Construction of a Short Form Toddler Temperament Questionnaire

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Abstract

The purpose of this study is to construct a Short Form of the Toddler Temperament Questionnaire (SFTTQ) which is easy to use in childcare consultations. In study 1, 24 items were selected out of 47 items from the Standard Edition of the Toddler Temperament Questionnaire (SETTQ). The Cronbach's alpha coefficients and the factor analysis with the Promax rotations showed that the SFTTQ consisting of 24 items is more reliable on the factorial validity than the Shorter Form of the Toddler Temperament Questionnaire (STTQ) consisting of 18 items. In study 2, the reliability and the validity of the SFTTQ were confirmed. Finally, we showed that the SFTTQ is very useful for childcare consultations.

1. Introduction

In childcare consultations, we can find proper solutions for various problems of parents' childcare by grasping the temperament characteristics of their child [1]. Empirical research on the infant temperament can be seen in the New York Longitudinal Study (hereinafter referred to as NYLS), launched by Thomas and Chess in 1956. They used nine temperament dimensions to assess the infant temperament. For assessment of the infant temperament, a questionnaire based on the reports of the NYLS [2, 3] is now finding wide application in clinical fields and research, even in Japan [4]. However, the problems on that questionnaire have been pointed out in terms of structure, contents and format. The reason for that is there is a difference in culture and too many items are included. Also, many contents may become inapplicable depending on the age of the subject because the scales are designed for a wide range of age.

Guided by some previous works [2], Takei et al. constructed the Standard Edition of Toddler Temperament Questionnaire (SETTQ) of six factors with 47 items [5]. The SETTQ consists of six temperament scales: "negative affect reaction", "sensitivity", "adaptability", "extroversion", "rhythmicity" and "distractibility". We have learned the following: the scales of "rhythmicity" and "distractibility" respectively correspond to two of nine temperament dimensions in NYLS; the scales of "negative affect reaction" and "adaptability" independently correspond to those constructed by incorporating a plurality of temperament dimensions among the nine NYLS temperament dimensions into one; and the scales of "sensitivity"

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and "extroversion" are independently constructed of the items belonging to a plurality of temperament dimensions described in the NYLS. In light of this, there are two temperament dimensions in the NYLS considered to be temperament factors that can be reliably extracted and exhibit high reproducibility.

Some scales of the SETTQ were supposed to be highly related to toddler developmental problems and the psychological concerns of caregivers such as anxiety and stress resulting from childcare. Therefore, we can effectively use the SETTQ in childcare consultations. To assess the state of the child in a short time, however, the development of a Toddler Temperament Questionnaire consisting of fewer items was required. Thus, Takei et al. constructed a Shorter Form of the Toddler Temperament Questionnaire (STTQ) of six factors with 18 items based on the SETTQ [5]. The test-retest reliability of the STTQ was confirmed as acceptable (r=.63 to r=.78) [6]. But the verification of the internal consistency showed low Cronbach's alpha coefficients (a=.48 to a=.70) [7].

In this study, we constructed a Short Form of the Toddler Temperament Questionnaire (SFTTQ) consisting of more items than the STTQ (study 1) and confirmed its reliability and validity (study 2).

2. Study 1

2.1. Purpose

To fix the problems derived from the STTQ constructed by Takei et al. [5], we constructed the SFTTQ with high reliability and validity.

2.2. Methods

Based on the factor analysis that we made on the construction of the SETTQ [5], we chose four items in each of six factors, 24 items in total, according to three rules as follows: First, we chose the one with higher factor loadings on a specified factor. Second, we excluded the one that says the same thing as already selected ones. Third, we chose the simpler one if two items have the same factor loading.

2.3. Results and discussion

From 24 selected items, we extracted six factors by the principal factor method and rotated them by Promax rotations.

While the order of six factors was different from that of the SETTQ, the six factors extracted in this study exactly corresponded to those of the SETTQ (Table 1). In other words, the exploratory factor analysis showed that the SFTTQ has as much factorial validity as the SETTQ.

