The Reliability of the Thai Version of the Toddlers' Temperament Questionnaire

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ABSTRACT

Objective: To evaluate the reliability of the Early Childhood Behavior Questionnaire (ECBQ)-very short form, Thai version; and to investigate Thai toddlers' temperaments

Materials and Methods: The English version of the very short form ECBQ was translated into Thai language. The primary caregivers of 360 healthy, 18-36 months old children, were asked to fill the questionnaire from the period of April, 2018 to June, 2019. The scores were calculated to determine the child's temperament. The reliability of the very short form ECBQ- Thai version was assessed by Cronbach's alpha coefficient for internal consistency and Intraclass correlation coefficient (ICC) for inter-rater reliability, two-week and six-month test-retest reliability.

Results: The Cronbach's alpha coefficients were 0.627-0.692, which indicated questionable internal consistency, but almost reach those of the original ECBQ. The inter-rater ICCs were 0.463-0.670, which were comparable to those in the original English version. The two-week ICCs were 0.602-0.750, which indicated moderate reliability, whereas the six-month ICCs decreased to 0.459-0.602. However, these values almost reached those of the original English version. Most toddlers were reported to have a surgency temperament. Boys significantly had more surgency temperament and had higher mean surgency scores, whereas girls exhibited a more effortful-control temperament.

Conclusion: The very short-form ECBQ, Thai version can be implemented in assessing Thai toddlers' temperament. The majority of Thai toddlers in this study demonstrated surgency temperament. Boys tended to be more surgency, while girls tended to be more effortful control.

Keywords: temperament, ECBQ questionnaire, Thai toddlers (Siriraj Med J 2022; 74: 217-224)

INTRODUCTION

Temperament is defined as an inborn difference in reactivity and self-regulation when a child interacts with his or her environment. Reactivity is the child's reaction to changes in the environment. Self-regulation is a process to modulate one's reactivity. Although one's temperament persists throughout life, heredity, maturation, and experiences influence it over time[1], for example, parental discipline and responses to a child's behavior can affect the child's expressions and habits. The most popular temperament concept among pediatricians has been Thomas and Chess's approach, which was introduced in 1977.[2] This concept has included nine dimensions of temperament, which were activity level, rhythmicity or regularity of physical functions, approach to or withdrawal from a new situation, adaptability, one's sensory threshold to external stimuli, intensity of reactions, quality of mood, distractibility, and attention span or persistent focus on tasks. Children are categorized from the nine dimensions into three groups, which are easy, difficult, and slow-to-warm up ones. The "easy child" is easy to raise and care for, exhibits regular sleep, waking

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and feeding times, good moods, and high adaptability. The "difficult child" has characteristics that are opposite to those in the first category. The "slow-to-warm-up child" demonstrates initial withdrawal from new stimuli and needs more time to adapt to those new situations, though eventually he or she can adjust to such stimuli.

Some behavioral problems have been claimed to be associated with temperament. The child who has a very high activity level and is very distractible might mimic the one with attention deficit/ hyperactivity disorder (ADHD). Toddlers with autism exhibited more sensitivity to stimuli and have more negative moods, compared to their typically developing peers.[3] Moreover, the child's temperament may have bidirectional interactions with the parents' responses and psychopathology. Parents of negative-mood and low-impulse-control children tended to report a history of anxiety.[4] One study found that the authoritative parenting style - when parents were always sensitive to the child's needs and give him or her freedom to make decisions in general situations while limiting the child's decision-making in more serious ones, especially potentially dangerous activities - was correlated with more patience and less irritability among their children.[5] This highlights the fact that a successful management strategy for behavioral problems based on temperamental origin should harmonize with the child's temperament. Thus, a correct interpretation of the child's temperament helps pediatricians and other medical personnel to assist parents in better understanding their children's characteristics and to guide parents in dealing with his or her problems.

