

学位論文

Development of an Elementary School Participation Checklist for Japanese Children Requiring Special Needs Education

日本の特別支援教育対象児のための小学校参加チェックリストの開発

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Abstract

Purpose: This study aimed to develop an ‘elementary school participation checklist’ for children with developmental disorders requiring special needs education.

Methods: A pilot version was used to survey 539 parents of elementary school students, including children who were suspected of having developmental disabilities. Thereafter, the results were factor-analyzed and a checklist was created. The results of 10 children with developmental disorders who are currently under special needs education were compared.

Results: After excluding items with a factor loading of less than 0.5, a refined 15-item version checklist was created. The median total scores for elementary school students and children with developmental disorders were 22 and 33 points, respectively.

Conclusion: Cronbach’ s alpha coefficients for each of these separate factors were 0.7 and above, confirming construct validity and internal consistency. Further research of criterion-related validity will be necessary to investigate the use of this checklist as a scale.

Keywords: adaptation, developmental disorders, occupational therapy, participation, special needs education

Although the number of children in Japan is decreasing overall (Statistics Bureau of Japan, Ministry of Internal Affairs and Communications, 2020), the number of children who require special needs education has increased each year.

The target group for special needs education in Japan is ‘all children with disabilities. Through the establishment of a consensus between the target child or family and the Board of Education, the educational environment according to the child’s state of disabilities is selected from a school for special needs education, a resource room attached to the elementary school or junior high school, or the combined use of regular classes and special classes (Special Needs Education Division, Elementary and Secondary Education Bureau, Ministry of Education, Culture, Sports, Science and Technology-Japan, 2020).

“Developmental Disability” in school education is defined by the Act on Support for Persons with Developmental Disabilities (2004). “Autism, Asperger Disorder and other Pervasive Developmental Disorders, Learning Disability, Attention-Deficit Hyperactivity Disorder” are collectively referred to as “Developmental Disorders.” Children with developmental disabilities who do not have intellectual disabilities take regular classes. If special guidance is required for some of their activities, they may be supplemented with special classes. However, the number of special classes provided by each school differs according to regional differences in the educational system. Therefore, many children only receive reasonable accommodation in regular classes.

A 2012 survey among teachers revealed that about 7.7% of students were suspected of having developmental disabilities after admission in regular classes. It was pointed out that interventions for special needs education were especially necessary for male students or those

with low grades (Ministry of Education, Culture, Sports, Science and Technology-Japan, 2012). Such students were found to have difficulties attending classes, such as through walking during class, and to be prone to maladjustment, such as skipping school (Otomo, 2010; Tokyo Metropolitan Board of Education, 2009;). This is a problem for special needs education. Therefore, in Japan, with the aim of ‘Education in which no one is left behind’, special needs education is flexibly provided to these students in their regular classes.

In this way, students with developmental disabilities requiring special needs education in Japan (target students) include children with a diagnosis of developmental disorders or children suspected of having developmental disorders.

However, as few teachers specialise in special needs education, an outside specialist support project has been promoted in which a specialist for developmental disorders, such as an occupational therapist, advises teachers on how to provide support (Developmental disorders area team, Ministry of Health and Welfare, JAOT, 2011a).

The content of consultations from schools regarding target students is diverse, but there are still few occupational therapists engaged in special needs education (JAOT, 2019a).

In this study, we focused on the ‘participation’ of the target students in school activities. In the International Classification of Functioning, Disability and Health (ICF) (World Health Organization, 2002), ‘Activity’ refers to ‘The execution of a task or action by an individual’ and ‘Participation’ refers to ‘Involvement in a life situation’. For children, ‘School’ is an environmental factor that occupies a large proportion of their life situations. In the medical field of occupational therapy, it is important to evaluate individual activities to support school participation. However, Milliken et al. (2007) found that most school-based

therapists reported addressing children's issues with grief. Even in Japan, target students are prone to maladjustment at school (Sukegawa & Ito, 2018). For this reason, we considered that it was essential to evaluate the participation of target students in the creation of a comprehensive support system.

Further, in occupational therapy, 'adaptation' includes the concept of 'adaptational change', whereby clients are encouraged to independently work on their environment so as to change it, and to confront or learn to live with their difficulties (JAOT, 2011b). Based on this concept, the 'adaptational change' that they were encouraged to make was defined as 'adaptation' in school participation, and the states that hindered the achievement of 'adaptational changes' were considered 'maladjustment'.

In Japan, adaptive behavior evaluation is used to evaluate school participation. Three related assessment tools can be used: The Social Maturity Scale-Revised (S-M) (Asahide Gakuen Education Research Institute, 2015), the Japanese version of the Vineland-II adaptive behavior scales (Vineland-II) (Sparrow et al. 2014), and the Adaptive Skills profile of students (ASIST) (Hashimoto et al., 2014). Since these require short-term investigation, they are not applicable to the outside expert model, and have seldom been used to assess target students (Sukegawa & Ito, 2019).

