical and emotional abuse was lower than the original CTQ. The lower cutoff scores among Japanese samples were observed in a study on emotional and behavioral problems in children (31), as well as postnatal depression (32, 33). Although the rationale for such low ratings in Japanese respondents compared to English-speaking norming samples remains unclear, the current study results may be attributed to a drastic increase of maltreatment reports to the Child Guidance Center in the last decade, which may reflect Japanese society's enhanced awareness of child maltreatment, and the fact that we captured less severe physical and emotional abuse cases (34).

Furthermore, it is of note that the current study showed 47/48 as the cutoff score of the CTQ-J total score for predicting the presence of child maltreatment; this was one of two studies in which the total score was used in the examination of the criterion validity (12). This finding suggests that the CTQ-J total score could be useful in differentiating people with a history of any form of maltreatment that requires child's removal from home and placement in an institution. When severity and type of maltreatment cannot be clarified through interviews, administration of the CTQ-J at Child Guidance Centers may help to improve the detection of the presence of any child maltreatment. To the best of our knowledge, this is the first study in Japan to examine the reliability and validity of childhood maltreatment history using the CTQ-J.

Several limitations of this study need to be acknowledged. First, both the institutionalized and comparison samples were of convenience, which limits the generalizability of the study results. Even to adolescents in out-of-home care or those living with their family in the community, this limitation should be applied, owing to sampling bias.

Also, the study failed to consider other social factors, such socioeconomic status and the ethnic or cultural background. Future research is needed to replicate the current findings with a larger study using a population-based sample, including diverse social and cultural background. Second, although the CTQ per se is based on recall, the institutionalized group might have suffered from post-traumatic symptoms, including dissociation and depression, which might have complicated the recollection of disturbing experiences. Also, denial, social desirability as well as fear of the consequences of disclosing family problems might have

influenced even the community group to underreport their experiences as well. Possibilities of underreporting were congruent with the literature, which described the tendency of underreporting among maltreatment victims (22, 35, 36). Nonetheless, despite such an impediment commonly associated with trauma research, an adequate agreement between the child interview on maltreatment and the CTQ was observed (4). Third, the current study simply reported cutoff scores observed by the current analyses and referred to the severity categories, which were indicated by the original CTQ studies (20). Future research needs to examine the validity of cutoff scores and severity categorization with Japanese sample. Fourth, only one researcher (RM) managed to code the types of maltreatment extracted from the child welfare records. Even though the indication of incidence of maltreatment was straightforward and easy to categorize into five types of maltreatment employed in the CTQ-J, future research should use multiple coders and calculate inter-rater reliability to confirm the reliable measurement of the documented child maltreatment data.

## Conclusions

In conclusion, the current study represents a step adding to maltreatment research by examining the internal consistency and criterion validity of the CTQ-J, although its limitations call for careful interpretations and applications of the results. Our findings implied that the measure could be used at clinical settings, such as the Child Guidance Center, as a supplemental tool in assessing the child maltreatment history of Japanese adolescents, since it predicts the child maltreatment cases which are severe enough to involved child removal from home. Future research should utilize a larger representative sample with a diverse age range that enables further examination of validity, including factor analysis.

## Abbreviations

CTQ-J

the Japanese Version of the Childhood Trauma Questionnaire-Short Form

CTQ

Childhood Trauma Questionnaire

CTQ-SF

Childhood Trauma Questionnaire-Short Form

ROC

receiver operating characteristic

AUC

area under the curve

ANOVA

analysis of variance

SD

standard deviation

CI

confidence interval

HMO

health management organization

# Declarations

## *Ethics approval and consent to participate*

The institutional review board at the National Center for Child Health and Development approved this study. In addition to informed written consent obtained from the head of the institution and parents in the non-institutionalized group, as well as written assent from all adolescent participants, approval from participants' case workers at the Child Guidance Center was obtained orally.

## *Consent for publication*

Not applicable

## *Availability of data and materials*

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

## *Competing interests*

The authors declare that they have no competing interests.

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## *Authors' contributions*

RM and TF contributed to the conception and design of the study, and statistical analyses; RM managed data collection and data management, as well as wrote the first draft; TF contributed to critical revision of the manuscript and approved the submitted version.

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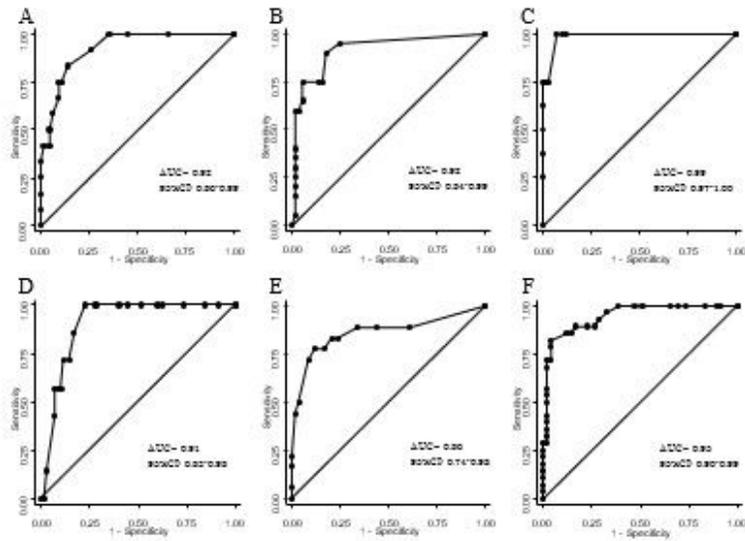
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## Figures



**Figure 1**

ROC curves for CTQ-J scores in predicting documented maltreatment. A, CTQ-J emotional abuse score for documented emotional abuse. B, CTQ-J physical abuse score for documented physical abuse. C, CTQ-J sexual abuse score for documented sexual abuse. D, CTQ-J emotional neglect score for documented emotional neglect. E, CTQ-J physical neglect score for documented physical neglect. F, CTQ-J total score for documented any maltreatment.