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Behavioral characteristics of 187 young adults with autism

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Abstract A survey was conducted on the present behavioral characteristics of 187 cases of adult autism in patients over 18 years of age employing Achenbach's Child Behavior Checklist (CBCL). When their behavioral characteristics were evaluated in relation to Present Language Developmental Level (PLDL) and Present Adaptive Level (PAL), it was seen that greater variation in behavior characteristics was seen among those exhibiting increasingly lower PLDL and PAL scores. Behavior characteristics reminiscent of depression were noted even among those exhibiting high PLDL. Behavior pointing to obsession was found in common among almost all cases of autism irrespective of PLDL or PAL. Psychotic symptoms such as hallucinations and delusions were absent in most cases. The results of the present study were indicative not only of the significance of obsessive behavior in autism, but also its significance in terms of delving further into the psychopathology of the disorder.

Key words Achenbach's Child Behavior Checklist (CBCL), autism in adults, depression, obsession, schizophrenia.

INTRODUCTION

Today, it is well known that autism is not a disorder restricted to infancy, but a disorder in which impairment of some sort will persist throughout life. The results of long-term follow-up study on autism have mostly been pessimistic,[1–5] although recent results indicate considerable improvement in the prognostic picture.[6]

Because autism is a syndrome defined by characteristics of behavior, there is considerable range in the level of mental development involved. In particular, the behavioral characteristics of autism upon reaching adulthood are quite varied, reflecting this disparity in mental development. For this reason, any attempt to capture a comprehensive pathological picture of autism in adulthood invariably incurs great difficulty. Apart from the follow-up studies, there have been a number of reports to date on the behavioral characteristics of subjects with autism in adulthood.[7] Despite improvement in the overall prognosis for autism, the studies demonstrate that conduct disorders and ego disturbances remain quite severe in such patients.

In comparative studies on behavior characteristics in terms of difference in the level of intellectual development,[8,9] a high incidence of self-injurious behavior and stereotypic behavior is reported for groups exhibiting low levels of development.[8] However, such studies rarely address the behavior characteristics in adulthood.

Previous reports on behavior characteristics in adulthood have been insufficient for comprehensive clarification due to limitations in the number of subjects, or great deviation among the object group. Furthermore, many points remain unclear regarding the extent to which the pathological picture can be altered through therapeutic intervention.

Therefore, taking the 201 subjects in a previously conducted follow-up study of autism,[6] a survey was conducted for clarifying their behavior characteristics in adulthood. In the study, we evaluated the differences in behavior characteristics arising from disparity in levels of development (language cognition, social adaptability). Apart from clarifying the behavior characteristics pertaining to adult autism in general, the behavior characteristics that persist unchanged through the long-term course irrespective of development level were investigated through this survey, with hopes that this may provide a clue to what the rudimental symptoms are in terms of the psychopathology of autism.

SUBJECTS

The subjects were autism patients with whom we had had therapeutic relationships in early childhood or school age at medical, educational or welfare institutions, or through therapeutic camps.[10] They all had three main symptoms: (i) impairment in reciprocal social interaction; (ii) impairment in verbal and non-verbal communication; and (iii) repetitive activities or obsessive preoccupation with a particular object. Most of the subjects had onset before the age of 36 months, apart from eight cases with onset thereafter. In accordance with present diagnostic criteria, all cases would satisfy criteria for autistic disorders by the *Diagnostic and Statistical Manual of Mental Disorders*, 3rd edition, revised (DSM-III-R).[11]

From the 201 subjects of our previous survey, 187 cases on whom information regarding their present condition was available were selected for the present study. The boy : girl ratio was 156 : 31 (5.0 : 1). Age distribution of the 187 cases is shown in Table 1, which was: 63 cases < 20 years, and 124 cases ≥ 20

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Table 1. Age distribution of subjects

Age	18–19	20–21	22-23	24–25	26–27	28–29	30–31	32–33	34+	Total	%
Male	54	39	26	22	9	2	3	1	0	156	83.4
Female	9	7	5	5	1	2	0	2	0	31	16.6
Total	63	46	31	27	10	4	3	3	0	187	100

years. The oldest subject was 33. The mean age was 21.5 (SD = 3.2) years.

The levels of development at the time of entering school were evaluated in terms of IQ and the levels of speech development were evaluated from data obtained through their clinical records.

