

## Factor Structure of the Conflict Tactics Scale 1

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### ABSTRACT

**Background:** The Conflict Tactics Scale 1 (CTS1) is a widely used self-report measure of abusive attitudes of parents towards children. The factor structure of the CTS1 still remains to be clarified. The aim of this study was to examine the factor structure of the Japanese version of the CTS1 for postpartum women in community settings.

**Method:** The data in this study came from the Okayama and Kumamoto’s study. These were part of a larger survey using longitudinal questionnaire studies conducted in Japan from 2001 to 2002 and in 2011, respectively. In both study sites, the participant mothers were asked to fill in the CTS1 one month after delivery when they attended for check-up at the out-patient clinic.

**Results:** A total of 1,150 questionnaires were collected, excluding the participants with missing values in the CTS1. Finally, 1,078 were included in the statistical analyses. Data of 1,078 women were divided into two parts. In the first halved sample (n=578), an exploratory factor analysis was conducted for the CTS1 items after excluding nine items with extremely low prevalence. It revealed 2-factor or 3-factor models. Then, we conducted a model comparison with the second halved sample (n=500), using confirmatory factor analysis. In terms of goodness-of-fit indices, the 2-factor model was superior. Its subscales were Reasoning and Psychological Aggression.

**Conclusion:** The 2-factor model of the CTS1 consisting of Reasoning and Psychological Aggression was superior to the 3-factor model. This is not inconsistent with the original authors’ theoretical model.

**KEYWORDS:** Infant, Perinatal care, Child abuse, Factor analysis, Psychometric testing

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## INTRODUCTION

Child abuse and neglect is widely known as an important clinical and social issue. Neonatal abuse, in particular, may be very serious, possibly leading to death of the baby. Instruments to measure the child abuse and neglect including an interview and self-report questionnaires have been developed.<sup>1-4</sup> Some of them such as the Family Stress Checklist (FSC),<sup>1</sup> and the Child Abuse Potential Inventory (CAPI)<sup>2</sup> are measures of *risks* for child abuse. There are other instruments such as the Parent-Child subscale of the Conflict Tactics Scales (CTSPC)<sup>3</sup> and the Conflict Tactics Scale 1 (CTS1)<sup>4</sup> that were designed to directly measure abusive attitude. Among them, the CTSPC is one of the most extensively studied.<sup>5-10</sup> In Japan, the CTS1, which is the original version of the CTSPC, was used for measuring neonatal abuse.<sup>11</sup> The CTS1 is a self-report questionnaire with only 19 items so that it may be easy to administer.

Straus et al.<sup>3</sup> showed a good test-retest reliability of the CTS1 instrument. However, the CTS1's factor structure still remains to be clarified. Straus et al.,<sup>3</sup> who developed the scale, presented a 3-subscale model including Reasoning, Psychological Aggression, and Physical Assault. However, this is based on only theoretical considerations. Identification of the appropriate factor structure of any measurement is of vital importance. If, for example, the actual factor structure of multiple-item measurement were different from what is derived from theory, research data based on the theory-driven subscales might be seriously biased and, in clinical practice, important aspects of patients/clients might be lost in assessment. Hence, it is critical for both research and clinical reasons to identify the factor structure of the abusive attitude measured with the CTS1.

The aim of this study was to examine the factor structure of the Japanese version of the CTS1 for postpartum women in community settings. We used data from two Japanese community studies of child abuse using the CTS1.

## MATERIALS AND METHODS

### *Design, Setting and Study Sample*

The data in this study came from two sources: one from the Okayama's study and the other from the Kumamoto's study. These were part of a larger survey using longitudinal questionnaire studies conducted in Okayama and Kumamoto Prefectures, Japan. Participants consisted of a purposive sample of women who were recruited from any types of hospitals and clinics. Women who had not adequate understanding of the Japanese were excluded.

The setting of Okayama's study<sup>12</sup> included one gynaecology department of a general hospital and four antenatal clinics located in Okayama. We solicited all women who gave birth at one of the five hospital/clinics in Okayama. Participants were a convenient sample of women who were recruited from August 2001 to April 2002 in Okayama.

