Table 2
Descriptive statistics of the Japanese version of Developmental Coordination Disorder Questionnaire.

Grade (age)	Control during movement				Fine motor				General coordination				DCDQ total			
	Male		Female		Male		Female		Male		Female		Male		Female	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Middle (4–5)	19.46	5.40	19.04	5.35	12.44	4.17	14.78	4.02	16.09	4.76	17.19	4.79	47.99	12.84	50.97	12.69
Senior (5–6)	21.31	5.46	19.99	5.26	13.63	4.20	15.59	3.76	17.23	4.27	17.73	4.59	52.51	12.11	53.38	12.50
1 (6–7)	21.22	5.48	20.38	5.32	14.53	3.72	16.12	3.63	16.75	4.57	17.99	4.59	52.55	12.24	54.56	12.03
2 (7–8)	21.51	5.22	20.45	5.12	13.82	3.63	15.70	3.39	16.27	4.39	17.66	4.34	51.73	11.58	53.81	11.31
3 (8–9)	22.29	5.38	20.76	5.01	14.17	3.56	15.60	3.50	16.98	4.26	17.53	4.16	53.44	11.71	53.94	11.00
4 (9–10)	22.94	5.43	21.27	5.38	14.91	3.51	16.02	3.44	17.76	4.33	17.77	4.20	55.79	11.67	55.18	11.51
5 (10–11)	23.29	5.21	21.86	5.64	14.98	3.74	16.58	3.47	17.83	4.46	18.41	4.44	56.10	11.96	56.99	12.00
6 (11–12)	23.39	5.77	22.09	5.21	14.88	4.00	16.71	3.35	17.72	4.75	18.30	4.15	55.99	13.29	57.12	11.34
7 (12–13)	23.64	5.26	22.39	5.41	14.88	3.93	16.45	3.53	17.78	4.50	18.35	4.40	56.39	12.33	57.16	12.01
8 (13–14)	24.62	5.10	23.03	5.52	15.97	3.77	17.05	3.26	19.07	4.46	18.62	4.55	59.72	12.19	58.59	12.08
9 (14–15)	25.11	4.92	23.73	5.55	16.00	3.70	17.39	3.44	19.04	4.61	18.96	4.64	60.36	12.00	60.04	12.22
Sex			78.88^{***}				284.13^{***}				21.44^{***}				6.86^{**}	
Grade			36.70^{***}				25.35^{***}				13.33^{***}				29.67^{***}	
Sex × grade			0.54				1.20				2.26^{*}				1.30	

* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

during movement subclass. In addition, the main effect of gender was higher in boys than in girls, and the main effect of school grade tended to increase as the grade level increased. The main effects of gender ($F(1, 6251) = 284.13$, $p < 0.001$) and school grade ($F(10, 6251) = 25.35$, $p < 0.001$) were significant in the fine motor subclass, while the interaction effect ($F(10, 6251) = 1.20$) was not significant. The main effect of gender was higher in girls than in boys, and the main effect of school grade tended to increase as the grade level increased. The main effects of gender ($F(1, 6231) = 21.44$, $p < 0.001$) and school grade ($F(10, 6231) = 13.33$, $p < 0.001$) and the interaction effect ($F(10, 6231) = 2.26$, $p < 0.001$) were significant in the general coordination subclass. The simple main effect by school grade was significant in the middle class students of the nursery school ($F(1, 6231) = 5.07$, $p < 0.001$), the elementary Year 1 schoolchildren ($F(1, 6231) = 14.60$, $p < 0.001$), and the Year 2 children ($F(1, 6231) = 17.14$, $p < 0.001$), and was higher in girls than in boys. The simple main effect of school grade was significant in both genders, boys ($F(10, 6231) = 11.86$, $p < 0.001$) and girls ($F(10, 6231) = 3.50$, $p < 0.001$), but the difference in school grade tended to be greater in boys than in girls. When the total scores of the DCDQ-J were analyzed using two-way ANOVA, the main effect of gender ($F(1, 6150) = 6.86$, $p < 0.01$) and that of school grade ($F(10, 6150) = 29.67$, $p < 0.001$) were significant, while the interaction effect ($F(10, 6150) = 1.30$) was not significant. The main effect of gender was greater in girls than in boys, and the main effect of school grade tended to increase as the grade level increased.

A main effect of school grade was observed at the subscale level and the total scores of the DCDQ-J; thus, the tendency of their developmental changes was evaluated using multiple regression analysis. The 1st to the 10th items were prepared by assigning a value of 1–11 to the middle class students of the nursery school through to Year 9 students. The influence of gender against each subscale and the total score were controlled at Step 1, and the items regarding their school grade from the 1st to the 10th were input by using a forward selection method at Step 2. The first item was significant in the control during movement subclass ($\beta = 0.23$, $p < 0.001$), and it tended to increase as the grade level increased. In the fine motor subclass, the first item was significant ($\beta = 0.17$, $p < 0.001$), and it tended to increase as the grade level increased. In the overall coordination subclass, an interaction of gender and school grade was observed, so that multiple regression analysis by gender was performed. The 2nd item was significant in boys ($\beta = 0.17$, $p < 0.001$), and in girls ($\beta = 0.09$, $p < 0.001$), and it increased as the grade level increased. In the total scores of DCDQ-J, the first item was significant ($\beta = 0.21$, $p < 0.001$), and it tended to increase as the grade level increased. Fig. 1 shows the plot of scores by school grade and the approximation curve.

3.3. Subgroups of coordination

Using the standard scores of the 3 subscales of the DCDQ-J, *k*-means clustering was performed to study the subgroups of coordination by changing the number of clusters from 2 to 4. In consideration of the interpretive potentiality, a 4-cluster analysis was used. Fig. 2 shows the subscale scores of the DCDQ-J by cluster. All of the subscale scores of Cluster 1 ($n = 1414$, 22.87%) were lower than the mean value; especially, the subscale score of the fine motor subclass was low. Therefore, Cluster 1 was defined as a "poor fine motor group." Cluster 2 ($n = 2307$, 37.31%) was characterized as having high subscale scores, and it was defined as an "excellent coordination group." The subscale score of fine motor alone in Cluster 3 ($n = 1377$, 22.27%) was greater than the mean value, and other 2 subscale scores were lower than the mean value, and it was defined as an "excellent fine motor group." All of the subscale scores of Cluster 4 ($n = 1086$, 17.56%) were far lower than the mean values, and it was defined as a "poor coordination group."

The frequency of cluster occurrence was studied when school grade and gender were different. The bias between the cluster and school grade was significant ($\chi^2(30) = 294.66$, $p < 0.001$). As the grade level increased, the number of participants

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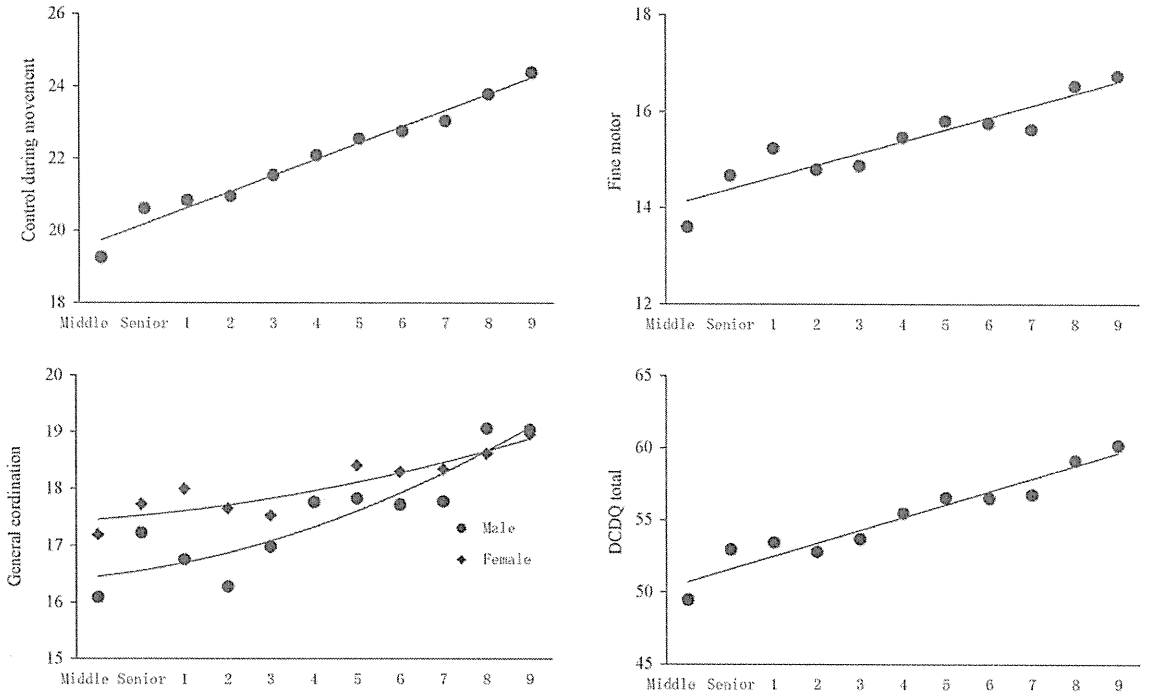

Fig. 1. The score of Japanese version of Developmental Coordination Disorder Questionnaire by grade.