Intellectual level at 6 years

The intellectual level of the children had been evaluated in most cases by intelligence tests such as Tanaka-Binet, Suzuki-Binet or Wechsler intelligence scale for children (WISC). Some children had been evaluated by intensive observation in therapeutic camping over 4 days. Approximately a quarter of the children were not mentally retarded (normal: 31 cases, 16.8%; borderline: 12 cases, 6.5%). Mild mental retardation was present in 53 cases (28.6%). Sex difference in the overall IQ distribution was not significant (Mann–Whitney *U*-test, $Z = 1.361$, n.s.), but when the group was split into two by IQ > or <= 50, the IQ of females was significantly higher than that of males (d.f. = 1, $\chi^2 = 3.994$, $P < 0.05$).

Level of speech development at 6 years

The levels of speech development at 6 years were defined as follows: very good, can speak naturally with a rich vocabulary; good, can speak albeit unnaturally and sometimes inappropriately; fair, can speak although with echolalia; poor, vocalizes only with echolalic speech; very poor, does not vocalize any meaningful words.

The results were: very good, 1.5%; good, 18.1%; fair, 31.2%; poor, 24.6%; and very poor, 24.6%. Approximately half of the children had no communicative speech. Females were more capable of speech than males (Mann–Whitney *U*-test, $Z = 2.137$, $P < 0.05$).

METHODS

Evaluation of present behavioral characteristics

The behavioral characteristics of the subjects were evaluated using a Japanese version of Achenbach's Child Behavior Checklist (CBCL).[12] Some items of the CBCL were modified to suit autistic young adults (Table 3). Specifically, 'item 61' was removed, and in 'item 113 others', behavior characteristics frequently observed in autism, that is, obsessive ideas, interests in females/males too much, negativistic, acts inappropriately, were appended. Apart from these changes, most items were deemed appropriate for all persons with autism. Evaluations of behavior were made by family members of the patients. The questionnaires were returned in 187 cases. We researched the frequency of problem behaviors and determined their correlation with Present Language Developmental Level (PLDL) and Present Adaptive Level (PAL). Statistical significance was tested by Spearman's rank–difference correlation method.

Procedure

Questionnaires were mailed to the families of the subjects, asking them to evaluate the present status of the patients. Apart from the Japanese version of Achenbach's CBCL (revised for young adults with autism), the questionnaire also included items addressing social outcome. Regarding present status assessment, final conclusions were drawn after interviewing the patients or their parents, directly or over the phone, and/or with reference to the opinions of staff with whom the patients were currently in contact, in medical, educational or welfare institutions. In follow-up studies to date, present status has generally been evaluated by overall outcome, even though agreement between intellectual capacity and adaptation capabilities are not seen in more than a few cases. For this reason, we believed it necessary to evaluate the two independently. The criteria for evaluation were established taking published studies[5] and the ranking criteria employed by the Japanese national annuity system for the handicapped into reference. Assessment of the present level of speech development and the level of adaptation was based on the findings from this survey. Evaluation of levels of adaptation was made on the condition of the subjects in the 6 months to 1 year prior to the date of the survey.

RESULTS

Present Language Developmental Level

The Present Language Developmental Level (PLDL) was evaluated and classified into five levels as follows: very good, can communicate freely with a rich vocabulary; good, can communicate, although unnaturally and sometimes inappropriately; fair, can understand others in daily life, but cannot communicate verbally; poor, vocalizes with echolalic speech mostly in single words; very poor, vocalizes 'words' with no meaning, or does not talk.

The results were: very good, 16.0%; good, 31.6%; fair, 32.6%; poor, 8.6%; and very poor, 11.2% (Table 2). This

Table 2. Present language developmental level and present adaptive level

	PLDL*			PAL**		
PLDL and PAL	Male/female 156/31	Total $n = 187$	%	Male/female 156/31	Total $n = 187$	%
Very good	22/8	30	16.0	16/3	19	10.2
Good	48/11	59	31.6	26/6	32	17.1
Fair	53/8	61	32.6	43/8	51	27.3
Poor	14/2	16	8.6	35/9	44	23.5
Very poor	19/2	21	11.2	36/5	41	21.9

*Mann–Whitney U-test $Z = 1.880$, $0.05 < P < 0.1$, **Mann–Whitney U-test $Z = 0.369$, NS.
PLDL, present language development level; PAL, present adaptive level.

amounted to 47.6% of all subjects with capacity for verbal communication to some extent. Females were superior to males in their ability to speak (Mann–Whitney U-test, $Z = 1.880$, $P < 0.05$).