Therefore, we tried to develop an 'elementary school participation checklist' (checklist) that evaluates the school participation status of the target students. This checklist was first used to develop an answer formula for parents. As a result, not only occupational therapists involved in outside specialist support projects but also occupational therapists who belong to medical institutions and have supported the target students can identify the school participation situation from outside the school through the students' parents.

In addition, the checklist was created based on a survey of parents of children enrolled in regular classes at ordinary elementary schools. Originally, the students in regular classes included students with typical development as well as target students. In this study, we examined the participation status of children with typical development and children who were suspected of having developmental disabilities, excluding children with developmental disabilities who had received a diagnosis from the group. We created a checklist and then tried to compare it with a group of children with developmental disabilities who are currently enrolled in special education.

Method

1. Creation of Elementary School Participation Checklist

Creation of questionnaire items for the pilot version

In prior research, the authors surveyed occupational therapy practices in Japan for children with developmental disorders (Sukegawa & Ito, 2019). We examined subgraphs of occupational therapy goals extracted via quantitative text analysis (QTA), together with the ‘Relationships between Occupational therapy and ICF’ (JAOT, 2019b; World Health Organization, 2002;). A summary was made of draft question items (the draft) for ten domains: ‘sensory functions’, ‘manual skills’, ‘exercise and movement’, ‘self-care’, ‘daily living’, ‘leisure’, ‘support and relationships’, ‘coping’, ‘physical environment’, and ‘school participation’. For each domain, 50 related question items were extracted from consultation cases within occupational therapy settings for target children. To test the draft items for both internal and face validity, evaluations of the two groups were requested. Group 1 consisted of six participants (principal parents of a child with a developmental disorder), and Group 2 had

four participants (three OTs specialised in children's development disabilities and with ten or more years of clinical experience as well as experience visiting elementary schools, and one clinical psychologist). In the results of both groups, no items were evaluated as 'inapplicable', while opinions stated for each item were either 'requires revision' or 'appropriate' (Streiner et al., 2015) (Table 1). Thereafter, textual revisions were made and a pilot version of an elementary school participation checklist (hereinafter referred to as "pilot version") was created (Figure. 1). For the response format, respondents had to consider the child's overall behavior in the preceding three months (excluding school vacation periods) backwards from the day of response, and respond in an ordinal-format four-point scale from '4. Very commonly', to '1. Never'. A separate response, '0. do not know', was also provided. Items nos. 20, 23-30, 36-40, and 46-50 were set as reverse items, such that when the child showed a state of maladjustment, the total points increased.

Survey of parents of elementary school students

Target subjects and solicitation methods

Japanese elementary students enrolled in a regular class who did not possess a disability certificate and who had not been diagnosed with an intellectual disability, physical disorder, or internal disorder conforming to a neurodevelopment disorder (American Psychiatric Association, 2013) were considered general 'elementary school students', and their parents were targeted as survey subjects, with solicitation performed via a web site created for the purpose of the present study. This website provided an overview of the study

as well as the children's requirements. After a target subject's consent had been obtained, the subject provided online responses anonymously. As children's school participation status was under the influence of multiple factors (Sukegawa & Ito, 2018), the sample size was based on the "COnsensus-based Standards for the selection of health Measurement Instruments" (COSMIN) (Mokkink et al., 2018) to correspond to the classical test theory (CTT). The school year of the target subjects was set at 100 persons or more for every school year (grade), and from Japanese population estimates (Statistics Bureau of Japan, Ministry of Internal Affairs and Communications, 2020), 50 males and 50 females per school year, for a total of 600 persons overall. Solicitation for each school year was terminated when the target numbers for the year were obtained.

Survey contents

Basic information comprised attributes relating to the respondents (age, relationship with the child, and area of residence); children (sex, school year, and the school classification of the enrolled elementary school), and responses to the 50 items of the pilot version.

Survey period

The survey was performed during two periods. Period I was from June 24 to August 21, 2019, and Period II was from February 5 to March 2, 2020. Due to the coronavirus (COVID-19) pandemic, Japanese elementary schools were closed nationwide from March 2, necessitating the addition of a notation to this effect, viz., 'evaluation of performance was

only till the end of February 2020, and excluded the period of the nationwide school closure due to COVID-19’.

Analysis method

For the pilot version, reverse items were converted for scoring purposes, representative values were calculated, and response bias was examined. Exploratory factor analysis was further performed, and the construct validity and internal consistency of each factor was examined. R3.5.1 for Mac OS was used for statistical processing.

2. Comparison of children with developmental disorders and elementary school students

Target subjects and solicitation methods

We targeted parents of children with developmental disabilities who were currently enrolled in special needs education. ‘Developmental disability’ is defined according to the definition of neurodevelopmental disorders in the Diagnostic and Statistical Manual of Mental Disorders (DSM-5)’s Handbook of Differential Diagnosis (American Psychiatric Association, 2013); however, children with intellectual disabilities were those whose total intelligence quotient (TIQ) score was less than 70. The educational environments used were a regular class, a resource room, and a special class.