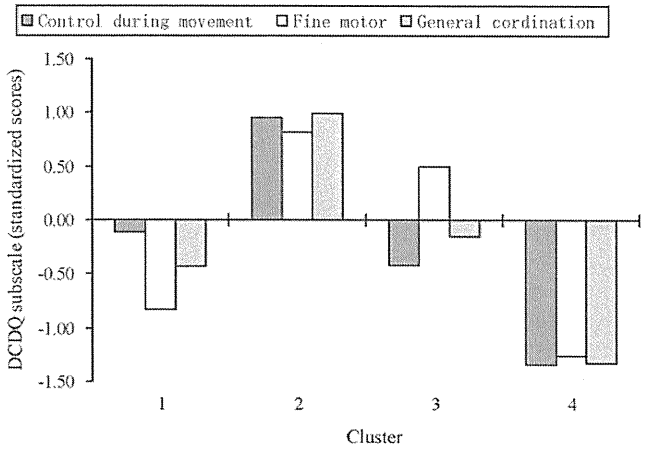

Fig. 2. The score of Japanese version of the Developmental Coordination Disorder Questionnaire subscales by cluster (standardized scores).

in the excellent coordination group increased, while those in the poor coordination group decreased (Fig. 3). The frequency of cluster occurrence of the other 2 groups was approximately 20% regardless of their school grade. In addition, there was a significant bias between the cluster and gender ($\chi^2(3) = 275.13$, $p < 0.001$), which indicated that the poor fine motor group had more boys than girls, while the excellent fine motor group had more girls (Fig. 4).

3.4. Relationship of the DCDQ-J with intelligence and ADHD-RS

In the Japanese version ADHD-RS, each subscale was averaged, and the resulting data was defined as inattentive ($\alpha = 0.90$) and hyperactive/impulsive ($\alpha = 0.86$); further, the total score of all items indicated ADHD tendencies ($\alpha = 0.93$). The correlation between the subscales was 0.75. The correlation coefficient between the DCDQ-J, the IQ, and the Japanese version ADHD-RS was calculated (Table 3). The 3 subscale scores and the total scores of the DCDQ-J were slightly positively associated with intelligence. Furthermore, a negative correlation of −0.2 to −0.5 was observed between the 3 subscale scores and the total scores of the DCDQ-J and the Japanese version ADHD-RS.

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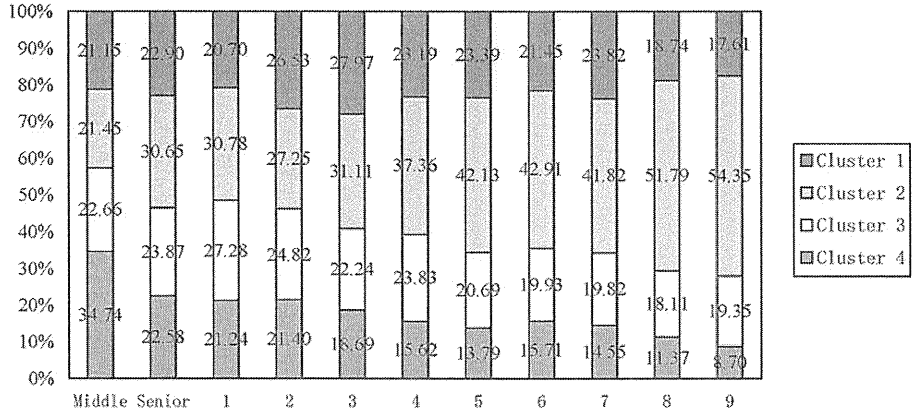

Fig. 3. The frequency ratio of each cluster by grade.

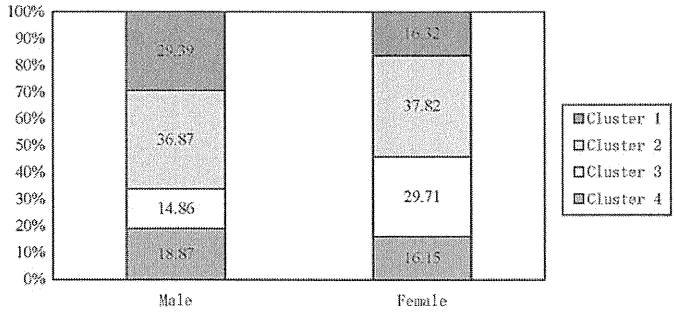

Fig. 4. The frequency ratio of each cluster by sex.

4. Discussion

This study was undertaken in a large sample of Japanese children by using DCDQ-J, ADHD-RS, and the New Kyoken Support to Intelligence Tests to establish relationships among coordination, ADHD tendencies, and intelligence. In this study, differences in development were evaluated, taking into consideration that motor skills increase with age and that the scores of control during movement and fine motor subclasses tend to increase linearly as the grade level increases. The general coordination changed non-linearly regardless of gender, and the scores tended to increase sharply as the grade level increased. The mean value and the development-related changes obtained in this study may be useful to study normal development of coordination and for screening of DCD in Japanese children.

When the subgroups of coordination were studied using the DCDQ-J, they were classified into 4 groups, including the poor fine motor group, the excellent coordination group, the excellent fine motor group, and the poor coordination group. Among these groups, the number of the participants in the excellent coordination group increased as the grade level increased, while those in the poor coordination group decreased. Furthermore, the poor fine motor group had more boys, while the excellent fine motor group had more girls. There were various patterns, for example, children with poor coordination were the weakest at fine motor or poor at all physical exercises, and the frequency of these patterns varied depending on their school grade and/or gender. Accordingly, special attention should be paid to children with clumsiness to determine the kind of movement that is their weak point, in consideration of their school grade and gender.

Table 3
Relationship between Developmental Coordination Disorder Questionnaire and intelligence quotient or attention-deficit hyperactivity disorder-rating scale.

	DCDQ			
	Control during movement	Fine motor	General coordination	DCDQ total
IQ	.12***	.14***	.11***	.14***
ADHD-RS				
Inattention	−.26***	−.46***	−.48***	−.43***
Hyperactive-Impulsive	−.19***	−.36***	−.35***	−.33***
ADHD total	−.24***	−.45***	−.45***	−.41***

*** $p < 0.001$.

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The DCDQ-J was related to the ADHD tendencies in children. Previous studies have mention that DCD is associated with ADHD, and that children with ADHD present clumsiness (Fox & Lent, 1996; Kopp et al., 2010; Lingam et al., 2010). In this study as well, all subscales and total scores of the DCDQ-J were significantly associated with the Japanese version ADHD-RS, which suggested that children with poor coordination more frequently showed inattention and hyperactivity in some situations. On the other hand, there was almost no relationship between scores of the DCDQ-J and the IQ. The correlation between the subscales and the total score of the DCDQ-J and their IQ ranged from 0.1 and 0.2, and children with poorer coordination tended to have lower IQs, but the relationship was very weak. Considering that the IQ should be within the normal limit in the diagnosis criteria of DCD by DSM-IV (2000), this study indicates that the DCDQ-J has some degree of validity and may be a useful screening tool for DCD in Japan.

5. Limitation and perspectives

Only the questionnaire survey was done in this study, which was not intended to provide a medical diagnosis of DCD. In countries other than Japan, the cutoff value of the DCDQ is set in terms of the medical diagnosis as well as other batteries of tests (Schoemaker et al., 2006; Tseng, Fu, Wilson, & Hu, 2010; Wilson et al., 2000, 2009). Therefore, the predictive validity of the DCDQ-J should be studied in Japan in the future.

Conflict of interests

The authors have no conflict of interests to declare.

