An Evaluation of Behavior Skills Training for the Identification of Precursor Behaviors and

Implementation of Functional Analyses on Precursor Behaviors by Japanese Teachers

Kozue Matsuda

A Dissertation Submitted to the Faculty of

The Chicago School of Professional Psychology

In Partial Fulfillment of the Requirements

For the Degree of Doctor of Philosophy in Psychology

March 11, 2019

ProQuest Number: 13815162

ProQuest 13815162

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Approved By:

Julie A. Ackerlund Brandt, PhD, BCBA-D, Chairperson
Assistant Professor, Applied Behavior Analysis Online Program

Susan Flynn, PhD, BCBA-D, Member
Department Chair, Applied Behavior Analysis Online Program

Neil Martin, PhD, BCBA-D, Member
Director of International Development, The Behavior Analyst Certification Board, Inc.

Acknowledgements

I would like to express my sincerest gratitude to my dissertation chair, Dr. Julie Ackerlund Brandt, for her advice, guidance, and feedback on this work. This dissertation would not have been possible without you. I would also like to thank Dr. Susan Flynn for her useful comments, remarks, and involvement throughout the learning process. Additionally, I would like to acknowledge Dr. Neil Martin as the second reader of this dissertation; I am indebted to him for his valuable comments. I thank Amanda Cano and Katie Saint for their assistance in data collection and analysis. I also thank Rina Nagai, Mari Uramoto, Sayaka Motai, and Satoko Futagami for their steadfast support and strength and for pushing me to succeed. Finally, I would like to express gratitude to my beloved family members, Arahi and Shayne, for believing in me, and to members of the 2016 cohort of the Chicago School of Professional Psychology for their understanding and endless love throughout my studies.

Abstract

Despite the importance of identifying the function of a problem behavior through experimental functional analysis (FA), not all teachers have the necessary skills to address severe behavior in children with autism spectrum disorder (ASD), or other developmental disorders. This is a particular problem in countries that are home to few trained behavior analysts and in which cultural mores are strongly averse to the occurrence of problem behavior. For this study, 7 Japanese teachers of students with ASD with limited experience in FA participated in 2 studies. In Study 1, the teachers were trained to identify precursors to problem behaviors using behavior skills training. In Study 2, the teachers were trained to conduct an FA of precursor behaviors. The results were that the training was successful in teaching participants to identify precursor behaviors and conduct precursor FAs. Additionally, the teachers reported high levels of social validity of the precursor FA.

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Chapter 1: Nature of the Study

Background

In clinics and schools, children with autism spectrum disorder (ASD) and other developmental difficulties engage in problem behaviors more than 3 times as often as their typically developing peers, and teachers and caretakers must continuously seek better interventions to reduce and stop the problem behavior (Dunlap, Kern-Dunlap, Clarke, & Robbins, 1991; Gebbie, Ceglowski, Taylor, & Miels, 2012). Applied behavior analysis (ABA) is a behavioral science whose primary goal is to help society (Baer, Wolf, & Risley, 1968; Moore, 2008), and since the original publication of an experimental model proposed by Iwata, Dorsey, Slifer, Bauman, and Richman (1982/1994), ABA researchers have successfully proposed functional analysis (FA) for identifying the functions of problem behaviors so interventions based on the function of a problem behavior can be developed (Dunlap et al., 1991; Iwata et al., 1982/1994). Although FA has been successfully used to identify the function of problem behaviors, some practical constraints in its implementation remain, and some individuals actively avoid using this approach in practice (Hanley, 2012; Iwata & Dozier, 2008).

One way to reduce the avoidance of FA in practice situations is to evaluate precursor behaviors instead of high-risk problem behaviors (Hanley, 2012; Iwata & Dozier, 2008). A precursor behavior is a behavior that reliably precedes the occurrence of a more dangerous problem behavior (e.g., face-punching), often presenting as a different topography (e.g., pushing materials away; Beavers, Iwata, & Lerman, 2013; Fahmie & Iwata, 2011). Different topographies are sensitive to the same consequences if a precursor behavior belongs to the same response class as the target problem behavior (Skinner, 1969).

Previous studies have suggested that FAs of precursor behavior show the same functions as FAs implemented for the problem behavior (i.e., Najdowski, Wallace, Ellsworth, MacAleese, & Cleveland, 2008; Smith & Churchill, 2002). Smith and Churchill (2002) examined the efficacy of conducting FAs of precursor behaviors that were reported to reliably precede dangerous problem behavior in order to identify the function of the problem behavior. Najdowski et al. (2008) aimed to use FAs of precursor behavior to identify the function of problem behaviors such as aggression or inappropriate sexual behavior (e.g., grabbing genitalia of staff or peers) because the typical FA procedures that systematically evoke the problem behavior raised ethical concerns. They aimed to indirectly manipulate the variables maintaining aggression and inappropriate sexual behavior by conducting an FA of precursor behavior. They identified precursors to severe problem behavior by interviewing the participants' caregivers. After conducting the FA of the precursor behavior, Najdowski et al. (2008) also implemented individualized interventions involving functional communication training (FCT), which, based on the identified variables, was designed to maintain precursor behavior during each FA. The results of Najdowski et al. (2008) study were that FAs of precursor behaviors may offer an alternative indirect method for assessing the operant function of severe problem behaviors. Although Smith and Churchill (2002) and Najdowski et al. (2008) suggested that FAs of precursor behaviors may help identify the function of problem behaviors, some individuals still avoid FAs in cases where the individuals engage in high-risk problem behaviors (Iwata & Dozier, 2008; Iwata et al., 2000).

One possible reason for this avoidance might involve the lack of a clear method for identifying precursor behavior or an insufficient number of professionals available in the community. Only a small number of researchers have conducted studies to identify precursor

behaviors, and the intensive training to conduct precursor FAs (e.g., behavior skills training [BST]) is not readily available (Borrero & Borrero, 2008; Fritz, Iwata, Hammond, & Bloom, 2013; Iwata et al., 2000). Researchers and practitioners in the field of behavior analysis and the Behavior Analyst Certification Board have suggested that Board Certified Behavior Analysts (BCBAs) should conduct FAs of severe problem behavior with teachers, parents, and allied professionals as partners in the process (Behavior Analyst Certification Board [BACB], 2014); however, in a country like Japan, where the number of professionals with credentials is very small, there is an urgent need to implement safer and easier FAs in order to developing and providing effective treatment (BACB, 2014; Hanley, 2012; Iwata & Dozier, 2008). In the current study, we evaluated the effects of BST to establish competence in the identification of precursor behavior and problem behavior (Study 1), and to teach teachers to conduct a precursor FA (Study 2).

Problem Statement

Behavior analytic researchers have examined alternative FAs, such as precursor behavior FAs, yet teachers who face children with problem behavior still do not have the ability to conduct precursor behavior FAs. Because the risk of evoking a problem behavior is relativity low, precursor behavior FA may be more acceptable to teachers in Japan, where access to BCBAs is limited and social mores surrounding problem behavior limit the acceptability of evoking it. However, currently there is a limitation in precursor FA methodology in the "preresearch" stage, where precursor behavior needs to be identified. Often, it has been identified through interviews with caretakers (i.e., Najdowski et al., 2008). In addition, the dissemination of the science of behavior needs to be "technological" (Baer et al., 1968), which means that the

teachers who teach children with problem behavior need to gain the skills to identify the precursor behavior and determine its function in order to provide effective interventions.

Purpose of the Study

The purpose of the current study is to extend previous research on precursor FAs to provide BST to teachers in places where only a small number of individuals have credentials, such as Japan. This study will build upon the literature on FA methodology and BST. The study aims to conduct the following evaluations:

Research Purpose 1: Evaluate BST for Japanese teachers for the purpose of identifying precursor behaviors.

Research Purpose 2: Evaluate the impact of the implementation of BST for precursor behavior FA on Japanese teachers.

Summary

An alternative FA methodology for high-risk behavior—precursor behavior FA—has been tested, yet many practitioners and behavior analysts avoid conducting the analysis due to a lack of BST in clinical settings. Without identification of the function of their problem behavior, children with ASD and other developmental difficulties continue to repeat disturbing behaviors. As part of the science of behavior, ABA needs to move the process of precursor behavior FA a step further. Examining the effects of BST on teachers' ability to identify precursor behavior has the potential to increase success in clinical and educational settings that have a small number of professionals.

Chapter 2: Review of the Literature

Introduction

Children diagnosed with developmental disorders such as ASD may engage in high-risk, dangerous behaviors that interfere with daily life and social engagement (Dunlap et al., 1991). High-risk, dangerous behaviors such as self-injury, aggression, and property destruction may prompt reactions from parents and caretakers, and these very reactions may strengthen the problem behaviors through social reinforcement (Iwata & Dozier, 2008). For instance, if a young child repeatedly bangs his head on the ground when the adults are busy, his parents and caretakers might immediately grab him. If this continues to occur, then the head-banging behavior might increase because of social reinforcement.

There is a wealth of research on the functions of behavior, yet teachers, caretakers, and doctors often blame children's problem behaviors on their diagnoses rather than identifying the environmental functions of the behaviors (Iwata et al., 1982, 1994). For example, teachers often attribute children's screaming to a diagnosis of ASD or anxiety or stress disorders. In this chapter, I discuss FA, examine the various types of FA, particularly, FA for high-risk behavior, introduce the research on precursor behavior FA, and examine limitations and cultural issues regarding FA in Japan, where it may not be readily accepted.

Functional Analysis

Functional analysis methodology allows environmental variables that influence the occurrence of problem behavior to be identified (Hanley, Iwata, & McCord, 2003; Iwata et al., 1982/1994). In applied behavior analysis, the term *functional analysis* is based on Skinner's (1953) explanation of the function of a behavior: "the external variables of which behavior is a function provide for what we may be called a casual or functional analysis" (p. 35). In clinical

settings, several conditions are arranged, each of which is designed to test a specific hypothesis about the controlling variable for a problem behavior. If any specific conditions repeatedly induce the problem behavior, the researchers and/or practitioners may claim to have discovered cause–effect relationships between these variables and the problem behavior.

Iwata et al. (1982/1994) presented an experimental FA, a systematic methodology that allows behavior analysts to determine the function of a target behavior, for self-injurious behavior. Their research has since been replicated and extended. An FA involves the direct, systematic manipulation of antecedent- and consequence-based environmental variables in order to identify the maintaining function of a target problem behavior (Dunlap et al., 1991; Iwata et al., 1982/1994). By conducting an FA and analyzing the pattern of connections between behavior levels and environmental events, behavior analysts can determine the behavior's maintaining function (Iwata et al., 1982/1994). These connections are identified by observing the frequency with which a target problem behavior occurs within each condition, as compared to a control condition (Hanley et al., 2003). Once the patterns have been evaluated and a function determined, the behavior analyst can develop a function-based intervention (Iwata et al., 1982/1994; Skinner, 1953).

A typical or "standard" FA follows a methodology similar to that employed by Iwata et al. (1982/1994). These authors examined patterns of self-injurious behavior in nine participants with developmental disabilities. The key components of experimental FAs include separate influential and incidental features of the environment, a direct, repeated measure of behavior, and controlled conditions (test and control) of observation (Beavers et al., 2013). In a standard FA, a randomized multi-element design (rapid alternation between 10- and 15-min sessions for each condition) is often used to assess the occurrence of the problem behavior. The experimental

conditions used in the original study were academic (task), alone, social disapproval, and the control setting. The first three conditions were developed to evaluate the three general functions of behavior (escape, self-stimulation, and attention), whereas the fourth served as a control condition (Iwata et al., 1982/1994).

In the academic condition (often referred to as the demand or escape condition), the researcher presents the participant with a task to carry out until the problem behavior occurs (Iwata et al., 1982/1994). While presenting the academic material, the experimenter frequently employs vocal cues (e.g., saying, "time to work") and physically prompts the participant to respond. If the participant engages in the problem behavior at any point, the researcher turns away from him or her and ceases the task demand condition for 30 s, effectively providing a break or escape from the task. The academic or task condition is used to test for a social negative reinforcement because the option "escape from demands" is systematically presented when the targeted problem behavior occurs (Iwata et al., 1982/1994).

In the alone condition, the subject is asked to remain alone in the room without toys, teaching materials, or items for entertainment. This condition is designed to test for automatic reinforcement such as self-stimulation (Iwata et al., 1982/1994). In some current iterations of this condition, the participant may be in the room with another individual—however, the latter ignores all problem behavior.

In the attention condition, the experimenter ignores the participant until the problem behavior occurs; then he or she delivers attention. Over the years, this has varied from statements of concern to reprimands, depending on the natural circumstances (Iwata et al., 1982/1994). Moderately preferred toys and other activities with which the participant may

engage at any time are available in the room. The attention condition is used to test for a possible function of social positive reinforcement, namely, access to attention from others.

In the control condition, often referred to as the play condition, highly preferred toys and activities are available in the room. The researcher places no demands on the participant and provides systematic attention (Iwata et al., 1982/1994). If problem behavior occurs in this condition, no changes are made to the environment. The "tangible" condition has commonly been added as a fifth condition. In this condition, the experimenter plays with highly preferred toys in front of the participant, who is only given access to the toys following problem behavior. The purpose of this condition is to test for a possible function of social positive reinforcement, similar to the attention condition, except that the access is to tangible items instead of attention.

Although the effectiveness of FAs has been well documented (e.g., Bloom, Lambert, Dayton, & Samaha, 2013; Carr, 1977; Dunlap et al., 1991; Iwata et al., 1982/1994), many have argued that the process is problematic, as it has extensive time demands, several constraints, and the potential to increase high-risk behaviors with detrimental outcomes (Beavers et al., 2013; Bloom, Iwata, Fritz, Roscoe, & Carreau, 2011; Iwata & Dozier, 2008). For example, if a teenager engages in self-injurious behavior in the form of banging his or her head against the floor and this behavior occurs during an FA, physical harm such as bruises, lacerations, or even a concussion could result. Nevertheless, conducting an FA remains the most successful method for determining an effective intervention. When conducting an FA of high-risk behavior, it is critical that the researcher be aware of ethical considerations, including setting ethical criteria and standards for session termination (Fritz et al., 2013). It is difficult for teachers and caregivers to allow observed high-risk behavior to occur frequently, especially when it is evoked

by a controlled environment during FA (Fritz et al., 2013). Because of these concerns, there have been many methodological alterations to FA in recent years.

Methodological Alternatives

In view of the challenges of the FA methodology as discussed in the previous section, alternative FA strategies have been developed to reduce some of the risks involved. As noted above, the challenges of functional experimental analysis include time constraints, a low rate of problem behavior, setting constraints, and high-risk behavior (Davis, Kahng, Schmidt, Bowman, & Boelter, 2012).

Time Constraints

Although FAs can be time-consuming, several authors have designed brief versions of the assessment (e.g., Derby et al., 1992; Northup et al., 1991). FAs often involve lengthy test and control sessions (usually 10 to 15 min) that are conducted repeatedly, sometimes for days or weeks, in order to observe an environment's effects on problem behavior. Northup et al. (1991) conducted a brief functional analysis during a single, 90-min outpatient evaluation. Before conducting the analog assessment, they reviewed the referral information and prepared the environment in terms of such elements as the order of assessment conditions, preferred activities, the tasks selected for escape conditions, and the roles of team members. The experiment consisted of a single exposure to a test of less than 10 min in order to determine control conditions, and the results demonstrated that a series of brief analog conditions can be conducted during an outpatient evaluation. Similarly, Derby et al. (1992) conducted a study that used brief assessment procedures for 79 individuals over a 3-year period to determine the percentage of clients for whom brief functional analysis could identify a specific contingency. Their results

suggested that although brief FAs can reveal the variables associated with problem behaviors, more extensive assessments are often necessary in order to clarify the initial assessment results.

Low Rates of Problem Behavior

Another criticism of experimental FA involves the difficulty of applying it to a problem behavior that occurs at a low frequency (e.g., elopement or vomiting; Hanley, 2012). The function of problem behaviors that occur at a low rate was tested by Thomason-Sassi, Iwata, Neidert, and Roscoe (2011), who investigated the use of response-latency data as an index for determining function. If a problem behavior occurred with shorter latencies for one condition, for example the attention condition, this would indicate that the maintaining function is attention. Thomason-Sassi et al. studied 10 adults who displayed severe problem behaviors (self-injury, aggression, property destruction) at least once a day. They conducted latency FA followed by standard functional analysis in order to allow a comparison of the results. During the latency FA, the session contingencies were the same as in a standard FA, except that the researchers delivered the consequence for the first response and terminated the sessions noncontingently after 1 min had elapsed following the first occurrence of the problem behavior. Each session lasted until either the first instance of the problem behavior occurred or 5 min had elapsed, after which the researchers recorded the latency with which the problem behavior occurred. The resulting data for the latency FA matched the results of the standard FA.