In parallel with the elementary school students, with the cooperation of after-school day-service facilities in the Kanto area, participation was solicited from the principal and parents of children with developmental disorders, as defined in this study, to serve as target subjects, with the goal of soliciting the aforementioned ten persons. The study plan was explained orally as well as with written documents, and consent for cooperation was obtained.

Survey method

Details about the elementary school students were supplemented with information relating to their diagnosis, intelligence levels, and enrolled school class. For the pilot version, responses were requested twice during a one-week period. Additionally, from an evaluation of standards standardized for Japanese students, the Japanese version of the shortened sensory profile (J-SSP) (Dunn & Tsuji, 2015) and Vineland-II were purchased, and the responses obtained with these were used as external criteria. With regard to Vineland-II, semi-structured interviews were conducted by testers with level B psychological test user level.

Survey period

The response collection period was from November 1 to November 26, 2019.

Analysis method

After analysing the elementary school students, the points and total points for a carefully selected 15-item version were extracted from responses to the pilot version for children with developmental disorders. After the transformation of the reverse items for use as scoring points, the relationships between the scores of J-SSP and Vineland-II were examined, which served as external criteria in conformance to an examination of test-retest reliability and convergent validity. Vineland-II was used as an index of adaptive behavior, and J-SSP was used as an index of the sensory characteristics of the target child.

To examine the cutoff value of the 15-item version, comparisons were made between elementary school students' overall sex differences, school-year differences, and the results

for children with developmental disorders. R3.5.1 for Mac OS was used for statistical processing.

Ethical considerations

For the present study, consent was obtained from the Tokyo Metropolitan University (TMU) Arakawa Campus Research Ethics Committee (approval nos.: 18098 and 19060) and Tokyo Kasei University research ethics committee (approval nos.: restricted 2019-3 and restricted 2019-14). There is no conflict of interest (COI) to be disclosed with any company.

Results

1. Creation of Elementary School Participation Checklist

Basic information on respondents and children

While the total number of respondents was 808, those excluded were 256 with duplicate answers, 10 with input errors, and 3 whose responses to 80% or more of the 50 items of the pilot version were '0. do not know'. Therefore, 539 respondents were analyzed, comprising 56 and 483 in Periods I and II, respectively.

The respondents' mean age was 44.1 years, and they comprised 254 fathers and 285 mothers. The number of respondents residing at each of the following locations was as follows: Hokkaido, 19; Tohoku, 27; Kanto, 256; Hokuriku, 13; Tokai, 54; Kinki, 90; Chugoku, 25; Shikoku, 9; and Kyushu and Okinawa, 46.

In relation to the children's sex, 279 were male and 260 were female. With regard to school year: in the first, second, third, fourth, fifth, and sixth years, there were 94, 97, 93, 79, 87, and 89 students, respectively. Thus, students in the lower grades (first to third years) totaled 284, while those in upper grades (fourth to sixth years) totaled 255. Regarding the respondents' enrolled school classification, 7, 517, and 15 were in national elementary, public, and private schools, respectively.

Pilot-version test results

Response bias results

Item nos. 42 and 43 showed ceiling effects (mean value plus standard deviation > 4.00). With the exception of item nos. 24, 29, 33, 37, 38, 39, and 40, all the other items showed floor effects (difference of standard deviation from mean value < 1.00). Approximately 10% or more of all respondents responded '0. Don't know' to item nos. 3, 5, 8, 19, 31, 32, 36, 41, 48, and 49.

Validity test results

With the obtainment of a sample size meeting the 'Excellent' standard within COSMIN (Mokkink et al., 2018), factor analysis was performed using the principal factor method. From the scree plot standard, the number of factors was determined to be two. Bartlett's test of sphericity, which shows the validity of the factor analysis data, found $P < 0.00$. Promax rotation was performed, and by excluding items with a factor loading of less than 0.5, 16 items were extracted. Then, together with the response bias results of extracted

items, items that showed a floor effect were kept as possibly showing a state of maladjustment specific for target children vis-à-vis school participation. Item no. 32, for which more than 10% of respondents responded ‘0. do not know’, was excluded as it was thought to be inappropriate under the response method for parents. Thus, there was a refined selection of 15 items (below the 15-item version). As a result, from among the 10 domains summarized at the time of draft creation, the following three domains were excluded: ‘exercise and movement’, ‘support and relationships’, and ‘physical environment (Table 2).

Reliability test results

Cronbach’s alpha (α) was used to test the version’s 15 items for internal consistency. The results showed a high internal consistency, with α -coefficients of the 15 items being above 0.70 (0.738-0.868), and factors 1 and 2 at 0.796 and 0.786, respectively (Table 2). Further, there was no correlation between the two factors, which were named based on the following determinants:

Factor 1 was named “problems” since it obstructed students’ participation in schools.

Factor 2 was named “independence,” as it represented self-initiated proactive behaviors and abilities.

2. Comparison of children with developmental disorders and elementary school students

Basic information from respondents and children with developmental disorders.

