

## Consultation on the Functional Assessment of Students with Severe Challenging Behavior in a Japanese Special School for Intellectual Disabilities

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### ABSTRACT

**Background** It is important to intervene early and treat children and individuals with behavioral disorders. We conducted a functional assessment-based consultation for teachers of several students with severe behavioral disorders and examined the effects of the consultation.

**Methods** Eight students with severe behavioral disorders were selected from two special schools for intellectual disabilities in western Japan. An external consultant team conducted a functional assessment-based consultation in cooperation with a team of teachers. Consultations were held once a month, and comprised three to six sessions per student.

**Results** As a result of the functional assessment, only 8 out of 10 behaviors with some communication function, and 2 with only sensory enhancements were estimated. The Effects of consultations based on functional assessment were presented. It was found that 6 out of 10 target behaviors had obtained high effects. The total score for each behavioral scale showed a statistically significant improvement.

**Conclusion** Although consultations lasted for only six months and occurred from three to six times for each student, scale scores for problem behavior before and after intervention were improved, overall. Each case report suggested that many factors influence the difference in the effects of consultation among individual students. This study is significant in that it provides a model for the consultation system that operates on a short-term basis, and presents a means for small-scale group consultations for students with intellectual disabilities and autism in cooperation with external specialized institutions in special schools in Japan.

**Key words** autism spectrum disorder; challenging behavior; consultation; functional assessment; intellectual disability

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Abbreviations: ABC, Abnormal Behavior Checklist; ASD, Autism spectrum disorder; CB, Challenging Behavior; CBCL, Child Behavior Checklist/4-18; CDSPB, Criteria for Determining Severe Problem Behavior; ID, Intellectual disability

Autism Spectrum Disorder (ASD), Attention Deficit Hyperactivity Disorder (ADHD), and Intellectual Disability (ID) are classified as “neurodevelopmental disorders”.<sup>1</sup> From early childhood to the school-going age, these neurodevelopmental disorders often cause various behavioral problems that make both classroom participation and interaction with the educational environment difficult. In recent years, the term “Challenging Behavior” (CB) has been used commonly in studies that have examined problematic behaviors associated with developmental disabilities such as ASD, ADHD, and ID. However, CB is not a diagnosis. Rather, it is a term that emphasizes what arises out of the interactions between individual and social factors. In other words, it refers to behaviors that pose a challenge to service providers, family members, and caregivers.<sup>2</sup> CBs among students with developmental disabilities, such as aggressive, destructive, self-injurious, stereotypical, and deviant behaviors, act as major barriers against social adaptation and remain a major issue in education.

In 2013, the Japanese Education Ministry reported that 3.6% students had behavioral problems in mainstream classes in both elementary and junior high schools. These students had ADHD, ASD, and/or Learning Disorders (LD). Since 2007, schools in Japan have been mandated to have support structures in place to assist students with the abovementioned problems. Special education in Japan is called “special needs education.” It is carried out in various forms, including in resource rooms, in special classes (both are in regular schools), and in special schools named “Schools for Special Needs Education.”<sup>3</sup> However, severe behavioral disorders among special school students with ID became a major issue in Japanese education and welfare because CB worsens with age. Inoue and Gomi<sup>4</sup> showed that for many individuals with severe behavioral disorders, the most difficult period was their time in school either as students of junior high school or high school as part of particular departments in a special school for students with ID. CB is considered the result of a complex interaction among biological, developmental, and environmental factors.<sup>5</sup> A preventive approach in providing care for severe challenging behavior in early adolescence, rendered by a multidisciplinary team including consultations with external experts, is thus very

**Table 1. Profile of the students**

Student	Gender	School grade	Diagnosis	IQ, DQ
S1	Male	Elementary 2	ID, ASD	IQ:22
S2	Female	Elementary 3	ID, ASD	DQ:19
S3	Male	Lower secondary 1	ID, ASD	DQ:6
S4	Female	Lower secondary 2	ID, ASD	DQ:53
S5	Female	Lower secondary 2	ID	IQ:13
S6	Male	Lower secondary 3	ID, ASD	DQ:24
S7	Male	Upper secondary 1	ID, ASD, ADHD	Unknown
S8	Male	Upper secondary 2	ID, ASD	Unknown

DQ, developmental quotient; IQ, intelligence quotient.

important.