Participants in Kumamoto's study<sup>11,13</sup> were women attending several antenatal clinics. They were a university hospital (the only academia-affiliated hospital in Kumamoto), 12 public/private hospitals, and five private clinics in Kumamoto Prefecture. Therefore, the present participants were pregnant women attending different types of antenatal clinics. At least in the 28th week of gestation, those women attending one of these antenatal clinics were solicited to participate in this study. Participants were a convenient sample of women who were recruited during the whole month of November 2011 in Kumamoto.

Eligible for the study were 1,530 participants in Okayama, and 1,442 in Kumamoto. Among them, 758 (50%) in Okayama and 392 (27%) in Kumamoto returned the questionnaires. A total of 1,150 questionnaires were collected; excluding the participants with missing values in the CTS1, we included a total of 714 (66%) participants in Okayama and 364 (34%) in Kumamoto in statistical analyses.

### *Measurement*

Conflict Tactics Scale (CTS)<sup>4</sup> is a

self-report measure of child abuse used for parents at various stages as well as during the child-care period. Of the series of the CTSs, we selected the CTS1 for this study. After obtaining permission from Straus, the original author, Kitamura, researcher and psychiatrist with extensive training in the UK, translated the CTS1 into Japanese. The CTS1 measures the frequency of different types of abusive parenting behaviours occurring since the present child's birth. It contains 19 items with a 7-point scale (*never* scored 0, *1 time* scored 1, *2 times* scored 2, *3-5 times* scored 4, *6-10 times* scored 8, *11-20 times* scored 15, *over 20 times* scored 25 based on CTS Handbook).<sup>14</sup> The first three items (A, B, C) are reasoning items such as "discussed an issue calmly". There are 7 psychological aggression items (D to J), and 9 physical assault items (K to S). One item "cry" (G) was omitted in the original version, but this was included in the present survey based on previous studies with Japanese mothers.<sup>12</sup> Two original items use the expression "knife or gun" in which "gun" was omitted from the Japanese version because of unavailability of fire arms in Japan. The timeframe of the original CTS1 was the previous year. However, in this study, this was changed into the time period since the child's birth. Therefore, this was about a three-week period.

#### *Procedure*

In both the Okayama and Kumamoto's studies, the participant mothers were asked to fill in the questionnaire one month after delivery when they attended the check-up at the out-patient clinic.

#### *Data Analysis*

The data were divided randomly into two groups by the means of random sampling using Statistical Package for Social Sciences (SPSS). The first group (n=578) was used for the exploratory factor analysis (EFA). In an EFA, we calculated Kaiser-Meyer-Olkin of sampling adequacy as well as Bartlett's test of sphericity in order to examine the

adequacy of the sample size and non-zero correlations between items. The number of factors was determined by scree plot. The minimum acceptable factor loading was 0.30. Maximum-likelihood extraction was undertaken. Axes were rotated with promax rotation: a diagonal rotation. The second group (n=500) was used for a confirmatory factor analysis (CFA). We chose the models identified in EFA. Measures of goodness-of-fit we used were chi-squared (CMIN), the comparative fit index (CFI), and root mean square error of approximation (RMSEA).<sup>15-17</sup> A good fit is defined as a CMIN/df less than 2, a CFI greater than 0.97, and an RMSEA less than 0.05.<sup>17</sup> An acceptable fit is defined as a CMIN/df less than 3, a CFI greater than 0.95, and an RMSEA less than 0.08.<sup>17</sup> We used the Akaike Information Criterion (AIC) as a means to compare models.<sup>18</sup> We considered that a model with its AIC score lower than that of another model is superior.<sup>19</sup> The data were analyzed using the SPSS version 21.0 and Amos version 21.0.<sup>20,21</sup>

#### *Ethical Considerations*

Informed consent and withdrawal without penalty were assured. In order for precautions to be taken to protect privacy, the questionnaire was anonymous, and data were presented so that no individual could be identified. We collected the questionnaires in stamp-added envelopes. The studies in Okayama and Kumamoto were approved by the Ethics Committee of Kumamoto University, School of Medical Sciences (No.458).

## **RESULTS**

#### *Characteristics of Participants*

The mean (SD) age of the participants was 29.2 (4.5) years ranging from 17 to 47 years. The mean (SD) age of the participants' partners was 31.1 (5.5) years (range: 17-63). Regarding the mode of child delivery, 904 (83.9%) participants had undergone vaginal delivery, and 110 (10.2%) delivered by caesarean section.