Having obtained consent from 14 persons to cooperate in the present study, 4 who were undiagnosed, who had mild intellectual disabilities, and who were preschoolers were excluded. Thus, 10 persons were determined as the target subjects.

All of the respondents were mothers, with a mean age of 44.7 years, and Kanto was their only place of residence.

Regarding the children, 6 were male and 4 female; 1 each was in the first and second years, 2 were in the fourth year, and 6 were in the fifth year. All were public elementary school students. As for the enrolled class types, 7 were in regular classes, 1 had both a regular and a special class, and 2 had both regular classes and used resource rooms. All were designated as children requiring special needs education at their enrolled schools. As for diagnosis, 9 had autism spectrum disorder, 1 had a developmental disorder, and 3 had attention deficit/hyperactivity disorder. Other diagnoses included coexisting diagnoses of various communication disorders, Asperger's syndrome, social anxiety disorder, and autoimmune deficiency.

Based on both the Wechsler intelligence scale and the Tanaka-Binet intelligence scale, 1 child each was found with 'borderline', 'below average', 'high', and 'very high', intelligence levels; while 4 and 2 children were found to have intelligence levels of 'average' and 'above average', respectively.

Relationship between the results of the 15-item version and external criteria

Test–retest reliability results of the 15-item version

Pearson’s correlation coefficient was used to calculate the test-retest reliability coefficients based on the results of the 15-item version’s two performances. From the correlation coefficient r table ($N=10, |r|>0.614$), except for item nos. 16 and 40, which had a significant correlation (.745-1.000).

Relationship with Vineland-II

The Maladaptive Behavior Index was ‘High’ for 6 children and ‘Mod. High’ for the remaining 4 children. Moreover, Internalizing was ‘High’ for 9 children and ‘Mod. High’ for 1 child. Externalizing was ‘High’ for 5 children, ‘Mod. High’ for 2 and ‘Adequate’ for 3 children.

Based on Pearson’s correlation coefficient, the 5% significance level relating to the total points (initial) for the 15-item version of the children with developmental disorders and those with the Adaptive Behavior Composite were: total points of -.665 and the Maladaptive Behavior Index of .846. Total points per factor and significant correlations were found between the total points of factor 1 and the Maladaptive Behavior Index of .779; and between the total points of factor 2 and the Adaptive Behavior Composite of -.740 and the “Daily Living Skills” domain points of -.731 (Table 3). However, there was no correlation with the 15-item version in relation to internalizing and externalizing (Table 3).

Relationship with J-SSP

The J-SSP total score results revealed a ‘Definite Difference’ for 6 persons and ‘Probable Difference’ for 4. For factor 1, the total points for the 15-item version (initial) of the children with developmental disorders showed significant correlations with the J-SSP sections of ‘Underresponsive/Seeks Sensation’ (.755) and ‘Auditory Filtering’ (.724). For Factor 2, the total points had a significant correlation with ‘Tactile Sensitivity’ (-.732), whereas the total points for the 15-item version had no correlation with J-SSP (Table 3).

Examination of the 15-item version cutoff value

With regard to elementary school students, children with developmental disorders, and their sample sizes; the ‘good’ criteria necessary for unidimensionality analysis under the COSMIN standard required five times the number of items and 100 and above. The categories that reached those levels were elementary school students with differences between the sexes (male/female) and between lower and upper grades. which were used for comparisons with the 15-item version points. The elementary school students’ sex and school year differences were significant ($p < 0.05$) using Wilcoxon rank score tests.

In the 15-item version, the median total scores for elementary school students and children with developmental disorders were 22 and 33 points, respectively. Moreover, among elementary school students, male and female children obtained 24 and 22 points, respectively, while 24 and 21 points were obtained for lower and upper grades, respectively (Figure. 2).

Prior research has shown percentages for each school year of children who possibly may have had a developmental disorder (Elementary and Secondary Education Bureau, Ministry of Education, Culture, Sports, Science and Technology-Japan, 2012). Using this as a reference, hypothetical cutoff values were calculated. The results were as follows: for elementary school students overall: 34 points at the 92.3 percentile, for low school years: 34 points at the 91.5 percentile, and for high school years: 33 points at the 93.1 percentile.

Discussion

1. 15-item version of the Elementary School Participation Checklist

In this study, ten areas were defined and original draft items were created from the authors' previous work, but in the survey of elementary school students' parents, the areas of 'exercise and movement', 'support and relationships', and 'physical environment' were excluded. 'Exercise and movement' and 'physical environment' have been emphasized in occupational therapy as areas for interventions for applied abilities and environmental resources of children with developmental disabilities. Occupational therapists evaluate children's performance from these perspectives and considers compensation methods or self-help tools. In addition, 'Support and relationship' is an item related to the target student's social abilities, especially communication and interpersonal relationships, and the content of measuring the sense of failure in the target student's participation in school.