Functional approaches are recognized as an evidence-based intervention strategies in the literature on CB.<sup>6–10</sup> Desirable outcomes of the functional approach in school education have been demonstrated by several early studies<sup>11–13</sup> that contributed toward the inclusion of the functional assessment of the Individuals with Disabilities Education Act that was passed in the United States in 1997.

It is important to intervene early and treat children and individuals with behavioral disorders. Interventions based on functional assessments are effective. The number of consultation studies based on functional assessment is increasing in Japan; however, most of them are single-case studies and few involve group interventions.<sup>14</sup> Moreover, only a few consultation studies have relied on functional assessment for special school teachers who handle students with severe behavioral disorders. There is no established school consultation system for CB in special schools in Japan. Therefore, we conducted a functional assessment-based consultation for teachers who handle students with severe behavioral disorders and examined the effects by focusing on improvements in the effect size and scores of several behavioral measures.

## SUBJECTS AND METHODS

### Participants

The special school to be consulted was selected from schools in the same prefecture as the author's university, which requires a travel time of about one hour. Two special schools were listed, and both principals agreed to the research cooperation. Special schools in Japan are schools for children with comparatively severe disabilities. Those schools comprise four levels of departments, namely, kindergarten, elementary, lower secondary (junior high) and upper secondary (high

school) departments. (The elementary and the lower secondary are compulsory education.) The Criteria for Determining Severe Problem Behavior (CDSBP) (described later) was distributed to each homeroom teacher for all students from elementary to high school in the two special schools. The collection rate was 100%.

A CDSBP score of 10 or higher would meet the Severe Behavior Disorder criteria in Japan, and a total of 38 students in both schools met the criteria. We asked each school to select within five students in the 38 students due to the limited number of consultations. Each homeroom teacher and principal submitted a total of eight students as candidates, four from each school. These students were evaluated again for CDSBP, immediately before the start of the consultation.

As these students themselves had severe intellectual disabilities, we spoke to their parents and teachers and obtained consent for their participation. Finally, eight students' homeroom teachers at both schools became consultees in this study. The homeroom teachers were aged between 32 and 56 years, and their special education careers had spanned over 5 years at the time of this study. The student profiles are presented in Table 1.

### Consultant team

The consultant team comprised the first and second authors, and one teacher leader at each school. During the consultation, the first author advised the special school teachers. The second author and teacher leaders analyzed the data submitted by each special school teacher, exchanged information with the school support department, and prepared the consultation sheets.

### Flow of consultation

Consultations were held once a month at each special school, for six months. The number of sessions was different for each case due to requirements in a school

setting (e.g., school events or the absence of students). The consultant team and homeroom teachers, teachers from the support department of special schools, deputy homeroom teachers, and department leader teachers attended the consultation. Each session lasted 15 to 20 minutes. Consultations began after consent was obtained from both parents and the homeroom teacher for each student. To understand the actual condition of the students, we asked the school to provide personal information on each student, such as their growth history and IQ, in advance. In some cases, we also requested video footage, through which the students' CBs were observed. Teachers in the school's support department (support department teachers) asked each homeroom teacher to tell them about the difficulties they encountered while teaching students with CB. This information was provided to the consultation team. Based on this, support department teachers and the consultant team identified the extent of CB in each student.

The consultant team created a behavior recording sheet for each child and distributed it to each consultee teacher through the support department teacher. The homeroom teachers filled out the behavior records of students all day for 5 to 10 days to assess the extent of CB. The objective of a functional assessment of behavior is to identify why a person behaves in the way that he or she does by identifying the "Antecedent" that elicits the "Behavior" and the "Consequence." The behavior recording sheet comprised CB, its antecedent (setting, time, and situation before CB occurred), and consequence (behavior of teachers and others after CB occurred). The records were sent to a consultant team and were analyzed for CB, frequency settings and time periods, and other factors. The results of the analysis were shared with the homeroom teachers during the first consultation, and support advice was given based on the results. The homeroom teachers recorded CB for 10 days after the first consultation. The records were analyzed by the consultant team and the consultation sheet was prepared. The second consultation provided support and advice based on the consultation sheets and reports received from homeroom teachers. Subsequent consultations repeated the procedure.