Present Adaptive Level

Present Adaptive Level (PAL) in terms of overall outcome was evaluated and classified into five levels as follows: very good, employed (or goes to school) and adapts satisfactorily, his/her ability to work is highly estimated; good, employed (or goes to school), lives a normal life almost independently; fair, behaves somewhat inappropriately but is capable of carrying on daily life in the home, or not employed but capable of daily life with a little aid; poor, behaves very oddly, cannot adapt socially and needs some aid; very poor, has poor social skills, cannot adapt socially, constantly requires extensive aid.

The results were: very good, 10.2%; good, 17.1%; fair, 27.3%; poor, 23.5%; and very poor, 21.9% (Table 2). Sex difference was not significant (Mann–Whitney U-test, $Z = 0.369$, n.s.).

Behaviors correlated only to Present Language Development Level

Achenbach's Child Behaviour Checklist items correlated with statistical significance only to PLDL are shown in Table 3. The frequency of the items was not that high, owing to the fact that the number of cases with high PLDL were limited. In addition to items such as '3. Argues a lot (incidence of behavior B + C = 24.1%)', '93. Talks too much (20.3%)', and '43. Lying or cheating (15.0%)', items that reveal depressive feelings, such as '35. Feels worthless (13.9%)', '112. Worrying (10.7%)' and '52. Feels too guilty (6.4%)' were not encountered at very high frequency.

Behaviors correlated only to Present Adaptive Level

Child Behavior Checklist items correlated with statistical significance to PAL are also shown in Table 3. These items reveal the behavioral characteristics of those who have great difficulty in social adaptation. The most frequently observed behavioral characteristic was noted by the items '42. Likes to be alone (70.1%)' and '102. Underactive (25.7%)' which reveal withdrawal symptoms. In addition to these, items such as '13. Confused (42.2%)', '22. Disobedient at home (40.6%)', '50. Too fearful or anxious (34.8%)', '23. Disobedient at school (company, care-unit) (34.8%)' '65. Refuses to talk (33.2%)' and '86. Stubborn, sullen or irritable (32.6%)' appeared with high frequency. These items reveal the negativistic tendency. The items '113d. Acts inappropriately (41.7%)', and '19. Demands attention (24.1%)', which are frequently encountered in high-functional autism also appeared at high frequency. '73. Sexual problems (13.9%)' including '59. Plays with sex parts in public (4.8%)' were not that frequent.

Behaviors correlated to both PLDL and PAL

Child Behavior Checklist items correlated with statistical significance to both PLDL and PAL are shown in Table 3. Some of these items reveal the behavioral characteristics of those who have great difficulty in communicating with others and adapting socially in manners appropriate to their age: '1. Acts too young (93.6%)', '25. Poor peer relations (82.9%)' and '79. Speech problem (78.1%)', '61. Poor school work (43.3%)' and '11. Too dependent (38.0%)'. Others demonstrate problems with attention, such as '8. Can't concentrate (61.0%)', '10. Can't sit still, restless, hyperactive (51.9%)', '66. Repeats certain acts (51.3%)' and '84. Strange behavior (38.5%)'.

In addition to these results, there are some severe behavior problems regarding impulsivity ('87. Moody (47.1%)', '95. Temper tantrums (44.4%)', '68. Screams a lot (41.2%)' and '41. Impulsive (39.6%)'), and self-injurious behavior ('18. Harms self (14.4%)'), in addition to other problems such as sleep disturbances ('76. Sleeps little (34.2%)' and '100. Trouble sleeping (19.8%)'), '6. Encopresis (2.7%)', '29. Fears (25.1%)', and '58. Picking (29.4%)'.

It is very interesting to note that one-third of the subjects exhibit symptoms relating to apathy such as '80. Stares blankly (34.2%)'.