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Validation of an interview-based rating scale developed in Japan for pervasive developmental disorders

Hiroyuki Ito[a,*], Jori Tani[b], Ryoji Yukihiro[c], Jun Adachi[d], Koichi Hara[e], Megumi Ogasawara[f], Masahiko Inoue[g], Yoko Kamio[h], Kazuhiko Nakamura[i], Tokio Uchiyama[j], Hironobu Ichikawa[k], Toshiro Sugiyama[l], Taku Hagiwara[d], Masatsugu Tsujii[m]

[a] Research Center for Child Mental Development, Hamamatsu University School of Medicine, Japan
[b] Faculty of Humanities, Tokaigakuen University, Japan
[c] Faculty of Human and Cultural Studies, Kyoto Gakuen University, Japan
[d] Hokkaido University of Education, Japan
[e] Faculty of Integrated Arts and Sciences, University of Tokushima, Japan
[f] School of Education, Tokyo Gakugei University, Japan
[g] Graduate School of Medical Sciences, Tottori University, Japan
[h] Department of Child and Adolescent Mental Health, National Center of Neurology and Psychiatry, Japan
[i] Department of Psychiatry and Neurology, Hamamatsu University School of Medicine, Japan
[j] Faculty of Human Development and Culture, Fukushima University, Japan
[k] Tokyo Metropolitan Children's Medical Center, Japan
[l] Department of Child and Adolescent Psychiatry, Hamamatsu University School of Medicine, Japan
[m] School of Contemporary Sociology, Chukyo University, Japan

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ABSTRACT

The pervasive developmental disorders (PDDs) Autism Society Japan Rating Scale (PARS), an interview-based instrument for evaluating PDDs, has been developed in Japan with the aim of providing a method that (1) can be used to evaluate PDD symptoms and related support needs and (2) is simpler and easier than the currently used "gold standard" instruments such as the Autism Diagnostic Interview-Revised (ADI-R). We examined the reliability and validity of PARS on the basis of data from 572 participants (277 PDD patients and 295 nonclinical controls). Inter-rater reliability was sufficient at both the item and scale level. Factor analysis extracted four subscales, for which internal consistency was found to be high. The sub and total scores of PARS showed correlations with the domain and total scores of ADI-R, in line with theoretical prediction, indicating the convergent validity of PARS. A receiver operating characteristic analysis showed that PARS has good discriminative validity in differentiating between PDD patients and nonclinical controls, regardless of intellectual capacity. Considering that PARS can be easily implemented by professionals with appropriate knowledge regarding PDDs, PARS may be superior to the existing instruments in terms of cost performance.

1. Introduction

Over the course of many years, several instruments have been developed for the diagnosis, evaluation, and screening of pervasive development disorders (PDD). In recent years, the Autism Diagnostic Interview-Revised (ADI-R; Le Couteur et al., 1989; Lord, Rutter, & Le Couteur, 1994) has been broadly accepted as a standardized interview-based diagnostic instrument for

* Corresponding author at: Research Center for Child Mental Development, Hamamatsu University School of Medicine, 1-20-1, Handayama, Higashi-ku, Hamamatsu 431-3192, Japan. Tel.: +81 53 435 2331; fax: +81 53 435 2291.
E-mail addresses: ito_hiroyuki@pd5.so-net.ne.jp, ito_h@hama-med.ac.jp (H. Ito).

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PDD. The Autism Diagnostic Observational Schedule (ADOS; Lord et al., 2000, 1989) is also widely used as an observation-based diagnostic instrument. These instruments have a high level of discriminative validity with respect to the differentiation of PDD from non-PDD and are useful in reaching a definitive diagnosis; however, their implementation requires special training and significant time, leading to the development of numerous simpler evaluation scales in recent years.

The Modified Checklist for Autism in Toddlers (M-CHAT; Robins, Fein, Barton, & Green, 2001), which has been broadly accepted as a screening instrument, is a unique tool that comprises a combination of questionnaires, telephone interviews, and structured follow-up interviews. Although it is a highly useful tool, its use is limited to toddlers because it was developed with the aim of early identification of PDD. In countries such as Japan and other Asian countries lacking the medical and governmental services for PDD that exist in the United States and Europe, it is believed that many people with undiagnosed PDD exist in a broad age group. In fact, Kawamura, Takahashi, and Ishii (2008) reported that in Toyota City, Japan, where a new systematic PDD screening system has been implemented, there were 11 times more detections of PDD compared with that observed in a survey done 20 years ago. However, few regions in the world have an adequate PDD detection system of this kind. Considering this, the development of a simple and practical evaluation scale that can be applied to a wide age group is an important and pressing issue.

The Autism Spectrum Screening Questionnaire (ASSQ; Ehlers, Gillberg, & Wing, 1999), Autism Screening Questionnaire (ASQ; Berument, Rutter, Lord, Pickles, & Bailey, 1999), and Social Responsiveness Scale (Constantino et al., 2003) have been developed as PDD evaluation scales that can be applied to a relatively broad age group. As all of these evaluation tools are in the format of a questionnaire that can be evaluated by parents or teachers, they have the advantage of being fairly easy to implement. However, in most cases, parents lack the specialized knowledge needed to understand PDD, so the standards for rating individual items can vary greatly depending on the individual conducting the evaluation, possibly leading to a deterioration of the reliability of evaluation results. Furthermore, though teachers generally have more PDD-related knowledge than do parents, they have less specific knowledge of each individual child; hence, their evaluations tend to be less reliable than those of parents. In practice, the sensitivity (true positive rate) and specificity (one minus false positive rate) of the ASSQ in distinguishing PDD and non-PDD was .91 and .77, respectively, for the parent evaluation and .90 and .58, respectively, for the teacher evaluation (Ehlers et al., 1999). Considering that the sensitivity and specificity of the ADI-R were 1.00 and .90, respectively (Lord et al., 1997), the level of accuracy of the ASSQ in distinguishing PDD from non-PDD was insufficient in the hands of both parents and teachers. Furthermore, in a simultaneous comparison conducted by Charman et al. (2007), sensitivity and specificity in identifying autistic spectrum disorders was .86 and .78, respectively, for the ASQ and .78 and .67, respectively, for the SRS, thereby indicating its insufficient precision in practical use.

To resolve this dilemma between accuracy and simplicity, the PDDs Autism Society Japan Rating Scale (PARS) has been developed in Japan as an instrument for evaluating PDDs (Adachi et al., 2006; Kamio et al., 2006; Tsujii et al., 2006). This scale was developed with the aim of providing an instrument that is simpler to use than the ADI-R and ADOS; is applicable to any age group, unlike the M-CHAT; and has better reliability and validity than questionnaire scales such as the ASSQ and ASQ. While PARS uses an interview format similar to ADI-R, the procedures, which are briefly summarized in the manual, can be implemented after simple training. Furthermore, because the criteria for rating each item is clearly defined in PARS, a more reliable and valid evaluation is possible than with questionnaire scales. In order to ease the rating process and shorten the evaluation time, the evaluator assigns values at three levels—none (0 points), somewhat apparent (1 point), and apparent (2 points)—for the 34 items listed as typical behavioral symptoms of PDD. This innovation ensures that the time required to implement PARS is kept to 30–90 min, depending on the interviewer's proficiency and the target's age and symptoms.

There is no international literature on the psychometric properties of PARS, although PARS is now widely used in Japan. This study examined the reliability and validity of PARS and involved a study population of 628 test subjects that included 302 people with PDD and 326 people without PDD. Specifically, we evaluated the inter-rater reliability, factor structure, internal consistency, correlation with the ADI-R, and the ability to distinguish subjects with PDD from a nonclinical sample.

2. Methods

2.1. PARS

The PARS instrument has been developed (Adachi et al., 2006; Kamio et al., 2006; Tsujii et al., 2006) and published (PARS Committee, 2008) in Japan. It involves the evaluation of PDD symptoms through a semi-structured interview conducted with a parent or family member of the subject as the target. This tool can be used to assess not only the risk of PDD but also the need for support pertaining to administrative and medical services. PARS comprises both an evaluation of symptoms when they were most pronounced during infancy (named the peak symptoms scale) and an evaluation of current symptoms (named the current symptoms scale). The former is used mainly to an assessment of PDD risk, and the latter is mainly used in assessment of actual support needs. The peak symptoms scale, which comprises 34 items, is the same for subjects of all age groups, whereas the current symptoms scale, which comprises 57 items, has 3 versions targeting different age groups: preschoolers, primary schoolers, and adolescents/adults. This study reports on data obtained from the peak symptoms scale.

The PARS peak symptoms scale comprises 34 items that describe the characteristic behavioral symptoms of PDDs during the preschooler phase. The items were selected by a panel of eight child psychiatrists and a developmental clinical psychotherapist who were specialized in autism research and clinical practice with more than 10 years of expertise. They compiled behavioral characteristics shown by children with PDD and classified them into eight categories—Interpersonal

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Relationship, Communication, Restricted Interests, Stereotyped Behavior, Resistance, Hypersensitivity, Clumsiness, and other complications. From these, 34 items relating to symptoms that are specific to PDD, as well as items relating to nonspecific symptoms with high need for either clinical or administrative support, were selected. Twenty-two out of the 34 items corresponded to diagnostic features for PDD in the *Diagnostic and Statistical Manual 4th Edition, Text Revision* (DSM-IV-TR; American Psychiatric Association, 2000), and 8 corresponded to associated features. Symptoms described in the remaining four items (items 15, 27, 28, and 32) were not listed in the DSM-IV-TR, but since they are often present in PDD children seen in everyday clinical experience, they were included in the scales.

The evaluation of each item in PARS is based on a 30-page manual (PARS Committee, 2008). This manual includes detailed explanations of the questioning and rating standards for each item. For example, for item 1 of the peak symptoms scale (not making eye contact), a sample question "has the child ever had difficulty making eye contact?" is presented, and the rating standards are listed in detail: "0: made eye contact always," "1: had some difficulty making eye contact (made eye contact when requesting or showing interest in something but not otherwise; sometimes made eye contact and sometimes did not; made eye contact only with the parents but not with others)," and "2: rarely made eye contact (did not make eye contact with parents; avoided eye contact)." In this way, evaluation based on subjective criteria of the interviewer is avoided, and a more objective evaluation is possible.