## Measurement

### Functional Assessment

Inoue<sup>15</sup> classified functional assessment into the following groups: communication-related functions, namely (1) demand (i.e., I want you to do it), (2) attention (i.e., I want your attention), and (3) avoidance/escape functions (i.e., I do not want to do it); and classified sensory-related functions, namely (1) sensory enhancement (i.e., immersion in a pleasing sensation) and (2) sensory

avoidance/escape (i.e., hiding from an unpleasant sensation) functions.

### Effect size of CB

In general, "effect size" is a statistical concept that measures the strength of the relationship between two variables on a numeric scale. However, in this study, the term "effect size" is used as a concept to describe intervention effects from single subject design. This is because the problem behavioral functions and interventions in each case are different. Behavioral psychologists have tried to synthesize intervention research, and effect sizes have been calculated on single subject data.<sup>16, 17</sup> Mean baseline reduction (MBR), the method adopted in this study, is one of them. We used the modified MBR methods used by Carr et al.<sup>18</sup> and Ogasawara, Asakura, and Suenaga.<sup>19</sup> Since the number of baseline days before the intervention differed for each student, the baseline data for 3 to 5 days and the same number of days for the last data from the intervention period were extracted. The effect size (%) was measured using the following formula: the average number of occurrences of CB per day during baseline – average number of occurrences of CB over the same number of days in the intervention period ÷ average number of occurrences of CB during the baseline period × 100.

### The Criteria for Determining Severe Problem Behavior (CDSPB)

CDSPB is a rating scale comprising 11 domains ("Severe self-injury," "Severe aggression," "Severe stereotypical or restricted behaviors," "Severe property destruction," "Severe sleep disturbances," and "Severe feeding problems," among others) specifying the criteria used to determine severe problem behaviors. The use of CDSPB began in 1993 in a national undertaking led by the Japanese Ministry of Health and Labor. Each domain is scored in three stages based on the presence or absence of behavior and its frequency (1, 3, and 5 points). A score higher than 10 points out of a maximum of 55 points is indicative of severe problem behaviors.

### Abnormal Behavior Checklist (ABC)

ABC<sup>20</sup> is a standardized behavior rating scale that was developed to assess problem behaviors among people with developmental disabilities and to evaluate the effectiveness of medication designed for such individuals. This assessment comprises 58 items that are classified into the following five subscales: (I) Irritability, Agitation, and Crying (15 items); (II) Lethargy and Social Withdrawal (16 items); (III) Stereotypical Behavior (7 items); (IV) Hyperactivity/Noncompliance (16 items); and (V) Inappropriate Speech (4 items). The

**Table 2. The function of each student's challenging behavior from the functional assessment, the main contents of the consultation, and the effect size**

Student	Target Behavior	Function	Consultation	Times	Effect size
S1	Hitting one's head with one's hands	Sensory, Demand, Escape/Avoidance	Extinction by headgear	4	100
	Hitting one's head on the floor	Sensory, Demand, Escape/Avoidance, Attention	Using communication cards		88.89
S2	Biting one's wrist	Demand, Escape/Avoidance, Sensory	Using communication cards	3	36.17
S3	Shouting and making a strange noise	Escape/Avoidance	Adjusting the environment	3	44.45
	Grabbing the teacher	Escape/Avoidance, Attention	Using communication cards		73.52
S4	Kicking and hitting teachers	Escape/Avoidance	Behavioral contract	5	100
S5	Hitting and scratching own cheek	Sensory	Teaching alternative sensory play	3	NA
S6	Crying	Escape/Avoidance	Adjusting the environment	6	78.57
			Differential reinforcement of on-task behavior		
S7	Repetitively turning lights on and off	Sensory	Teaching alternative sensory play	4	NA
S8	Hitting and scratching teachers or classmates	Escape/Avoidance, Attention	Adjusting the environment	6	100
			Teaching alternative play		