*Factor Analyses*

In the first halved group, the skewness of 16-items of CTS1 (D-S) was over 5.2 (5.2-24.0). Further, items K to R showed extremely low prevalence (Table 1). Hence, we excluded those 9 items. After log-transformation, the remaining 10 CTS1 items were entered into an EFA. The KMO (0.819) and Bartlett test ( $P<0.001$ ) was acceptable. The scree test suggested either a 2- or 3-factor model (Table 1, Figure 1).

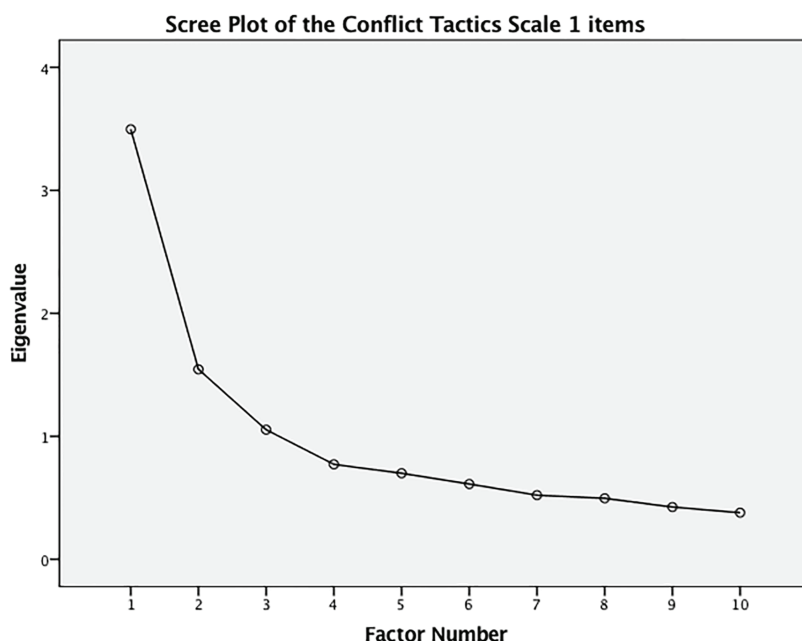
In the 3-factor solution, the first factor

was loaded highly ( $>0.3$ ) on CTS1 items D, E, F, and G (Table 1). Item G had the highest factor loading (0.79). These items reflect psychological aggression. The second factor was loaded highly on items H, I, and J. Item F showed the factor loading of 0.30 for the second factor. These items may reflect physical threat. The final factor was loaded on items A, B, and C. These may reflect reasoning or being reasonable. Hence, this 3-factor model indicated three categories: reasoning, psychological aggression, and

**Table 1:** Means, SDs, and factor structure of the Conflict Tactics Scale 1 items (n=578)

Items	Contents	Mean±SD	Skewness	Skewness after log transformation	3-factor model*			2-factor model*	
					1	2	3	1	2
A	Discussed an issue calmly with (child name)	17.91±9.36	-0.8	-1.6	-0.17	0.02	<b>0.51</b>	-0.16	<b>0.47</b>
B	Got information to back up your side of things	2.49±5.04	3.1	1.1	0.15	0.05	<b>0.41</b>	0.15	<b>0.43</b>
C	Brought in, or tried to bring in someone to help settle things	9.35±9.25	0.8	-0.3	0.07	-0.04	<b>0.71</b>	-0.02	<b>0.70</b>
D	Insulted or swore at him/her	0.46±2.17	8.6	3.6	<b>0.65</b>	0.10	0.09	<b>0.64</b>	0.18
E	Sulked or refused to talk about an issue	0.96±2.49	5.2	1.8	<b>0.68</b>	-0.05	0.07	<b>0.54</b>	0.17
F	Stomped out of the room or house or yard	0.12±1.13	19.1	6.9	<b>0.43</b>	<b>0.40</b>	-0.09	<b>0.78</b>	-0.10
G	Cried (this item is not scored)	0.26±1.49	11.6	4.3	<b>0.79</b>	-0.06	-0.11	<b>0.62</b>	0.03
H	Did or said something to spite him/her	0.14±1.20	16.5	6.9	0.02	<b>0.68</b>	0.03	<b>0.63</b>	-0.07
I	Threatened to hit or throw something at him/her	0.10±1.24	17.3	10.1	-0.14	<b>0.89</b>	0.02	<b>0.64</b>	-0.10
J	Threw or smashed or hit or kicked something	0.10±1.10	20.6	8.7	0.14	<b>0.45</b>	-0.02	<b>0.54</b>	-0.07
K	Threw something at him/her	0.04±1.04	24.0	22.7					
L	Pushed, grabbed, or shoved him/her	0.05±1.05	23.6	19.0					
M	Slapped or spanked him/her	0.05±1.04	23.9	21.5					
N	Kicked, bit, or hit him/her with a fist	0.04±1.04	24.0	24.0					
O	Hit or tried to hit him/her with something	0.04±1.04	24.0	22.7					
P	Beat him/her up	0.04±1.04	24.0	24.0					
Q	Burned or scalded him/her	0.04±1.04	24.0	24.0					
R	Threatened him/her with a knife or gun	0.04±1.04	24.0	24.0					
S	Used a knife or fired a gun	0.04±1.04	24.0	24.0					

