Original Article

Interventions for Students with Problem Behaviors: A Workshop Incorporating Applied Behavior Analysis for Japanese Teachers

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ABSTRACT

Background   We conducted a workshop-style program based on applied behavior analysis (ABA) for Japanese teachers in charge of children with developmental disabilities who had behavioral problems. Additionally, we investigated whether making and implementing behavioral intervention plans (BIPs) for participants, improved students' behavioral problems, and the mental health of participants.

Methods   The participants were 18 Japanese elementary and kindergarten teachers in charge of students with behavioral problems. The workshop comprised eight two-hour sessions of lectures and group discussions related to ABA. Achievement level was evaluated for the development and implementation of the BIP and improvement of behavioral problems. In addition, we analyzed changes in the 30-item General Health Questionnaire (GHQ-30) scores pre- and post-workshop to assess participants' mental health. Fifteen teachers who participated in more than half of the sessions were analyzed.

Results   All 15 teachers analyzed were able to perform appropriate functional behavioral assessment (FBA) and make a BIP, and 12 showed improvement in the targeted problem behaviors. Many target behaviors had avoidance functions and many antecedent strategies were behavior contracts. Adaptive behaviors incompatible with problem behaviors were selected as alternative behaviors to problem behaviors. Also, there was no aversive control over the outcome strategy. The average score for "social activity disorder" and "anxiety / caprice" in GHQ30 showed a statistically significant improvement in pre- and post-workshop.

Conclusion   It was found that appropriate FAB and BIP could be created using "the strategy sheet," in workshops based on the ABA. It was also suggested that the workshop program may in turn improve teachers' mental health. Further study is needed on the effectiveness of the workshop program using intergroup comparison designs for more subjects.

Key words   applied behavior analysis; developmental disabilities; problem behaviors; teacher training

Since 2007, all Japanese schools have been mandated to provide a special education support system for students with behavioral and learning difficulties. In 2013, Japan's Ministry of Education, Culture, Sports, Science and Technology reported that 3.6% of students in the country had behavioral problems in regular classes in both elementary and junior high schools. These students were suspected of having attention deficit hyperactivity disorder (ADHD), or autism spectrum disorder (ASD). Given this context, the development of effective assessment and staff training program have become an urgent need in Japanese special education.[1]

Many literature reviews recognize functional behavioral assessment (FBA) based on the principle of applied behavior analysis (ABA) as evidence-based intervention strategies for problem behavior reduction.[2] FBA were significant concepts in the 1997 amendments to the United States' Individuals with Disabilities Education Act.[3] However, FBA are not yet part of Japan's education legislation and are still unfamiliar to many Japanese teachers.

Although FBA-based interventions have shown a lot of research evidence, less research has been conducted on teacher training to implement these interventions in schools, and even less on changes in student behavior due to teacher training.[4] Borgmeier, Lorman, Hara, and Rodriguez[5] evaluated the effectiveness of 60 minutes of training for teachers to use FBA. The results showed an improvement in teachers' knowledge of planning FBAs and interventions. Gentry, Iceton, and Milnef[6] reported improved knowledge and skills during role play through three days of FBA training. However, these studies neither require the teachers in charge to perform FBA

on the students nor did they implement educational program based on FBA.

For evidence-based interventions to be effective for students, they must be consistently implemented. The degree to which the treatment is implemented as planned is referred to as "treatment integrity."[7] Collier–Meek, Sanetti, and Fallon[8] emphasized the application of the ABA strategy to enhance the effectiveness of treatment integrity. They proposed the use of FBAs such as the approach model of "antecedent strategy," "consequence strategy," and "training of alternative behavior." However, their study included only one case study. Although the number of studies on FBA-based staff training is gradually increasing, in Japan, most works are single-case studies involving school consultations,[9] and few are in the form of group interventions. It is desirable that such staff training programs should be continuous and should allow consultants to intervene in the school setting directly.

As behavioral school consultant systems for problem behavior in Japanese special education are insufficient, teacher group workshops are an indirect method of effecting behavioral changes among students. Teachers' behavioral change resulting in students' behavioral change is the highest index value for teacher workshops on problem behaviors. Therefore, to promote behavioral changes among students, it is necessary to develop a behavioral intervention plan (BIP) based on the students' behavioral assessment and a program that ensures that the BIP is implemented accurately.