NA, not applicable (There was no behavior record)

standardized Japanese version of ABC is Ono.<sup>21</sup>

#### Child Behavior Checklist /4-18 (CBCL)

CBCL<sup>22</sup> is a parent or teacher questionnaire used to assess problems in young people aged between 4 and 18 years. It comprises 118 items addressing behavioral and emotional problems, eight subscales (Withdrawn, Somatic Complaints, Anxious/Depressed, Social problems, Thought Problems, Attention Problems, Delinquent Behavior, Aggressive Behavior) and two factors (Internalizing comprised three subscales: Anxious/Depressed, Withdrawn, and Somatic Complaints; Externalizing comprised two subscales: Aggressive and Delinquent). The response format is as follows: 0 denotes "not true;" 1 denotes "somewhat or sometimes true;" and 2 denotes "very true" or "often true." Syndrome scores are derived by summing the responses for each problem item. CBCL was translated in to Japanese and the reliability and validity were confirmed.<sup>23</sup>

The data of pre-post test on each measurement was using Wilcoxon signed-rank test with the IBM SPSS Statistics version 25. Differences were considered significant if the *p* value was < .05.

#### Ethical considerations

This study was approved by the Tottori University School of Medicine Ethics Committee (approval number 2163). Requests for research cooperation took place through written documentation.

#### RESULTS

Table 2 shows each student's CB as understood through the functional assessment, the main contents of the consultation, and the effect size. A total of ten CBs was selected as target behaviors (two CBs in S1 and two in S3). As a result of a functional assessment, it was estimated that eight CBs function as some kind of communication (two of whom included sensory functions). "Escape/Avoidance" functions were the most common in eight out of ten behaviors, followed by four "Sensory" and three "Demand" and "Attention" functions. For two CBs shown by S5 and S7, it was presumed that the behavior itself produced sensory reinforcement (sensory enhancement). Teachers experienced difficulty in recording these two behaviors, because they occurred with high frequency. After intervention, four behaviors showed high levels of improvement with 80% or more as the effect size, two showed a slightly high degree improvement ranging between 70 and 80%, and the

**Table 3. Mean score of each scale in the pre-post tests and Wilcoxon signed-rank test**

Scale	M (SD)		Wilcoxon signed-rank test	
	Pre	Post	Z	P
Criteria for Determining Severe Problem Behavior (CDSPB)	17.38 (8.40)	9,00 (6.75)	-2.29	0.01 < P < 0.02
Aberrant Behavior Checklist (ABC)				
Irritability	24.13 (4.26)	16.13 (7.46)	-1.28	P > 0.10
Lethargy	14.13 (9.53)	9.38 (10.52)	-1.68	P > 0.10
Stereotypical behavior	8.13 (5.90)	5.63 (4.21)	-1.27	P > 0.10
Hyperactivity	18.75 (11.17)	13.75 (10.53)	-2.32	0.01 < P < 0.02
Inappropriate speech	3.63 (3.60)	5,00 (6.42)	-0.54	P > 0.10
Total score	68.88 (26.14)	48.63 (31.71)	-2.17	0.02 < P < 0.05
Children Behavior Check List (CBCL)				
Withdrawn	3,00 (2,00)	2.13 (1.69)	-1.9	0.05 < P < 0.10
Somatic Complaints	0.25 (0.66)	2.88 (2.67)	-1.34	P > 0.10
Anxious/Depressed	1.50 (1.87)	3.75 (4.84)	-0.94	P > 0.10
Social Problems	8.00 (3.04)	6.13 (2.85)	-1.48	P > 0.10
Thought Problems	4.25 (2.49)	3.13 (2.03)	-0.84	P > 0.10
Attention Problems	17.75 (6.14)	13.63 (7.09)	-1.62	P > 0.10
Delinquent Behavior	2.88 (2.67)	1.50 (1.87)	-2.13	0.02 < P < 0.05
Aggressive Behavior	17.62 (6.96)	10.62 (7.47)	-2.03	0.02 < P < 0.05
Internalizing	9.38 (5.74)	6.63 (5.89)	-1.02	P > 0.10
Externalizing	20.50 (8.70)	12.50 (8.94)	-2.04	0.02 < P < 0.05
Total Problems	60.63 (21.37)	41.13 (21.12)	-2.03	0.02 < P < 0.05

remaining two behaviors showed low scores. In the six behaviors that showed improvement, the result was 3/3 for aggressive behavior, 2/3 for self-injury, and 1/1 for crying. Aggressive behavior showed a high rate of improvement.