Although Thomas and Chess's temperament concept is clinically practical for the evaluation of children's behavior and in terms of offering recommendation to parents, however, the Toddler Temperament Scale questionnaire developed by Fullard et al, in 1984[6] to measure the nine dimensions of temperament contains 97 question items which is not clinically practical for Thai context. Most of Thai-version questionnaires developed for time-constraint clinical use consists of 15-40 question items.[7-9]

There is also the concept of temperament developed by Rothbart in 1981. Rothbart's temperament is defined as biologically-rooted individual differences in reactivity and self-regulation in one's emotional, activational, and attentional processes.[1] In their effort to measure children's temperaments, Putnam et al.[10] formulated 18 scales of temperamental components based on Rothbart's temperamental concept, which are shown in the appendix. The children were classified into three groups: "surgency," which refers to the ones with a high activity level and positive anticipation regarding new activities; "negative affectivity," referring to children who display fear and frustration; and "effortful control," which applies to those with high impulse control and attentiveness to tasks. This approach led to the development of the Early Childhood Behavior Questionnaire (ECBQ),[10] which was designed to assess temperament in children from 18-36 months old. The psychometric properties have demonstrated good internal consistency and reliability.[7] There are three versions of the ECBQ - the standard ECBQ (consisting of 201 items), the short-form ECBQ (107 items), and the very short-form ECBQ (36 items).[11]

The ECBQ has been widely used in English and in more than 18 languages, such as Chinese, Japanese, and French. The very short-form version has been widely implemented in English and ten non-English-speaking countries.[11]

To the best of our knowledge, there is no temperament questionnaire for Thai toddlers. As a result, research on temperament in the Thai population has been very limited. The aim of this study was to translate the original English very short form of ECBQ into Thai and to evaluate the reliability of the Thai version. We also aimed to study Thai toddlers' temperament by using this form. The English version of the very short-form ECBQ was selected for this research study because the number of the question items is feasible for implementation in busy clinical settings in Thailand.

MATERIALS AND METHODS

The details of the original questionnaire

The very short version of the Early Childhood Behavior Questionnaire (ECBQ) is used to evaluate the temperament of 18-36-month-old children. The questionnaire includes 36 items regarding children's behaviors, which are specific to each temperament type. There are 12 items for surgency, 12 for effortful control, and another 12 for negative affectivity. Parents or caregivers give a Likert scale score regarding the frequency of their child's behaviors. The scores range from 1 (never) to 7 (always), and "Does not apply" (if the question is not relevant to the child). The mean score of each temperament type is calculated, and the highest mean scores define the child's temperament type. If there is more than one equally highest mean score, the child is classified as more than one - i.e. a mixed-temperament type. Internal consistency was evaluated by using Cronbach's alpha coefficient. The internal consistency of negative affectivity, surgency, and effortful-control temperament were 0.70, 0.72, 0.72, respectively. The longitudinal stability over six months was 0.65.[12]

The translation process

The Thai version of the very short-form ECBQ was translated with the permission of the pioneer of the original English version. The content validity was measured by three Thai developmental and behavioral pediatricians. The acceptable content validity index was 0.67. Each item's content validity was initially ranged from 0.33 to 0.67. The items which had low content validity were retranslated. After substantial agreement from those three specialists, reflected by a content validity index of 1, the translation back into English was done to confirm that the Thai version adhered with the original English version.

Population and procedure

This cross-sectional, questionnaire-based research included caregivers of 18-to-36-month-old children who attended the well child clinic and daycare at Siriraj Hospital, or who were in pre-kindergarten and daycare in Bangkok and the surrounding metropolitan area. The recruitment period was from April, 2018 to June, 2019. The exclusion criteria were those whose children had a diagnosis of developmental delay or chronic diseases. Caregivers who could not read Thai were also excluded. This study was approved by the Human Research Protection Unit, Faculty of Medicine Siriraj Hospital, Mahidol University.

After signing an informed consent, 360 caregivers were asked to fill out the 20-minute Thai very short-form ECBQ. Of these, 20 were randomized for two-week (short-term) test-retest reliability; another 20 were allocated for six-month (long term) test-retest reliability. Eighty-three pairs of primary and secondary caregivers were recruited for inter-rater reliability testing. The number of the participants in each group randomized for test-retest and inter-rater reliabilities were based on the reliabilities from the original English version (0.6 and 0.31, respectively), estimated type I error of 0.05, and the power of 80%. The scores obtained from the questionnaire were calculated so as to interpret the children's temperament. At the end of the study, all caregivers received the information about their child's temperament, as well as the developmental and behavioral pediatrician's guidance in child-rearing practices specific to each child's temperament.