Furthermore, the problem of burnout of staff who directly care for students with problem behaviors is a serious problem. Tierney, Quinlan, and Hastings[10] conducted a three-day training on understanding behavioral problems and managing stress. The 48 staff members who participated were evaluated before training and during a 3-month follow-up. Although there was an increase in the self-efficacy scale, the assessment of causal beliefs about emotional response and behavioral occurrence did not improve. However, the evaluations of teachers in this study are the effects of teacher training only, and not the teachers' implementation of an FBA-based approach. In this study, we also investigated the effect of the workshop on the mental health of participants.

In this ABA-based workshop for teachers on reducing problem behaviors, participants created a BIP for their students' problem behaviors and supported their practice in school. In addition, we used "strategy sheet"[11] as the FBA-based BIP. In implementing the workshop, the following research questions were examined in this study:

Research Question 1: Is it possible for participating teachers to make a BIP that reflects the FBA?

Research Question 2: Is it possible for participating teachers to implement BIPs at school and improve problem behaviors?

Research Question 3: What kind of mental health improvement will the participants have after participating in the workshop?

MATERIALS AND METHODS
Participants
The participants in this study were 18 teachers (5 male and 13 female) with an average age of 39.3 years (SD 9.1). Regarding affiliation, five were regular elementary school teachers, two were regular elementary school assistants, seven were kindergarten teachers, two were elementary school resource room teachers, and two were elementary school special class teachers. The average number of years of teaching experience was 15.3 (SD 9.4), of which the average special education experience was 3.7 years (SD 3.9). Table 1 shows the participants' profile. The participants were recruited through the author's university website homepage. The recruitment information clearly stated that the candidate must be a classroom teacher or an assistant teacher of students with problem behaviors, in addition to explaining that the focus of the workshop was on planning and implementing FBAs based on ABA. Participants got a regular teacher's license at the university but did not have a special education license. Also, they had no experience of attending lectures or training on the ABA. Informed written consent was obtained from all participants.

Workshop program content and schedule
The workshop consisted of eight sessions held once a week on Saturdays. Each session lasted two hours—one hour for the lecture and one for group work. Participants were divided into small groups of 4 or 5 during the group work. The same set of members worked across both work-groups, and, to support the participants, each work-group had one to two graduate students who were also school teachers. The schedule and content (lectures and group works) of the workshop program are shown in Table 2.

On the first day (orientation), participants completed the 30-item General Health Questionnaire (GHQ-30)[12] and a lecture was given on the proceedings of the workshop, problem behaviors, and Antecedent-Behavior-Consequence (ABC) analysis. In the first group work, participants practiced describing behaviors concretely rather than abstractly. They also made lists of the problem behaviors of the students in their classrooms.

Table 1. Profile and results of the participants

Participant	Gender	Age (years)	Affiliation	Years of teaching career (special education)	Attendance	Level of achievement
A	Male	44	Elementary first grade	21 (9)	8	A
B	Male	33	Elementary first grade	12 (4)	8	A
C	Female	39	Elementary second grade	10 (2)	7	C
D	Female	45	Elementary third grade	23 (2)	6	B
E	Male	50	Elementary fourth grade	23 (2)	7	B
F	Female	28	Elementary assistant	1 (0)	7	A
G	Female	32	Elementary assistant	10 (8)	3	–
H	Female	29	Kindergarten	3 (0)	8	A
I	Female	44	Kindergarten	12 (5)	8	A
J	Female	23	Kindergarten	3 (0)	8	A
K	Female	31	Kindergarten	8 (0)	7	A
L	Female	44	Kindergarten	15 (0)	5	B
M	Female	29	Kindergarten	7 (0)	5	B
N	Male	47	Kindergarten	24 (0)	3	–
O	Male	39	Elementary Resource room	17 (6)	7	C
P	Female	51	Elementary Resource room	31 (8)	7	B
Q	Female	51	Elementary Special class	29 (10)	6	D
R	Female	49	Elementary Special class	27 (10)	4	–

The levels of achievement of participants G, N, and R were not evaluated as their attendance was lower than the required criteria.