Factor loadings  $>0.30$  are in boldface; \*the exploratory factor analysis



**Figure 1:** Scree Plot of the Conflict Tactics Scale 1 items

physical threat. By comparison, in the 2-factor model, the items D to J were loaded highly on the first factor. This is a mixture of psychological aggression and physical threat. Because items of physical threat (e.g. “Threatened to hit or throw something at him/her”, and “Threw or smashed or hit or kicked something”) did not involve actual use of violence but rather alluded to the use of violence. Hence, we considered these items as reflecting psychological abuse. We named it psychological aggression.

We then compared the 2- and 3-factor models in the second halved group using a CFA (Table 2). Although the 3-factor model failed to show acceptable fit indices, the 2-factor model was nearly acceptable. Furthermore, the AIC was better (lower) for the 2-factor model than the 3-factor model. Therefore, we

considered that the 2-factor model should be adopted for further analyses. In this model, there was a moderate correlation between the two factors (Figure 2).

#### *Factor Analysis of the conflict Tactics Scale 1*

The correlation between “reasoning” and “psychological aggression” was 0.36. This suggests the moderate independence of these two factors. This was consistent with the theoretical framework created by the original developer.<sup>3</sup> Thus, we made two subscales of the CTS1: “reasoning” and “psychological aggression”. The Cronbach’s alpha coefficients of these two subscales were 0.75 and 0.57, respectively.

## **DISCUSSION**

To the best of our knowledge, this is the first

**Table 2:** Comparison of two models of the Conflict Tactics Scale 1 factor structure in this study

	<b>2-factor model*</b>	<b>3-factor model*</b>
CMIN <sup>a</sup>	131.2	124.4
Df <sup>b</sup>	34	31
CMIN/df	3.9	4.0
CFI <sup>c</sup>	0.86	0.87
RMSEA <sup>d</sup>	0.076	0.078
AIC <sup>e</sup>	173.2	192.4

\*The confirmatory factor analysis; <sup>a</sup>Chi-squared; <sup>b</sup>Degrees of freedom; <sup>c</sup>Comparative fit index; <sup>d</sup>Root mean square error of approximation; <sup>e</sup>Akaike information criteria