Behaviors not correlated to PLDL or PAL

Child Behavior Checklist items not correlated with statistical significance to PLDL and PAL are shown in Table 4. These items reveal the behavioral characteristics that are exhibited

Table 3. Behavioral characteristics by Achenbach's Child Behavior Checklist (modified) ($n = 187$)

Behavior items	Not true (A)	%	Somewhat or sometimes true (B)	%	Very true or often true (C)	%	PLDL	PAL
1. Acts too young	12	6.4	65	34.8	110	58.8	**	**
2. Allergy	141	75.4	25	13.4	21	11.2		
3. Argues a lot	142	75.9	32	17.1	13	7.0	**	
4. Asthma	174	93.0	9	4.8	4	2.1		
5. Behaves like opposite sex	176	94.1	10	5.3	1	0.5		
6. Encopresis	182	97.3	4	2.1	1	0.5	**	*
7. Bragging	170	90.9	12	6.4	5	2.7		
8. Can't concentrate	73	39.0	66	35.3	48	25.7	**	**
9. Can't get mind off thoughts	64	34.2	67	35.8	56	29.9		
10. Can't sit still, restless, hyperactive	90	48.1	69	36.9	28	15.0	**	**
11. Too dependent	116	62.0	50	26.7	21	11.2	*	**
12. Lonely	174	93.0	12	6.4	1	0.5		
13. Confused	108	57.8	69	36.9	10	5.3		*
14 Cries a lot	160	85.6	22	11.8	5	2.7		
15. Cruel to animals	179	95.7	7	3.7	1	0.5		
16. Cruel to others	165	88.2	20	10.7	2	1.1		
17. Daydreams	125	66.8	53	28.3	9	4.8		
18. Harms self	160	85.6	19	10.2	8	4.3	**	**
19. Demands attention	142	75.9	36	19.3	9	4.8		*
20. Destroys own things	165	88.2	19	10.2	3	1.6		*
21. Destroys others' things	173	92.5	12	6.4	2	1.1		
22. Disobedient at home	111	59.4	62	33.2	14	7.5		**
23. Disobedient at school (company or care-unit)	122	65.2	48	25.7	17	9.1		**
24. Doesn't eat well	166	88.8	17	9.1	4	2.1		
25. Poor peer relations	32	17.1	69	36.9	86	46.0	*	**
26. Lacks guilt	127	67.9	34	18.2	26	13.9	*	**
27. Easily jealous	160	85.6	20	10.7	7	3.7		
28. Eats non-food	174	93.0	8	4.3	5	2.7		
29. Fears	140	74.9	25	13.4	22	11.8	*	**
30. Fears school (company or care-unit)	172	92.0	9	4.8	6	3.2		
31. Fears impulses	165	88.2	19	10.2	3	1.6		
32. Needs to be perfect	89	47.6	65	34.8	33	17.6		
33. Feels unloved	174	93.0	10	5.3	3	1.6		
34. Feels persecuted	172	92.0	13	7.0	2	1.1		
35. Feels worthless	161	86.1	20	10.7	6	3.2	**	
36. Accident prone	175	93.6	10	5.3	2	1.1		
37. Fighting	161	86.1	21	11.2	5	2.7		
38. Is teased	127	67.9	51	27.3	9	4.8		
39. Hangs around children who get in trouble	183	97.9	4	2.1	0	0		
40. Hears things that aren't there	184	98.4	3	1.6	0	0		
41. Impulsive	113	60.4	56	29.9	18	9.6	*	**
42. Likes to be alone	56	29.9	89	47.6	42	22.5		*
43. Lying or cheating	159	85.0	25	13.4	3	1.6	*	
44. Bites fingernails	134	71.7	29	15.5	24	12.8		
45. Nervous	63	33.7	86	46.0	38	20.3		
46. Nervous movements	140	74.9	31	16.6	16	8.6		
47. Nightmares	179	95.7	8	4.3	0	0		
48. Not liked	135	72.2	41	21.9	11	5.9		
49. Constipated	160	85.6	19	10.2	8	4.3		

Table 3. (*Continued*)