Table 2. Schedule and contents of the workshop on problem behaviors for teachers

Session	Lecture contents	Practice (group work) contents
#1	Orientation	Completing a Pre-GHQ30
	What are problem behaviors?	Self-introduction
	A-B-C analysis of the behavior	Describing behaviors concretely
#2	Characteristics of and support for developmental disabilities	Prioritizing and determining the target behavior Functional assessment
#3	Characteristics of and support for developmental disabilities	Changing the antecedent and consequence of the problem behaviors
#4	Developing a BIP Teaching alternative behaviors to children with problem behaviors	Developing a BIP using the "Strategy Sheet"
#5	Reviewing the BIP	Reviewing and modifying the BIP
#6	Reviewing the BIP	Reviewing and modifying the BIP
#7	Reviewing the BIP	Reviewing and modifying the BIP schedule
#8	Ways of in-school cooperation	Completing a Questionnaire and post-GHQ30

BIP, behavioral intervention plan.

The second and third lectures focused on understanding the characteristics of, and providing basic support to students with developmental disabilities, such as ASD and ADHD. In the second group work, each participant selected a target behavior to focus on by prioritizing the problem behaviors from the lists created in the first group work.

Participants then performed a functional assessment of their chosen target behavior using the Motivation Assessment Scale (MAS)[13]– a seven-point

rating scale comprising 16 questions that is used to assess four functions of problem behavior: sensory, escape, social attention, and tangibles. In this scale, points from each item are collected in an evaluation form and the average is calculated. The function of the target behavior was finally determined by the MAS result and by referring to the behavior observation data.

In the third group work, participants practiced filling out the recording sheet with the events that took place in the classroom before (antecedent) and after (consequence) the target behavior occurred. The participants were also required to maintain the daily recording sheets as homework until the next session. On these recording sheets, the participants registered the number of times and events that the targeted behavior occurred in the classroom per day.

The fourth lecture introduced techniques to help teachers teach alternative attitudes to problem behaviors in the classroom. The staff also demonstrated how to fill out the BIP using the strategy sheet based on FBA. In the fourth group work, participants evaluated the function of target behavior based on the results of recording sheets recorded at school and the results of MAS, and classified them into avoidance, demand, attention, refusal, and sensory. And each participant then discussed and prepared their strategy sheets. From the fifth session onwards, the staff taught teachers how to promote school-wide cooperation. In the corresponding group work, participants shared the results of their execution of the BIP prepared in the previous session. When the BIP of a group did not work well, the staff assisted the group in discussing ideas for modifying the program.

The researcher prepared an Internet homepage (HP) that only the participants could access using passwords to share information. On the HP, materials from the lectures were made available to all participants, including those who had not been able to attend. A bulletin board system (BBS) was also set up so that the participants could ask about their support program.

Instruments

Collier-Meek, Sanetti, and Fallon et al.[8] used diagrams based on ABA for easy intervention and to enhance the treatment integrity of participants. In this study, we used a strategy sheet similar to this diagram. An example of the strategy sheet is shown in Fig. 1. The strategy sheet includes a BIP created to establish appropriate behaviors based on a functional assessment of the problem behavior. One sheet was used for one target behavior for each student. The sheet is A4-sized and is divided into two parts—top and bottom. The top portion is designed to enable the functional assessment

of a problem behavior and is completed based on a behavioral observation or MAS. Three frames are provided to enter A (Antecedent), B (Behavior), and C (Consequence) as well as the estimated functions (e.g., attention, demand, escape/avoidance, and sensory).

The lower portion of the sheet provides space for the BIP. It includes three columns to be completed with the following information during the group work discussion: antecedent strategy (environmental adjustments that prevent problem behaviors from occurring), alternative appropriate behaviors for problem behaviors, consequence strategy (reinforcement of appropriate behaviors), and prompting for alternative behaviors or responses to the occurrence of problem behaviors.

Program evaluation
Analysis of BIP
It was important to consider whether the BIP designed by the teacher was based on the FBA in order to increase the treatment integrity. In the BIP formulated by the teacher, we evaluated whether the participants identified the function of the target behavior, manipulated the antecedent strategy, selected the alternative functional behavior, manipulated the consequence strategy, and classified the functions of each problem behavior into avoidance, demand, attention, refusal, and sensory by reference to observation and the MAS evaluation.