Of the two factors obtained in the 15-item version, in factor 1, 'problem', among the applied abilities of the students, items related to learning and self-care necessary for school participation remained. In factor 2, 'independence' items that asked whether the target student had valuable activities outside of school, interpersonal relationships with friends, and a sense of adaptation to school participation remained. These results indicate that participation in

regular classes requires support focused on the activities and self-care required on campus; task-oriented support would be useful. In addition, it is considered important to support school participation with respect for individual independence and to consider involvement in a group of children.

2. Enabling the active use of the checklist

Regarding the differences between the sexes and school years of elementary students, the results of the 15-item version showed a tendency for maladjustment to be higher for male children and during low school years, as was shown in prior research (Elementary and Secondary Education Bureau, Ministry of Education, Culture, Sports, Science and Technology-Japan, 2012). It is estimated that the elementary school group surveyed in this study includes children who are suspected of having developmental disabilities. Outside specialist support projects may need to consider whether children in regular classes need special education. In the future, the hypothetical cutoff values of the 15-item version of the present study could be used for this reason.

Regarding the relationship between the 15-item version for children with developmental disorders and Vineland-II, both the total points and factor 2 total points showed negative correlations with the total scores of Adaptive Behavior Composite. In addition, a positive correlation was shown for total points and factor 1 total points with the Maladaptive Behavior Index. This could be linked with future investigations of the convergent validity of the 15-item version. Moreover, in the subarea, Factor 1 total points had a positive correlation with the scores of the J-SSP section in ‘Underresponsive/Seeks Sensation’ and ‘Auditory Filtering’, while factor 2 scores showed a negative correlation with the ‘Daily Living Skills’ domain of Vineland-II and a positive correlation with ‘Tactile

Sensitivity' of J-SSP. These subareas overlap with the occupational therapy intervention domain. In future investigations of criterion-related validity, it will be useful to incorporate activities of daily living (ADL) among the external criteria.

Conclusion

Based on a survey of Japanese general elementary students, the present study created a 2-factor, 15-item version of an elementary school participation checklist to provide special needs education that supports children with developmental disorders who are enrolled in general classes. The construct validity and internal consistency of the created version were confirmed. The use of this version was examined by comparing the results of the survey version for general elementary school children with the results for children with developmental disorders.

Limitations and problems of the present study

This study focused mainly on the selection of checklist question items, but did not perform external criteria tests to investigate maladjustment status in the school participation of elementary school students. Therefore, to consider the use of this checklist as a scale, further investigation of criterion-related validity will be necessary. In addition, it is necessary to study future comparisons with the teacher response method to target students in actual school situations.

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The elementary school participation checklist/pilot version of the questionnaire (50 questions)						
*Answer by selecting the appropriate number while looking back on your child's overall behavior over 3 months from the day you started responding excluding school holidays (such as summer holidays).						
To respond, follow the instructions below and select the appropriate number.		0	1	2	3	4
The child very commonly (almost 95–100%) reacts as documented → 4.		D O C U M E N T E D	N E V E R	R A R E L Y	S O M E T I M E S	V E R Y C O M M O N L Y
The child sometimes (about 50–94%) reacts as documented → 3.						
The child rarely (about 2.5–49%) reacts as documented → 2.						
The child slightly or never (about 0–24%) reacts as documented → 1.						
The responder does not know whether the child reacts as s/he documented, or the child had no opportunity to react as documented → 0.		K N O W				
1	I hate noisy places.	0	1	2	3	4
2	I may overlook handouts.	0	1	2	3	4
3	I have a habit during classes (example: biting my nails, touching putty rubber, etc.).	0	1	2	3	4
4	My brushstroke pressure is very weak.	0	1	2	3	4
5	I hate places where my feet are unstable (example: swaying playground equipment).	0	1	2	3	4
6	My handwriting is messy.	0	1	2	3	4
7	I hate detailed tasks.	0	1	2	3	4
8	I find it difficult to use the required tools during lessons (example: compass, musical instruments, etc.).	0	1	2	3	4
9	I break my belongings.	0	1	2	3	4
10	I take a long time to get things done.	0	1	2	3	4
11	I am tired after coming home from school.	0	1	2	3	4
12	I hate exercising.	0	1	2	3	4
13	I walk slowly.	0	1	2	3	4
14	My movements are awkward.	0	1	2	3	4
15	I fall.	0	1	2	3	4
16	I get those around me to help me.	0	1	2	3	4
17	I find it difficult to eat without food spilling from my mouth.	0	1	2	3	4
18	It takes time for me to get dressed.	0	1	2	3	4
19	I go to the toilet even during non-break times.	0	1	2	3	4
20	I tidy up my clothes by myself.	0	1	2	3	4
21	It takes time for me to wake up in the morning.	0	1	2	3	4
22	Someone helps me prepare for school.	0	1	2	3	4
23	I can go on an errand by myself.	0	1	2	3	4
24	I can go to nearby places (within 2 km) by myself.	0	1	2	3	4
25	I can manage small amounts of money by myself.	0	1	2	3	4
26	I can spend time alone safely.	0	1	2	3	4
27	I prefer to play with my friends rather than with adults.	0	1	2	3	4
28	I have a favorite hobby.	0	1	2	3	4
29	I play with my friends outside of school.	0	1	2	3	4
30	I continuously participate in activities other than lessons (example: club, extracurricular activities, etc.).	0	1	2	3	4
31	I quarrel with my school friends.	0	1	2	3	4
32	I get warnings from my schoolteachers.	0	1	2	3	4
33	I get scolded by my family.	0	1	2	3	4
34	I do not feel well even though I have no health problems.	0	1	2	3	4
35	I need some encouragement to attend school.	0	1	2	3	4
36	I consult my friends when something is bothering me.	0	1	2	3	4
37	I consult adults when something is bothering me.	0	1	2	3	4
38	I explain events so that people can easily understand.	0	1	2	3	4
39	I say "I am sorry" when I do something wrong.	0	1	2	3	4
40	I can withstand even things I hate according to settings.	0	1	2	3	4
41	I lean on my desk and chair during class.	0	1	2	3	4
42	I put on clothes that are easy to wear.	0	1	2	3	4
43	I use writing tools that are easy to manage (example: 2B pencils, etc.).	0	1	2	3	4
44	I cannot use chopsticks well.	0	1	2	3	4
45	There are items in school lunches that I cannot eat.	0	1	2	3	4
46	I enjoy school.	0	1	2	3	4
47	I enjoy playing with my friends.	0	1	2	3	4
48	I enjoy class lessons.	0	1	2	3	4
49	I trust my teachers.	0	1	2	3	4
50	I enjoy school events.	0	1	2	3	4