Behavior items	Not true (A)	%	Somewhat or sometimes true (B)	%	Very true or often true (C)	%	PLDL	PAL
50. Too fearful or anxious	122	65.2	52	27.8	13	7.0		*
51. Dizzy	182	97.3	4	2.1	1	0.5		
52. Feels too guilty	175	93.6	12	6.4	0	0	*[+]	
53. Overeating	114	61.0	49	26.2	24	12.8		
54. Overtired	158	84.5	19	10.2	10	5.3		
55. Overweight	134	71.7	29	15.5	24	12.8		
56. Physical problems without known medical cause								
a. Aches and pains	184	98.4	3	1.6	0	0		
b. Headaches	178	95.2	8	4.3	1	0.5		
c. Nausea, feels sick	173	92.5	12	6.4	2	1.1		
d. Eye problems	172	92.0	11	5.9	4	2.1		
e. Skin problems	149	79.7	27	14.4	11	5.9		
f. Stomach aches, cramps	179	95.7	5	2.7	3	1.6		
g. Vomiting	174	93.0	12	6.4	1	0.5		
h. Other physical problems	175	93.6	7	3.7	5	2.7		
57. Attacks people	153	81.8	32	17.1	2	1.1		
58. Picking	132	70.6	33	17.6	22	11.8	**	**
59. Plays with sex parts in public	178	95.2	8	4.3	1	0.5		*
60. Plays with sex parts too much	166	88.8	19	10.2	2	1.1		
61. Poor school work[++]	—	—	—	—	—	—		
62. Clumsy	100	53.5	56	29.9	31	16.6		
63. Prefers older people	144	77.0	28	15.0	15	8.0		
64. Prefers younger people	171	91.4	11	5.9	5	2.7		
65. Refuses to talk	125	66.8	45	24.1	17	9.1		*
66. Repeats certain acts	91	48.7	43	23.0	53	28.3	**	**
67. Runs away from home	177	94.7	5	2.7	5	2.7		
68. Screams a lot	110	58.5	54	28.9	23	12.3	**	**
69. Secretive	156	83.4	25	13.4	6	3.2		
70. Sees things that aren't there	184	98.4	3	1.6	0	0		
71. Self-conscious	168	89.8	16	8.6	3	1.6		
72. Sets fires	186	99.5	1	0.5	0	0		
73. Sexual problems	161	86.1	14	7.5	12	6.4		**
74. Showing off	178	95.2	9	4.8	0	0		
75. Shy or timid	130	69.5	45	24.1	12	6.4		
76. Sleeps little	123	65.8	39	20.9	25	13.4	**	**
77. Sleeps much	168	89.8	13	7.0	6	3.2		
78. Smears feces	183	97.9	2	1.1	2	1.1		
79. Speech problem	41	21.9	42	22.5	104	55.6	**	**
80. Stares blankly	123	65.8	51	27.3	13	7.0	*	**
81. Steals at home	183	97.9	4	2.1	0	0		
82. Steals outside home	186	99.5	1	0.5	0	0		
83. Stores up un-needed things	153	81.8	22	11.8	12	6.4		
84. Strange behavior	115	61.5	40	21.4	32	17.1	**	**
85. Strange ideas	165	88.2	15	8.0	7	3.7		
86. Stubborn, sullen or irritable	126	67.4	45	24.1	16	8.6		*
87. Moody	99	52.9	63	33.7	25	13.4	**	**
88. Sulks a lot	168	89.8	17	9.1	2	1.1		
89. Suspicious	152	81.3	27	14.4	8	4.3		
90. Swearing or obscene language	175	93.6	8	4.3	4	2.1		

Table 3. (*Continued*)

Behavior items	Not true (A)	%	Somewhat or sometimes true (B)	%	Very true or often, true (C)	%	PLDL	PAL
91. Suicidal talk	180	96.3	6	3.2	1	0.5		
92. Talks or walks in sleep	185	98.9	2	1.1	0	0		
93. Talks too much	149	79.7	29	15.5	9	4.8	*	
94. Teases a lot	175	93.6	12	6.4	0	0		
95. Temper tantrums	104	55.6	71	38.0	12	6.4	**	**
96. Thinks about sex too much	179	95.7	6	3.2	2	1.1		
97. Threatens people	182	97.3	5	2.7	0	0		
98. Thumb sucking	177	94.7	8	4.3	2	1.1		
99. Too concerned with neatness	154	82.4	29	15.5	4	2.1		
100. Trouble sleeping	150	80.2	27	14.4	10	5.3	**	**
101. Truancy	177	94.7	7	3.7	3	1.6		
102. Underactive	139	74.3	35	18.7	13	7.0		**
103. Unhappy, sad, or depressed	178	95.2	5	2.7	4	2.1		
104. Unusually loud	154	82.4	23	12.3	10	5.3		
105. Alcohol or drugs	186	99.5	1	0.5	0	0		
106. Vandalism	173	92.5	13	7.0	1	0.5		
107. Daytime wetting	185	98.9	2	1.1	0	0		
108. Wets bed	183	97.9	4	2.1	0	0		
109. Whining	182	97.3	5	2.7	0	0		
110. Wishes to be of opposite sex	186	99.5	1	0.5	0	0		
111. Withdrawn	145	77.5	33	17.6	9	4.8		
112. Worrying	167	89.3	18	9.6	2	1.1	**	
113. Others								
a. Obsessive ideas	76	40.6	71	38.0	40	21.4		
b. Interests in females/males too much	149	79.7	34	18.2	4	2.1		
c. Negativistic	152	81.3	30	16.0	5	2.7		
d. Acts inappropriately	109	58.3	52	27.8	26	13.9		*