Neidert, Iwata, Dempsey, and Thomason-Sassi (2013) also extended previous research on trial-based FAs by using the latency FA for infrequent problem behavior (e.g., elopement). Two adults who had intellectual disabilities and engaged in elopement participated, and the researchers conducted sessions for 5 min or until the elopement occurred. For this study, the latency FA consisted of three test conditions (ignore, attention, and demand) and a control

condition. Similar to Thomason-Sassi et al. (2011), Neidert et al. found that the latency measure was a successful indicator of the maintaining function for elopement.

Setting Constraints

Trial-based functional analysis (TBFA) may address the issue of limited environmental control by using embedded assessment of ongoing activities (Bloom et al., 2011; Flynn & Lo, 2016). As a standard FA is typically session-based rather than trial-based, multiple instances of problem behavior might occur during one session, and it is possible to extend a session until a problem behavior occurs. Conversely, a TBFA includes a single opportunity for a problem behavior to occur per trial segment and demonstrates functional relationships between environmental variables and problem behavior through brief experimental trials (Bloom et al., 2013; Flynn & Lo, 2016).

Bloom et al. (2011) conducted a TBFA in a typical classroom, embedding trials into the regular classroom routines of 10 children. Prior to the experimental session, the researchers trained the teachers to serve as therapists during the TBFAs with functional communication training (FCT; Carr & Durand, 1985) based on the identified functions of the problem behaviors. The researchers also provided the session plans and conducted a one-hour training session that included reviewing the session descriptions, engaging in role-playing trials, and receiving performance feedback until the teachers performed without error for each trial type. Each TBFA trial consisted of a 2-min control segment followed by a 2-min test segment and then another 2-min control segment. During the first control segment, the potential reinforcer for the condition was delivered noncontingently. When the test segment began, the teacher removed or terminated the potential reinforcer, and it was delivered again contingent on problem behavior. Segments were terminated after the first occurrence of problem behavior or were continued for a period of

2 min if no problem behavior occurred. The function of the problem behavior was determined

by comparing the test segment for each of the conditions to the control segment (Bloom et al.,

2011; Lambert, Bloom, & Irvin, 2012). A potential limitation of TBFA is that it may only

provide FCT for the specific intervention and may fail to include interventions for all identified

functions (Bloom et al., 2011).

High-Risk Behavior

Conducting an FA is difficult for problem behaviors such as self-injury, aggression, and

destructive behavior, which risk harm to the participants and the experimenters. To address this

challenge, FA has been conducted on precursor behavior, defined as a behavior that reliably

precedes the occurrence of the problem behavior (Beavers et al., 2013; Borrero & Borrero, 2008;

Smith & Churchill, 2002). For example, an individual might always stamp his or her feet or

scream before engaging in the dangerous behavior (e.g., biting, hitting, kicking, or

masturbating). Different topographies of high-risk problem behavior can be maintained by the

same consequences (Skinner, 1969). Indeed, a range of research has identified the possibility of

functional equivalence between precursor behaviors and high-risk problem behaviors. Although

precursor FAs may be considered an alternative to standard FAs, precursor FAs are conducted on

different, lower-risk behavior than the actual problem behavior and thus may address multiple

issues raised by FA, such as time and setting constraints.

<div align="center">

Precursor Functional Analysis (FA) Research

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A response class is defined by the common consequences that are produced by any

member of the class (Catania, 1992; Lalli, Mace, Wohn, & Livezey, 1995). Previous studies

have shown that changes in frequency for one topography can affect the probability of other

members of the response class (Carr & Durand, 1985). Lalli et al. (1995) evaluated the effects of

extinction and functional equivalence training on response covariation, hypothesizing that the latency between a request and the first occurrence of each member of the behavior class was hierarchically related. They found that the dependent variable of interest is the time between a teacher's request and the first occurrence of each response-class member. In their study, Lalli et al. examined the severe problem behaviors of a 15-year-old girl with developmental difficulties and ASD who was admitted to a hospital; the behaviors included (a) insertion of her hand into her mouth (self-injury); (b) slapping, punching, and kicking (aggression); (c) vocalizations louder than normal conversational volume (screams); and (d) saying "no" in response to the caretakers' requests. The experimenter conducted a typical FA in 15-min sessions during the patient's hospitalization, using a multi-element design in order to conduct three to five sessions daily. The researchers noted that when reinforcement contingencies were applied to the first problem behavior, the remaining behaviors were suppressed. Moreover, because the problem behaviors occurred in a predictable sequence, the researchers referred to this as a response hierarchy.

Overall, Lalli et al. (1995) suggested that the four problem behaviors constituted a response class and noted that the participant's behavior showed a pattern of escalation that began with screams and escalated first to aggression and then to self-injurious behavior. Lalli et al. introduced the concept of precursor FAs for severe problem behavior by presenting target early behaviors as part of a sequence and proposing a means to prevent the occurrence of more serious problem behaviors. A key limitation of this study was the low number of participants. The identification of behavior patterns based on a behavior hierarchy requires further examination. In addition, the definition of problem behavior may warrant reconsideration due to the patient's age. Saying "No" could be socially validated as current BACB ethical code.

In a subsequent study, Smith and Churchill (2002) aimed to determine maintaining variables for more severe behaviors based on the outcomes of analyzing more socially acceptable precursor behavior. Smith and Churchill focused on the applied contingencies of Lalli et al.'s (1995) study for the first response hierarchy, which nearly eliminated the following responses by the participant. Smith and Churchill hypothesized that placing FA contingencies on precursor behaviors might reduce risk during FAs, and they conducted a study to determine whether precursor FA could identify a common maintaining contingency and whether the primary problem behaviors would occur less frequently during FAs of precursor behaviors.

First, Smith and Churchill (2002) interviewed the caretakers of four participants with developmental disabilities who exhibited severe problem behavior and precursor behavior. Then they conducted FA on the problem and precursor behaviors. The FA—consisting of alone, attention, tangible, play, and demand conditions—was tested using a multi-element design. Each session lasted 15 min, and one to four sessions were conducted per day, 5 days a week. Smith and Churchill compared the results of the four participants' FAs, finding that all precursor behavior FA matched the FA of the problem behavior and noting a reduction in problem behaviors during the assessments of precursor behaviors. The authors also suggested that precursor behavior FA procedures could represent an alternative FA method when the behavior targeted for reduction is too dangerous to the participant or therapist to be allowed to occur.

Despite this recommendation, Smith and Churchill (2002) noted two key limitations of their study. The first involved the lack of systematic identification of precursor behavior. The researchers initially identified precursor behavior by interviewing caregivers and using direct observation, then implemented FAs for both precursor and problem behavior. Second, there was a lack of systematic training for the precursor behavior FA; the researchers conducted the

precursor behavior FA and the problem behavior FA themselves. In addition, Borrero and

Borrero (2008) pointed out that a potential limitation of Smith and Churchill's study was that no

systematic methods for direct observation were used to assess the relationship between

precursors and the severe problem behavior.

Borrero and Borrero (2008) identified precursor behaviors and determined whether they

were members of the same or distinct response classes by means of several comparative

probability calculations. They conducted descriptive analyses for problem behavior (aggression

and property destruction) and potential precursors to the problem behavior for two participants,

both adolescents with ASD. Borrero and Borrero identified potential precursors to problem

behavior for both participants before conducting static and dynamic probability calculations.

Hypothesizing that lag-sequential analyses could be used for empirical identification of precursor

behavior, Borrero and Borrero demonstrated that the probability of precursor behavior increased

immediately before the target behavior occurred. Their results also showed that the problem

behaviors and precursor behaviors were maintained by the same operant functions and belonged

to the same response class. As limitations, the researchers noted that the two probability values

were calculated using different methods and that the unconditional probability of behavior could

have been artificially suppressed.

Although Borrero and Borrero (2008) did not suggest that precursor behavior FA should

replace the typical FA for a problem behavior, this methodology may offer useful alternative

procedures for minimizing risk during the assessment of particularly harmful response

topographies. However, as the authors noted, a limitation of their study was that it was not

designed to provide a treatment based on the results of the FA. Additionally, the researchers

conducted both FAs. Their study verified precursor behavior preceding the problem behavior

using statistical analyses, but this only showed the reliability of the descriptive data and not a systematic method for identifying precursor behavior.

Herscovitch, Roscoe, Libby, Bourret, and Ahearn (2009) argued that Borrero and Borrero (2008) did not examine the differences between several potential precursor responses. Herscovitch et al. thus extended the study to identify the precursor with the most robust relationship to the targeted problem behavior; they then conducted FA on the identified precursor and the more severe targeted problem behavior. They first conducted an indirect assessment of the participant (a 10-year-old boy with ASD) and identified 16 different topographies of behavior that occurred before his head-hitting behavior; then they calculated the descriptive assessment data using conditional probability analysis. They identified three potential precursor behaviors and conducted FA for multiple forms of precursor behavior in order to determine whether the findings obtained through indirect assessment matched those obtained through descriptive assessment, as well as comparative probability analyses of multiple potential precursor responses. Their study supports both indirect and descriptive assessment methods for identifying precursor behavior. Additionally, their findings support the validity of FAs of precursor behavior, and they offer recommendations for decreasing the risk associated with an FA of severe problem behavior. The authors also took advantage of access to precursor behavior FAs with behavior analysts.

Treatment Based on Precursor Behavior

Precursors to severe problem behavior are often less severe than the behavior they precede and are maintained by the consequences and precursor behavior relevant to the assessment and treatment of the severe problem behavior (Fahmie & Iwata, 2011). Najdowski et al. (2008) extended the work of Smith and Churchill (2002) by conducting an FA of precursor

behavior with three participants and then providing treatment based on the results of the FAs. Najdowski et al. hypothesized that implementing an intervention based on an FA of precursor behavior might reduce the target problem behavior. Participants in the study included two children with brain injuries who exhibited developmental delays and one adult diagnosed with developmental delays. All three participants displayed severe aggression toward teachers and inappropriate sexual behavior such as masturbation and grabbing the genitalia of staff and peers at their day program. Following Smith and Churchill, Najdowski et al. interviewed the participants' caretakers in order to identify precursor behavior and subsequently conducted FA on the precursor behaviors. Then they implemented the treatment intervention, providing FCT to the participants.

Najdowski et al. (2008) reported that the treatment eliminated the precursor behaviors and also possibly prevented the recurrence of the severe problem behavior. These findings could imply that FAs of precursor behavior can be used to infer the function of other topographies of behavior occurring later in the response-class hierarchy. Additionally, the results were consistent with the precursor, and the severe problem behavior involved hierarchically occurring members of the same response class. The latter is a significant finding for the alternative FA, as it is finding suggests that the first precursor behavior with lowest damage may have the same function as the problem behavior that occurs later. Najdowski et al. noted that one limitation of their study was that they interviewed the caretakers. Formal and systematic descriptive procedures may be needed to verify that the forms of behavior identified as precursors preceded the severe problem behavior.

Dracobly and Smith (2012) also conducted a study to provide treatment based on an FA of precursor behavior. First, the authors observed male participants who displayed self-injurious

behavior in a natural environment in order to identify problem and precursor behaviors. Following Borrero and Borrero (2008), they performed lag-sequential and comparative probability analyses to evaluate the relationship between possible precursors (e.g., lifting or tilting one's head) and a problem behavior (e.g., self-injurious behavior). The researchers conducted FA on the precursor behavior identified in their Study 1 (e.g., lifting or tilting one's head) using procedures described by Smith and Churchill (2002), and then provided treatment based on the FA of the precursor behavior, which indicated that its function was attention. They then asked the teacher to provide 5–10 s of attention each time the participants lifted their head. The results showed that an intervention based on the results of precursor FA successfully reduced self-injurious behavior in the natural environment.

Dracobly and Smith (2012) suggested that precursor FA may present a promising approach to treating severe problem behavior; however, their study may reflect the limitations of previous studies of precursor behavior FA (e.g., Najdowski et al., 2008; Smith and Churchill, 2002). First, precursor behavior was identified through staff interviews and informal observations. Dracobly and Smith noted that informal observations may be sensitive to potential false positive outcomes due to a lack of systematic measurement. Dracobly and Smith also noted that another study limitation was that the assessment and treatment evaluation took 17 months, whereas interventions for severe problem behavior need to happen much more quickly.

Fritz et al. (2013) identified precursor behaviors and investigated whether an effective intervention could be designed based on the results of precursor analysis alone. First, they conducted interviews with the caregivers of 16 individuals with intellectual disabilities, and then they conducted precursor assessment that consisted of discrete trials resembling the attention and demand conditions of FAs (Iwata et al., 1982/1994) and lasting 5 min or less. Next, they

generated a list of precursor behaviors and carried out a probability analysis comparing the precursor behaviors identified in the interviews with the precursor behaviors observed during the descriptive assessments. They found that in nearly every case, the caregivers' interviews failed to identify precursor behavior. In fact, the researchers noted that caregivers might not identify all existing precursors and that even informal observations might not detect precursor behavior. Moreover, they reported that the FAs confirmed that the precursor behaviors identified during the descriptive assessments were members of the same response class. As a limitation of their study, Fritz et al. noted that participants might engage in low rates of severe problem behavior during precursor FAs.

Behavior Skill Training (BST)

Concerns about the implementation of FA also include the feasibility of conducting the assessment (Chok, Shlesinger, Studer & Bird, 2012; Iwata et al., 2000). BST, an evidence-based protocol that is used to teach new skills in a short amount of time, could provide a solution to this problem (Parsons, Rollyson, & Reid, 2012). BST consists of four main components: instruction, modeling, practice, and feedback that is given until mastery is achieved. However, the specific procedural steps may be modified to meet the target behavior (Parsons et al., 2012). Although BST can be used for teaching safety skills to children and adults (e.g., skills related to responding to firearms; Gross, Miltenberger, Knudson, Bosch, & Breitwieser, 2007) and for teaching new skills (e.g., safe ways for youth players to tackle in football; Tai & Miltenberger, 2017), BST has often been used and studied by behavior analysts in the fields of ASD and developmental disabilities (Dogan et al., 2017; Iwata et al., 2000; Rosales, Stone, & Rehfeldt, 2009).

Dogan et al. (2017) implemented BST to train four parents to teach social skill targets to

their children who had been diagnosed with ASD. The primary dependent variable in their study

was the percentage of the 15 BST steps that were correctly implemented by the parents. The

researchers implemented four components (information, modeling, practice, and feedback

intervention), and the results demonstrated a steady improvement in social skills teaching for all

participants (Dogan et al., 2017).

Rosales et al. (2009) used BST to teach implementation of the Picture Exchange

Communication System (PECS) to college students. PECS is often used by the ASD population

for effective communication (Bondy & Frost, 2011). The researchers used a simulated setting

and examined the effectiveness of BST using video training, using a checklist to measure the

percentage of correct responses (Rosales et al., 2009). The instruction and modeling sections of

BST were implemented via videotape, and the practice and feedback sections of BST were

completed by role-playing each component and receiving feedback until mastery (80% and

above) was achieved. The results showed a significant post-BST increase in the percentage of

correctly performed steps over the baseline for all participants.

Parsons et al. (2012) clarified that a more detailed breakdown of BST steps could further

increase the correctness of BST implementation. Instead of the four basic BST components, they

introduced six components of BST: (a) describe the target skill, (b) provide a written description

of the skill, (c) demonstrate the target skill, (d) require the trainee to practice the target skill, (e)

provide feedback during practice, and (f) repeat Steps 4 and 5 until mastery is achieved. In Step

1, the trainer explains the importance of the skill that is being taught. The trainer is also required

to compose a performance checklist that gives the definition of the target behavior. In Step 2,

the trainer needs to provide a written description of the target behaviors that focuses on exactly

which steps need to be performed. This information must include all environmental and background information for the clients, which will enable the trainees to have successful implementations. In Step 3, the trainer needs to demonstrate the skills. The role-playing demonstration must be well scripted to ensure accuracy and fluency. In Step 4, the trainer must demonstrate the target skill, and all trainees must practice performing the target skill. In Step 5, the trainer must provide feedback as the trainees practice performing the target skill. Both supportive and corrective feedback are necessary for achieving mastery of the target skill. Finally, Step 6 involves repeating Steps 4 and 5 until mastery is achieved. The trainer needs to establish a mastery criterion, such as performing the skill with 90% accuracy or higher, to ensure the achievement of target skills.