2.2. Sample

The 572 subjects of the main sample comprised two broad groups: a PDD group made up of 277 subjects and a nonclinical control group made up of 295 subjects (Table 1).

Participants in the PDD group were diagnosed as having PDD or subordinate disorders based on the DSM-IV by experienced psychiatrists of medical and educational facilities in 28 areas throughout Japan. The diagnoses were made by integrating data from parental interviews; developmental and medical information; records provided by parents, other caregivers, and teachers; and direct observations of and interactions with the children. Subjects were referred to the facilities due to developmental concerns and randomly recruited for the study by examiners belonging to the facilities. Among these, 175 subjects underwent full-scale IQ tests using intelligence scales such as the Wechsler (Japanese WISC-III Publication Committee, 1998; Shinagawa, Kobayashi, Fujita, & Maekawa, 1990), Binet (Tanaka Institute for Educational Research, 2003), and K-ABC scales (Kaufman, Nadeen, & Kaufman, 1993). Of the 175 subjects, 51 were considered mentally retarded (IQ < 70), while 118 were not (IQ ≥ 70). To evaluate the correlation between PARS and the ADI-R, an ADI-R interview was additionally administered to 74 subjects (mean age = 14.0 years; SD = 3.6; range = 7–24 years; mean IQ = 86.2; SD = 24.7; range = 40–135) from the PDD group.

Table 1
Characteristics of the main sample.

	Age			IQ			Gender		
	M[a]	SD[b]	Range	*M*	SD	Range	Male	Female	Total
All age groups									
PDD[c] group	12.5	5.8	3–39	81.6	29.2	19–142	233	44	277
Without MR[d] (IQ[e] ≥ 70)	12.7	5.5	4–39	97.2	16.8	70–142	105	13	118
With MR (IQ < 70)	12.3	4.9	5–31	43.6	15.7	18–69	44	13	57
IQ unknown	12.4	6.3	3–32	–	–	–	84	18	102
Nonclinical control group	1.08	7.6	3–38	–	–	–	153	142	295
Preschoolers (age, 3–6 years)									
PDD group	5.1	1.0	3–6	74.1	24.5	22–121	27	12	39
Without MR (IQ ≥ 70)	5.4	0.8	4–6	87.7	13.6	70–121	9	5	14
With MR (IQ < 70)	5.9	.4	5–6	47.0	17.8	22–68	3	3	6
IQ unknown	4.5	1.0	3–6	–	–	–	15	4	19
Nonclinical control group	4.8	1.0	3–6	–	–	–	69	63	132
Primary schoolers (age, 6–12 years)									
PDD group	9.9	1.8	6–12	80.9	31.9	18–140	94	15	109
Without MR (IQ ≥ 70)	10.2	1.7	7–12	99.6	16.2	71–140	46	5	51
With MR (IQ < 70)	9.2	2.0	6–12	40.5	13.5	18–65	16	5	21
IQ unknown	10.0	1.7	7–12	–	–	–	32	5	37
Nonclinical control group	9.2	1.8	6–12	–	–	–	34	33	67
Adolescents and adults (age, 12–39 years)									
PDD group	17.3	5.2	12–39	77.4	31.2	19–142	112	17	129
Without MR (IQ ≥ 70)	17.1	5.5	12–39	97.9	16.9	70–142	50	3	53
With MR (IQ < 70)	15.9	3.7	12–31	44.9	16.7	19–69	25	5	30
IQ unknown	17.8	5.0	12–32	–	–	–	37	9	46
Nonclinical control group	20.1	6.0	13–38	–	–	–	50	46	96

[a] Mean.
[b] Standard deviation.
[c] Pervasive development disorders.
[d] Mental retardation.
[e] Intelligence quotient.

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Participants in the nonclinical control group were recruited from the local communities by individual examiners at locations such as schools, daycare centers, universities, offices, parents' circles, and neighborhood organizations. Individuals were excluded from the nonclinical control group if they had a clinical diagnosis of any psychiatric disease. IQs were not recorded for the nonclinical control group because they did not have histories of any psychiatric problems or special needs education and were considered to have normal intellectual ability.

Furthermore, separate from the main sample, data from 56 participants (mean age = 9.2 years; SD = 5.8; range = 3–26 years) diagnosed as having PDD by experienced psychiatrists were analysed to evaluate the inter-rater reliability of PARS.

The protocol of this study was approved by the institutional review board of Hamamatsu University School of Medicine.

2.3. Procedure

Psychiatrists, clinical psychologists, and graduate students involved in the service for developmental disorders administered the PARS interview by referring to the manual. They had undergone a brief training, which had the following agenda: (a) a lecture on psychiatric features of individuals with PDD; (b) instructions on the rating criterion of each item of PARS; and (c) open completion, scoring, and discussion of the interview. They conducted the PARS interview with the informants (many of whom were parents) after obtaining the appropriate informed consent. The interviewers were not completely blind to the probands' diagnosis because some of them recruited participants themselves. For some participants, an additional ADI-R interview was implemented by Japanese interviewers who had undergone a three-day long ADI-R training workshop in the United States to learn the implementation and scoring methods of ADI-R (Lord et al., 1994). They created a Japanese translation of the ADI-R and received permission from the original author and the publisher to use it through a validation process based on Japanese sample (Tsuchiya et al., submitted for publication). The ADI-R generates algorithm scores for each of the three subdomains; (a) qualitative impairments in reciprocal social behavior; (b) delays in language development; and (c) restricted range of interest and/or stereotypic behaviors. The item composition of the subdomain of delays in language development differs depending on whether or not a subject can use language. We implemented ADI-R only for subjects who can use language.

For the sample used for evaluation of inter-rater reliability, PARS was administered independently to each informant by two interviewers (one experienced specialist and one less experienced trainee).

2.4. Statistical analyses

A comprehensive examination of the reliability and validity of PARS was conducted in five steps. First, to consider the inter-rater reliability of PARS, the correlation coefficient between the scores recorded by the two interviewers of the same subject was calculated. Second, to examine the factor structure of PARS, exploratory factor analysis (mean-adjusted weight least-square estimation with promax rotation) was performed based on the PDD group data, and four subscales were extracted. As the score for each item was considered as an ordered categorical variable of three values, factor analysis was carried out using the polychoric correlation coefficient (see Holgado-Tello, Chacon-Moscoso, Barbero-Garcia, & Vila-Abad, 2010). Third, the α coefficient was calculated based on data of the PDD group to examine the internal consistency of the overall scale and four subscales. Fourth, to examine convergent validity, correlation of PARS scores with the ADI-R algorithm scores was considered using Pearson's coefficient.

Fifth, to consider how well PARS distinguishes between PDD and non-PDD, *t*-tests and receiver operating characteristic (ROC) analysis (Swets, 1988) were performed. ROC analysis plots the curve (ROC curve) of the true positive rate (sensitivity) vs. the false positive rate (one minus specificity) as the discrimination cutoff value is varied. The larger the area under the ROC curve (AUC), the higher the discriminative power of the scale. In general, sensitivity and specificity are in a trade-off relationship, and the two cannot be simultaneously maximized. In the present study, the cutoff value was set at the point where the sum of sensitivity and specificity was the largest, and sensitivity and specificity for that point were reported. Further analysis including the presence of mental retardation (MR) as a variable was conducted to consider whether the discriminative power of PARS is influenced by IQ level.

Before initiating the abovementioned analyses, we examined the difference in the scale scores for the 3 age groups because previous studies (Adachi et al., 2006; Kamio et al., 2006; Tsujii et al., 2006) have examined the scale properties of the PARS separately for each age group. One-way ANOVA showed that the total PARS score did not significantly differ for the 3 age groups, both in the PDD group, $F(2, 280) = .41$, $p = .66$, and in the control group, $F(2, 315) = 2.49$, $p = .08$. Therefore, we decided to perform the analyses without any distinction between the age groups.

Significance levels of statistical tests were set at 5% and 1%. Mplus (Muthén & Muthén, 1998–2007) was used for factor analysis, and SPSS 15.0J (SPSS Inc., 2006) was used for other analyses.

3. Results

3.1. Inter-rater reliability

Spearman's rank correlation coefficients between the scores of two interviewers were significant for all items ($p < .05$ in item 27; $p < .01$ in remaining items), with an average value of .68 (SD = .11). For the total score, the Pearson's correlation coefficient between the scores of the interviewers was $r = .78$ ($p < .01$).

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Table 2
Corrected item-total correlations and factor loadings.