Statistical analysis

The data were prepared and analyzed using PASW Statistics 18.0 (SPSS Inc., Chicago, IL, USA). Descriptive statistics were used to describe the participants' characteristics. Number and percentage were used to describe qualitative data, while mean and standard deviation (SD) were used to describe normally distributed quantitative data. A median (25^{th}, 75^{th} percentile) was used to report non-normally distributed data. The Chi-Square test was used to evaluate statistical significance.

Cronbach's alpha coefficient was used to evaluate the internal consistency of the questionnaire. The coefficient, which was < 0.5, 0.5-0.6, 0.6-0.7, and > 0.7, was defined as unacceptable, poor, questionable, and good internal consistency, respectively.[13,14] Test-retest reliability was interpreted by using the intraclass correlation coefficient (ICC). Inter-rater reliability was evaluated using the two-way random-effects model, while intra-rater reliability was evaluated by using the two-way mixed-effects model. In this study, an ICC which was < 0.5, 0.5-0.75, and 0.75-0.9 was classified as of poor, moderate, and good reliability, consecutively.[15]

RESULTS

The demographic data are shown in Table 1. Of the 360 caregivers, 323 (89.7%) answered the questionnaire regarding the child's gender. The majority of these caregivers were mothers. The short-term (two weeks) test-retest reliability was performed involving 20 fathers or mothers of the children, which included nine (45%) boys and 11 (55%) girls. Long-term (six months) test-retest reliability was performed involving 20 participants whose children were 11 (55%) boys and nine (45%) girls. Sixteen out of 20 caregivers, who were randomized for long- term test-retest reliability, were fathers or mothers. Another 4 out of 20 were other family members. Of the 83 pairs of primary and secondary caregivers recruited for inter-rater reliability, 46 (55.4%) were the caregivers of boys, and 37 (45.6%) were the caregivers of girls. All the children were Thai and lived in Bangkok and the surrounding metropolitan area. The mean age (SD) was 27.9 (6.2) months old.

Table 2 demonstrates Cronbach's alpha coefficient for each temperament and the range of Cronbach's alpha coefficient when one item was deleted. The overall Cronbach's alpha coefficients were 0.682, 0.627, and 0.692 for surgency, negative affectivity, and effortful-control temperament, respectively. The maximum of the coefficient when one item was deleted was 0.707.

Regarding the inter-rater reliability, the ICCs were 0.638, 0.670, and 0.463 for surgency, negative affectivity, and effortful-control temperament, respectively. The ICCs for short-term intra-rater reliability were 0.614, 0.750, and 0.602 for surgency, negative affectivity, and effortful-control temperament, respectively. For long-term one, the ICCs decreased to 0.602, 0.459, and 0.476, respectively. (Table 3)

TABLE 1. Demographic data of the children and the caregivers

Characteristics	Number (%)
Child's gender	
Boy	174 (53.9)
Girl	149 (46.1)
Missing data	37
Child's Age (N=357)	
18-23 months	98 (27.5)
24-30 months	110 (30.8)
31-36 months	149 (41.7)
Missing data	3
Caregivers	
Parents	346 (96.1)
Grandparents	12 (3.3)
Others	2 (0.5)
Caregivers' marital Status	
Single	32 (8.9)
Married	317 (88.1)
Divorced	11 (3.1)
Caregivers' education	
Under Bachelor degree	42 (11.7)
Bachelor degree	194 (53.9)
Above Bachelor degree	124 (34.4)
Family's monthly income	
≤30,000 Bahts	111 (31.7)
30,001-50,000 Bahts	107 (30.6)
50,001-100,000 Bahts	82 (23.4)
≥100,001 Bahts	50 (14.3)
Missing	10

TABLE 2. Cronbach's alpha coefficient for each temperament.

Temperament	Cronbach's alpha coefficient	Cronbach's alpha coefficient when item is deleted
Surgency	0.682	0.645 to 0.692
Negative Affectivity	0.627	0.576 to 0.636
Effortful Control	0.692	0.649 to 0.707

TABLE 3. Inter-rater reliability, short-term and long-term intra-rater reliabilities.