Table 3 shows the results of the mean score, pre-post standard deviation after each scale, and the Wilcoxon signed-rank test. On the CDSPB, the pre-average score was 17.38 (SD 8.40), which was above the threshold for severe behavioral disorders of 10 or more. The post-average score decreased to 9 points, indicating a statistically significant improvement (0.05 < P < 0.10). In ABC-J, post-average scores decreased for all factors except inappropriate language. There was also a statistically significant improvement in hyperactivity (0.01 < P < 0.02) and total scores (0.02 < P < 0.05). In CBCL, six of the eight factors had a reduced mean score, and the Withdrawal (0.02 < P < 0.05), Delinquent Behavior (0.02 < P < 0.05), and Aggressive Behavior (0.02 < P < 0.05) scores showed statistically significant improvement. There was a statistically significant improvement in both the Total (0.02 < P < 0.05) and Externalizing (0.02

< P < 0.05) scores.

A summary of each case is presented below. The number of consultations ranged between three and six. S1 was selected as the first target for self-injurious behavior, where in the conduct involved “hitting one’s head with one’s hands.” The functional assessment showed that this behavior had three functions. One was a sensory function that used the sensation itself as a reinforcer, the second was a demand function, and the third was an escape/avoidance function that operated as communication. As an approach to the most frequently occurring sensory function, sensory elimination was performed by wearing headgear that was capable of absorbing shock stimuli. At first, S1 accepted it and stopped hitting his head with his hands. Eventually, S1 began to hit his head on the floor. It was assumed that he sought stronger sensory stimuli. Since this behavior was thought to have multiple communication functions (Demand, Escape/Avoidance, Attention), we decided to teach alternative communication behaviors in addition to sensory elimination. The homeroom teacher was instructed to use a communication card as an alternative

mode of communicating his own feelings. As a result, the number of instances of hitting one's head with one's hands decreased from an average of 20.5 a day to 0 times, and the number of instances of hitting one's head on the floor decreased from 4.5 to 0.5 times. The effect sizes were 100 and 88.89, respectively.

S2 selected "biting one's wrist" as the target behavior and the functions were estimated as the demand, escape/avoidance, and sensory functions. CB occurs as a demand function when a favorite activity has been completed, and as an escape/avoidance function when the student is prompted to switch activities. Since S2 could not speak language because of severe intellectual disability (ID), he was trained to use a picture card upon request. He was also taught to operate a CD player as an alternative behavior with sensory enhancement function. The average number of daily occurrences decreased slightly from 11.75 to 7.5. The effect size was 36.17.

S3 targeted "shouting and making a strange noise," where the escape/avoidance function was estimated, and "grabbing the teacher," where the escape/avoidance and attention functions were estimated. Both occurred when the homeroom teacher instructed the activity or task. The consultant suggested that the teacher change the instruction, activity, or task to something easier for the students to follow. The teacher also used picture cards to communicate but the students did not understand, so he switched to using gestures and concrete objects. "Shouting and making a strange noise" improved from 19.25 to 10.5, and "grabbing behavior" improved from 8.5 to 2.25. The effect sizes were 45.45 and 73.52, respectively.

S4 targeted "kicking and hitting teachers," presumed to have an escape/avoidance function. This took place when the teacher provided instructions. As S4 had moderate ID and was able to read words and letters, rules were set by behavioral contract law so that proposals from teachers could be accepted. The average number of occurrences improved from 1.67 to 0, and the effect size was 100.