No.	Item	I-T corr.[a]	Factor loading			
			F1 SC[b]	F2 SD[c]	F3 SB[d]	F4 RI[e]
5	Does not communicate interest by pointing	.70	**.83**	.17	.01	−.20
6	Verbal development is delayed	.71	**.82**	−.29	.00	.09
7	Conversation does not continue	.79	**.81**	−.22	.03	.29
4	Does not bring items to show	.67	**.79**	.16	.08	−.23
1	Does not make eye contact	.74	**.69**	−.01	.06	.04
2	Is not interested in other children	.74	**.62**	.23	−.02	−.05
9	Does not play with other children	.79	**.57**	.08	.15	.06
3	Does not look back when name is called	.70	**.53**	.02	.20	.06
28	Becomes unstable bringing back to unpleasant memories	.53	−.20	**.82**	−.06	−.01
26	Becomes confused when everyday situations or routines changes	.69	.06	**.67**	−.12	.06
33	Suddenly cries or becomes upset	.60	.12	**.62**	.02	.05
32	Is very scared over nothing	.54	−.10	**.60**	−.06	.18
34	Show self-injurious action like banging head on wall or chewing hands	.46	.01	**.41**	.26	−.15
27	Cannot maintain personal independence due to disrupted lifestyle	.41	−.17	**.40**	.25	−.19
30	Disturbed by particular sounds	.63	−.03	**.37**	.19	.21
24	Does not like to be touched	.58	.14	**.37**	.20	.10
31	Is either insensitive or oversensitive to pain, heat, etc.	.62	−.15	**.36**	.28	.03
20	Does not like to be held	.56	.18	**.25**	.16	.17
22	Turns pages or crumples paper repeatedly in the same way	.54	−.03	−.14	**.67**	.23
19	Eats or swallows nonfood items	.37	.00	−.05	**.66**	−.22
14	Likes watching things that revolve	.59	.03	−.05	**.66**	.13
18	Is hyperactive and may go anywhere if left unattended	.62	.05	−.20	**.65**	−.02
17	Walks on tiptoes	.47	−.01	−.01	**.60**	−.18
23	Moves entire or part of the body repeatedly in the same pattern	.56	.03	.07	**.54**	.06
12	Becomes immersed in sensory play	.61	.15	−.05	**.51**	.06
15	Looks at things from the corner of eye or from extremely close	.62	.15	−.03	**.48**	.23
11	Repeats the words of commercials, etc.	.61	−.08	−.06	.00	**.81**
10	Parrot-like repetition stands out	.68	.37	−.10	−.08	**.68**
13	Loves road signs, logos, numbers, and letters	.59	−.13	.09	.06	**.60**
8	Speaks only one way to say what he/she wants	.70	.09	.04	−.06	**.51**
21	Repeatedly watches specific scenes of videos	.62	−.11	.15	.14	**.49**
25	Persistently asks the same question	.48	−.28	.19	.00	**.38**
16	Becomes immersed lining up toys and bottles	.61	.05	.21	.03	**.34**
29	Extremely unbalanced diet, eats very few food items	.57	.03	.18	.11	**.24**

	Interfactor correlations			
	F1	F2	F3	F4
F2	.25			
F3	.45	.50	–	
F4	.27	.42	.33	–

Bold loadings indicate grouping in sub-scales.
[a] Corrected item-total correlation.
[b] Social Communication.
[c] Sensitivity/Difficulty.
[d] Stereotyped Behavior.
[e] Restricted Interests.

3.2. Factor structure and internal consistency

Table 2 shows the corrected item-total correlation for each item and the results of factor analysis. Based on a scree plot (9.25, 3.76, 2.36, 2.02, 1.68, 1.62, . . .) that showed a leveling-off of eigenvalues after the fourth factor (cf. Cattell, 1966) and perceived interpretability, a four-factor solution was employed. The four factors explained 42.27% of the variability of the total score, and each factor was named in decreasing order according to the factor loading of the items grouped in the factor, starting with Social Communication, Sensitivity/Difficulty, Stereotyped Behavior, and Restricted Interests. The α coefficient based on data of the PDD group was .84 for the communication scale (8 items), .74 for the sensitivity/difficulty scale (10 items), .72 for the stereotyped behavior scale (8 items), and .70 for the Restricted Interests scale (8 items). The α coefficient for all scales was .86. All of the individual item-to-total score correlations were positive and mainly substantial, in the range of .37–.79 (29 of the 34 exceeding .50). The mean values for each subscale and the total score for each group are shown in Table 3.

3.3. Correlation with the ADI-R

The correlation of PARS subscores and total score with ADI-R domain scores and total score is shown in Table 4. The score of Qualitative Abnormalities in Reciprocal Social Interaction in ADI-R showed moderate correlation with the score of Social

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Table 3
Means and standard deviations of PARS total score and subscores.

	Social Communication		Sensitivity/ Difficulty		Stereotyped Behavior		Restricted Interest		Total sore	
	M[a]	SD[b]	*M*	SD	*M*	SD	*M*	SD	*M*	SD
PDD[c] group	10.03	4.62	7.36	4.61	6.12	4.02	7.96	4.09	31.46	12.52
Without MR[d] (IQ ≥ 70)	8.83	4.37	7.04	4.99	5.46	3.68	8.11	4.23	29.45	13.00
With MR (IQ < 70)	12.66	3.18	7.83	4.39	8.21	4.12	8.45	4.17	37.14	11.55
Nonclinical control group	.38	1.19	.43	1.05	.54	1.07	.88	1.50	2.23	3.64

[a] Mean.
[b] Standard deviation.
[c] Pervasive development disorders.
[d] Mental retardation.

Table 4
Correlations between the ADI-R and PARS.

PARS	ADI-R			
	Social Interaction[a]	Communication[b]	Stereotyped Behavior[c]	Total score
Social Communication	.48**	.43**	.07	.48**
Sensitivity/Difficulty	.17	.03	.37**	.20
Stereotyped Behavior	.03	.27*	.42**	.25*
Restricted Interest	.07	.10	.41**	.19
Total score	.27**	.31**	.46**	.41**

[a] Qualitative abnormalities in reciprocal social interaction.
[b] Qualitative abnormalities in communication.
[c] Restricted, repetitive, and stereotyped patterns of behavior.
* $p < .05$.
** $p < .01$.

Communication in PARS. Furthermore, the score of Qualitative Abnormalities in Communication in the ADI-R showed moderate correlation with the score of Social Communication in PARS, and weak correlation with the score of Stereotyped Behavior and the total score in PARS. The score of Restricted, Repetitive, and Stereotyped Patterns of Behavior in the ADI-R showed weak correlation with the score of Sensitivity/Difficulty in PARS and moderate correlations with the score of Stereotyped Behavior and Restricted Interests and the total score in PARS. The total score of the ADI-R showed a moderate correlation with the score of Social Communication and the total score in PARS and a weak correlation with Stereotyped Behavior.

3.4. Discriminative validity

Table 5 and Fig. 1 shows the results of the *t*-test and ROC analysis between the PDD groups (whole group and without MR group) and the nonclinical control group. Three main points can be concluded from the table and figure. First, PARS shows high discriminative power even when the presence or absence of MR is controlled. Second, for either comparison, the total score has more discriminative power than the subscores. This is a general trend seen in other evaluation instruments such as

Table 5
Discriminative validity of the total and subscores of PARS.

	t[a]	AUC[b]	Cutoff point	Sensitivity	Specificity
PDD vs. nonclinical control					
Social Communication	33.9	.973	3	.929	.959
Sensitivity/Difficulty	24.6	.961	2	.921	.902
Stereotyped Behaviors	22.5	.928	2	.896	.851
Restricted Interests	27.2	.953	3	.875	.902
Total score	37.6	.991	9	.975	.956
PDD without MR vs. nonclinical control					
Social Communication	20.8	.964	3	.908	.959
Sensitivity/Difficulty	14.3	.949	2	.882	.902
Stereotyped Behaviors	14.4	.921	2	.882	.851
Restricted Interests	18.2	.952	3	.882	.902
Total score	22.5	.990	9	.975	.956

[a] All *t* values are significant at the 1% level.
[b] Area under the curve.

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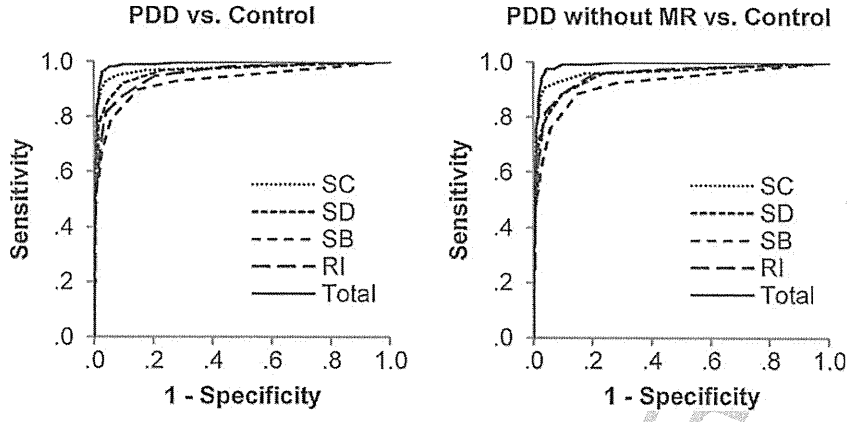

Fig. 1. Receiver operating characteristic curves for discrimination between normal control group and whole PDD (left) and PDD without MR group (right). SC, Social Communication; SD, Sensitivity/Difficulty; SB, Stereotyped Behaviors; RI, Restricted Interests.

the ADI-R (Lord et al., 1997) and ASQ (Berument et al., 1999). Third, the desired cutoff values are not affected by the presence or absence of MR.