Figure 1. The elementary school participation checklist/pilot version of the questionnaire (50 questions)

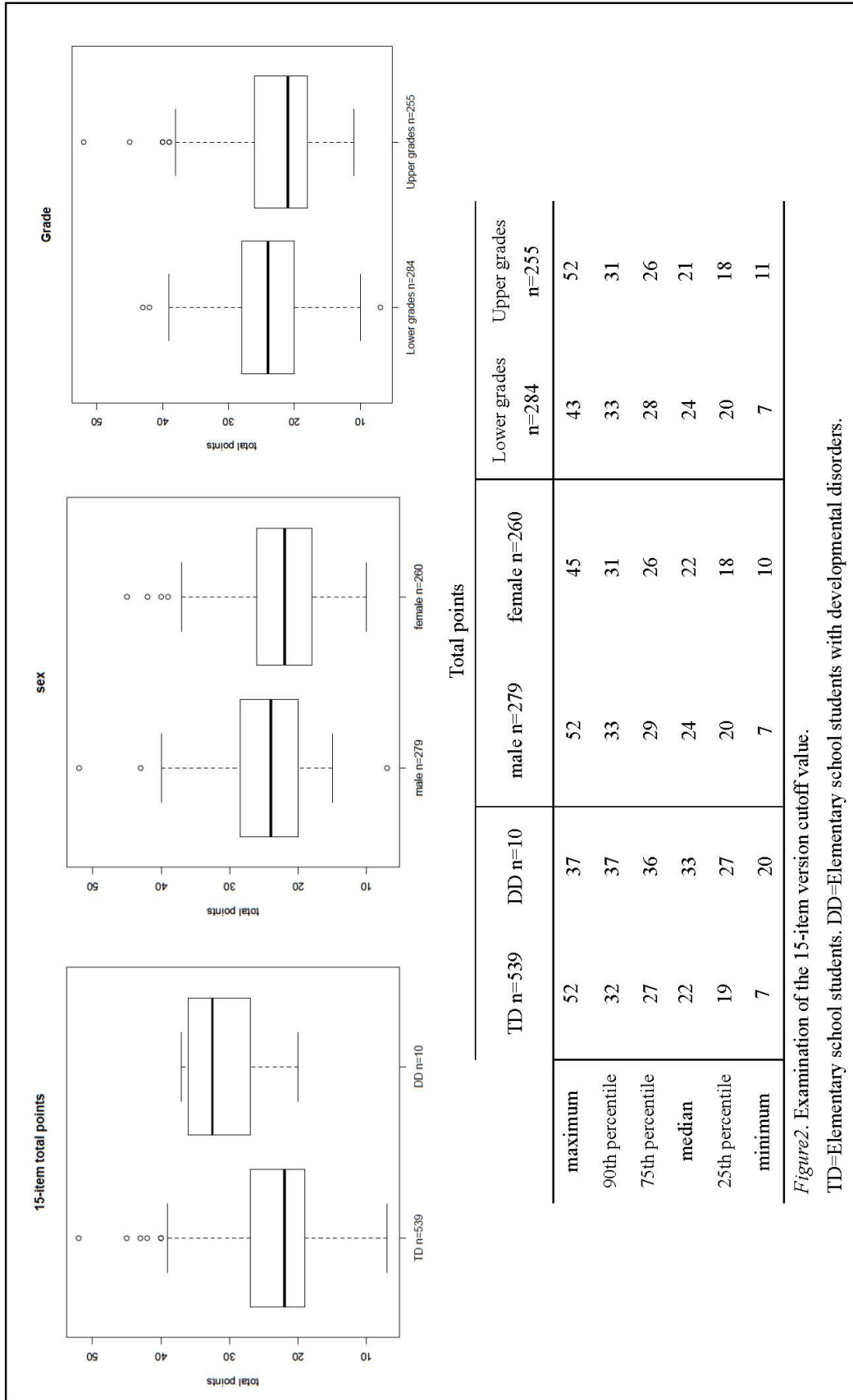


Figure 2. Examination of the 15-item version cutoff value.