*$P<0.01$ **$P<0.001$ (Spearman's rank correlation)
†Mann–Whitney *U*-test
††This item was omitted because of inappropriateness for adults.
PLDL, Present Language Developmental Level; PAL, Present Adaptive Level.

most commonly by autistics, without regard to whether or not they are high functioning.

The most characteristic tendency is high frequency in items revealing obsessive tendencies, such as '45. Nervous (66.3%)', '9. Can't get mind off thoughts (65.8%)', '113a. Obsessive ideas (59.4%)' and '32. Needs to be perfect (52.4%)'. Additionally, items revealing the neurotic tendency, such as '75. Shy or timid (30.5%)', '44. Bites fingernails (28.3%)' and '46. Nervous movements (25.1%)' were also encountered at high frequency.

Other items exhibited at high frequency were '62. Clumsy (46.5%)', '53. Overeating (39.0%)', '17. Daydreams (33.2%)', '38. Is teased (32.1%)', '55. Overweight (28.3%)', '48. Not liked (27.8%)', '2. Allergy (24.6%)', '63. Prefers older people (23.0%)', '111. Withdrawn (22.5%)', '56e. Skin problems (20.3%)' and '113b. Interests in females/males too much (20.3%)'

However, anti-social behavior, such as items '81. Steals at home (2.1%)', '82. Steals outside home (0.5%)', '72. Sets fires (0.5%)', and '105. Alcohol or drugs (0.5%)', or psychotic symptoms suggestive of hallucinations, such as '40. Hears things that aren't there (1.6%)', and '70. Sees things that aren't there (1.6%)', were rare.

DISCUSSION

The present study incorporates the largest number of subjects among reports on the behavioral characteristics of adulthood autism to date. The subjects of the present study are the same group that was studied in a previous follow-up survey of autism cases.[6] Given the close similarity in distribution of the level of intellectual development of our subjects with that of other follow-up studies on autism,[5,13] we believe the results of our current study are of value as a reference for obtaining clues leading to clarification of the overall behavior characteristics of autism in adulthood.

Table 4. Behaviors not correlated to PLDL nor PAL ($n = 187$)

	Behavior items*	%
45.	Nervous	66.3**
9.	Can't get mind off thoughts	65.8
113a.	Obsessive ideas	59.4
32.	Needs to be perfect	52.4
62.	Clumsy	46.5
53.	Overeating	39.0
17.	Daydreams	33.2
38.	Is teased	32.1
75.	Shy or timid	30.5
44.	Bites fingernails	28.3
55.	Overweight	28.3
48.	Not liked	27.8
46.	Nervous movements	25.1
2.	Allergy	24.6
63.	Prefers older people	23.0
111.	Withdrawn	22.5
56e.	Skin problems	20.3
113b.	Interests in females/males too much	20.3

*Items are listed in order of frequency of occurrence.
**Values denote incidence of behavior (B+C in Table 4)
PLDL, present language development level; PAL, present adaptive level.

The present study investigates the differences in adult behavior characteristics reflecting levels of language development and adaptation, and furthermore, addresses the question of which behavior characteristics are common to autism in general, irrespective of levels of development.

In determining primacy of deficit for autism, Ozonoff and McEvoy,[14] and Rapin[15] point out the necessity of taking the following three conditions into account: (i) universality of the deficit among individuals with the disorder; (ii) specificity of the deficit to the disorder; and (iii) persistence or stability of the deficit throughout development.

The findings from the present study appear to indicate that, irrespective of the levels of language development or adaptation, the behaviors occurring at high frequency, namely, the characteristic behaviors common to all cases of autism, are possibly related to the core psychopathology of autism. Many of these frequently observed behaviors were related to obsessiveness, perfectionalistic tendency, and neurotic tendency. Furthermore, other elements that most probably contribute to their difficulties with interpersonal relationships were also noted to appear with high frequencies.