S5 involved a self-injurious behavior of "hitting and scratching one's cheek" and was presumed to have a sensory function. It took place when there was nothing to do except receive instructions. Therefore, it was recommended that alternative sensory play be taught. However, it was difficult for homeroom teachers to find resources to teach such play. Owing to the high frequency of the behavior, no records were made.

The target of S6 was "crying," and it was assumed to have an escape/avoidance function. As it occurred during tasks, we adjusted the environment during rest

periods. We also recommended that on-task behaviors be praised and his favorite activities be incorporated into the tasks. The student thus worked on his favorite activities, and his behavior records improved from 2.8 to 0.6 and the effect size was 78.57.

S7 involved "repeatedly turning lights on and off," and was presumed to have a sensory function. There were other similar behaviors such as opening and closing the toilet seat and pulling the fibers of yarn apart, and it was difficult to stop these behaviors. We suggested relying on alternative activities but found it difficult to find actual activities to carry out. As a result, the homeroom teachers had to work on favorite activities and could not record improvements.

S8 involved "hitting and scratching a teacher or a classmate" and was presumed to have attention and escape/avoidance functions. It occurred in specific situations such as while changing clothes and when visual schedules and instructions were administered. We recommended engaging them in playing with toys without other people interfering. The behavior records showed an improvement from 0.75 to 0. The effect size was 100.

## DISCUSSION

The purpose of this study was to examine the effects of a consultation based on the functional assessment of students with severe behavioral disorders at special schools in Japan. Although consultations lasted for only six months and occurred from three to six times for each student, scale scores for problem behavior before and after intervention were improved, overall. It was suggested through each case report that many factors influence the difference in the effects of consultation among individual students.

Among the eight target behaviors that were from obtained behavior records, two behaviors that were less effective were S2's "biting one's wrist" and S3's "shouting and making a strange noise." We considered that this was due to insufficient improvement of a task environment to prevent escape or avoidance other than teaching alternative communication. This study also showed that teacher's recording and responding were more difficult to CBs with sensory functions than CBs with communication functions. This is probably because CBs with sensory function frequently occurred, and it was difficult to provide independent leisure activities that constituted alternative appropriate behavior. The two target behaviors with sensory function that were not recorded also occurred frequently and may have been a burden on homeroom teachers (S5, S7). Inoue, Nakatani, and Higashino<sup>24</sup> pointed out that it was important to use tools such as applications to encourage

teachers to record behaviors. It is necessary to consider whether introducing such tools in the consultation can improve behavior recording patterns in the future.

This study examined teaching techniques that were easy to implement in school such as environment setting and communication instructions, with the consultation team and then made a proposal. However, CBs with sensory functions that took place frequently would have benefited from more specialized techniques such as non-contingent reinforcement (NCR) that would have been more effective as opposed to the techniques proposed. A consultation team in the future would need to add on-the-job training to accommodate this. The context and level of expertise in different consulting teams differ in each country and system, and it is necessary to consider each of these in the future.

This study is significant as it presents a model for the consultation system to follow in the short term, involving small-scale group consultations for students with intellectual disabilities and autism, in cooperation with specialized external institutions in special schools in Japan. A “contextual fit” is important for enhancing the effectiveness of consultations.<sup>25</sup> Okamoto and Kamiyama<sup>13</sup> reviewed studies on intervention for CB in schools and/or other institutions in Japan. They emphasized that a particular aspect of the research received high support, namely the “selection of target behavior” wherein experts collaborated with the staff in the support environment. The support department teachers engaged with the homeroom teachers to understand their difficulties and selected specific target behavior to develop strategies that they could implement. This is thought to have contributed toward enhancing the contextual fit and effect.

Despite its valuable findings and contributions, this study has a few limitations. It is necessary to conduct intergroup comparative studies by setting an intervention delay group. Re-examination by consultants other than the author is necessary. In this study, the behavioral change on part of the teacher as a consultant could not be measured using objective indicators. In the future, it is necessary to deepen research on the examination of fidelity and support tailored to examine individual teachers. It is also necessary to consider the long-term maintenance and follow-up system for behavioral changes in children while framing such interventions.

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