Iwata et al. (2000) examined the implementation of FA procedures for college students using BST. The students' performance was assessed during scripted simulations. The participants role-played as therapists, and the graduate students who role-played as clients had extensive FA experience and were able to follow the scripted scenarios and emit the problem behaviors. The "therapist" behaviors were scored as correct or incorrect based on the target skills of the FA procedures. Iwata et al. taught only three FA conditions (attention, play, and demand). The BST began by providing participants with a written description of what exactly in the teaching target behavior the parents must achieve, including the rationale, and proposed each of the conditions after the baseline sessions. Then the researchers examined the students' understanding by providing a 20-item written quiz based on the written description. Only students who scored 90% or higher went on to the next level of scripted simulated role-playing training. During the scripted simulated role-playing, feedback was immediately provided until the students completed two consecutive sessions with a minimum of 95% accuracy for each of

the three conditions. The results showed that the "therapist" participants had a relatively high percentage of correct responses during the baseline, and all participants achieved a score of 95% or higher in a short period of time after the BST training. The results of this study suggest that complex methods such as FA can be taught by using BST.

Ward-Horner and Sturmey (2012) examined the component analysis of BST while training participants—who were teachers—in FA. The researchers created a simulated role-playing script in which the clients were children in order to see which components of the BST package for teaching FA were effective. In the training phases, the participants' behaviors were independently evaluated in modeling, rehearsal, and feedback. The results showed that rehearsal, which the researchers had added to the BST package, was ineffective, whereas feedback was an effective component of BST.

Cultural Considerations in Japan

Resources for conducting and researching FAs are scarce in Japan (The Japanese Association for Behavior Analysis, 2019), and there are several issues that may hinder the use of FA for children with ASD and developmental disabilities. However, with the reform of the education system and international pressure, excuses for not implementing FA have become unacceptable, and teacher training is critical for these children to realize the benefits of education.

The first issue to be addressed is the excuses given for not implementing the science of behavior in the classroom. The attitudes of teachers and the assumptions of Japanese parents may play a role in explaining the lack of FAs in Japan. Japanese society tends to consider people with disabilities as unacceptable (Kayama, 2010). The problems that individual family members may face are considered personal, and Japanese people frequently avoid situations in which they

might feel shame (Kayama, 2010). Japanese parents are more likely to emphasize the importance of emotional connections such as empathy to professionals and to express feelings of being stigmatized (Kayama, 2010). The attitudes of teachers toward children with ASD and developmental disabilities may affect parents' willingness to be a part of the teams that provide support for their children rather than teaching (Kayama, 2010). Thus, the methodology of an FA, which evokes children's problem behavior, may not be well received.

The second issue is a lack of experts with credentials such as BCBAs and BCBA-Ds (BACB, 2019), even though behavior analysis has been accepted and is well established in Japan. The Japanese Association for Behavior Analysis was established in 1979, and Japanese students have subsequently been able to learn behavior analysis in the country's universities (The Japanese Association for Behavior Analysis, 2019). Unlike in the United States and other countries, the credentials for behavior analysts issued by the BACB are not yet recognized in Japan (BACB, 2019). Although most Japanese behavior analysts teach the subject in universities, the resources for practicing it in clinical settings are limited, particularly in the field of special education (The Japanese Association for Behavior Analysis, 2019). Because the number of BCBAs/BCBA-Ds in Japan is exiguous (BACB, 2019), the quality of services and ethical concerns could be the main issues hindering dissemination of the science of behavior. Although credential courses for Japanese behavior analysts have been offered since 2015, immediate behavior-analytic skills training for teachers who are responsible for children with ASD and developmental disabilities could be beneficial for both the children and the overall society (BACB, 2019).

The third issue is the use of physical punishment, which seems to be widely accepted in Japanese society, even for children with ASD and developmental disabilities (Kimura &

Yamazaki, 2016). Even though such punishment of students is prohibited by Japanese law, 10.8% of all students are still punished in school. In special needs schools, 3.6% of the students are still punished, and 69.7% of the parents of children with intellectual disabilities hit their children either "frequently" or "occasionally" (Kimura & Yamazaki, 2016; Ministry of Education, Culture, Sports, Science, and Technology [MEXT], 2014). As the enforcement of laws against teachers using physical punishment becomes stricter, teachers need to gain effective skills for teaching and intervention.

Until recently, Japanese teachers could use segregation, closed doors, and even physical punishment to deal with problem behaviors (Forlin, Kawai, & Higuchi, 2015; Kimura & Yamazaki, 2016)—even though Japan ratified the United Nations Convention on the Rights of the Child in 1994 (Forlin et al., 2015). Following the international trend toward establishing inclusive practices such as the Individuals with Disabilities Education Act (IDEA) in the United States, the Japanese government has taken a more direct approach to the inclusion of children with ASD and developmental disabilities in schools. Inclusion means that the society and schools respect all types of differences, including differences of gender, religion, race, region of residence, language, dialect, and political beliefs (Mithout, 2016). The presence of a child with attention deficit disorder or hyperactivity has been identified as a major stress factor by Japanese teachers (Mithout, 2016). Teacher training, particularly in identifying the function of problem behavior by conducting FAs, could be a solution for schools.

Summary and Purpose

FA methodology is a powerful assessment tool for identifying contingencies that maintain problem behavior and, more importantly, for assisting in the development of effective treatments (Iwata et al., 2000). Looking at the history and progress of various FA methodologies raises

several questions: Why are teachers of students who present difficult and unexpected behavior not implementing FA? Is there any acceptable methodology for teachers in Japan, where the number of BCBAs is limited? Can Japanese teachers learn to identify precursor behavior and problem behavior? Can Japanese teachers learn to implement precursor FAs through BST?

The purpose of this study is to replicate and extend current research on precursor behavior FA for Japanese teachers. Previous studies of precursor FA have identified precursor behavior and problem behavior by interviewing caretakers (Najdowski et al., 2008; Smith & Churchill, 2002). Previous studies have also used this information to conduct precursor FAs (Smith & Churchill, 2002); however, these studies have solely involved FA implementation by researchers and behavior analysts (Borrero & Borrero, 2008; Herscovitch et al., 2009; Najdowski et al., 2008; Smith & Churchill, 2002). If precursor FAs indeed offer a promising approach to treating severe problem behavior (e.g., Borrero & Borrero, 2008; Herscovitch et al., 2009; Najdowski et al., 2008; Smith & Churchill, 2002), then teachers should be able to identify precursor behavior and to use precursor FAs. The current study examines the effectiveness of BST for the identification of precursor behavior and for precursor FAs by teachers in Japan, where the culture makes it difficult to accept the FA methodology. In Study 1, I trained teachers to identify precursor and problem behaviors using BST. In Study 2, I used role-playing activities to train each teacher how to conduct an FA of precursor behaviors. Overall, the current study examines four areas of teacher training for precursor FA.

Chapter 3: Research Design and Method

Chapter Overview

The main purpose of this study is to evaluate the effects of BST on teachers'
identification of precursor behavior (Study 1) and their ability to conduct FA on precursor
behavior (Study 2). This chapter describes the research team, the recruitment and eligibility
criteria for teachers, the participants and setting, the materials, the response measurement, the
interobserver agreement, the experimental design, and the procedures for Study 1 and Study 2.
As a Board-Certified Behavior Analyst (BCBA), I conducted training for seven teachers using
BST. A multiple baseline design across participants was used to evaluate the effects of BST on
the treatment integrity.

Research Team

I was the primary investigator for both Study 1 and Study 2 and conducted all sessions.
A secondary observer (also a BCBA and doctoral student) was enlisted to observe video- and
audio-recorded sessions for the purposes of interobserver agreement and procedural integrity of
the data collection. Two Board-Certified Behavior Analysts-Doctorate (BCBA-Ds) who served
as my academic advisors supervised the research project. All research team members completed
the Collaborative Institutional Training Initiative Program on the application of social and
behavioral research prior to participation in the studies. The research team had access to the data
and videotaped sessions.

Scripted Clients' Role

I asked BCBAs and Registered Behavior Technicians (RBTs) who spoke Japanese and
had extensive experience conducting FAs to serve as the clients for the simulated setting for the
videos (Study 1) and role-playing (Study 2). In order to collect data on the performance of

Japanese teachers who were untrained, it was necessary to create a situation that required conducting FA on precursor behaviors.

Recruitment and Eligibility

Adult teacher participants were recruited at local schools and teaching agencies in Japan. The researcher posted recruitment flyers (Appendices B and C) via personal social media accounts in both English and Japanese (Facebook and LinkedIn). The flyers included information on eligibility for participation (i.e., at least 1 year of teaching children with ASD or other developmental difficulties; little or no knowledge about FA procedures; availability for attending Studies 1 and 2).

I contacted the teachers who expressed interest via email to schedule a time to review the components of the study in person as well as provide the teachers with an informed consent document in Japanese (Appendices C and D). During the informed consent meeting, I verbally reviewed the document and responded to all questions asked by the teachers. I informed the teacher participants that all information would remain confidential and that they would be identified by number (e.g., Teacher 1) rather than by name. I also informed the participants that they could withdraw at any time without recourse. At the end of the meeting, I asked the participants to sign the informed consent document. An initial baseline session was scheduled for each participant to complete the screening (Appendices F and G).

The screening helped determine that the participants had experience in teaching children with ASD and other development difficulties for more than 12 months, had little or no training in FA for the problem behavior, and would be able to attend both Study 1 and Study 2. Teachers who answered that they had "more than 1 year of teaching," no FA experience, and the ability to attend both studies were invited to participate in the research. All participants were required to

use an electronic data-collecting app (Countee; see Appendix H) on an iPhone. The app does not recognize Japanese letters, so the researcher explained in Japanese how to use the app (e.g., the green keys indicated precursor behavior and the red keys indicated problem behavior on Countee) and assisted with typing in English.

Participants

Seven Japanese teachers who were currently working with students diagnosed with ASD who engaged in various problem behaviors were chosen to participate in Studies 1 and 2. Table 1 includes the participant demographic information, including gender and years of teaching. Two male and five female teachers participated in the study. Their years of experience as a teacher varied between 1 and 12.

<div align="center">

Study 1: Behavior Skill Training for Identifying Precursor Behavior

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Setting

All sessions were held at a teaching center in Tokyo, Japan, prior to the participants' individual teaching sessions with their students. The training sessions were conducted in an individual session room measuring 6 × 3 m. All training related to Study 1 procedures was conducted in the teachers' classrooms during a 20-min planning period.

Materials

The room contained a table and chairs. The participants watched simulated precursor behavior scenario videos and training PowerPoint presentations (Appendix K) on a personal computer (PC). The researcher provided training in English and Japanese and prepared all written materials in Japanese. A 20-question quiz in Japanese was administered after the PowerPoint presentation (Appendices L and M). The researcher also trained the teachers on using the hand-held PC app Countee for collecting data.

Simulated Precursor Behavior Scenario Videos

Prior to the study, the BCBAs, RBTs, and I created the simulated precursor behavior and problem behavior scenario videos (Appendix I: Video Scripts for Study 1; Appendix J: Video Samples for Study 1). The scenarios included precursor behaviors to the problem behaviors, with the conditional probability of the problem behavior for each participant being greater than .80. During all training (baseline, training, and follow-ups), the researcher presented a video model of other behavior analysts using the Countee app to collect data on precursor behaviors. Each teacher watched videos showing the problem behavior scenario (aggression or self-injurious behavior) and collected data on precursor behaviors (e.g., tapping legs) and the problem behavior.

Dependent Variable and Measurement

The dependent variable for Study 1 was the *interobserver agreement (IOA)* percentage score between the teachers' data collection and the master data set (developed by the researcher). Each teacher independently collected data for each video, including data on precursor behaviors and target behaviors. *Precursor behavior* was defined to include broad behavioral categories, such as vocalizations, facial expressions, posture changes, repetitive motor movements, single motor movements, object manipulations, and so forth, similar to Fritz et al. (2013). *Target behaviors* were defined individually but fell under the general categories of aggression, property destruction, or self-injurious behavior. The frequency of each behavior was collected using the electronic data-collecting app Countee on an iPhone or Android smartphone. The app allowed the collected data to be split into separate intervals. Each session was divided into 10-s intervals, and *IOA* was calculated using the proportional interval method to compare counts within intervals—that is, agreements within intervals were assessed. Agreement between observers was

measured by dividing the smaller number of recorded responses in each interval by the larger number (except that if both observers scored 0 in an interval, the score for that interval was 1); these fractions were then averaged across intervals and multiplied by 100% to yield the overall IOA.

Experimental Design

A concurrent multiple-baseline design with generalization probes was used across participants to study the effects of the training. After a minimum of three baseline sessions including a stable trend, the training was implemented. The training continued until a participant's IOA scores reached a score of 100% across three sessions without feedback. The generalization probes were applied after the training session.

Procedure

Before conducting Study 1, I developed a series of scripts specifying the occurrence of various antecedents and precursor, target, and consequent behaviors during 5-min simulated assessment sessions; these were videotaped for the training.

Baseline. During the baseline, the participants watched videos once and recorded data based on the provided behavioral categories. There were no programmed consequences for correct or incorrect data collection.

Initial training. During this phase, I provided the participants with written and verbal information about the precursor behaviors and definitions of *antecedent condition*, *precursor behavior*, *consequence,* and *social validity*. I gave a PowerPoint presentation and highlighted the definitions. I asked the participants to read the highlighted parts aloud after cues. After the teachers read the material, they completed a 20-item competency test. Those who scored 90% or higher on the competency test proceeded to the next phase. Those who scored 80% or lower

were required to review the written material again before taking a similar, but not identical, 20-item competency test.

Training and performance feedback. During training, the teachers watched a video and collected data on the same behaviors as in the baseline. Praise was delivered for correct identification of precursor behaviors and feedback including a review of the protocol and definitions occurred when teachers were not able to identify the precursor behavior.

Generalization probes. The teachers viewed novel videos and collected data on similar behaviors (precursor, problem behavior, etc.) as a baseline and rehearsed without feedback.

Study 2: Behavior Skill Training for Conducting a Precursor Functional Analysis (FA)

Participants

In Study 2, the participants were the same seven Japanese teachers who took part in Study 1 (Identification of Precursor Behavior). Two BCBAs and two RBTs with extensive experience in conducting standard FAs played the roles of clients.

Setting

All sessions were held at a teaching center in Tokyo, Japan outside of the participants' individual teaching times. The sessions were conducted in an individual session room measuring 6×3 m. All training related to the Study 2 procedures was conducted in the teachers' classrooms during a 90-min planning period.

Materials

The room contained a table and chairs; in addition, there were toys and possible reinforcers, written materials, stopwatches, and video-recording equipment, all required for training purposes. Other materials were almost identical to those in Study 1. The teachers watched training PowerPoint presentations on a PC. I provided training in English and Japanese

and prepared all written materials in Japanese (Appendices M and N). A quiz (20 questions) in Japanese was administered after the PowerPoint presentation (Appendices J and K).

Simulated Precursor Behavior Scenarios for Role-Playing

Prior to the study, the BCBAs, RBTs, and I created simulated precursor behavior and problem behavior scenarios for the role-playing (Appendix P: Sample Scenarios for Escape), based on Iwata et al. (2000) BST training for FAs. The scenarios included precursor behaviors for the problem behaviors, with the conditional probability of the problem behavior occurring for each participant being greater than .80. During all training (baseline, training, and follow-ups), I provided the role-playing BCBAs ("actors") with a sign that gave the timing for the precursor and problem behaviors. The teacher participants were required to produce FA conditions as instructed by the researcher and then collect data on precursor behaviors using the Countee app.

Dependent Variable and Data Collection

The primary dependent variable was the *accuracy* of the teacher's performance during the simulated precursor FA. Teachers' responses during the session were scored as either correct or incorrect. *Correct* antecedent responses were defined as the accurate implementation of FA procedures based on the condition descriptions, but not following precursor or target behavior (i.e., ignoring a client prior to problem behavior). *Correct* consequent responses were defined as the accurate implementation of FA procedures based on the condition descriptions within 5 s of the precursor or target behavior (i.e., providing attention for precursor behavior). Condition-specific responses were as follows. Demand test condition responses included (a) presentation of instructional trials; (b) prompting student behavior with a gestural cue when he or she does not perform; (c) implementation of the escape period, contingent on precursor behavior; and (d) turning away with no verbal exchange when the precursor behavior occurs. Attention condition

responses included (a) initiating the condition (e.g., providing leisure activities, removal of attention, or no task presentation); (b) delivering contingent social disapproval; (c) ignoring appropriate behavior; and (d) ignoring nontargeted problem behavior. Tangible condition responses included (a) initiating the condition (e.g., providing leisure activities, removal of attention, or no task presentation); (b) removing preferred activities; (c) providing preferred activities, contingent on the precursor behavior; and (d) ignoring nontargeted problem behavior. Play condition responses included (a) initiating the condition (e.g., providing leisure activities, withdrawing attention, or presenting no task); (b) delivering frequent attention and allowing free access to preferred items; (c) refraining from delivering demands; and (d) ignoring both targeted and nontargeted problem behaviors. Alone condition responses included (a) initiating the condition (e.g., no access to attention or leisure activities) with a camera; (b) removing the teacher from the room while continuing to monitor via video; and (c) ignoring both targeted and nontargeted problem behaviors.