4. Discussion

The objective of this study was to validate PARS, a scale developed for (1) the evaluation of PDD symptoms in a simpler manner than "gold standard" instruments, such as the ADI-R and ADOS, and (2) more objective evaluation than questionnaire scales, such as the ASSQ and ASQ. As long as the interviewer has a certain level of expertise pertaining to PDDs, PARS can be used after brief training and can be administered in an hour on an average by simplifying and structuring the interview procedure as much as possible and by using simple and clear terms in the manual. In this study, we administered PARS to individuals with PDD and nonclinical controls in order to examine its reliability and validity.

The rating scores recorded by two different interviewers of the same subject showed a sufficient correlation for individual items as well as for the overall score, demonstrating the inter-rater reliability of PARS. The developers of questionnaire scales have often criticized the form of the interview method, stating "the severity of each assessed behavior is rated by the interviewer 'second-hand' on the basis of the parent's answers" (Constantino et al., 2003). This criticism is based on the belief that the interview process produces random or systematic measurement error due to its "second-hand" nature. However, the PARS interview's high inter-rater reliability indicates that it produces little random error, probably because of each item's clearly defined rating criteria. We believe that a semi-structured interview conducted by specialists in treatment of developmental disorders will provide a more accurate measurement than a questionnaire scale based on the subjective judgments of people who lack specialized knowledge, as long as rating criteria are clearly defined and sufficient inter-rater reliability of the evaluation instrument is maintained.

Factor analysis extracted four subscales: Social Communication, Sensitivity/Difficulty, Stereotyped Behaviors, and Restricted Interests. The Social Communication scale corresponds to the "reciprocal social interaction skills" and "communication skills" criteria of the DSM-IV-TR (American Psychiatric Association, 2000), and the Stereotyped Behavior scale and the Restricted Interests scales correspond to the DSM-IV-TR's "presence of stereotyped behavior, interests, and activities." While there is no clear correspondence of the Sensitivity/Difficulty scale with the DSM-IV-TR criteria, it addresses many peripheral symptoms such as sensory over-responsibility and problematic behavior, which are thought to be important in practical support for PDD patients. Through these four scales, PARS not only covers core PDD symptoms but also covers a wide variety of peripheral symptoms. Each subscale and the overall scale showed an α coefficient greater than .70, which demonstrated sufficient internal consistency.

Correlation with the ADI-R clearly duplicated the correspondence relationships with DSM-IV stated above, demonstrating the convergent validity of PARS. Furthermore, the Sensitivity/Difficulty scale showed a correlation with the ADI-R's Restricted, Repetitive, and Stereotyped Patterns of Behavior domain. This might show that the limited interest or fixation on specific things or objects may be the root cause of peripheral symptoms included in the Sensitivity/Difficulty scale.

Through the ROC analysis of the ability of PARS to distinguish between PDD and non-PDD, PARS showed high discriminative power regardless of the intellectual capacity of the patient. The total score demonstrated a higher discriminative power than the subscores, similar to the case with the ADI-R (Lord et al., 1997) and ASQ (Berument et al., 1999). Considering its ease of implementation, PARS may be superior to the ADI-R or ADOS in terms of cost performance. Furthermore, the ROC analysis indicated that the selected cutoff value of PARS is relatively stable regardless of the intellectual capacity of the patient. The fact that a fixed cutoff level can be employed regardless of the nature of the interview subjects is considerably important in terms of convenience and utility in practical use.

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One limitation of the study is that the interviewers were not completely blind to the probands' diagnosis. This factor might have a positive influence on the result of discriminative power analysis. Thus, the conclusion about our measurement technique's discriminative power is limited. However, it is unlikely that this problem systematically affects the result of our other analyses (i.e., factor analysis, reliability analysis, and correlation analysis), because the lack of blindness might uniformly raise the score of the PDD group and lower the score of the control group. Such uniform changes do not affect these kinds of analyses.

Finally, we discuss future issues. First, although this study examined the discriminative power of PARS in differentiating between PDD patients and the general population, there is a need to examine its discriminative power in other developmental disorders, such as attention deficit hyperactivity disorder, which shows somewhat similar symptoms to PDD (Hattori et al., 2006), or in other mental disorders, including schizophrenia, depression, and anxiety disorder, which often occur together with PDD. Second, the effectiveness of PARS in distinguishing subordinate diagnoses of PDD, which was not included among the objectives of this study, also needs to be considered. By appropriately combining the four subscales extracted in the factor analysis, PARS might be able to distinguish among subordinate diagnoses. We believe this is also an important issue with respect to the versatility of PARS. Third, an English version needs to be developed if PARS is to be used internationally. Currently, PARS is published in Japan and is being used by many clinical and research institutions (Yamada et al., 2007), but it cannot be used overseas as the Japanese version is the only one that exists. Since PARS is simpler than the ADI-R or ADOS and has sufficient reliability and validity, it can be an extremely useful instrument worldwide.

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■原　著■

広汎性発達障害児の人物画研究(1)：DAM項目による身体部位表現の分析

明　翫　光　宜[*1]　　望　月　知　世[*2]
内　田　裕　之[*3]　　辻　井　正　次[*4]

Key words：広汎性発達障害，人物画，身体部位

要旨：本研究では，広汎性発達障害児の人物画の特徴を捉えるために，定型発達児との比較研究を行った．対象は広汎性発達障害群30名(男児)，定型発達群97名(男児)であった．DAM項目について両群を比較したところ，DAM-IQなどの総合指標だけの分析では広汎性発達障害の心理査定に限界があり，人物画に描かれている身体部位表現に注目することの重要性を示唆した．

Ⅰ．目　的

子どもを対象にしたアセスメント技法として，描画法は親しみやすく，短時間で簡単に実施できることから，臨床現場でよく使用されている．特に人物画は，知能や発達指標として有効性が高く，身体図式など発達支援においても有効な情報を提供することから広く活用されてきた．人物画の研究は，これまで実に多くの研究が行われてきている一方，広汎性発達障害(以下PDDとする)を対象にした研究はまだ十分に行われていない．本研究は第1報としてPDDの人物画の基礎資料を提示し，その基本的特徴について述べることとする．

1．人物画による知能の測定

人物画の利用の方向性として，Goodenough (1926)が「Draw a Man（以下，DAMとする)」を知能検査として用いたことを受け，一門・山下(1983)が，53名の自閉症児に対してDAMと田中ビネーとの対応を検討し，DAM-MA，DAM-IQともにビネーMA，ビネーIQよりも低くなると述べている．また，中野・勝野・栗田(1992)は，自閉傾向が高くなると人物画描画能力が低くなること，DAM-IQがビネーIQよりも劣る例が多かったと報告している．これに対して全般的知能に比べて人物画描画能力が高い傾向にあるという報告もある(渡辺・長沼・瀬戸屋ら，

Mitsunori MYOGAN et al：A Study on the Draw a Man Test in Children with Pervasive Developmental Disorders (1)：The Analysis of Body Proportion by DAM Item
[*1] 東海学園大学人文学部［〒468-8514 愛知県名古屋市天白区中平2-901］
[*2] NPO法人アスペ・エルデの会，[*3] 大阪大学大学院連合小児発達学研究科，[*4] 中京大学現代社会学部

2002)．こうした結果の違いは，知能検査としての課題ないし刺激の違いが反映されること，つまり各検査に示される子どもの知的能力の対応が異なることが示唆される．

一方，渡辺ら(2002)は自閉症の症状の程度を評価するCARSとDAM-IQとの相関が低いことから，人物画は自閉症状の程度よりは全般的知能の発達と関連があることを示唆している．さらに，人物画描画能力の発達をビネーと比較してPDD群を「DAM優位型群」と「DAM＝ビネー型群」とに分類し，CARS-TVの各項目を比較したところ，DAM優位型群では，対人関係や模倣，コミュニケーション，視覚的な反応について自閉症状が有意に高かった．このことから，DAM優位型のPDD児は，一般的に大人や子どもとの関わり(コミュニケーション，遊び，模倣)を通じて人間のイメージを作り，自分のイメージを何度も描き，人物画を発展させていく人物画の発達のプロセスとは異なる可能性を示唆した．Lim & Slaughter (2008)はアスペルガー障害群(以下，AS群とする) 21名と定型発達群28名を対象にHTP法による比較を行い，人物画得点についてはAS群が有意に低かったという結果を見出している．また，人物画得点とVABS(ヴァインランド適応行動尺度)のコミュニケーション領域得点との間に有意な正の相関があったことから，Lim & Slaughterは，AS群は全般的な描画能力は問題ないが，人物画など特定の描画能力に問題があること，詳細な人間表象を持たないこと，人物画を描く動機の低さ，描画順の違いなどの特徴を述べた．