Level of achievement of the BIP
The level of achievement of the BIP was evaluated according to five levels based on each teacher's implementation: level A – Improved behavioral change with an objective record (when the occurrence rate of the target behavior shows a decrease of 80% or more for one week or more continuously); level B – No objective data are shown but improvements are reported; level C – No objective data are shown and no behavioral improvement is confirmed; level D – A BIP was developed but not implemented; level E – The participant was unable to develop a BIP.

The 30-item General Health Questionnaire (GHQ-30)
For the evaluation of the mental health status of the participants, this study adopted the GHQ-30.[12] The Japanese version of GHQ-30[14] has acceptable reliability and validity. This is a four-point item questionnaire comprising 30 questions about the participant's mental and physical health in the preceding two or three weeks. The scales have six factors: general disease tendency, physical symptoms, sleeplessness, social activity disorder, depressive tendency, and anxiety/caprice. The GHQ-30 was conducted before and after the workshop.
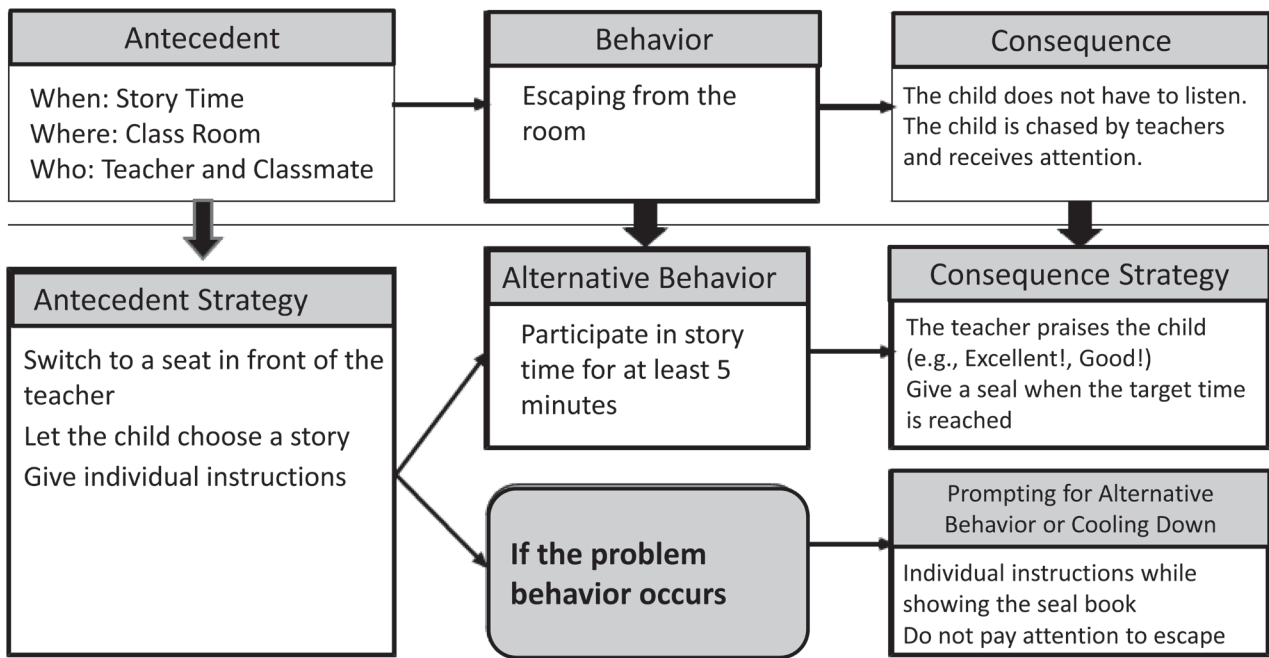
Fig. 1. Strategy sheet and its example.

Post-workshop questionnaire and interview

A post-workshop questionnaire was administered to understand participants' understanding of and satisfaction with the workshop. The contents of the questionnaire were graded on a five-point Likert scale (ranging from "*strongly agree*" to "*strongly disagree*"), and elicited information about the satisfaction with the lectures and group works, as well as the positive effect of implementing the plans on their schools. Other questions, such as "Did the recognition of or response toward the targeted problem behavior change after the workshop?" were included. In addition, each participant was interviewed regarding the implementation of the BIP in their schools.