Interobserver Agreement (IOA)

A second observer from the Chicago School of Professional Psychology watched videos of the sessions and independently collected data to calculate interobserver agreement (IOA) data for 38% of the sessions. Agreement percentages were calculated by dividing session times into 10-s intervals and comparing the observers' records on an interval-by-interval basis. The mean IOA across participants was 95% (range: 89% to 99%). The observers' records were compared using the same interobserver methods as in Study 2. The mean IOA across participants was 95% (range: 89% to 99%).

Treatment Integrity

The observers collected treatment integrity data for a minimum of 30% of the training sessions when I provided baseline, instruction, quiz, and feedback training (Appendix Q: Treatment Integrity Checklist). The overall mean percentage for agreement across participants was 100%.

Experimental Design

A concurrent multiple-baseline design with generalization probes was used across participants to study the effects of the precursor FA training. After three or more baseline sessions showed a steady trend, the training was implemented. The training continued until implementation reached a score of 90% or higher across three sessions without feedback. The generalization probes were applied after the training session. The order of the precursor FA sessions was alternated using a multi-element design.

Procedures

The goal was for the teachers to successfully conduct an FA on precursor behavior after the training. For this phase, I played the client's role by engaging in the predetermined precursor and target behaviors. There were four assessment conditions and one control condition (attention, demand, tangible, play, and alone, respectively). The entire training session, which lasted a minimum of 30 min (depending on the teacher accuracy), consisted of presentation of the model FA, an explanation of each condition procedure, and role-playing. The following conditions were presented in 1-min simulated assessment sessions representing each of the four noncontrol conditions.

During the *attention* condition, the teacher provided the client with an environment that had free access to leisure items. The teacher ignored the client for the entire session unless the

precursor or target behavior occurred, at which time the teacher provided a statement and brief physical contact (e.g., "Please stop, don't do that, you will hurt yourself" along with a soft touch). During the *demand* condition, the teacher presented learning materials to the client and initiated a learning trial. If the client complied, the teacher praised the client and continued to conduct learning trials. If the client engaged in the precursor or target behavior, the trial was terminated by the removal of the task materials for a 10-s interval, and then the teacher initiated a new learning trial. During the *tangible* condition, the teacher presented highly preferred leisure items to the client, who took the items and played with them. If the child engaged in the precursor or target behavior, the items were returned to the teacher for 10 s. During the *play* condition, the teacher provided the client with highly preferred toys. The client had free access to these items throughout the session. The teacher paid attention to the client on a 10-s fixed time schedule during the session. There was no change in the environment following precursor or target behavior.

Baseline. During baseline sessions, I asked the teacher to conduct a specific condition of a precursor FA. During the baseline, I did not provide any formal instruction, assistance, or feedback.

Training. During training, I provided written and verbal information regarding the precursor FA procedures. After reading this information and my instructions, the teachers completed a 20-item competency test. If a teacher scored at least 90%, he or she proceeded to the next phase. If a teacher scored 80% or lower, he or she reviewed the written material and retook a similar, but not identical, 20-item competency test (see Table 2 for the test results).

Modeling and Feedback. During the modeling sessions, I demonstrated how to conduct a specific FA condition, and then the teacher rehearsed the condition. Following the session, I

provided the teacher with feedback about his or her correct and incorrect responses, using the

video from the session. When a teacher implemented a session with 90% accuracy, he or she

moved on to the generalization phase.

Generalization Procedures

The teachers conducted the precursor FA on novel scripted scenarios for role-playing and

collected data without feedback.

Social Validity Measure

Following completion of Studies 1 and 2, I asked each participant to complete a social

validity questionnaire in Japanese (Appendices R and S). This survey sought to obtain the

subjective opinions of the participants about the effectiveness, acceptability, and impact of the

precursor FA.

Chapter 4: Findings

Introduction

Figures 1 and 2 show the results of the participants' performance in identifying precursor

behavior, and Figure 3 shows participants' percentages of correct responses for precursor FAs

following BST. Overall, the participants' accuracy improved across phases. Table 2 shows the

participants' quiz results for Studies 1 and 2. All participants passed on their first attempt.

Study 1

Figures 1 and 2 show the results of the participants' performance during the identification

of precursor behavior and problem behavior following BST in Study 1, expressed as the

percentage of correct responses (IOA). During the baseline, all participants scored 0% across the

baseline; meaning all participants failed to identify any precursor behaviors. Baseline

performances for identifying the problem behavior were also generally low ($M = 38\%$; range:

17%–84%). Although the participants were often able to recognize self-injurious behavior (SIB)

or screaming, the rate of identification was variable. Although Teacher 7, who had more than 10

years of teaching experience, was able to correctly identify problem behavior for six out of the

eight behaviors in the simulated videos in the baseline, the scores for correct identification

ranged from 0%–96.6%, reflecting significant variability. Although all participants watched the

same videos depicting a variety of precursor and problem behaviors, the results for identification

of these behaviors varied. For example, whereas head hitting was presented as a problem

behavior, not all teachers agreed on what counted, choosing instead to identify another behavior

(e.g., facing sideways). The rate of correct responses increased for all participants after a brief

BST training on precursor behavior that focused on identifying precursor behavior. Following

training, all participants improved their rate of correct responses for precursor behavior

identification, (M = 92.5, range: 88%–96.6%) and problem behavior identification (M = 96%, range: 92%–97.5%). All participants maintained their scores during the follow-up sessions for precursor behavior identification (M = 92.6, range: 87.3%–98.3%) and problem behavior identification (M = 98%, range: 97%–100%).

Study 2

Figures 3 and 4 show the results for Study 2, reflecting the percentage of correct teacher participant responses during simulated precursor behavior FA sessions across the baseline, training, and follow-ups. During the baseline, all participants failed to conduct FAs on precursor behavior. Six participants showed an agreement of less than 20% with the correct procedure for an FA. In fact, all six of these participants kept ignoring any behavior that occurred during a baseline session. Only one participant (Teacher 1) changed the environment for testing each FA condition, but this participant still failed to conduct an FA on the precursor behavior and failed to present an FA for the attention conditions. During the training sessions, all participants' correct response rates increased after a brief BST training that focused on precursor behavior FA. All participants' performances also improved following the training for correct implementation for precursor behavior (M = 95.4, range: 87.2%–100%). All participants also exhibited high correct performance during the follow-up for correct implementation for precursor behavior (M = 98, range: 94%–100%).

Results for Social Validity

A social validity survey with a six-point Likert scale (1 = *strongly disagree,* to 6 = *strongly agree*) was completed by all participants during the last follow-up session. Table 3 displays the results of participants' responses to the social validity survey. Overall, the responses from participants regarding the study outcomes were favorable. All participants agreed or

strongly agreed that the training was effective in meeting the intended purposes and that the

training procedures provided necessary information. All participants agreed or strongly agreed

that precursor behavior FA would be effective overall. Most participants (86%) agreed or

strongly agreed that they would recommend and implement a precursor behavior FA in actual

settings. Overall, the participants considered themselves competent to implement precursor

behavior FAs and indicated that it would be very possible to implement them in their daily

teaching situations.

Chapter 5: Summary, Conclusions, and Recommendations

Introduction

The purpose of this study was to examine the effect of BST as a method for increasing the identification of precursor behavior by Japanese teachers (Study 1) and to evaluate the impact of the implementation of BST for precursor-based FA on Japanese teachers (Study 2). All seven participants in this study were able to identify the precursor behaviors of problem behavior after brief BST and maintained this performance post-BST. The results of conducting FAs on precursor behavior in Study 2 were that, although the BST sessions were scripted-simulation role-playing, all Japanese teachers who showed little or no correct identification of precursor behavior in the baseline, and quickly met the mastery criteria following training and maintained their FA performance post-BST. Therefore, there is a functional relationship between BST and Japanese teachers' behavior. The BST was effective in enabling Japanese teachers to identify precursor behaviors, conduct precursor FA, and identify the function of precursor behaviors.

Interpretation of Findings

The participating teachers were able to identify precursor and problem behavior after brief BST. Previous researchers (e.g., Lalli et al., 1995; Najdowski et al., 2008; Smith & Churchill, 2002) identified these behaviors by interviewing the caretakers. As the baseline for Study 1 suggests, even those with a long experience of teaching children with ASD could not always identify the precursor and problem behaviors via direct observation. The results suggest that caregivers' and teachers' reports may be unreliable, even with direct observation (Fahmie & Iwata, 2011). Instructing these teachers to evaluate precursor behaviors using a data-based procedure was both useful and necessary to ensure accurate identification.

Interestingly, although the primary target skill was to identify precursor behaviors, all participants were able to self-correct in identifying precursor behaviors as well as the problem behaviors after training. For example, all teachers except Teacher 1 were unable to identify either type of behavior during the baseline. During the BST, in addition to examining the details of what to look for in precursor behavior, I introduced Wolf's (1978) social validity of problem behavior in behavior analysis. The definition of problem behavior should be based on social validity: the behavior hinders the benefit of clients. For example, fiddling of the hands may not be acceptable during school greetings in Japanese classrooms. The greeting occurs each time a lesson starts, and stillness is required for all children, including children with ASD. The still behavior preferred by the teachers and schools does not necessarily translate into individuals' behavior. Japanese teachers need to observe the children from the social validity perspective, rather than a rule-based one. After the BST, all participants were able to self-correct in identifying not only the precursor behaviors but also the problem behaviors. Some of the scripted videos contained a subtle precursor behavior (e.g., the behavior suddenly stopped or involved minor change in facial expressions) and all participants were able to identify the target behavior as a problem behavior that hinders learning and could also identify the precursor behaviors that occurred before the problem behaviors. These findings suggest that disseminating the social validity of a target problem behavior and achieving the overriding goal of personal welfare are also professional obligations for behavior analysts (Wolf, 1978).

In addition, I suggest that, based on the training and social validity measures, the science of behavior analysis can overcome some cultural obstacles. When the Japanese participants were asked to identify problem and precursor behaviors, all were able to identify two different behaviors, but no problem behaviors from the client's point of view. The participants tended to

identify fiddling with one's hands, leaving one's seat, or shifting one's chair as the main problem

behaviors rather than the self-injuring behaviors seen in the baseline videos. Within the Japanese

school system, teachers often always require students to sit still and maintain good posture

during lessons (Mithout, 2016). The participants were quick to judge the child actors' behaviors

in the video based on cultural and personal criteria. For example, in one video, the child actor

demonstrated screaming and jumping as a problem behavior and banging a table with both hands

as a precursor behavior. Half of the teachers identified the problem behavior as leaving the chair

instead of screaming and jumping. After social validity training on what constitutes problem

behavior, all teachers self-corrected in identifying both problem behaviors and the precursor

behavior, rather than noncompliance. Japanese teachers may judge students' behavior as it

benefits the entire class or themselves instead of considering which behaviors or skills individual

students should exhibit. Behavior analysis can bring science to education for the benefit of both

students and teachers. The current study changed the viewpoints of the Japanese participants

based on social validity (Wolf, 1978).

Implementation of FA has been avoided by some teachers because of its complex

procedures and requirement for the participant to engage in severe problem behavior; however,

this is not necessary with the precursor FA (Iwata et al., 2000; Smith & Churchill, 2002). The

current study is the first to train Japanese teachers to implement an FA for precursor behaviors.

The participants in Study 2 averaged less than 50% accurate responding during baseline sessions.

All participants subsequently achieved 87%–100% accuracy after receiving roughly sixty

minutes of BST, which consisted of reading instructions, passing a quiz, and receiving feedback

on their performance. The results of Study 2 suggest that Japanese teachers, even those with

little to no experience in FA, can quickly acquire a basic set of skills for conducting precursor FAs to deal with precursor problem behaviors.

Several studies have suggested that using FA for precursor behaviors may provide an alternative method of assessing the function of severe problem behaviors (e.g., Najdowskil et al., 2008; Smith & Churchill, 2002). The results of Study 2 imply that problem behavior may occur even when conducting FA on precursor behavior. Even with simulated and scripted training, the participants were not allowed to stop or block the severe problem behavior during the alone condition. The FA results helped the participants to identify the function of the precursor behavior. In previous precursor FA research, precursor-to-target interruption, maintained by automatic reinforcement, was reported in only one study (Fahmie & Iwata, 2011). It should be noted that, even though the number of subsequent target behavior occurrences may be small, conducting FA on precursor behavior does not entirely eliminate the severe problem behavior. Therefore, despite the suggestions to implement precursor FA, the risk of the occurrence of possible severe problem behavior still exists.

Although the performance of the participants in Study 2 showed a stable trend of 0%–20% during the baseline, all participants except Teacher 1 maintained "ignore" as the consequence for both precursor and target behaviors in all conditions' settings. This suggests that Japanese teachers may have a prior approach in which, if problem behavior occurs, they do not deliver social consequences. A few applied behavior analysis manuals and studies written in Japanese have commented on the ignoring of problem behavior while making no mention of the function of the behavior (Kamio, Haraguchi, Miyake, & Hiraiwa, 2015). The idea of experimental assessments such as FA is new to Japan. The functional approach to assessment of problem behavior has come to be regarded as best practice in both clinical research and

applications (Iwata et al., 2000), and the dissemination of related principles and updated research is crucial for benefiting clients in Japan. The current study suggests that Japanese teachers are capable of learning FA via BST.

Limitations

Although the Japanese participants acquired a high degree of competence in identifying precursor and problem behaviors and conducting FA sessions for precursor behavior, the findings are limited in four respects. First, the training was conducted under simulated conditions; such training, according to the literature, has not always generalized to clinical situations (e.g., Sawyer et al., 2017). For future research, a follow-up study to measure performance under actual clinical conditions should be conducted with experienced BCBAs.

Second, the content of the training focused on delineating a set of skills. When implementing FAs or precursor behavior FAs, various aspects need to be considered, such as the data interpretation and modification of assessment conditions, if needed. For example, I mentioned the sequence effect to the participants during the training, but the scripted-simulated actors were not asked to show such an effect. Furthermore, the main problem in conducting precursor FAs when an alone condition session is conducted is that risk management needs to be included in the skill set. Future researchers should consider evaluating the nuances to see if they can and need to be taught for teachers to accurately conduct a precursor FA.

Third, the definition and rate of the occurrence of precursor behaviors to the problem behavior is in this study are limited. For this study, the precursor behavior occurred at longer intervals (e.g., 10 s), as per previous studies (e.g., Dracobly & Smith, 2012). The actual length of time between precursor and problem behavior could be called into question. Future

researchers should focus on determining the appropriate temporal parameters, which may include various intervals to simulate natural contingencies.

Conclusion

The findings of the present study suggest that Japanese teachers can acquire the skills to identify and conduct FA based on precursor behaviors through brief BST. I do not suggest that precursor FAs are always risk-free, especially if the teachers decide to conduct the alone condition, but rather that they may be a useful alternative FA procedure for other conditions. More importantly, involving the science of behavior to focus on problem and precursor behaviors based on clients' perceived social validity and identifying the function of these behaviors, rather than simply ignoring them or watching them happen benefit both Japanese teachers and clients alike. In the current study, I provided participants with a simple definition of precursor behavior. During the training, I also explained the difficulties of identification, the possibility that there might be no precursor behavior in actual cases, and how to comparatively analyze precursor behaviors. Thus, the participants were aware that correct identification of both precursor and problem behavior might not occur unless a comparative analysis has been executed. Despite the limitations, the results of the study are valuable, particularly in a country like Japan, where reform has meant that the educational system for students with disabilities has changed dramatically, yet school teachers are left with the reformed system without receiving relevant training. The Japanese government and the MEXT are focused on how to include students with disabilities, but they need to broaden their definition of inclusion for teachers who are stranded behind a cultural boundary that hinders access to scientific methods of assessment. Recent findings suggest that precursor FAs may be a promising approach to the assessment of

problem behavior, as they reduce the risk of harmful problem behavior occurring during

assessment while an empirical experimental analysis is conducted.