Next, we calculated the Cronbach's alpha coefficients to confirm the internal consistency. The Cronbach's alpha coefficients for every scale were .54 to .77. Compared with the result of the STTQ based on the same sample, only the Cronbach's alpha coefficient for the "Distractibility" scale of the SFTTQ (.54) was lower than that of the STTQ (.55) [5]. On the other hand, the Cronbach's alpha coefficients for the other scales of the SFTTQ were higher than those of the STTQ. Thus, the scales of the SFTTQ are more reliable as a whole.

Table 1　Results from factor analysis with promax rotations of the SFTTQ

	Items (summarized)	Factor I	Factor II	Factor III	Factor IV	Factor V	Factor VI	Communality	α	Scale
2	cries and gets bad-tempered when touched by any stranger	.778								3
23	clings to you when others are there together	.650								3
17	is willing to talk to strangers	-.573								3
1	is pleased to get strangers to play with him	-.653						.39	.77	3
13	reveals emotions when things don't go as he/she wishes		.677							1
14	makes a noise and cries out frequently		.649							1
4	is short-tempered		.640							1
9	gets irritated and cries when he/she learns new matters		.452						.31	.68	1
6	actively moves around while exploring an unfamiliar place			.632						4
21	prefers playing actively rather than quietly while seated			.607						4
8	is curious about new matters			.508						4
7	prefers playing with others rather than playing alone			.389				.27	.62	4
19	looks toward other children on hearing their voices				.720					6
20	stops playing and looks toward himself when anyone passes by				.577					6
11	stops playing and looks toward the phone when he hears it ringing				.343					6
18	turns around when called while watching a favorite TV program				.276			.13	.54	6
22	sticks to keeping things tidy and in order					.567				2
5	immediately reacts to his/her wet clothes and eagerly wants them changed					.506				2
15	never makes the same mistake after being severely scolded once or twice					.446				2
16	is sensitive to smells whether they are good or bad					.437		.12	.56	2
12	eats almost the same amount at every dinner						.599			5
10	concentrates on eating to the end at meals						.505			5
3	falls asleep within a fixed period of time after he/she goes to bed						.478			5
24	gets up at almost the same time every morning						.443	.09	.57	5

Note. Scale: 1: negative affect reactions, 2: sensitivity, 3: adaptability, 4: extroversion, 5: rhythmicity, 6: distractibility

3. Study 2

3.1. Purpose

Comparing the results of the SFTTQ survey with that of the SETTQ [5] and the STTQ [5-7], we discussed the factorial validity and the test-retest reliability of the SFTTQ.

3.2. Methods

3.2.1. Participants

The participants were 393 mothers who had their babies in the obstetrics and gynecology department of a general hospital. The mean age of their children was 22.5 months (SD=3.3). They were 181 boys, 207 girls and 5 unknowns. We excluded the record if the participants didn't answer every question. Consequently, the data which we could analyze for the correlation between the SETTQ and the SFTTQ was reduced to

348. Next, when the participants didn't answer the second questionnaire in 14 ± 3 days after answering the first, we excluded that record also. Thus, the data which we could analyze for the correlation between the first SFTTQ and the second SFTTQ was reduced to 223.

3.2.2. Procedures

When the participant's child was over one year old, we sent the SETTQ and two sheets of the SFTTQ and collected them by mail. We asked the participants to answer the second SFTTQ in 14 ± 3 days after answering the first.

3.2.3. Measurements

Each participant was asked to fill out one SETTQ and two SFTTQs. The SETTQ consists of 47 items and the SFTTQ consists of 24 items. The participants were asked to judge the frequency on a 4-point scale: '4' refers to 'always' and '1' to 'never'.

3.3. Results and discussion

From the first SFTTQ data, we extracted six factors by the principal factor method and rotated them using Promax rotations. The results showed that six factors of the first SFTTQ exactly corresponded to six scales of the SETTQ [5]. And four items in each SFTTQ factor belonged to the same scale of the SETTQ (Table 2). Then we could say the SFTTQ has as much factor validity as the SETTQ.

Next, we calculated the alpha coefficients to confirm the internal consistency (Table 3). The Cronbach's alpha coefficients for every scale were .57 to .81. Comparing these values with those of the STTQ, only the Cronbach's alpha coefficient for the "Sensitivity" scale of the SFTTQ (.57) was lower than that of the STTQ (.63) [7]. On the other hand, the Cronbach's alpha coefficients for the other scales of the SFTTQ were higher than those of the STTQ [7]. Thus we could say the scales of the SFTTQ are more consistent as a whole.