TD=Elementary school students. DD=Elementary school students with developmental disorders.

Table 1
Creation of question-items for the pilot version

No.	area	The initial draft	Group 1		Group 2	
		50 items	rating	comments	rating	comments
1		I hate noisy places or do not notice the instruction of the teacher.	appropriate		revision	double-barreled question
2		I find the blackboard difficult to see, or overlook handouts.	appropriate		revision	double-barreled question
3	sensory functions	I have a habit biting my nails or pencils, trucking putty rubber, etc.	appropriate		revision	a long sentence
4		My bus/hstroke pressure is very strong or weak.	appropriate		revision	double-barreled question
5		I like or hate places where is high, unstable, and swaying playground equipment, etc.	appropriate		revision	double-barreled question
6		Even if I need to write it carefully, my handwriting is bad or messy.	appropriate		revision	double-barreled question
7		I hate detailed tasks, or the art class.	appropriate		revision	double-barreled question
8	manual skills	I find it difficult to use compass, and musical instruments, etc during lessons.	appropriate		revision	a long sentence
9		I am easy to break the belongings used at school, or break them.	appropriate		revision	double-barreled question
10		I need more time working and writing than students in the same class.	appropriate		revision	a long sentence
11		I am tired or look tired after coming home from school.	appropriate		revision	double-barreled question
12		I hate exercising or sports events.	appropriate		revision	double-barreled question
13	exercise and movement	I walk faster or slower than students in the same class.	revision	I cannot be compared with classmates.	revision	double-barreled question
14		My movements are more awkward or look rougher than students in the same class.	revision	I cannot be compared with classmates.	revision	double-barreled question
15		I fall and get hurt.	appropriate		revision	The degree of injury is unclear.
16		I have my classmates help with things around me.	revision	He/she gets help from teachers.	appropriate	
17		I find it difficult to eat without food spilling from my mouth, or making my clothes dirty.	appropriate		revision	double-barreled question
18	self-care	It takes time for me to get dressed, or difficult to change clothes.	appropriate		revision	double-barreled question
19		I go to the toilet during class.	appropriate		revision	correct the sentence
20		I cannot tidy up my clothes, hair, and dirty hands by myself.	appropriate		revision	double-barreled question
21		It takes time for me to wake up without help in time for school.	appropriate		revision	double-barreled question
22		I have a lot of things left behind, or someone helps me prepare for school.	appropriate		revision	double-barreled question
23	daily living	I cannot go on an errand by myself, or want not to go.	appropriate		revision	double-barreled question
24		I cannot get on a bus or train by myself, or want not to get on.	appropriate		revision	double-barreled question
25		I cannot manage small amounts of money by myself, or difficult to manage.	appropriate		revision	a long sentence
26		I can do what I like and spend time alone safely.	appropriate		revision	double-barreled question
27		I prefer to play with my friends rather than with adults or my family.	appropriate		revision	a long sentence
28	leisure	I have a favorite hobby or activity.	appropriate		revision	double-barreled question
29		I play with classmates outside of school.	revision	He/she does not play with just classmates.	appropriate	
30		I continuously participate in club or extracurricular activities.	appropriate		revision	double-barreled question
31		I quarrel with my school friends for some reason.	appropriate		revision	correct the sentence
32		For some reason, I get warnings from my schoolteachers, and inform my family know.	appropriate		revision	double-barreled question
33	support and relationships	I get scolded by my family.	appropriate		appropriate	
34		I look sick or do not feel well even though I have no health problems.	appropriate		revision	double-barreled question
35		I want not to go to school, or need some encouragement to attend school.	appropriate		revision	double-barreled question

36		I consult my friends when I have a problem or something is bothering me.	appropriate	revision	double-barreled question	
37		I consult my teacher or my family when I have a problem or something is bothering me.	appropriate	revision	double-barreled question	
38	coping	I explain when I have a problem or something is bothering me so that people can easily understand.	appropriate	revision	double-barreled question	
39		I can say "I am sorry" by myself when I quarrel with friends or when I am scolded by adults.	appropriate	revision	a long sentence	
40		I can withstand even things I hate according to setting for my friends or family.	appropriate	revision	a long sentence	
41		I can not keep my posture, or lean on my desk and chair during class.	appropriate	revision	double-barreled question	
42		I have comfortable clothes and shoes.	appropriate	revision	correct the sentence	
43	physical environment	I have an easy-to-use writing instrument, and I choose it.	appropriate	revision	correct the sentence	
44		I cannot use chopsticks in school lunches well.	revision	Different types of chopsticks at school and at home	revision	correct the sentence
45		There are some items in school lunches that I hate, or I cannot eat at all.	appropriate	revision	double-barreled question	
46		I enjoy or seem to enjoy school.	appropriate	revision	correct the sentence	
47		I enjoy or seem to enjoy playing with class mates.	revision	He/she does not play with just classmates.	revision	correct the sentence
48	school participation	I enjoy or seem to enjoy class lessons.	appropriate	revision	correct the sentence	
49		I trust or seem to trust my teachers.	appropriate	revision	correct the sentence	
50		I enjoy school events.	appropriate	revision	correct the sentence	