Temperament	ICC[a] (95% CI)	ICC[b] (95% CI)	ICC[c] (95% CI)
Surgency	0.638 (0.495-0.747)	0.614 (0.228-0.832)	0.602 (0.244-0.819)
Negative Affectivity	0.670 (0.536-0.772)	0.750 (0.461-0.896)	0.459 (0.021-0.746)
Effortful Control	0.463 (0.280-0.614)	0.602 (0.231-0.824)	0.476 (0.040-0.756)

ICC: Intraclass correlation coefficient
[a] Intraclass correlation coefficient between primary and secondary caregivers
[b] Intraclass correlation coefficient, two weeks apart (short-term)
[c] Intraclass correlation coefficient, six months apart (long-term)

The temperament classifications of 360 Thai children in this study were 205 (56.9%) for surgency, 135 (37.5%) for effortful control, and 3 (0.8%) for negative affectivity. There were 16 (4.4%) children whose caregivers rated their temperaments as surgency and effortful control equally; one (0.3%) child was classified as manifesting surgency and negative affectivity. Boys significantly had more surgency temperament and a higher mean surgency scores than girls. Girls exhibited more effortful-control than boys. There was no statistical significance of gender difference in terms of negative affectivity and mixed temperament. (Table 4)

TABLE 4. Descriptive statistics for the scale scores of each temperament in boys and girls.

Temperament	Boys	Girls	*p*-value
Surgency			
N (%)	107 (61.5)	72 (48.3)	0.019*
Mean scores ± SD	5.36 ± 0.62	5.16 ± 0.69	0.008*
Negative Affectivity			
N (%)	0	3 (2)	0.097
Mean scores ± SD	2.86 ± 0.67	3.00 ± 0.73	0.056
Effortful Control			
N (%)	57 (32.8)	68 (45.6)	0.022*
Mean scores ± SD	5.11 ± 0.65	5.09 ± 0.68	0.740
Surgency-Effortful Control equally			
N (%)	10 (5.7)	5 (3.4)	0.428
Mean scores ± SD	N/A	N/A	N/A
Surgency-Negative Affectivity equally			
N (%)	0	1 (0.3)	0.461
Mean scores ± SD	N/A	N/A	N/A

p-value < 0.05 is considered statistically significant
* *p*-value < 0.05

DISCUSSION

This is the first study in Thailand that has used the translated very short form of Early Childhood Behavior Questionnaire (ECBQ), which is the clinically practical evaluative tool for assessing Thai toddlers' temperament. This study is also the first preliminary report on Thai toddlers' temperament. The majority of Thai toddlers in this study demonstrated surgency temperament. Boys exhibited more surgency, while girls manifested more effortful control.

The very short form of ECBQ, Thai version demonstrated an internal consistency coefficient at 0.682 for surgency temperament, 0.627 for negative-affectivity temperament, and 0.692 for effortful-control temperament. Although these coefficients suggested questionable internal consistency, they were slightly lower than those of the original English version (0.72 for surgency, 0.7 for negative affectivity, and 0.72 for effortful control).[12] The maximum of the Cronbach's alpha coefficient of the Thai version of the questionnaire, when any item was deleted, was 0.707, which was slightly higher than the overall Cronbach's alpha coefficient. This suggests that no item disproportionately affected the overall internal consistency (i.e. No specific item should be removed from the Thai version of the very short-form ECBQ). A recent study translating the very short-form ECBQ into Czech, which recruited 709 children ages 18-36 months, also revealed an internal consistency by Cronbach's alpha coefficients of 0.65, 0.70, and 0.71 for surgency, negative affectivity, and effortful control, consecutively. However, there was no report regarding the inter-rater and test-retest reliabilities.[16]

The intraclass correlation coefficients exhibited moderate to good short-term intra-rater reliability (0.614, 0.602, and 0.750 for surgency, effortful control, and negative affectivity, respectively). In contrast, the long-term one had poor to moderate reliability (0.602 for surgency, 0.476 for effortful control, and 0.459 for negative-affectivity temperament). We postulated that the decline in the reliability might be due to chronological fading. However, the long-term ICCs almost reached those of the original English version, which was ranged from 0.55-0.83.[12] The inter-rater reliability was classified as being of poor to moderate reliability - i.e. 0.463, 0.638, and 0.670 for effortful control, surgency, and negative affectivity, respectively, which were slightly more favorable than in the original English version, which reported an overall inter-rater reliability of 0.31 (0.32, 0.24, and 0.36 for effortful control, surgency, and negative affectivity, respectively).[12] All of the properties demonstrated that very short-form ECBQ, Thai version can be fruitfully used in research on temperament among Thai children.