chi-squared=131.238  
 df=34  
 CFI=.861  
 RMSEA=.076  
 AIC=173.238

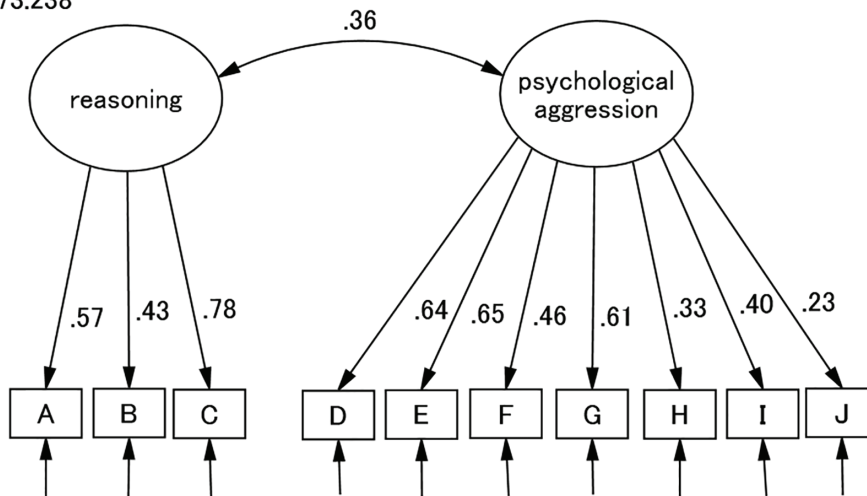


Figure 2: Confirmatory factor analysis of the Conflict Tactics Scale 1.

study to clarify the factor structure of the CTS1 among mothers of neonates. Due to lack of previous research on the CTS1, the results of this study should be viewed as preliminary and should be replicated by further investigations. Nevertheless, the previous studies on the factor structure of the CTS1 in different populations and that of the modified versions of the CTS are worth comparing with the present report. The CTS1 with slight modification<sup>22</sup> was applied for couples who requested treatment for marital problems. This study reported at least three factors interpreted as psychological aggression, physical aggression, and reasoning regardless of the reporter's gender, clinical non-clinical difference, and geographical site.<sup>23</sup> The similar 3-factor structure of the CTS1 was reported by a study using dating couples.<sup>24</sup> The modified CTS, known as the CTS2, was added a few more items and examined for its factor structure among military servants. This yielded 4 factors interpretable as psychological, mild physical, severe physical aggression, and reasoning.<sup>25</sup> Another study, using the CTS2 among postpartum women's partner violence, revealed factors reflecting reasoning (negotiation), minor psychological aggression, severe psychological aggression, minor physical assault, and severe physical assault.<sup>26</sup> A study of incarcerated women

using the CTS2 revealed factors reflecting negotiation, psychological aggression, physical assault, sexual coercion, and injury.<sup>27</sup> Despite slight differences about the number of factors as well as factor items, these previous studies were consistent with the notion that reasoning (negotiation) was an independent factor and that psychological and physical aggressive behaviours were separate categories.

The model identified in the present study was consistent with the theoretical proposal made by Straus, the original developer.<sup>3</sup> Despite the original authors' proposal of 3-factor model, our study suggested two factors: reasoning and psychological aggression. Straus's third factor, "physical assault" failed to be identified due to the virtual non-existence of these items among the present participants. For the remaining items, our and the Straus's original proposal are identical. The correlation between the two factors was only moderate. This suggested that these factors were independent. The findings of the present study, that were consistent with those of previous studies using different versions of the instrument in different populations, are promising in its generalizability, and we should encourage clinicians and researchers to use the subscales

of the CTS1 rather than the total score.

There were some limitations in this study. First, there may be a membership bias. All participants were from a general population of postpartum women, so that there was a large skewness of the CTS1 scores. We attempted to correct skewness by log transformation. However, the skewness after the log transformation was still large for 9 items that reflected more severe types of abusive parenting. Second, there may have been a self-selection bias. All women participated in this study voluntarily. This means that they may be more likely to pay attention to their parenting behaviour than women who declined. Validity of self-report may be another source of bias. This is particularly true in this case because reporting of child abuse may be influenced by social desirability attitudes. Therefore, further investigations should be conducted in a population where child abuse is very likely to occur. Third, we investigated only mothers. This did not mean that fathers are free from risk of being child abuse perpetrators; therefore, data from fathers are definitely necessary. Women and men who are reported to the Child Protection Agency should also be included. Another drawback of this study is a relatively poor goodness-of-fit of the model we selected. The 2-factor model's CFI was 0.86 and RMSEA was 0.076. However, it should be remembered that we did not posit covariations between error variables; also, the goodness-of-fit indices are usually poor in CFAs as compared to models such as structural regressions.

## CONCLUSION

We examined the structure of the Japanese version of the CTS1 for postpartum women in a perinatal unit. As a result, a two-factor structure, psychological aggression and reasoning, of the CTS1 was found. Our findings suggested that these two factors were discrete. Further research could strengthen the psychometric properties of the CTS1.

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**Conflict of Interest:** None declared.

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