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Appendix A: Tables and Figures

Table 1

Participant Demographics

	Gender	Years of Teaching Children With ASD
Teacher 1	Female	4
Teacher 2	Male	6
Teacher 3	Male	4
Teacher 4	Female	2
Teacher 5	Female	4
Teacher 6	Female	1
Teacher 7	Female	12

Table 2

Participant Quiz Results

	Study 1 (%)	Result	Study 2 (%)	Result
Teacher 1	95	First success	90	First success
Teacher 2	100	First success	95	First success
Teacher 3	100	First success	90	First success
Teacher 4	100	First success	100	First success
Teacher 5	95	First success	90	First success
Teacher 6	95	First success	95	First success
Teacher 7	95	First success	90	First success

Table 3

The Participants' Social Validity Survey

| Question	*Strongly Disagree*	*Disagree*	*Slightly Disagree*	*Slightly Agree*	*Agree*	*Strongly Agree*
The training was effective in meeting the purposes.	0 %	0 %	0 %	0 %	42%	58%
I would suggest the use of this intervention to other teachers.	0 %	0 %	0 %	14%	28%	58%
I will use this intervention in the school setting.	0 %	0 %	0 %	14 %	29%	57%
This intervention was appropriate for a variety of students.	0 %	0 %	0 %	14%	29%	57%
The monitoring procedures were manageable.	0 %	0 %	0 %	14%	28%	58%
The training procedures gave the necessary information	0 %	0 %	0 %	0%	0%	100%
Precursor behavior FA intervention will be beneficial for my students.	0 %	0 %	0 %	0%	14%	86%
Precursor behavior FA intervention will be effective overall.	0 %	0 %	0 %	0 %	28%	72%
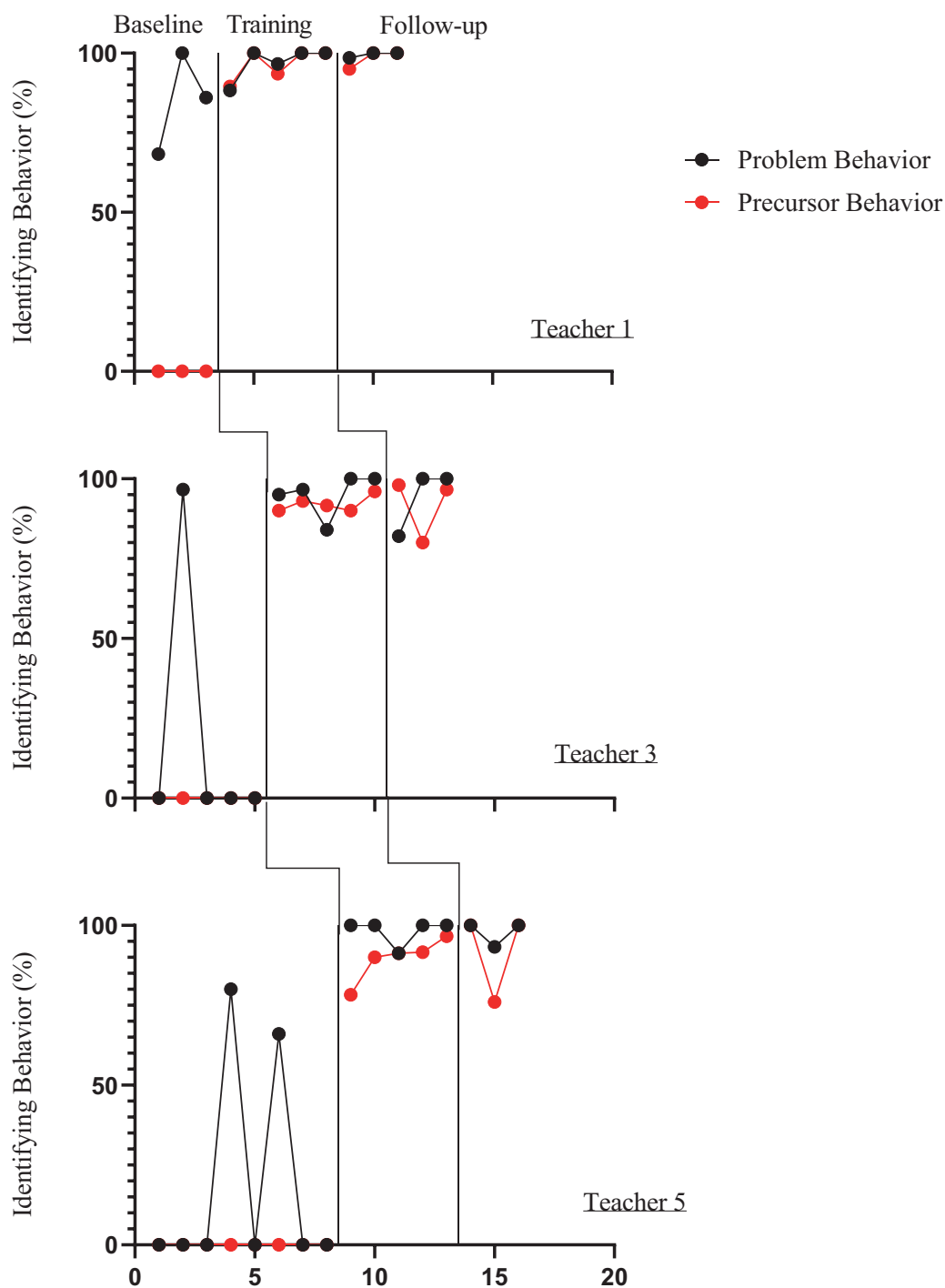
Figure 1. Percentage of identification of precursor behavior and problem behavior while watching simulated video sessions across baseline, training, and follow-up by Teachers 1, 3, and 5.
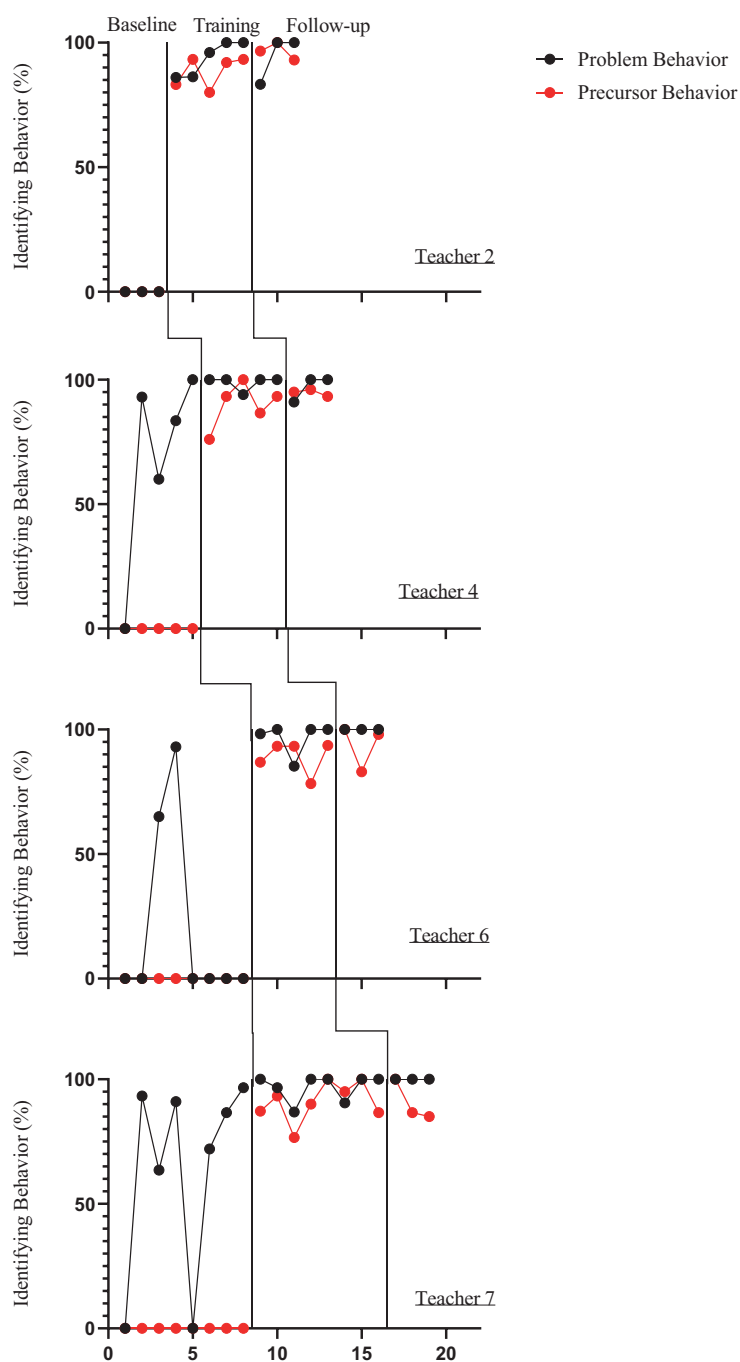
Figure 2. Percentage of identification of precursor behavior and problem behavior while watching simulated video sessions across baseline, training, and follow-up by Teachers 2, 4, 6, and 7.
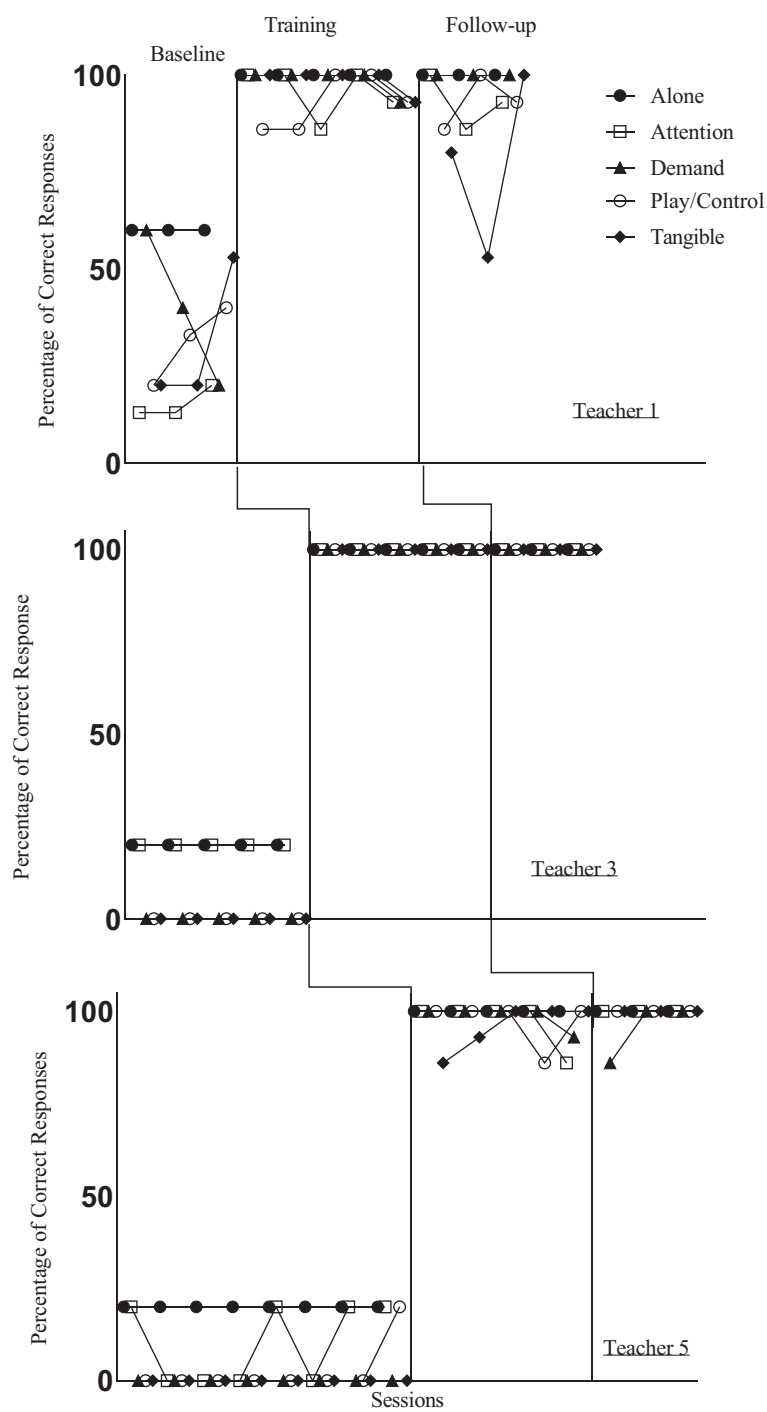
Figure 3. Percentage of correct teacher responses during simulated precursor behavior functional analysis sessions across baseline, training, and follow-up for Teachers 1, 3, and 5.
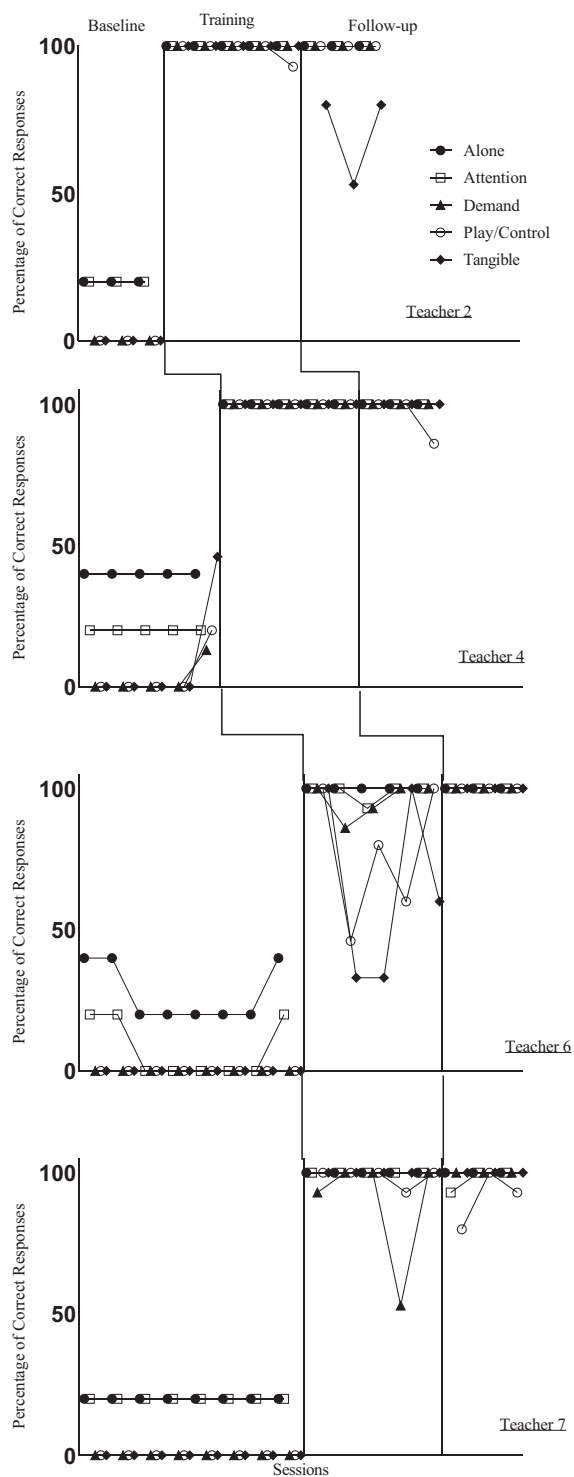
Figure 4. Percentage of correct teacher responses during simulated precursor behavior functional analysis sessions across baseline, training, and follow-ups for Teachers 2, 4, 6, and 7.

Appendix B: Request for Participation

Advertisement for Research Participants

My name is Kozue Matsuda, and I am a student at the Chicago School of Professional Psychology. I am seeking teacher participants for research that is being conducted as part of my dissertation requirement for a Ph.D. in applied behavior analysis. The title of my research is *An Evaluation of Behavior Skills Training for the Identification of Precursor Behaviors and Implementation of Precursor-based Functional Analyses with Japanese Teachers*

I am seeking teachers who work with children who demonstrate problem behavior, particularly children who have autism spectrum disorder or other types of developmental disability.

Purpose of the Research

The purpose of the research is to demonstrate that teachers can learn to
- identify early signs of problem behavior in students before the actual problem behavior manifests itself;
- train other teachers to carry out tests on early signs of problem behavior so that they are able to identify the reasons for such behavior.

In addition, teachers will be asked questions about this study.

Eligibility for Participation in the Study
- At least one year of teaching children who have autism spectrum disorder or other developmental difficulties.
- Little or no knowledge of the procedure of functional assessment.
- Availability to attend studies 1 and 2 (discussed in the following section).

Summary of the Study Procedures

All training will take place at the training site (Children Center).

Task

Study 1 (identification of pre-problem behavior)
- You will watch five videos (each less than 1 minute) and answer questions about them.
- I will provide training at the school or training site in relation to recognizing the early signs of pre-problem behavior.
- You will watch "Taking a quiz."

Study 2 (testing for the causes of the pre-problem behavior)
- You will watch a short demonstration by me and another teacher of pre-problem behavior in the classroom and answer questions about it.

- I will provide training for recognizing the early signs of pre-problem behavior
- You will apply the test to me and another teacher so as to practice conducting the test for pre-problem behavior.

Time Commitment for Participation
Study 1 has a duration of 120 minutes. Study 2 has a duration of 180 minutes.