Data analysis

To clarify the effect of the workshop on participants' mental health, we compared the difference in GHQ pre-post scores using the Wilcoxson signed-rank sum test. All statistical tests were performed using SPSS ver. 25.0. Both authors confirmed the correspondence between participants' interviews and episodic data.

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. The study was conducted in accordance with the ethical standards established by the 1964 Declaration of Helsinki.

RESULTS
Analysis of BIPs

Table 3 shows each student's diagnosis, targeted problem behavior, the function of the target behavior, appropriate alternative behaviors described in the BIP, and responses of antecedents and consequences. In total, seven students were diagnosed with ASD, four with ADHD, two with intellectual disability (ID), and five were undiagnosed.

As a result of the functional assessment of the target behavior using the strategy sheet created by the participants, all 15 teachers classified the target behavior into some function. The classified functions were avoidance (40.0%), refusal (13.3%), attention (1.4%), sensory (0.7%), avoidance and attention (26.7%). Antecedent strategies include effective environmental manipulations and responses to prevent problem behaviors. Antecedent strategies were categorized into behavior contract (42.8%), the task adjustment (21.4%), visual prompt (21.4%), individual instruction (0.7%), and seat change and individual instruction (21.4%) in the 14 behaviors which were filled out.

It is necessary to replace the targeted problem behavior with the appropriate behavior. In this study, we identified the appropriate behavior by classifying them into alternative behaviors that were incompatible with problem behaviors and those that were functionally

Table 3. Student's diagnosis, target behavior, function, and description in the BIP

Participant	Diagnosis	Targeted behaviors	Function	Description in the BIP		
				Antecedent strategies	Appropriate and alternative behaviors	Consequence strategies
A	ID	Throwing objects	Avoidance	Task adjustment	Asking the teacher for help	Choice favorite playing
B	ASD	Aggressive behavior	Refusal	Behavior contract	Following friends' directions	Verbal praise; Piggyback ride
C	ASD	Wandering during class	Attention	Task adjustment	Solving three computational tasks	Verbal praise; Token system
D	ADHD	Escape from the classroom	Avoidance, Attention	Behavior contract	Entering the classroom with friends in three min.	Token system; Right to speak before the class starts
E	ID	Keep playing without preparing for classes	Avoidance	Individual instruction	Preparing for classes	Verbal praise; Reading specialty book
F	Undiagnosed	Drawing pictures instead of studying	Avoidance	Behavior contract	Doing a task	Choose a drawing paper, stickers, etc.
G	ADHD	–	–	–	–	–
H	ASD	Keep playing without preparing for a class after arriving at kindergarten	Avoidance	Visual prompt	Putting a sticker on the attendance card	Verbal praise; Play with a ball
I	ADHD	Making noise during story time	Avoidance, Attention	Seat Change, Individual instruction	Increase reading picture books	Verbal praise
J	ASD	Escaping from the room during story time	Avoidance, Attention	Seat Change, Individual instruction	Participate in story time for at least 5 minutes	Verbal praise; Token system
K	ADHD	Playing in the water without washing hands	Sensory	Behavior contract	Handwashing	Verbal praise; Physical play
L	Undiagnosed	Speaking without following the rules of discussion	Attention	Behavior contract	Speaking up only when his/her name is called	Verbal praise; Communication notebook
M	Undiagnosed	Throwing an object when other students touch	Refusal	Behavior contract	Asking the teacher for help	Verbal praise
N	undiagnosed	–	–	–	–	–
O	ASD	Drawing pictures instead of studying	Avoidance,	Task adjustment	Increase study time	Verbal praise
P	Undiagnosed	Wandering during class	Avoidance, Attention	Visual prompt	Doing a task	Verbal praise; Token system
Q	ASD	Keep playing without preparing for class	Avoidance	N/A	Preparing for classes	Verbal praise; Token system
R	ASD	–	–	–	–	–

Data of participants G, N, and R were not evaluated as their attendance was lower than the required criteria. ADHD, attention deficit hyperactivity disorder; ASD, autism spectrum disorder; BIP, behavioral intervention plan; ID, intellectual disability.

equivalent behaviors. This resulted in only two functionally equivalent communicative behavior— "ask the teacher for help"— and the rest were selected as incompatible behaviors, such as escaping from the task and engagement behavior. There was no aversive control in the consequence strategies, and most of them were a combination of verbal praise alone and a token system.