The SFTTQ's two-week test-retest reliability, measured by Pearson correlations, was relatively high, r=.67 to .83 (p<.001) (Table 3). Comparing these values with those of STTQ [6], only the coefficient for the "Distractibility" scale of the SFTTQ (.67) was a little lower than that of the STTQ (.74) [6]. But the other scales of the SFTTQ had higher correlation coefficients than those of the STTQ [6]. So we could say the scales of the SFTTQ are more reliable as a whole.

The SFTTQ's validity was measured by Pearson correlation coefficients between the SFTTQ and the SETTQ (Table 3). Each SFTTQ scale correlates positively with the corresponding scale of the SETTQ (r=.76 to .89, p<.001). Comparing these results with those of the STTQ, the Pearson correlation coefficients of the SFTTQ scales were higher than those of the STTQ scales. For example, the Pearson correlation coefficient of "Distractibility" of the SFTTQ (r=.76) was higher than that of the STTQ (r=.39) [6].

While the SFTTQ increased no more than six items over the STTQ, the reliability and the validity of six scales were greatly improved. Using the SFTTQ, we can grasp toddlers' temperaments more securely in a short time in childcare consultations.

Table 2　Results from factor analysis with promax rotations of the SFTTQ

	Items (summarized)	Factor I	Factor II	Factor III	Factor IV	Factor V	Factor VI	α	Scale
14	makes a noise and cries out frequently	.767							1
13	reveals emotions when things don't go as he/she wishes	.755							1
4	is short-tempered	.746							1
9	gets irritated and cries when he/she learns new matters	.478					.245	.79	1
2	cries and gets bad-tempered when touched by any stranger		.802						3
1	is pleased to get strangers to play with him		.676						3
23	clings to you when others are there together		.668						3
17	is willing to talk to strangers		.619			-.285		.81	3
19	looks toward other children on hearing their voices			.689					6
20	stops playing and looks toward himself when anyone passes by			.596					6
18	turns around when called while watching a favorite TV program			.530					6
11	stops playing and looks toward the phone when he hears it ringing			.454				.68	6
3	falls asleep within a fixed period of time after he/she goes to bed				.673				5
12	eats almost the same amount at every dinner				.647				5
24	gets up at almost the same time every morning				.602				5
10	concentrates on eating to the end at meals	-.204			.404			.69	5
6	actively moves around while exploring an unfamiliar place					.642			4
21	prefers playing actively rather than quietly while seated					.605			4
7	prefers playing with others rather than playing alone					.473			4
8	is curious about new matters					.450		.66	4
5	immediately reacts to his/her wet clothes and eagerly wants them changed						.551		2
16	is sensitive to smells whether they are good or bad						.477		2
22	sticks to keeping things tidy and in order						.462		2
15	never makes the same mistake after being severely scolded once or twice						.460	.57	2

Note. Scale: 1: negative affect reactions, 2: sensitivity, 3: adaptability, 4: extroversion, 5: rhythmicity, 6: distractibility

Table 3　The means and standard deviation (S.D.) for each scale of SFTTQS and SETTQ, internal consistency, test-retest reliabilty and test validity of SFTTQ

	Internal Consistency (Cronbach's α coefficient)	First SFTTQ (n=348) Mean (S.D.)	Second SFTTQ (n=223) Mean (S.D.)	SETTQ (n=348) Mean (S.D.)	Pearson Correlations	
					Test-retest Reliability	Test Validity
adaptability	.81	2.66 (.74)	2.66 (.67)	2.65 (.66)	.83***	.89***
negative affect reactions	.79	2.50 (.63)	2.65 (.60)	2.52 (.49)	.79***	.86***
extroversion	.66	3.27 (.49)	3.30 (.49)	3.26 (.38)	.76***	.79***
distractibility	.68	3.33 (.43)	3.32 (.40)	3.28 (.33)	.67***	.76***
sensitivity	.57	2.33 (.58)	2.43 (.50)	2.49 (.41)	.77***	.77***
rhythmicity	.69	2.95 (.57)	2.99 (.52)	3.09 (.48)	.75***	.85***

***p < .001

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