Our study found that the majority of our participants were reported as having a surgency temperament. Although no previous studies reported the most common temperament type in their populations, there has been plentiful evidence that culture affects temperament. American children get higher scores for surgency and lower scores for negative affectivity than Japanese children.[17] One possible explanation is that self-reliance, autonomy, and creativity are highly valued and promoted in the Western cultures, whereas such characteristics tend not to be in the Asian ones. However, the American children got higher scores for negative affectivity,[18] and tended to demonstrate more effortful control than Chilean and Italian toddlers, respectively.[19] Therefore, how Thai children's temperament differs from that of children's from other regions should be the subject of future research. Our findings regarding gender differences are comparable to those of previous international studies.[16,20] Possible explanations involve how boys and girls are raised to behave differently.

There were some limitations to this study. The data collection about parental temperament scoring did not be specified that the parent was a father or a mother. This lack of information hindered the comparisons between fathers' and mothers' perspectives that may lead to low inter-rater reliability, especially regarding effortful-control temperament. Although our sample size was adequate for evaluating the reliability of the questionnaire, it was obviously too low to represent all Thai toddlers. Future research should be done using a considerably larger sample size and should include the participants from every region of Thailand.

CONCLUSION

The very short form Early Childhood Behavior Questionnaire, Thai version demonstrated acceptable internal consistency and reliability. The majority of the Thai toddlers revealed a surgency temperament. Boys exhibited more surgency, while girls manifested more effortful control.

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Conflict of interest declaration

The authors declare no conflicts of interest relating to any aspect of this study.

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APPENDIX

The ECBQ assesses the following 18 scales of temperament:

Activity Level/Energy: Level (rate and intensity) of gross motor activity, including rate and extent of locomotion

Attentional Focusing: Sustained duration of orienting on an object of attention; resisting distraction

Attentional Shifting: The ability to transfer attentional focus from one activity/task to another

Cuddliness: A child's expression of enjoyment in and molding of the body to being held by a caregiver

Discomfort: Amount of negative affect related to sensory qualities of stimulation, including intensity, rate, or complexity of light, sound, texture.

Fear: Negative affect, including unease, worry, or nervousness related to anticipated pain or distress and/or potentially threatening situations; being startled by sudden events

Frustration: Negative affect related to interruption of ongoing tasks or goal blocking

High-intensity Pleasure: Pleasure or enjoyment related to situations involving high stimulus intensity, rate, complexity, novelty and incongruity

Impulsivity: Speed of response initiation

Inhibitory Control: The capacity to stop, moderate, or refrain from a behavior under instruction

Low-intensity Pleasure: Pleasure or enjoyment related to situations involving low stimulus intensity, rate, complexity, novelty and incongruity

Motor Activation: Repetitive small-motor movements; fidgeting

Perceptual Sensitivity: Detection of slight, low-intensity stimuli from the external environment

Positive Anticipation: Excitement about expected pleasurable activities

Sadness: Tearfulness or lowered mood related to exposure to personal suffering, disappointment, object loss, loss of approval, or response to other's suffering

Shyness: Slow or inhibited approach and/or discomfort in social situations involving novelty or uncertainty

Sociability: Seeking and taking pleasure in interactions with others

Soothability: Rate of recovery from peak distress, excitement, or general arousal

Children's temperament divided into three factors:

Surgency/Extraversion is characterized by high positive loadings for Activity Level, High-Intensity Pleasure, and the Impulsivity scale and strong negative loadings on the Shyness scales.

Negative Affectivity is characterized by high positive loadings for Anger/Frustration, Sadness, Fear, and Discomfort and negative loading for the Soothability scales.

Effortful Control is characterized by high positive loadings for Inhibitory Control, Attention Control, and the Perceptual Sensitivity scales.

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