以上の諸研究から，DAMと知能検査の対応についてはIQという数値だけから評価するのではなく，認知過程や情報処理過程などを考慮に入れることで，人物画によるPDDの心理査定の有用性は十分にあること，他の心理検査との相関研究に示唆されるように，人物画はことばではなくグラフィックな表現としてのコミュニケーションの発達と関連があることが明らかになっている．

2. PDDの人物画特性について

一方，DAM項目やKoppitz (1968)の発達指標・情緒指標の通過率(注)からPDDの特徴を検討した研究もある．一門・山下(1983)では，「胴」，「衣服」，「指」，「脚」，「衣服全部」，「腕の長さ」の通過率が有意に低く，全体としてアンバランスな人物画であることが示唆された．またKoppitzの情緒指標では個々の指標に対する解釈は難しく，「非現実的なパターン化された像」，「荒く不安定な描線」，「表面的な性差の抽出」などの特徴から，自閉症の身体図式の希薄さ，不器用の問題，対人関係の障害を示唆した．

また，藤本・磯部・山田ら(1991)は，自閉症群は身体に関する情報を一般的な知識として抽出できるが比率や明細度など詳細な情報の抽出が困難であること，小林(1977)のDAM法が発達的な順序に従ってDAM採点項目が配列されている点に着目し，非自閉症群や定型発達児群は大筋この順序に従っているが，自閉症群は発達順序に従わず，スキャッターが多かったことを報告している．

是枝・東條(2004)は，自閉症児20名(男子17名，女子3名：range：7～12歳)を対象に人物画を施行し，分析を行った．その結果，目や口，手や足など，身体の基本的な部分の描写は全般的にクリアーできているものの，胴体の長さの割合や腕の付け方(通過率は55%)，頭や足の割合(通過率は45～65%)など，身体像の全体的なバランスの描写がやや欠ける面がうかがえた．この傾向は，身体図式の未熟さや認知特性などが人物像を視覚的にイメージして，限られた紙面上に全身のバランスを考えて描画していくことに，少なからず影響を与えていると考察している．

望月(2008)の研究では，定型発達群と比較して以下の特徴が指摘された．定型発達群は，間接の表現，顎の抽出，拇指の分化の表現など高度な人間らしい抽出表現になっていくのに対して，HFPDD群は「首」，「首の輪郭」，「脚の割合」の通過率が低く，眼，口や手足のつき方などの基本的な抽出が不正確である傾向がある．また構図を決める上で重要な描き順に着目すると，定型発達群は「頭→髪→顔」などある程度のパターンが存在したが，HFPDD群においては実に様々なパターンが認められた．人物画の発達に着目すると，定型発達群の人物画は小学校1年生で基本像がほぼ完成し，完成後は手足の関節やバランスなど全体像としてまとめ上げていく傾向があるのに対して，HFPDD群は小学校3年生になって基本像が完成し，その後は全体像よりは部分の細かさの抽出に向かう傾向があることである．

事例検討として，末次(2003)は，言語性LD，非言語性LD，高機能自閉症，ADHD，境界線知能という発達障害児5例について人物画を通して分析を行った．その結果，発達障害に共通する特徴として「低い自己評価」，「弱い身体イメージ」，「特定部分への固執」，「知的レベルに比較して低い描画能力」，「独特な発達的変化」の5つの特徴を示した．近藤(2003)は，アスペルガー障害の男児事例の6歳から12歳までの間に描かれた15枚の人物画をGoodenough法とKoppitz法を用いて分析した．この事例における表現の変化を通して，PDD児は定型発達児に比較して約3年の遅れを見せながら描画が発達していくこと，知的能力と人物画テストの成績が乖離しやすいこと，身体の一部を詳しく描く傾向，描画全般における統合不全，非相称，部分の欠如，全体のバランスが悪いなど，描画に心理的付加を加えることが少ない傾向であることを示唆した．小坂・生天目・中村ら(2008)は，不登校で来談したPDD児の事例研究において，瞳がない，手の指が描けていない，衣服が簡素であるという人物画の特徴を指摘している．

以上の先行研究から，PDD群は人物画の基本的な部分を抽出できるが，比率など身体の全体像を踏まえてバランスよく描くという構成力に問題があることが共通しており，この点が上記のビネーIQとDAM-IQの不一致を生んでいると考えられる．

3. PDDの描画特性について

このように，PDDの人物画には特徴があるが，こうした表現の成立機序に目を配ると，PDD児の場合，入力情報を違う形式に変換するのが困難であることが注目される．例えば，自閉症児は視覚・空間情報を限定的で柔軟性のない方法で利用して描画課題に取り組むために，見えたものを見えたまま正確に描こうとする傾向があると考えられている(Eames & Cox, 1994)．また描画過程で絵を重ねるoverlapや個々の要素を分離するfragmentationの視点から描画を評定すると，自閉症児群にこれらの特徴が多く該当するという．通常，人間という概念は身体部位の寄せ集めではなく人間像全体として統合されやすいが，自閉症児の場合，この統一感に欠けていること(fragmentation)，注意の狭さ，統合の難しさ(overlap)があることが考えられている(Fein,Lucci & Waterhouse,1990)．

日本では，松瀬・若林(2001)が，自閉症児の描画に特徴的な表現として，特異なこだわり，細密な描写，特異な興味・関心に関連した描画，文字や記号の使用，抽象画的描画などが見られること，人物画の描出の遅さ・稚拙さを指摘している．こうした知見からPDD児の認知特性が描画を通して理解できると同時に，木谷(2003)が指摘するようにPDD児の認知の準拠枠そのものを支援者が共有し，PDD児を取り巻く環境や外的世界の意味(内的世界)を支援者自身

表1-1　本研究の対象児の内訳(低学年)

低学年	1年生	2年生	3年生	合計
PDD群	3	9	1	13
T群	17	15	17	49

表1-2　本研究の対象児の内訳(高学年)

高学年	4年生	5年生	6年生	合計
PDD群	7	7	3	17
T群	16	18	14	48

が解釈し直す可能性は十分にあると考えられる．このようにPDD独自の描画の特異性が次第に明らかになっているが，現状の人物画の評価法は部分の明細を中心に加算していくシステムであり，PDDの描画過程や要素間の関連に注目していない．つまり，従来の評価法通りに解釈していくとPDD独自の特性がどうしてもこぼれてしまう．人物画の採点システムにおいて，発達障害を捉える分析モデルを考案していく必要があるだろう．

4．本研究の目的

本研究では，PDD児の人物画の特徴を明らかにすることを基本的問題点とし，同じ生活年齢の定型発達群との比較から，①PDD群の人物画描画能力が本当に遅れるのか，②遅れるとしたらPDD児が人物画のどの部分で得点が低くなり，描画能力の発達の遅れがどのような部分に表れやすいのかをDAM項目を「人物の部分」，「各部分の比率」，「部分の明確化」の3つのカテゴリーに分けて検討する．なお，描画の発達研究の知見から，定型発達児が9歳に達すると，人物画はほぼ完成像を示すといわれている(小林，1977)．さらに，9歳以降の人物画は表現の仕方の複雑化・簡略化という質的な変化が見られるという(小林，1977)．しかし，本研究では定型発達児の発達的変化ではなく，PDD群にみられる人物画特性を明らかにすることを基本的問題点としたため，PDD群，定型発達群共に1～6年生までを調査の対象とし，評定・分析を行った．

Ⅱ．方　法

1．対象

PDD群については，児童精神科医が広汎性発達障害と診断し，1名以上の臨床心理士が診断を確認している児童期事例38名(男子33名，女子5名)を対象とした．検査の実施においては，筆者(望月)が対象児の保護者に書面にて研究主旨を説明し，同意が得られた児童に対して検査を実施した．分析の対象は，人物画を描くことのできなかった4名を除いた34名とした．また筆者らは，34名のうち男児が30名と多かったこと，また人物画において性差が認められるという事実(日比，1994)に着目した．そこで，本研究ではPDD群の同質性を確保するために，以下の分析に男児のみの描画を用いた．なおPDD群の内訳は，年齢9.03±1.81歳(range6–12)，知能検査(WISC–Ⅲ)による全IQの平均は，99.18±19.14 (range52–139)であった．

また，定型発達群(以下T群とする)として，A県内の公立小学生1年から6年まで198名が調査に参加した．各クラスには筆者(望月)が，研究主旨を説明した後に調査を実施した．なおPDD群との比較のため，男児のみを分析対象とした．分析対象児の内訳は以下の通りである(表1–1：表1–2)．

2．調査期間

2008年7月～11月にかけてである．

3．手続き

PDD群には個別に対面方式で，T群には集団法で人物画を実施した．教示は「あなたと同じ性別の人を1人描いてね．頭から足まで全部描いてね」と教示した．性別ではわからない子どもに