Participant situation and level of achievement of the BIP

The attendance rate for all 18 participants was 79.86%. Participants G, N, and R were absent more than four

Table 4. Median and inter quarter range on GHQ30 (*n* = 11)

	Pre				Post				*Z*	*P*	Effect size *r*
	Median	Inter quarter range			Median	Inter quarter range					
Sub-Scale											
General disease tendency	1.0	0.0	–	2.0	1.0	0.0	–	2.0	0.11	0.914	0.03
Physical symptoms	1.0	0.0	–	2.0	0.0	0.0	–	1.0	0.95	0.341	0.29
Sleeplessness	1.0	0.0	–	3.0	1.0	0.0	–	1.0	1.19	0.236	0.36
Social activity disorder	0.0	0.0	–	2.0	0.0	0.0	–	1.0	2.00	0.046*	0.60
Anxiety/caprice	3.0	1.0	–	4.0	1.0	0.0	–	3.0	2.20	0.028*	0.66
Depressive tendency	0.0	0.0	–	0.0	0.0	0.0	–	0.0	1.00	0.317	0.30
Total	7.0	6.0	–	9.0	3.0	1.0	–	7.0	1.74	0.083	0.52

Data with missing values and data that did not meet the criteria for attendance and level of achievement were excluded from the analysis. *$P < 0.05$.

times and were thus excluded from further analysis. The remaining 15 participants were able to develop their own BIPs. The participants' levels of achievement were as follows—7, 5, 2, and 1 participants were at Level A, B, C, and Level D, respectively. All participants except Q were able to implement the BIP in their schools. Participant Q (Level D) reported that they had spent too much time setting the target behavior and developing the procedures in the groupwork.

The 12 participants other than D and O reported improvement in target behaviors. Two participants D and O did not see any effect during the plan implementation period; Participant D reported a lack of support from his school, making it difficult for him to spend time dealing with students' specific problems, and participant O was unable to implement the plan for a sufficient time as he was not the main class teacher. Of the 12 participants who reported improvement in students' target behaviors, 7 had accurate behavioral records (Level A), and 5 did not (Level B).

GHQ-30
We analyzed the data of 11 participants, excluding three with missing pre-post scores on the GHQ-30 and one (Q) who did not implement the BIP. The median scores of GHQ are shown in Table 4. The Wilcoxson signed-rank sum test was performed to check whether there was a difference between the pre-post scores of GHQ. The results showed significant differences in " social activity disorder " ($P < 0.05$) and " anxiety/caprice " ($P < 0.05$), with a significant trend in the total GHQ score ($P < 0.10$). The effect size was calculated as $r = 0.60$ for "social activity disorder" and $r = 0.66$ for " anxiety/caprice," and the total score was $r = 0.52$, indicating that these three effect sizes corresponded to a large effect size.[15]

Post-workshop questionnaire and interview
For the items asking about changes in recognizing or responding to the problem behaviors after the workshop, 14 participants who were able to implement the BIP reported that there was a change. They reported: "I started to focus on not only the behavior, but also on its background, such as the antecedent and the consequence;" "I came to identify students' behavior well by recording their behaviors;" "I used to focus on students' problem behaviors, however, now I understand the student better than before;" "I used to treat all students in the same way, but now I can treat them differently to match each student's developmental status;" "I praise students more than before;" and "I treat students such that I can prevent problem behaviors."

DISCUSSION
This study investigated the effects of an 8-session 16-hour workshop for Japanese teachers on reducing students' problem behaviors using ABA principle. Eighteen teachers in charge of students with behavioral problems participated, and 15 people who participated in more than half of the sessions were analyzed. In this study, all the subjects analyzed were able to perform FBA and make a BIP. In a survey of schools in Wisconsin, USA, a full quarter of the FBAs submitted failed to identify the function of the target behavior and 46% of the BIPs used only aversive strategies as means to address the target behavior.[16] In contrast, in this study, there was no aversive control over the outcome strategy. From the above, it could be suggested that FAB and BIP can be created using the strategy sheet from this study.