The research study will be conducted at the Children's Center or at the teacher's school. All studies will last a maximum of three hours.

Contact
If you have any questions, please do not hesitate to contact me

Respectfully,
Kozue Matsuda, BCBA
Email: kmatsuda@ego.thechicagoschool.edu

Appendix C: Request for Participation in Japanese

Advertisement for Research Participants

私はシカゴ・スクール・オブ・プロフェッショナル・サイコロジーの学生です。この研究は、応用行動分析学　博士号のための私の論文の要件の一部として実施いたします。。 現在、教員の皆様のご参加をお願いしています。

私の研究のタイトルは、教員による前兆行動の同定と機能分析です。
問題行動を示す子供、特に自閉症スペクトラム障害または発達障害を持つ子どもたちと働く先生方を探しています。

研究の目的
この研究の目的は、教師が
•実際の問題行動が明らかになる前に、学生の問題行動の早期兆候を特定する。
•問題行動の早期兆候についてのテストを実施するように他の教員を訓練し、そのような行動の理由を特定できるようにする。
さらに、教師にはこの調査に関する質問があります。

研究への参加資格
•自閉症スペクトラム障害または他の発達上の困難を有する子どもを教えるために少なくとも１年間。
•機能分析の手順に関する知識がほとんどまたはまったくない。
•研究１と研究２に参加できるかどうか（次のセクションで説明します）。

研究手順の概要
すべてのトレーニングは、トレーニングサイトで行われます。

研究内容
研究１（問題前の行動の同定）
•５つのビデオ（各ビデオは５分未満）を見て、それに関する質問に答えます。
•私は学校や訓練現場で行動の初期の兆候を見つける方法を訓練します。
•クイズを受けた後に、再度ビデオをみてもらいます。

研究２（事前問題の理由のテスト）
•ロールプレイを通じて　行動機能　を判明します（ベースラインテスト）。
·行動の初期兆候の理由をテストする方法の訓練をうけます。
·再度、ロールプレイを通じて行動の理由を判明するための練習をします。

参加時間：
研究１は１２０分です。研究２は１８０分です。

調査研究は、チルドレン・センターにて行われます。

お問い合わせ
ご不明な点がございましたら、私または、ブランデッド博士にお気軽にご連絡ください。

Appendix D: Informed Consent

Informed Consent

Investigator: Kozue Matsuda

Study title: *An Evaluation of Behavior Skills Training for the Identification of Precursor Behaviors and Implementation of Precursor-based Functional Analyses with Japanese Teachers*

I am a student at the Chicago School of Professional Psychology, and I am conducting a study as part of the dissertation requirement for a Ph.D. in applied behavior analysis.

I request your participation in this research study. Please take your time to read the following information, and do not hesitate to ask me any questions you may have before signing this document.

Purpose: This study determines how teachers can identify early signs of problem behavior (study 1) and also how teachers can learn to apply the testing methodology called functional analysis by providing a particular setting before and after the target behavior (study 2).

Behavior analysis has shown that early signs of problem behavior often have the same origin as problem behavior itself, even if problem behavior manifests itself in a different form. An example of this is a student blinking his or her eyes (early sign) before beginning to scream (problem behavior). If the teacher (you) and the researcher (me) establish the reason for the blinking (perhaps the student is simply seeking attention from the teacher) and also provide the necessary feedback (the teacher providing attention by asking, "Do you need help?"), we can learn the reason for the problem behavior. If the teacher identifies the early signs of problem behavior and also tests for these signs, we may prevent the problem behavior from occurring, giving the student a chance to learn without being distracted by their own problem behavior. As a result, the teacher will be better able to conduct the lesson.

Procedures: All the studies, procedures, and sessions will be monitored by me. I will conduct two studies, one involving the watching of videos and the other the training of participants in person. No children will be involved in either study.
Study 1 will have a duration of 120 minutes and study 2 of 120 minutes. The research will conduct at the Children Center (Address: 1-5-9, Hiroo, Shibuya-Ku, Tokyo, Japan).

Study 1: I will provide training to help you identify the early signs of problem behavior.

I will first show you five videos in which two adults play the part of teacher and student, respectively. The objective of the study is to identify the early signs of problem behavior among students, and I will provide relevant training in the form of a presentation. I will then ask you to watch the videos again so that I can assess your ability to identify the early signs of problem behavior. For study 1 you will only be watching videos and noting the possible early signs of problem behavior.

Study 2: I will provide training to help you identify the reasons for the early signs of problem behavior by means of testing, that is, by providing certain feedback. This process is called *functional analysis*. You will be asked to conduct a test to identify the reasons for problem behavior. I will provide the relevant training for this test. You will then conduct the test yourself on me playing the part of students.

Video or audio recording will take place for data-collection purposes. The recordings will be used only for educational and instructional purposes and only within the Chicago School of Professional Psychology, and they will be destroyed after a minimum of five years.

Data from this research will be presented at the Chicago School of Professional Psychology and at professional conferences. The video and audio recordings will not be used as part of any presentation.

Risks of participation: Identifiable information will be collected, leading to a loss of participant confidentiality. In addition, you may experience fatigue, frustration, or loss of time. I believe these risks are no more than what would be experienced in a role-play training activity.

Risks will be minimized by my providing feedback that will concentrate on how you can make improvements and by my providing prompts during the training. I will do this to encourage you to try your best simply. Furthermore, the duration of training sessions will be reduced if I notice you are becoming frustrated. The training sessions will include short breaks and will take place in a congenial atmosphere. I will monitor and minimize emotional distress. If you become frustrated for example by fatigue, I will propose a short break and pause the study. I will ask you restart the study later. There will be no physical risk to participants*.*

Benefits of participation: You may not benefit from this study. However, I hope that what you learn may be of benefit to you in your teaching children who have autism spectrum disorder or other developmental difficulties, and that your students may eventually benefit from experiencing less problem behaviors in your classroom.

Alternatives to participation: Participation in this study is voluntary. You may withdraw at any time, without penalty. Because participation may cause emotional distress, your level of stress will be monitored.

Confidentiality: During this study, your name, telephone numbers and email address will be collected. Your personal information will be confidential.

Any identifying information will be removed, and unique participant identifiers will be created so that only anonymous and confidential data will be used for all resulting presentations and publications. Research files will be kept in a secure cloud drive. Data will be kept in a locked cabinet at my office in Tokyo for a minimum of five years before being destroyed. Any hard copies of data sheets will be shredded, and all electronic data files will be destroyed. All instructions, including this informed-consent form, will be translated into the participants' language of use (Japanese).

Research materials will be kept for a minimum of five years after publication per American Psychological Association guidelines.

Your research records may be reviewed by federal agencies whose responsibility is to protect human subjects participating in research, including by the Office for Human Research Protections and representatives from the Chicago School of Professional Psychology Institutional Review Board (IRB), a committee that oversees research.

Questions or concerns: If you have questions related to the procedures described in this document, please contact the researcher, Kozue Matsuda (email: kmatsuda@ego.thechicagoschool.edu).

Dissertation chair: Dr. Julie Ackerlund Brandt, BCBA-D, LBA-WI (email: jbrandt@thechicagoschool.edu).

If you have questions concerning your rights in this research study, you may contact the IRB, which is concerned with protecting subjects in research projects. You may reach the IRB office Monday–Friday by calling 312 467 2343 or by writing to Institutional Review Board, Chicago School of Professional Psychology, 325 N. Wells, Chicago, Illinois, 60654.

Consent to Participate in Research

Participant:

I have read the above information and have received satisfactory answers to my questions. I understand the research project, and the procedures involved have been explained to me. I agree to participate in this study. My participation is voluntary, and I do not have to sign this form if I do not want to be part of this research project. I will receive a copy of this consent form for my records.

_____
Name of participant (print)

_____
Signature of participant

Date: _____

_____
Name of the person obtaining consent (print)

_____
Signature of the person obtaining consent

Date: _____

Appendix E: Informed Consent in Japanese

インフォームドコンセント

TheChicagoSchool
of Professional Psychology

研究者：松田幸都枝

研究タイトル：*An Evaluation of Behavior Skills Training for the Identification of Precursor Behaviors and Implementation of Precursor-based Functional Analyses with Japanese Teachers*（教員による前兆行動の同定と機能分析）

現在、シカゴ・スクール・オブ・プロフェッショナル・サイコロジー（大学院）の学生をしています。この研究は、応用行動分析学　博士号　取得の論文の要件の一部として実施するいたします。今回、教員の皆様のご参加をお願いしています。以下の情報をお読みいただき、研究にご参加いただければ幸いです。文書に署名する前にお気軽にご質問ください。

目的：本研究では、問題行動の前兆行動（研究1）と、目標行動の前後に特定の設定（前兆行動）を特定することによって、機能分析と呼ばれる試験方法を教師がどのように適用するのか、を検証します（研究2）。

行動分析学は、問題行動の初期の前兆行動が、たとえ問題行動が別の形で現れたとしても、しばしば問題行動自体と同じ起源を有することを示すことがあります。
例えば、悲鳴を上げ始める前に（問題行動）、目を瞬きさせている（早い兆候）学生です。教師（あなた）と研究者（私）が目の瞬きをする（おそらく単に生徒が教師から注意を引いている）場合、必要なフィードバックを提供する（教師は "手伝ってあげようか"）、問題行動の理由を知ることができます。先生が問題行動の前兆行動を特定し、これらの徴候をテストした場合、問題行動が発生しないようにし、問題行動に気を取らずに学習する機会を与えます。その結果、教師はより良いレッスンを行うことができます。

手順：すべての研究、手順、およびセッションは私によって監視されます。私は2つの研究を行います.1つはビデオの視聴しての前兆行動の同定、もう1つは参加者による前兆行動への機能分析の訓練です。どちらの研究にも子どもたちは関与しません。
研究1は120分、研究2は180分です。研究はチルドレン・センター.
または参加者の学校で行われます。

研究1：問題行動の初期の前兆を特定するための訓練を提供します。

最初に、2人の大人がそれぞれ教師と学生の役割を果たす5つのビデオをお見せします。この研究の目的は、生徒の問題行動の初期の徴候を特定することであり、プレゼンテーションの形で適切な訓練を提供する。その後、問題の行動の初期の徴候を特定する能力を評価できるように、動画をもう一度見ていただきます。研究1の場合は、ビデオを見ているだけで、問題行動の可能性がある早期の兆候に気付くことになります。

研究2：私が生徒役になり、問題の行動の前兆行動がテストによって、すなわち特定のフィードバックを提供することによって特定される理由を特定するのに役立つトレーニングを提供します。このプロセスを機能分析といいます。この研究では、みなさんに前兆行動の機能分析の実施方法をご指導します。

ビデオやオーディオの録音は、データの収集目的で行われます。録音は教育目的や授業目的でのみ使用され、シカゴ・スクール・オブ・プロフェッショナル・サイコロジー内でのみ使用され、5年後に破棄されます。

この研究のデータは、シカゴ・スクール・オブ・プロフェッショナル・サイコロジーと専門会議で発表されます。ビデオとオーディオの録音は、プレゼンテーションの一部としては使用されません。

参加のリスク：個人情報が収集され、参加者の機密性が失われる可能性があります。さらに、疲労、欲求不満、時間の喪失を経験の可能性もがあります。

リスクを最小限に抑えるためには、改善のためのフィードバックや研修中のプロンプトを提供します。できるだけみなさんが　順調に習得できる方法でリスクを軽減します。さらに、トレーニングセッションの期間が短縮するなども検討します。訓練中には短時間の休憩が含まれます。あなたが疲労などで欲求不満になった場合は、短時間休憩を提案して研究をその場で一回休むなども検討します。参加者には物理的なリスクはありません。

参加のメリット：この研究の恩恵をみなさんが物品などで受けることはできません。しかし、みなさんが学んだことが、自閉症スペクトラム障害やその他の発達上の困難を抱えている児童への教育にとって意義があると思います。最終的に教室での問題行動が少なくなることも願っています。

参加の選択肢：この研究への参加は任意で、みなさんは罰金を科さずいつでも辞退することができます。

守秘義務：この調査中、あなたの名前、電話番号、およびEメールアドレスが収集さ

れます。お客様の個人情報は個人情報扱いとなります。

識別情報はすべて削除され、ユニークな参加者識別子が作成され、結果として得られるすべてのプレゼンテーションや出版物に匿名の機密データだけが使用されます。 研究ファイルは安全なクラウドドライブに保存されます。 データは破壊される前に最低 5 年間、東京の私のオフィスのロックされたキャビネットに保管されます。 データシートのハードコピーが破棄され、すべての電子データファイルが破棄されます。 このインフォームドコンセントフォームを含むすべての指示は、参加者の使用言語（日本語）に翻訳されます。

研究記録は、ヒューマンリサーチ・プロテクション局（OHRP）や研究を監督する委員会であるシカゴ・スクール・オブ・プロフェッショナル・シンセティック・インスティテュート・レビュー委員会の代表者など、研究に参加する人間の被験者を守る責任がある連邦政府機関によって審査される場合があります。

質問/懸念事項：この文書に記載されている手順に関連する質問がある場合は、研究者：松田幸都枝までご連絡ください

メールアドレス：kmatsuda@ego.thechicagoschool.edu

議長：Julie Ackerlund Brandt 博士、BCBA-D、LBA-WI
E メール：
jbrandt@thechicagoschool.edu

参加者の署名：

上記の情報を読んで、質問に満足のいく回答を得ました。 研究プロジェクトを理解し、関連する手順の説明されました。 私はこの研究に参加することに同意します。 私の参加は任意であり、この研究プロジェクトに参加したくない場合は、この書式に署名する必要はありません。 この同意書のコピーを私の記録に送付します。

_____
参加者の名前

_____

参加者の署名

日付：_____

_____
同意を得た者の氏名（印刷）

_____
同意を得た者の署名

Appendix F: Eligibility Screening

Screening Questions

Questions the researcher will ask via email or phone:

1. How long have you been teaching children with ASD and/or other developmental difficulties?

If the answer is "more than 12 months," then the teacher passes the first eligibility requirement.

2. Have you ever done functional assessment analysis?

If the answer is "NO," then the teacher passes the second eligibility requirement.

3. Can you attend both studies (each study lasts 120-180 minutes)?

If the answer is "YES," then the teacher passes the third eligibility requirement.

Appendix G: Eligibility Screening in Japanese

Screening Questions

研究者は電子メールまたは電話で質問します。
1. ASD や他の発達障害のある子供たちをどのくらい教えていますか？
答えが 12 ヶ月以上ある場合は、最初の資格を得ます。

2.機能分析をしたことがありますか？
答えが NO の場合、第 2 の適格性を得ます。

3.両方の研究に参加できますか(必要時間 120-180 分です）？
答えが YES の場合は、3 番目の資格を得ます。

3 つの回答がそろったところで、研究参加をしていただけるスクリーニングが終了します。

Appendix H: Countee Manual

Countee Task Analysis by Jennifer Quigley

1. Open application

2. Click on + sign in top right corner

3. Label new template (ex. Initials, assessment)

    a. Click create

4. Input duration of session

5. Keys:

    a. Click add new:

        i. Name: Put in what you want the key to be labeled as

        ii. Description: include information about assessment as needed

        iii. Type: choose frequency or duration for key

        iv. Choose color (this shows up next to the name in your data collection)

    b. Repeat for all desired keys

6. Once template is complete:

    a. Click new session

    b. Label new session with initials, condition and assessment (They all go into the same bin

        so be very specific on your label)

    c. Click create

7. Session:

    a. Click session start

        i. Timer begins

        ii. Click on keys as behavior occurs

        iii. Click on any duration keys a second time to stop duration from counting

        iv. There is no erase/back key as far as I can tell so that's one of the problems

        v. Session will end automatically at set duration

        vi. You can reset session if needed or pause timer with buttons on screen

8. After session:

    a. Click on my session button on bottom right of home screen

    b. Click on specific session

    c. Data will be present for viewing

Appendix I: Video Scripts for Study 1

Video Scripts Sample Memo for Precursor Behavior Identification Training

Purpose: The following scripted video is used for training teachers for the identification of precursor behavior.

The actors: All actors are BCBAs and RBTs (adults).

The roles: The child actors wear yellow hats for clear identification.

Number of videos: 12

Duration of each: 5 min

Each script contains both problem behavior and precursor behavior. The latter needs to occur before approximately 10 s.

Video 1

Possible function: Escape

Problem behavior: Biting back of own hand

Precursor behavior: Screaming, "ah!"

Video 2

Possible function: Self-stimulation

Problem behavior: Hitting own head

Precursor behavior: Stretching arm

Video 3

Possible function: Escape/Attention

Problem behavior: Banging own head on desk

Precursor behavior: Biting the collar of own jumper

Video 4

Possible function: Attention

Problem behavior: Throwing himself down and screaming

Precursor behavior: Saying, "smile please."