表2　DAM項目の分類

①人物の部分		②部分の比率		③部分の明細度			
No	Item	No	Item	No	Item	No	Item
1.	頭	8.	胴の長さ	10.	腕と脚のつけ方A	34.	腕および脚の輪郭
2.	目	18.	脚の割合	11.	眉またはまつ毛	35.	肩
3.	胴	21.	眼の形	12.	衣服	36.	肩または腕脇の関節
4.	脚	24.	足の割合	13.	毛髪B	38.	掌
5.	口	27.	腕の割合	15.	腕と脚のつけ方B	39.	衣服の部分4つ以上
6.	腕	29.	頭の割合	17.	首の輪郭	40.	描線A
7.	毛髪A	33.	耳の位置と割合	19.	衣服2以上	41.	脚の関節
9.	鼻	37.	顎と額	20.	両眼の瞳	42.	鼻と口の輪郭
14.	首	45.	顔貌	23.	踵	43.	横向きA
16.	指			25.	頭の輪郭	44.	鼻孔
22.	耳			26.	衣服の全部	46.	顎の突出
				28.	指の細部	47.	衣服の種類完成
				30.	眼の向き	48.	親指の分化
				31.	胴の輪郭	49.	横向きB
				32.	指の数	50.	描線B

対しては「男か女かということです．あなたはどちらですか？」と確認したあと，描き始めるように促した．用紙は縦にして子どもに提示したが，横にしようとする子どもに対しては1度だけ「縦にして描いてください」と伝え，それでも横で描こうとする時にはそのまま描画させた．所要時間，描画中に見られた子どもの行動は調査者によって記録された．描画後，人物画の性別を確認し，不明な部位については質問を行った．

4. 材料

B5普通紙1枚，鉛筆，消しゴム

5. 評定方法

人物画については，小林(1977)によるGoodenough人物画知能検査の改訂版に基づいて50項目について評定した．その際に人物画描写の質を検討するために，野本(2000)にならい50のDAM評価項目を，①「人物の部分」11項目，②「各部分の比率」9項目，③「部分の明細度」30項目のカテゴリーに分類した(表2)．3カテゴリーの評価ポイントとしては，①「人物の部分」は身体像全体の部分・下位概念にあたり，これらに欠落があることは身体像全体の構成に問題があることが示唆される．また②「各部分の比率」は身体部位の欠落としてではなく身体部位それぞれが適切なバランスで描かれているかどうかを確認する項目群であり，③「部分の明細度」は丁寧に身体部位や附属物を描くことで認知の分化度や洗練度・詳細な表現能力が反映される項目群である．

本研究では，PDD群の人物画特性を捉えるために，各DAM項目についての通過率を算出した．通過率が高いとPDD群においてその項目が描かれやすい傾向を，通過率が低ければその項

表3　PDD群とT群におけるDAM得点，DAM－IQの平均値

	PDD群				T群			
	低学年 (N=13)		高学年 (N=17)		低学年 (N=49)		高学年 (N=48)	
	平均	SD	平均	SD	平均	SD	平均	SD
DAM得点	17.69	9.26	24.41	5.29	25.12	5.17	26.54	4.70
DAM－IQ	85.12	28.81	72.80	10.48	97.86	13.15	74.42	10.36

目が描かれることが少ない傾向を示す．

さらに総合的な指標として，通過したDAM項目を加算したものがDAM得点となり，そのDAM得点に基づいてDAM–MA（精神年齢），DAM–IQ（知能指数）が換算される．

なお，統計的解析には，Windows版SPSS Statistics18を用いた．

Ⅲ．結　果

1．DAM得点，DAM–IQについて

分析にあたってPDD群とT群を低学年（1～3年生），高学年（4～6年）に分けて比較した．まず，DAM得点，DAM–IQについて検討するために，PDD群とT群を年齢要因（低学年・高学年）×診断の要因（PDD・T）の4条件の平均値を示し（表3），2×2の分散分析を行った．

DAM得点では，診断要因と年齢要因のそれぞれに有意な主効果が認められた（$F(1, 123) = 16.73$, $p < .01$；$F(1, 123) = 12.12$, $p < .01$）．また年齢要因と診断要因の交互作用が有意であったため（$F(1, 123) = 5.14$, $p < .01$），Bonferroni法を用いて単純主効果の検定を行った．その結果，低学年における診断要因の単純主効果（$F(1, 123) = 18.39$, $p < 0.01$）とPDD群における年齢要因の単純主効果（$F(1, 123) = 10.77$, $p < 0.01$）が有意であった．

DAM–IQでは診断要因と年齢要因のそれぞれに有意な主効果が認められた（$F(1, 123) = 5.67$, $p < .05$；$F(1, 123) = 35.39$, $p < .01$）．なお年齢要因と診断要因の交互作用は認められなかった．

これらの結果からPDD群のDAM得点は高学年になると得点が伸び，DAM得点，DAM–IQにおいて両群の差が狭くなっていくことが注目される．また高学年になり，PDD群とT群のDAM–IQが低下しているのは，小林（1977）の指摘する通り，描画の簡素化が全体の得点に反映されたと考えられる．

2．DAM項目の特徴について

次に，PDD群のDAM項目の特徴について比較した（表4–1，表4–2，表4–3）．DAM項目の通過率の差についてχ^2検定またはFisher直接法を行った．なお，Fisher直接法は各セルの度数が5未満の場合に用いた．

人物画の基本的な部分では（表4–1），低学年の「毛髪A」，「指」の項目においてPDD群がT群に比較して有意に低かった．なお高学年において，PDD群とT群との間に有意差は認められなかった．

次に，人物画の部分の割合では（表4–2），低学年の「胴の長さ」，「脚の割合」の項目においてPDD群がT群に比較して有意に低かった．なお高学年においてPDD群とT群との間に有意差は認められなかった．このように人物画の基本的な構成では，低学年においてPDD群とT群にいくつかの描画のスタイルに違いが認められることがうかがえる．

最後に，人物画の明細度では（表4–3），低学

表4-1　人物の部分におけるPDD群とT群の通過率の比較

Item	低学年			高学年		
	PDD群 (N=13)	T群 (N=49)	χ^2値またはFisher'sP	PDD群 (N=17)	T群 (N=48)	χ^2値またはFisher'sP
頭	13 (100)	49 (100)	n.s.	17 (100)	48 (100)	n.s.
目	13 (100)	49 (100)	n.s.	17 (100)	48 (100)	n.s.
胴	12 (92.3)	49 (100)	n.s.	17 (100)	48 (100)	n.s.
脚	12 (92.3)	49 (100)	n.s.	17 (100)	48 (100)	n.s.
口	13 (100)	49 (100)	n.s.	17 (100)	47 (97.9)	n.s.
腕	12 (92.3)	49 (100)	n.s.	17 (100)	48 (100)	n.s.
毛髪A	10 (76.9)	49 (100)	P=.0075**	17 (100)	48 (100)	n.s.
鼻	7 (53.9)	33 (67.4)	n.s.	10 (58.8)	37 (77.1)	n.s.
首	4 (30.8)	16 (32.7)	n.s.	9 (52.9)	21 (43.8)	n.s.
指	6 (46.2)	48 (98)	P=.00**	13 (76.5)	44 (91.7)	n.s.
耳	5 (38.5)	24 (49)	n.s.	8 (47.1)	31 (64.6)	n.s.

*・・・p＜.05　**・・・p＜.01

表4-2　人物の部分の割合におけるPDD群とT群の通過率の比較

Item	低学年			高学年		
	PDD群 (N=13)	T群 (N=49)	χ^2値またはFisher'sP	PDD群 (N=17)	T群 (N=48)	χ^2値またはFisher'sP
胴の長さ	8 (61.5)	45 (91.8)	P=.0151*	15 (88.2)	42 (87.5)	n.s.
脚の割合	1 (7.69)	19 (38.8)	P=.0451*	6 (35.3)	17 (35.4)	n.s.
眼の形	2 (15.4)	19 (38.8)	n.s.	7 (41.2)	25 (52.1)	n.s.
足の割合	2 (15.4)	23 (46.9)	n.s.	4 (23.5)	18 (37.5)	n.s.
腕の割合	5 (38.5)	22 (44.9)	n.s.	6 (35.3)	20 (41.7)	n.s.
頭の割合	4 (30.8)	6 (12.2)	n.s.	4 (23.5)	9 (18.8)	n.s.
耳の位置と割合	4 (30.8)	17 (34.7)	n.s.	5 (29.4)	20 (41.7)	n.s.
顎と額	6 (46.2)	35 (71.4)	n.s.	10 (58.8)	27 (56.3)	n.s.
顔貌	0 (0)	0 (0)	n.s.	0 (0)	0 (0)	n.s.

*・・・p＜.05　**・・・p＜.01

年の「衣服」,「毛髪B」,「腕と脚のつけ方B」,「衣服2以上」,「両眼の瞳」,「衣服全部」,「指の数」においてPDD群がT群に比較して有意に低かった．高学年においても「毛髪B」,「衣類全部」,「胴の輪郭」においてPDD群がT群に比較して有意に低かった．

低学年のPDD群は，明細度に示される人間の身体の細かな描写だけではなく，毛髪や指，衣服，瞳といった人間の身体に備わる基本的な部分を描くことも苦手であることが示唆された．