Much attention has been paid to the obsessive behaviors of autism.[16,17] However, interest in the obsessive symptoms *per se* has lessened since the language cognition disorder theory was advocated,[18] from which point the focus of research has shifted to characterization of the picture of the cognitive disorder.

Kanner had originally emphasized the importance of obsessive behavior in particular among the symptoms of autism,[19] and our present results appear to inculcate upon the need to focus anew upon the obsessive behaviors of autism.

As for the mechanism of onset of the obsessive symptoms themselves, many researchers have conducted investigations to date. In one of the more recent studies, Baron-Cohen contended that because the obsessive symptoms traditionally associated with autism do not satisfy the criteria of obsessive symptoms exhibited by adults, that they ought to be conceptualized as repetitive behavior instead.[20] However, can it truly be said that such subjects lack awareness of their obsessions? In reality, reminiscences by autistics[21,22] give vivid indication of the extent to which they are distressed by awareness of their obsessions. It is believed investigation of which characteristics of the cognitive structure of autistics are being reflected in their obsessive symptoms is necessary for clarifying the essence of autism,[23] which should also settle this question of whether the obsessive symptoms autistics do or do not truly qualify as obsessive behavior.

The results of our present study revealed that cases exhibiting psychotic symptoms (e.g. 'item 40' and 'item 70') suggestive of hallucinations were very rare, although needless to say, the absence of positive symptoms like hallucinations does not in itself rule out the possibility of schizophrenia. The issue of difference between autism and schizophrenia has been a subject of frequent debate.[24–28] Among many reports on the rarity of schizophrenia-like symptoms,[26,27] analysis of disease histories of childhood schizophrenia reveal that cases having been diagnosed as autism at some point in the past are not rare.[28] In any case, in terms of development of the function of language cognition, comparison of autism, accompanied by severe impairment from early infancy, and schizophrenia, in which most cases have onset after acquisition of language cognition development to some degree, solely on the symptomatological level is, in itself, a more or less irrational approach. It has been verified through reminiscences by autistics that in reality, autism involves many aspects indicative of psychotic anxiety.[21,22] Hence, perhaps what is called for at this point is departure from investigation on the symptomatological level, and greater approach toward study of the inner world *per se*.

Because the version of Achenbach's CBCL employed in the present study may not be a sufficient adaptation of the questionnaire to young adults with autism, it could be that we have not been able to fully capture their overall behavior characteristics. Furthermore, methodological limitations are placed on our results from the CBCL, due to the assessments being delegated to family members. Although it may be true that behavior characteristics unrelated to either PLDL or PAL are readily noted as behavior characteristics common to all autistics, it would probably be overly simplistic to conclude that those behaviors are indicative of the core psychopathology of autism. However, the results have been obtained from the largest follow-up survey of its kind to date on subjects who have all been followed prospectively over time. Therefore, we believe it may be justified to consider the behavior characteristics of adulthood autistics noted in this study as possessing a considerable degree of universality.

In a retrospective study on behavioral change in high-IQ adolescents and adults with autism, Piven *et al.* report better

improvement of communication and social behavior in comparison to improvement of ritualistic/repetitive behavior.[23] And results from a recent follow-up survey[6] revealed that although the social outcome of autism is showing improvement as the result of therapeutic education, multifarious behavior peculiarities still remain. It is admittedly true that great difficulty exists in objectively determining whether or not autistics are aware of their obsessions in light of their limitations in linguistic expression. However, as it was demonstrated through observations by family members that obsessive behavior does exist among such individuals at a considerably high rate of frequency, it can be inferred that some aspect of the subjects' behavior indicating self-consciousness of the obsessions prompted the family members to take notice of this condition. When one attempts strict application of the psychopathological concepts structured upon subjects characterized by relative ease of communication to autistics, one is naturally led to question whether the behavior of autistics can truly be regarded as obsessive behavior in the conventional sense, as pointed out by Baron-Cohen.[20] However, not only has it been recognized that obsessive behavior in autism can be of the level of poor insight in DSM-IV,[29] but reminiscences by autistics[22] have revealed the existence of an inner world that is rich beyond imagination from their actual verbal communication skills. Thus, because obsessive behavior is of particular note as a behavior characteristic found in common among autism cases in general, it may be said that further investigation on the obsessive symptoms is indispensable for clarification of the essential nature of autism.

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