Video 5

Possible function: Escape/Attention

Problem behavior: Jumping and moving to the corner of the room

Precursor behavior: Banging on desk

Video 6

Possible function: Escape

Problem behavior: Hitting own forehead

Precursor behavior: Screaming, "uhh!" and putting hand to face

Video 7

Possible function: Escape

Problem behavior: Sobbing

Precursor behavior: Flapping both hands and saying, "ata."

Video 8

Possible function: Attention

Problem behavior: Kneading hands

Precursor behavior: Stamping feet

Video 9

Possible function: Escape/Tangible

Problem behavior: Spinning objects

Precursor behavior: Screaming, "let's go, train is going!"

Video 10

Possible function: Escape

Problem behavior: Screaming and throwing objects

Precursor behavior: Mumbling

Video 11

Possible function: Attention

Problem behavior: Stamping own foot

Precursor behavior: Suddenly stopping all action

Video 12

Possible function: Attention

Problem behavior: Pushing others

Precursor behavior: Gazing at the ceiling

Appendix J: Video Samples for Study 1
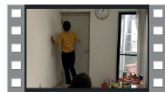
https://1drv.ms/f/s!Atujn7bKIOzvgqBaKoHU2y9Azt0dEg

| ⊘ Study 1 video 2 | ⊘ 名 Study 1 video 4 | ⊘ Study 1 video 5 | ⊘ 名 Study 1 video 10 | ⊘ 名 Study 1 Video 11 | ⊘ 名 Study 1 Video1 |
| ⊘ 名 Study 1 Video3 | ⊘ 名 Study 1 Video6 | ⊘ 名 Study 1 video7 | ⊘ Study 1 video8 | ⊘ 名 Study 1 video12 | ⊘ Study1 Video 9 |

Appendix K: Training Slides for Study 1 Example in Japanese

Appendix L: Quiz for Study 1 and Study 2

Precursor behavior knowledge test (Study 1)

1. Why does the student exhibit the problem behavior?
    a. Because the student has been diagnosed with autism spectrum disorder
    b. Because of the caregiver's lack of discipline
    c. Because it meets the function of the needs
    d. Because the student is not punished enough

2. What is the target behavior?
    a. Behavior that the teacher does not like
    b. Behavior that the parents do not like
    c. Behavior which makes it difficult to learn and to carry on daily life
    d. The behavior of the teacher

3. Which of the following does 'social validity' NOT refer to?
    Social validity refers to _____, _____, and _____ .

    a. The social significance of intervention goals
    b. The social acceptability of intervention procedures
    c. The social importance of effects
    d. The behavior that parents wish a child to exhibit

4. What is the precursor behavior?
    a. Behavior that occurs before the target behavior
    b. Behavior that tells you when the rain will come
    c. Behavior that is bigger than the target behavior
    d. Behavior that occurs after the target behavior

5. What is the precursor behavior?
    a. Behavior that occurs 24 hours before the target behavior
    b. Behavior that occurs 1 hour before the target behavior
    a. Behavior that occurs 1 year before the target behavior
    b. Behavior that occurs less than 10 seconds before the target behavior

6. What does ABC stand for?
    a. Antecedent, Behave, Concise
    b. Average, Behavior, Condense
    c. Apply Behavioral Constructs
    d. Antecedent, Behavior, Consequence

7. What does an ABC chart help us to do?
    a. Determine the function of a behavior
    b. Outline how we learn
    c. Collect information about a behavior

    d. Increase good behavior

8. What is behavior?
    a. Thoughts, feelings, emotions, and actions
    b. The activity of living organisms
    c. Everything
    d. Intentions and actions

9. Which of the following are characteristics of a good definition of a behavior?
    a. Short, exact, and specific
    b. Observable, precise, and lengthy
    c. Recognizable, measurable, and fast
    d. Observable, measurable, and specific

10. What is an antecedent?
    a. Something that occurs after the behavior
    b. Something that occurs before the behavior
    c. The purpose or goal of the behavior
    d. Something that increases the future occurrence of the behavior

11. What is a consequence?
    a. Something that occurs after the behavior
    b. Something that occurs before the behavior
    c. The purpose or goal of the behavior
    d. Something that increases the future occurrence of the behavior

12. What does the function of the behavior tell us?
    a. The purpose or goal of the behavior
    b. How to stop the behavior from happening
    c. The definition of the behavior
    d. How to observe the behavior

13. What do antecedent events identify?
    a. How and why
    b. Who and what
    c. Where and when
    d. What and how

14. Which of the following is NOT precursor behavior?
    a. Hitting table
    b. Vocalization
    c. Disrespectful language
    d. All of the above are precursor behaviors

15. Which of the following is NOT precursor behavior?
    a. Talking to the teacher after the target behavior

b. Talking to the teacher before the target behavior
c. Whining to the teacher before the target behavior
d. Vocalizing "mmm" sounds before the target behavior

16. You asked a caregiver about a student's precursor behavior, and she told you, "She hit the teacher today because she does not like her." What do you have to do?
    a. Agree with the caregiver's opinion and assign the student to another teacher
    b. Conduct direct observation and identify the precursor behavior
    c. Conduct a teacher's meeting and fire the teacher
    d. Disagree with the caregiver's opinion and inform the principal

17. What is reinforcement?
    a. A reward
    b. Anything good
    c. Something that increases the future occurrence of the behavior
    d. A bribe

18. What is reinforcer?
    a. Chocolate
    b. Praise
    c. Something that increases the future occurrence of the behavior
    d. Punishment

19. "The child's target behavior is hitting his head, and the precursor behavior is vocalization of 'mmm' sounds."
    a. This may be correct even with a different topography of the behavior
    a. This maybe incorrect due to the different topography of the behavior
    b. This may be incorrect because he is not crying
    c. This may be correct because hitting and vocalization always occur in every child.

20. Which of the following is NOT precursor behavior?
    a. Always licking hands before screaming
    b. Always crying after screaming
    c. Always jumping for 20 minutes during recess time
    d. Always smiling

Precursor Behavior Knowledge Test (Study 2)

1. What does FA stand for?
   a. Functional Assessment
   b. Functional Analysis
   c. Foundation Analysis
   d. Frequency Assessment

2. Which of the following is NOT a condition in a FA?
   a. Attention
   b. Demand
   c. Play
   d. Interview

3. Which assessment condition (attention, demand, alone, play) is considered the control condition for the other conditions?
   a. All can be control conditions
   b. Attention condition
   c. Alone condition
   d. Play condition

4. What does an FA do?
   a. Interviews individuals about behavior
   b. Identifies the antecedents and consequences of the behavior
   c. Hypothesizes the function of the behavior
   d. Imposes calming effect

5. Which of the following is an advantage of an FA?
   a. Less complex
   b. Shorter amount of time
   c. Tests hypothesis
   d. Easy to apply

6. Which of the following is NOT needed to conduct a precursor FA?
   a. Inform the caregivers and receive written consent.
   b. Meditation room
   c. Target behavior
   d. Precursor behavior

7. During the condition, what should you do if the client engages in disruptive or aggressive behavior (e.g. screaming or throwing objects)?
   a. Depends on the conditions
   b. Always speak to supervisors

    c. Immediately stop the condition

    d. Depends on the behavior

8. What should you do if a client becomes injured during a session?

    a. If the injury behavior is target behavior, then continue the session

    b. Watch, but continue the session

    c. Immediately stop the session

    d. Continue the session

9. Precursor behavior FA

    a. Is applied to precursor behavior

    b. May not cause the severe target behavior

    c. Is recommended for risky target behavior

    d. All of the above

10. Precursor behavior FA

    a. Always starts with attention function

    b. Always starts with alone function

    c. Always starts with tangible function

    d. None of the above

11. Precursor behavior FA

    a. May not be implemented for all the functions

    b. Only needs to do two sessions

    c. Is always 100% accurate

    d. May identify the function of the behavior

12. Precursor behavior FA needs to

    a. Present the functions in random order

    b. Always be given in the same order of the four functions

    c. Occur sometimes at night, sometimes at daytime

    d. Always happens in the classroom

13. If the dangerous behavior occurs during precursor behavior FA,

    a. Never stop the FA

    b. Stop taking data and let the BCBA handle the situation

    c. Ask the caregivers

    d. You must handle the situation and report to the BCBA

14. If you are not sure of the precursor behavior FA,

    a. Stop taking data and let the BCBA handle the situation

    b. Never stop the FA

    c. Ask the caregivers

    d. You must handle the situation and report to the BCBA

15. When you conduct a precursor behavior FA, if the function matches with the target behavior
    a. Precursor behavior is increased
    b. Precursor behavior is decreased
    c. No change
    d. Sometime increases, sometimes decreases

16. When you conduct a precursor behavior FA, if the function matches with the target behavior
    a. As soon as you stop the condition, move to the next function
    b. Continue FA until the target behavior occurs
    c. Continue FA until precursor behavior increases
    d. Stop FA and stop the test

17. During the attention condition, you will
    a. Never provide attention
    b. Ask to do some tasks
    c. Provide attention when precursor behavior occurs
    d. Leave the room

18. The conducting of a precursor behavior FA is
    a. Better than a typical FA because it only requires a short time
    b. Good because it always finds the function of the target behavior
    c. Suitable if the target behavior is high risk
    d. Uncertain because no researcher has conducted a precursor behavior FA before

19. When you conduct a precursor behavior FA:
    a. Plan well
    b. Make sure all the material is ready for each testing function
    c. Make sure it is safe for the teacher as well as the child
    d. All of the above

20. When you conduct a precursor behavior FA, if the client does not respond to your second prompt within 5 s, what should you do?
    a. Stop the condition
    b. Give him the feedback "No good"
    c. Continue and repeat the instruction with a third prompt
    d. Change the condition

Appendix M: Quiz for Study 1 and Study 2 in Japanese

前兆行動の知識テスト（研究 1）

1. なぜ生徒に問題行動があるのですか？
    a. 自閉症スペクトラム障害と診断された人だから
    b. 介護者/指導者のしつけがなってないため
    c. 必要な行動の機能を満たすため
    d. 体罰が足りないから

2. 目標とする行動は何ですか？
    a. 先生が個人的に好きな行動
    b. 両親が好きな行動
    c. 個人が日常の生活が困難になったり学習するのが難しい行動
    d. 先生の行動すべて

3. どの文章が穴埋め箇所には　**適切ではない**のですか？
   「社会的妥当性は　　　　　　　指す。」

    a. 介入目標の社会的意義
    b. 介入手続きの社会的受容性
    c. 効果の社会的重要性
    d. 両親が子供に行動することを望む行動

4. 前兆行動とはどんな行動ですか？
    a. 目標行動の前に起こる行動
    b. 雨がいつ来るかを伝える行動
    c. 目標の行動よりも大きい行動
    d. 目標行動の後に起こる行動

5. 前兆行動はどんな定義がふさわしいですか？
    a. 目標行動の 24 時間前に発生する行動
    b. 目標行動の 1 時間前に発生する行動
    c. 目標行動の 1 年前に起こる行動

    d. 目標行動の 10 秒前に起こる行動

6.   ABC は何を表していますか？
    a. 先行、行動、簡潔
    b. 平均、行動、集中
    c. 行動を適用する
    d. 先行、行動、結果

7.   ABC チャートは私たちが何をするのに役立ちますか？
    a. 行動の機能を決定する
    b. 私たちが学ぶ方法の概要
    c. 行動に関する情報を収集する
    d. 良い行動を増やす

8.   行動とは何ですか？
    a. 思考、感情、感情、行動
    b. 生物の活動
    c. すべて
    d. 意図と行動

9.   行動の良い定義は何であるべきですか？
    a. 短く正確で具体的
    b. 観察可能で、正確で、長い
    c. 認識可能、測定可能、および高速
    d. 観察可能、測定可能、限定できる

10.   先行条件とは何ですか？
    a. 行動の後に起こる何か
    b. 行動の前に起こること
    c. 行動の目的または目標
    d. 将来の行動の発生を増加させるもの

11.   結果は何ですか？
    a. 行動の後に起こる何か

b．行動の前に起こること
c．行動の目的または目標
d．将来の行動の発生を増加させるもの

12. 行動の機能は私たちに何を伝えていますか？
a．行動の目的または目標
b．どのように動作を停止するか
c．行動の定義
d．どのように行動を観察する

13. 先行条件は何を識別しますか？
a．How and Why　（どのように　と　なぜ）
b．Who　（だれ）Where　What
c．心理的要因
d．どのように

14. 次のうち**前兆行動ではないもの**はどれですか？
a．テーブルをコンコンとする
b．発声
c．無礼な言葉
d．上記のすべて

15. 前兆行動ではないものはどれですか？
a．目標行動後に教師に話す
b．目標の行動の前に先生に話す
c．目標の行動の前に教師に泣き言をいう
d．ターゲット動作の前に "うーん"をとうなる

16. あなたが前兆行動を家族に聞いているとき、母親は「指導している先生のことが、うちの子が嫌いだから　先生をたたいたのです」と言った。あなたは何をしなければなりませんか？
a．保護者の意見に同意し、先生を変更する
b．直接観察を行い、前兆行動を特定する
c．ミーティングを行い、指導を指摘する
d．保護者の意見には同意しないで、上司に相談する

17. 強化子とは何ですか？
    a．報酬
    b．何か良い物
    c．将来の行動の発生を増加させる
    d．わいろ

18. 強化子とは何ですか？
    a．チョコレート
    b．賞賛
    c．将来の行動の発生を増加させるもの
    d．罰

19. "子供の目標行動は頭をたたく、前兆行動は子供がうーとうなる "
    a．おそらく異なる行動のトポグラフィー（形態）だが、前兆行動の可能性は高い
    b．行動のトポグラフィーがちがうので間違っている
    c．前兆行動は泣くことなので間違えている
    d．どの子供もたたく行動とうなりは同時におこるのであっている。

20. 次のうち前兆行動はどれですか？
    a．ずっと泣いている
    b．いつも笑っている
    c．常に、悲鳴を上げる前に　自分の手を舐める
    d．休み時間にジャンプをする

前兆行動の知識 test（研究２）Precursor behavior Knowledge Test (Study 2)
名前

1. FA は何の略ですか
   - e. 機能アセスメント
   - f. 機能分析
   - g. 基礎分析
   - h. 頻度アセスメント

2. FA の条件ではないのはどれですか
   - e. 注目
   - f. 回避
   - g. 自由遊び
   - h. インタビュー

3. アセスメント条件で、コントロール条件として使われるものはどれですか
   - a. すべて条件
   - b. 注目引き条件（アテンション）
   - c. 一人きりの条件
   - d. 自由遊び条件

4. FA が示すものはなんですか
   - e. インタビューによってとらえた行動
   - f. 行動の先行条件と後続条件
   - g. 行動の機能の仮説
   - h. 落ち着かせる効果

5. FA の長所は次のうちどれですか
   - e. 複雑ではない
   - f. すぐにできる
   - g. 仮説をテストできる
   - h. 簡単に応用できる

6. 前兆行動 FA を実施するのに必要でないものはどれですか
   - e. 保護者への報告と書面によるインフォームドコンセント
   - f. 瞑想をする部屋
   - g. 目標行動
   - h. 前兆行動

7. もし実施中に、クライアントが危険な行動を実行した場合（想定外の危険な行動）で、その行動が目標行動でも前兆行動でもない場合、

e. 条件によって継続するかどうか　を決める
f. 常にスーパーバイザーに相談する
g. すぐに FA を辞める
h. 行動による

8. クライアントがセッション中に怪我をした場合

e. もしその行動が目標行動であれば指導を継続する
f. みているが指導を継続する
g. すぐに指導をやめる
h. 指導を継続する

9. 前兆行動 FA は、
e. 前兆行動に FA をかける
f. 大きな問題行動をおこさない
g. 危険な目標行動に対して適している
h. 上記のすべて

10. 前兆行動 FA は
e. 常に注目引き条件から開始する
f. 常に一人きり条件から開始する
g. 常に物の条件から開始する
h. どれも正しくない

11. 前兆行動 FA は
e. すべての機能に関して調査はしない
f. ２つの条件だけをする
g. １００％正しい
h. 行動の機能を同定できる可能性がある

12. 前兆行動 FA は
e. 機能条件をランダムな順番で実施する
f. ４つの機能条件を常に同じ順番で実施する
g. 時には夜に　時には昼実施する
h. つねに教室でやる

13. 前兆行動 FA 中に危険な行動がおきたら
e. FA は決して中止しない
f. データをとるのをやめて、BCBA に報告して対応をしてもらう
g. 保護者にきく
h. 自分の責任で終了して、BCBA に報告をする

14. もし前兆行動 FA に関してわからないことがあれば
   e. データをとるのをやめて、BCBA に報告して対応をしてもらう
   f. FA を実施したらやめない
   g. 保護者にきく
   h. 自分の責任で終了して、BCBA に報告をする

15. 前兆行動 FA を実施する際に、もし機能条件が目標行動とマッチしていれば
 （例：アテンション条件で、関心を与えない設定を組んでいれば）
   e. 前兆行動が増える
   f. 前兆行動が減る
   g. 行動に変わりはない
   h. 増えたり減ったりする

16. 前兆行動 FA を実施する際にもし機能条件がマッチした場合には
   e. その機能条件をすぐにやめて次の機能を実施する
   f. 時間いっぱいまで FA を実施してから、次の機能条件を設定する
   g. 前兆ではなく目標行動がでるまで　実施する
   h. FA と研究を中止する

17. 注もく引き（アテンション）条件の際に
   a. 一切関心を与えない
   b. 課題を提示する
   c. 前兆行動が起きた際に注目を与える
   d. 部屋からでる

18. 前兆行動 FA は
   e. 通常の FA より短い時間でできるから優れている
   f. 常に機能を同定できる
   g. 目標行動（問題行動）の危険度が高いものに適している
   h. 前兆行動 FA は実施されたことがないのでわからない

19. 前兆行動 FA は
   e. 計画を綿密にたてる Planned well
   f. すべての教材をすべての機能条件のために準備する
   g. 指導者と対象（児童）の安全を確保する
   h. 上記すべて

20. 前兆行動 FA を実施した際、5 秒以内に 2 回プロンプトをしたけれど、クライアントが反応をしなかった

  a. その機能の条件を中止する
  b. 「できていないよ」とフィードバックを出す
  c. 3 回目のプロンプトをだす
  d. 機能条件を変える

Appendix N: Precursor Functional Analysis (FA) instruction

Precursor Functional Analysis Study 2: Procedural Descriptions of Assessment Conditions

Memo for Teachers: Precursor Behavior Functional Analysis by Teachers (training)

Welcome, and thank you for attending Study 2.