Note. Group 1: 6 principal parents of a child with developmental disorders. Group 2: 3 OTs specialized in children's development disabilities and having 10 or more years of clinical experience as well as experience of visiting elementary schools, etc. and one clinical psychologist.

Table 2
 Factor loading and α -coefficient of the 15-item version from the elementary school participation checklist/pilot version

area	No.	The 15-items	Factor loading		α -coefficient	
			Factor 1	Factor 2	By item	By Factor
Factor 1 problems	2	I may overlook school printouts.	.636	-.117	.762	
	6	My handwriting is messy.	.561	-.075	.783	
	9	I break my belongings.	.521	-.020	.779	
	10	I take a long time to get things done.	.664	-.060	.760	.796
	16	I get those around me to help me.	.602	.000	.768	
self-care	17	I find it difficult to eat without food spilling from my mouth.	.532	.032	.787	
	18	It takes time for me to get dressed.	.594	.015	.774	
	22	Someone helps me prepare for school.	.563	.010	.770	
daily living	27	I prefer to play with my friends rather than with adults.	-.067	.589	.757	
	28	I have a favorite hobby.	-.117	.579	.768	
leisure	29	I play with my friends outside of school.	-.065	.534	.868	
	40	I can withstand even things I hate according to settings.	.094	.505	.781	.786
coping	46	I enjoy school.	-.020	.634	.756	
	47	I enjoy playing with my friends.	-.080	.744	.738	
	50	I enjoy school events.	-.049	.702	.745	

Note. Factor loadings >.50 are in boldface.

Table 3
Relationship between the results of the 15-item version of the elementary school participation checklist and external criteria

Scale	The 15-item version			Vineland-II										J-SSP				
	Total	Factor 1	Factor 2	Adapt Behav. Comp.	Communication	Daily Living Skills	Socialization	Maladaptive Behavior Index	Internalizing	Externalizing	Teach. Sensitivity	Task/Small Sensitivity	Movement Sensitivity	Underresponsive/ Staks Sensation	Auditory Filtering	Low Energy/ Weak	Visual/Auditory Sensitivity	Total
The 15-item version	1.000																	
Factor 1	.701	1.000																
Factor 2	.293	-.159	1.000															
Adapt. Behav. Comp.	-.655	-.148	-.740	1.000														
Communication	-.116	-.209	.075	.294	1.000													
Daily Living Skills	-.548	-.024	-.731	.712	-.244	1.000												
Socialization	-.428	-.073	-.51	.736	-.100	.240	1.000											
Maladaptive Behavior Index	.846	.779	.291	-.644	-.265	-.431	-.448	1.000										
Internalizing	.591	.449	.311	-.428	-.256	-.604	.136	.636	1.000									
Externalizing	.605	.424	.358	-.482	.144	-.313	-.572	.715	.091	1.000								
Teach. Sensitivity	.396	-.163	.732	-.473	-.197	-.455	-.156	.236	.447	.251	1.000							
Task/Small Sensitivity	-.269	-.518	.213	.044	.324	-.280	.174	-.593	-.120	-.605	.038	1.000						
Movement Sensitivity	-.241	-.034	-.295	.168	-.081	.135	.249	-.309	-.270	-.295	-.129	.443	1.000					
Underresponsive/ Staks Sensation	.299	.755	-.438	.04	-.222	.259	-.094	-.521	.172	.161	-.560	-.596	-.186	1.000				
Auditory Filtering	.370	.724	-.305	-.081	-.160	.023	-.074	.693	.460	.365	-.098	-.619	-.103	.739	1.000			
Low Energy/ Weak	.114	-.055	.220	-.063	-.138	.238	-.326	-.130	-.269	-.008	.361	.290	.290	-.361	-.227	1.000		
Visual/Auditory Sensitivity	-.590	-.499	-.253	.087	-.226	.224	.029	-.382	-.210	-.443	-.067	.125	.283	-.036	.080	-.132	1.000	
Total	.289	.466	-.126	.033	-.268	.012	.216	.302	.548	-.221	.175	-.055	.185	.408	.665	.098	.255	1.000

Note. Correlation coefficient. $r^2 \times 100(N=10)$ are in boldface. Vineland-II = Japanese version of Vineland-II adaptive behavior scales; J-SSP = Japanese version of the shortened sensory profile.