Participants' most target behaviors and set antecedent strategies were avoidance functions and behavior contracts. Furthermore, functionally equivalent

behaviors (e.g. helping their teachers as escaping from task) for the appropriate behaviors were few, whereas incompatible alternative behaviors (e.g. engaging in escaping behavior to avoid task) were more. These incompatible alternative behaviors were tailored to the level of the individual student, but basically the individual student was required to behave similarly as their classmates. The upper limit of the number of students in a general class set by the Japanese government is 40 in elementary and junior high schools (35 in the first grade of elementary school), which is larger than in European and US schools. It is suggested that such cultural factors may have influenced the selection of target behaviors or the alternative appropriate behaviors.

Many studies have pointed out that there is a gap in the formulation and implementation of BIP in schools.[4] The results of this study showed that all 15 participants developed BIPs, 14 implemented their BIPs, and 12 showed improvement in the targeted problem behaviors. These results help in identifying the factors that determine the success of a group workshop for problem behaviors.

The first factor is the content of the workshop. A review of Japanese intervention studies[9] found that studies reporting large effects had practitioners collaborate with people from a supportive environment in all steps of the functional assessment, or the assessment and selection of target behaviors. The high achievement rate for FBA and BIP might be because the workshop included both, a lecture component and group work. In group work, teachers discussed a real example of their students' problem behaviors, made their BIP, implemented them in their classrooms, and repeatedly confirmed and updated the program with feedback from the other participants and staff in the next workshop session. This group work style is based on the Plan-Do-See method of planning the BIP and is be useful for generalization and maintenance after the workshop program.

The second factor is using visual and simple diagrams as BIPs. It is likely that the program was easy to implement because of the use of a strategy sheet, which made the ABA intervention method easy to understand. This finding is supported by previous research.[8] In order to conclusively prove the effectiveness of strategy sheets in the future, it is necessary to include a control group.

The third factor is attendance. Results showed that, the attendance rate of participants with high achievement level (Level A) was significantly higher than that of other participants. In order to be highly effective in the workshop, it is necessary to improve the environmental conditions to satisfy sufficient attendance. This

workshop was held on a holiday, and participation was voluntary for teachers. In the future, it will be necessary to give consideration so that teachers can participate in weekday hours as regular job training.

The fourth factor is securing sufficient opportunities to implement the BIP at schools. According to the interview results participant Q could not implement BIP due to delayed planning. Two participants who implemented the BIP but did not see improvements also had limited instructional opportunities because they were not the main teachers (O) and did not have a cooperative relationship within the school (D). It is difficult for teachers to ensure instruction frequency solely on their own efforts. A school-wide support system, human resources, and a supportive environment are necessary for effective implementation. As pointed out in previous studies about school consultation,[17] it may be important to have a department within the school that coordinates the practices of teachers with external institutions.

The results of this study also indicate the challenge of participants in recording children's behavior at school. Many Japanese teachers are not accustomed to keeping track of and recording children's problem behaviors. Inoue, Nakatani, and Higashino[18] developed a smartphone application that can easily record problem behaviors. In the future, it would be necessary to extend the rules and systems that can introduce such tools to schools.

The problem behavior causes emotional reactions such as fear, anger, and irritation in teachers; these emotions are associated with increased stress, which tends to result in burnout among staff.[19] There was a statistically significant difference in "social activity disorder" and "anxiety/caprice" between the pre-GHQ and post-GHQ scores. Previous studies have reported little improvement in anxiety or emotions associated with training.[10] The improvement of the GHQ score in this study did not place a heavy burden on the participants of the workshop, indicating the possibility of improved mental health.

Limitations and future direction

The limitation of this study is that the indicators of improvement in children's behavior were subjective reports and behavior records of participants. Although data acquisition is limited because it is a community study, future studies should test the reliability of behavior records, the fidelity of implementation, and social validations. Further, studies using intergroup comparison designs for more subjects also be needed. The generalization of BIP planning using workshops to other students and long-term maintenance will be issues

for the future. In this study, teachers' experience and special education careers were not related to achievement level. More samples are needed to clarify this point.

An Internet platform, as a supplementary means of the workshop, was set up for lecture delivery to absentees, to answer questions, and as a place for information exchange between participants. They were not analyzed as data in this study; however, the future studies should examine the possibility of Internet-based workshops.

The authors declare no conflict of interest.

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