During Study 2 you will be:

1. taking baseline data from the researcher;

2. reading the following and attending training;

3. taking a quiz (scoring 90% or higher to move on to section 4);

4. receiving precursor functional analysis (FA) training (simulated session);

5. taking data;

6. conducting follow-ups.

1. Taking Baseline Data from the Researcher

What to Do

The teacher will implement a FA of precursor behavior that is demonstrated by the clients.

Simulating teachers will be acting as your clients in this study.

2. Reading the Following and Attending Training

What to Do

The teacher will read the following instruction:

Alone Condition

Purpose. This condition is designed to establish whether target behavior is maintained despite attention received from the teacher. The teacher will ignore all client behavior except for the target behavior (in this case, precursor behavior).

Attention Condition

  Purpose. This condition is designed to establish whether target behavior is maintained despite attention received from the teacher. The teacher will ignore all client behavior except for the target behavior (in this case, precursor behavior).

  Target behavior. For Study 2, target behavior is the precursor behavior identified in Study 1.

  How to conduct a session:

1. Set up the room (chairs, desk, leisure materials, datasheets, stopwatch, and pen).

2. Make sure that only people who have been informed of the FA session and procedures are in the room.

3. Begin a session by directing the clients to the leisure materials. Tell the clients that they can play with the toys and leisure materials and that you will be working in the same room.

4. As soon as you tell your clients that you are busy, move away from them, sit in another chair, and pretend to be busy with quiet work.

5. Completely ignore (neither making eye contact nor facing away) all behaviors exhibited except precursor behavior.

6. If the precursor behavior occurs, give verbal and physical attention to that client.   Walk over to the client, saying either "Don't do that" or "Please stop." Then briefly touch the client's arm, physically preventing the precursor behavior.

7. Do not shout or physically restrain the client.

8. If the target behavior does not occur during the session, ignore the client for the entire session. Check the timer and stop when the session is over.

9. After precursor behavior occurs and you have responded to it, resume ignoring the client until the session is over.

Demand (Escape) Condition

Purpose. This condition is designed to establish whether the target behavior is maintained by escape-from-task demands. The teacher is to make demands in relation to instruction, tasks, or academic learning until the precursor behavior occurs, at which point the task is to be removed.

Target behavior. During Study 2, the target behavior is the precursor behavior identified in Study 1.

How to conduct a session:

1. Set up the room (chairs, desk, leisure materials, datasheets, stopwatch, and pen).

2. Set a stopwatch at the beginning of the session. Initiate an instructional trial every 30 seconds.

3. Make sure that only people who have been informed of the FA session and procedures are in the room.

4. Begin a session by directing the clients to be seated at the table.

5. If the precursor behavior occurs, immediately terminate the trial. Remove the task and academic trial from the table and turn away from the clients, ignoring them until a new trial is to begin.

6. Count the passing seconds silently. If a client performs the response within 5 seconds or at least begins to initiate the response during that time, praise the client by saying "Nice job" when the client is finished responding.

7. If the client does not perform the response within 5 seconds, repeat the instruction and

simultaneously demonstrate the response. Model the behavior at the same time.

8. If the client does not perform the response within 5 seconds of your demonstration, repeat the instruction and use a physical prompt.

9. If the precursor behavior occurs, immediately terminate the trial. Remove the task and academic trial from the table and turn away from the client, ignoring the client until a new trial is to begin.

10. If a client displays other inappropriate behaviors, continue to demand tasks. Only if precursor behavior is displayed is the task demand to be terminated.

11. Repeat the session, providing instruction every 30 seconds until the session is over.

Play Condition

Purpose. This condition is designed to be a general control condition during which no demands are placed on the clients and continuous access to leisure materials is available. Attention is to be given with a frequency independent of the client's behavior.

Target behavior. During Study 2, the target behavior is the precursor behavior identified in Study 1.

How to conduct a session:

1. Begin a session by setting a stopwatch and directing the clients to the leisure materials in the room.

2. Make sure that only people who have been informed of the FA session and procedures are in the room.

3. Once your clients are in the room, provide some form of attention every 30 seconds, saying, for example, "Here are some toys you can play with" or "Oh, you're playing nicely." Briefly touch clients' shoulders and smile, if this is required.

4. Do not give instructions or make demands.

5. If a client displays any form of inappropriate behavior, including precursor and main-problem behavior, do not provide attention.

6. If a client attempts to interact appropriately, reciprocate but do not engage in play with the client.

7. If precursor behavior occurs at intervals of 30 seconds, do not provide attention. Deliver attention after a further 5 seconds have elapsed, then deliver positive attention, not mentioning inappropriate or precursor behavior.

Outline of Assessment Conditions

Ignore/Alone
1. Prepare a safe room devoid of leisure items and academic materials.
2. Ask the client to enter the room.
3. Take data on precursor behavior.
4. Ignore any problem behaviors, including precursor and problem behaviors

Attention

1. Instruct the client to play and then ignore the client
2. If the client shows any behavior other than precursor behavior, ignore it.
3. If the client shows the precursor behavior, say "no, don't do that" to the client and physically stop.
4. Repeat from 1 until the condition time ends.

Demand

1. Present tasks and praise when the client does what the teacher asks.
2. If a precursor behavior occurs, remove all the teaching materials.
3. If it is not a precursor behavior, continue to request that the client complete the assigned task.
4. Continue the prompt and repeat 1 until the precursor behavior is displayed or the condition ends.

Play / Control

1. Provide instruct to play.
2. Give attention once every 20 seconds (positive)
3. Reply if the client seeks to interact

4. Do not provide any attention to inappropriate behavior

Tangible

1. Set the items (leisure items or individualized items).
2. The teacher takes the items away and keeps them where the client can see them.
3. As soon as the precursor behavior occurs, return the items.
4. Repeat 1.

Appendix O: Precursor Functional Analysis (FA) Instruction in Japanese

前兆行動の機能分析　研究２：機能の種類別手続き

教師のための記録：教員による前兆行動の機能分析（訓練）

研究２にご参加いただきありがとうございます。

皆さんには下記の事項を実施していただきます

1.　研究者は皆さんのベースラインデータを記録します。
2.　下記の手続きを読んで訓練に参加します
3.　その後、クイズをうけ 90%の合格をした方は、実際の練習に参加することができます。
4.　訓練では、みなさんは機能分析のデータを取ります。
5.　その後、フォローアップを実施します

1.　ベースライン

皆さんが実施にすること

皆さんは実際に　FA を前兆行動に実施していきます。この研究では、趣味レーションをする別の指導者があなたのクライアントとして参加します。

2.　下記の手続きを読んで訓練に参加します

注目引き（アテンション）条件

目的：この条件は、教師から注意を引いたにもかかわらず目標行動が維持されるかどうかを立証するように設計されています。教師は、ターゲットの動作（この場合は前兆行動）以外のすべてのクライアント動作を無視します。

機能分析セッションのやり方：

1.　部屋の準備をします（椅子、机、強化子や遊びとしてのアイテム、データシート、ストップウォッチ、ペン）を設置します。

2.　 FAのセッションと手順について知らされた人だけが部屋にいるようにしてください。

3.　クライアント（この訓練では大人です）におもちゃで遊んでいいよと、案内することでセッションを開始します。彼らがおもちゃで遊ぶことができること、その後、あなたが同じ部屋で作業することになることをクライアントに伝えましょう。例「先生、お仕事するから遊んでいてね」

4.　あなたが忙しいとクライアントに伝えたらすぐに、彼らから離れ、部屋の隅で別の椅子に座り、静かな仕事で忙しいふりをします。

5.　前兆行動以外の行動を完全に無視します（アイコンタクトをとらない、向こうを向く）。

6.　前兆行動が発生した場合は、そのクライアントに口頭および身体的注意を払います。「そんなことしない」「やめてね」と言って、クライアントのところまで歩いていきます。それからクライアントの腕を軽く触って（止める感じで）前の行動を物理的に防ぎます。

7.　クライアントに対して遠くから叫んだり、身体を拘束したりしないでください。

8.　セッション中にターゲットの動作が発生しない場合は、セッション全体でクライアントを無視します。タイマーを確認し、セッションが終了したら停止します。データをとります

9.　前兆行動が発生して応答したら、時間が終了するまで、クライアントの無視を再開　→　前兆行動　→　無視　を実施します。

回避（エスケープ）条件

目的：この条件は、目標行動が　課題からの回避によって維持されるかどうかを確立するために設計されています。先生は　前兆行動が生じるまで、指導、課題、または学問的学習に関して要求を出しつづけていただきます。前兆行動が出た際には、課題を　わかりやすくひっこめてください

機能分析セッションのやり方：

1. 部屋の準備をします（椅子、机、課題、データシート、ストップウォッチ、ペン）を設置します。
2. みなさんは　30秒ごとに指導のトライアルを実施します。
3. FAのセッションと手順について知らされた人だけが部屋にいるようにしてください。
4. クライアントに着席指示を出してセッションを開始します。

5. 前兆行動が起きた場合、直ちに課題を中止してください。机上から課題などを下ろして　クライアントからも離れます（同じ部屋にはいく）。時間がきたら、再度提示しますが、それまでは無視をします。

6. その際に　頭の中では、静かに秒数を数えてください。クライアントが 5 秒以内に応答を実行するか、少なくともその時間内に何か課題を開始または課題を完了した場合には、「よくできたね」と賞賛していいです。

7. 6 が起きなかった場合は、30 秒の設定に伴って、指示をだします

8. もし反応（前兆行動も問題行動もないが、課題をしない）場合には、プロンプトをいれます

9. プロンプトをいれて前兆行動が発生した場合には、同じく再度課題を中止します。机上から課題を下ろしてください。再度クライアントからはなれて　タイマーがなるまで応用や課題をださないでください

10. 　前兆行動以外の行動に関しては、課題を出し続けます。

11. 　セッションの時間が終了するまで、　30 秒ごとに指示をだして　前兆行動がでるか　どうか　のデータをとってください。

自由遊び　条件　プレイコンディション

目的：この条件は、クライアントに何の要求も課されず、レジャー用品への継続的なアクセスが可能になる一般的な管理条件になるように設計されています。この条件では、アテンションはクライアントの行動とは無関係の頻度でだします。

機能分析セッションのやり方：

1. 部屋の準備をします（椅子、机、強化子や遊びとしてのアイテム、データシート、ストップウォッチ、ペン）を設置します。

2. みなさんは　30 秒ごとにアテンションをむけるトライアルを実施します。

3. FA のセッションと手順について知らされた人だけが部屋にいるようにしてください。

4. クライアントが部屋に入ったら、30 秒ごとに何らかの注意を向けて一人で遊ばせます。

5. 指示や要求をしないでください。

6. 前兆行動や不適切な行動があった場合は、注意をむけないでください。

7. クライアントが適切に話しかけてきた場合は、返答はしますが、クライアントとは一緒に行動しません。

8. このセッションの 30 秒の間で、前兆行動が起きたら注意を与えないでください。

9. クライアントが何らかの不適切な振る舞いをした場合は、注意を向けないでください。

機能条件のアウトライン

注目引き条件

1. 遊ぶように指示を出して、その後クライアントを無視する
2. もしクライアントが適切ン行動をしても　無視をする
3. もしクライアントが、前兆行動以外の不適切な行動をしたら無視をする
4. もしクライアントが前兆行動を起こしたら、「だめ」「しない」などの注意をいいながら、止める（触る）

回避条件

1. ストップウォッチを設定して、課題を設定する
2. 課題指示が聞けていたら、賞賛する
3. もし前兆行動がおきたら、机上から課題をどける
4. もし前兆行動以外であれば、課題をするように要求をし続ける
5. もし反応がおきなければ、前兆行動または　反応が起きるまでプロンプトをつづける
6. 課題をだす間隔は、20-30 秒づつあける

自由遊び

1. ストップウォッチを用意して遊ぶようにする
2. 30 秒に 1 回、アテンションを与える（ポジティブ）
3. もしクライアントが適切な関わりを求めたら与える
4. もし不適切な行動があれば　注意もしないし、アテンションは与えない

Appendix P: Sample Scenarios for Escape condition

Sample Scenarios for Escape condition		
Time	Scripted "clients" behavior	
(minute: seconds)	Response class	Topography
0:15	(1) Precursor behavior	Saying "Aaa"(10 s)
0:25 option	If FA condition did not occur SIB	Bite hands
0:30	(2) Precursor behavior	Saying "Aaa"(10 s)
0:40 option	If FA condition did not occur SIB	Bite hands
1:00	(3) Precursor behavior	Saying "Aaa"(10 s)

Appendix Q: Treatment Integrity Checklist

Table 1

Treatment Integrity for Precursor Behavior Basic Skill Training

The instructor set up the materials (quiz, video, counting materials, PowerPoints).	Y	N
The instructor gave clear instructions to the teacher.	Y	N
The instructor provided no prompting while the teacher was taking the quiz.	Y	N
The instructor provided feedback for the teacher's responses.	Y	N
The instructor delivered the next step after the teacher achieved 90% or above on the quiz.	Y	N
% Correct = /5 = %		

Appendix R: Social Validity Questionnaire

Social Validity Questionnaire

	Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
1. The training was effective in meeting the purposes.	1	2	3	4	5	6
2. I would suggest the use of this intervention to other teachers.	1	2	3	4	5	6
3. I will use this intervention in the school setting.	1	2	3	4	5	6
4. This intervention did *not* result in negative side-effects for the students.	1	2	3	4	5	6
5. This intervention was appropriate for a variety of students.	1	2	3	4	5	6
6. I liked the procedures used in this intervention.	1	2	3	4	5	6
7. The monitoring procedures were manageable.	1	2	3	4	5	6
8. The training procedures gave the necessary information	1	2	3	4	5	6
9. Overall, precursor behavior FA intervention was beneficial for my students.	1	2	3	4	5	6

Appendix S: Social Validity Questionnaire in Japanese

Social Validity Questionnaire in Japanese

	強く反対する	反対	やや反対する	やや賛成する	賛成	強く賛成する
1. 研修は目的達成に効果的だった。	1	2	3	4	5	6
2. 私はこの介入を他の教師に使用することを提案する	1	2	3	4	5	6
3. 私は学校の環境でこの介入を使用します	1	2	3	4	5	6
4. この介入は生徒に負の副作用をもたらさなかった。	1	2	3	4	5	6
5. この介入は、様々な学生にとって適切であった。	1	2	3	4	5	6
6. 私はこの介入で使用された手順が好きだった	1	2	3	4	5	6
7. モニタリング手順は管理可能であった。	1	2	3	4	5	6
8. 訓練手続きにより必要な情報が得られた	1	2	3	4	5	6
9. この介入は生徒にとって有益であろう。	1	2	3	4	5	6
10. 全体的に、前兆行動の FA の介入は生徒にとって有益であった。	1	2	3	4	5	6