

Examining the Use of Structural Analysis to Develop Antecedent-Based Interventions for
Young Children Exhibiting Challenging Behavior

By

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To Stephanie, Adeline, and Eli

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TABLE OF CONTENTS

	Page
DEDICATION.....	ii
ACKNOWLEDGEMENTS.....	iii
LIST OF TABLES.....	vi
LIST OF FIGURES.....	vii
Chapter	
I. Introduction.....	1
Managing Challenging Behavior.....	2
Functional Behavior Assessment.....	3
Purpose.....	8
II. Method.....	10
Participants.....	10
Settings.....	13
Materials.....	14
Response Definitions and Data Collection.....	15
Experimental Design.....	18
Procedures.....	19
Interobserver Agreement (IOA).....	26
Procedural Fidelity.....	28
Social Validity.....	30
III. Results.....	32
Chester.....	32
Sara.....	41
Ann.....	50
Social Validity.....	59
IV. Discussion.....	67
Limitations.....	69
Implications for Future Research.....	70
Implications for Practice.....	72
Conclusion.....	74

Appendix

A. Teacher Report.....75

B. ABI Framework by Classroom Activity.....76

C. Procedural Fidelity Form for Teacher Training.....80

D. Social Validity Questionnaire on Acceptability and Feasibility of FBA and SA.....82

E. Blind Rater Social Validity Questionnaire.....84

F. Chester’s ABI Script.....87

G. Sara’s ABI Script.....88

H. Ann’s ABI Script.....89

REFERENCES.....90

LIST OF TABLES

Table	Page
1. Child Participant Information.....	12
2. Target Behavior Operational Definitions, Examples, and Non-examples.....	16
3. Child Behavior IOA by Condition.....	28
4. Teacher Procedural Fidelity by Child and Condition.....	30
5. Summary of Teacher Responses to Challenging Behavior of Target Children.....	41
6. Summary of Behavior Specific Praise Statements Delivered by Teachers to Target Children.....	41
7. Teachers' Perceptions of the FBA and SA Process.....	60
8. IRP-15 Pre-Intervention Ratings.....	62
9. IRP-15 Post-Intervention Ratings.....	63
10. Blind Rater Social Validity Assessment.....	65

LIST OF FIGURES

Figure	Page
1. Structural Analysis Data for Chester.....	34
2. Center Menu for Chester.....	36
3. Frequency of Chester’s Challenging Behavior per Session.....	38
4. Engagement Data for Chester.....	40
5. Structural Analysis Data for Sara.....	44
6. Center Menu for Sara.....	46
7. Frequency of Sara’s Challenging Behavior per Session.....	48
8. Engagement Data for Sara.....	49
9. Structural Analysis Data for Ann.....	52
10. Engagement Data for Ann.....	57
11. Frequency of Ann’s Challenging Behavior per Session.....	58

CHAPTER I

INTRODUCTION

Estimates of the prevalence of young children who are at-risk for or currently engage in challenging behavior range from 10% to 25% (Campbell, 1995; Kupersmidt et al., 2000; Powell et al., 2007), and 50% of preschool-age children who engage in challenging behavior will continue to exhibit challenging behavior in elementary school (Campbell, 1995). Preschool teachers report that approximately 10% of children in their classrooms engage in antisocial aggressive behavior at least once per day (Kupersmidt et al., 2000), and a negative correlation exists between aggressive behavior in preschool-age children and overall academic skills when they are in elementary school (Brennen et al., 2012). Additionally, the expulsion rate for preschool-age children is three times higher than for K-12 students (Gilliam, 2005). Taken together, these findings underscore the continued and critical need to support EC teachers in preventing and managing challenging behavior in early childhood (EC) settings (Bruns & Mogharreban, 2007; Snell et al., 2012).

Unfortunately, while EC teachers are aware that challenging behavior may interfere with a child's ability to access quality instruction (Quesenberry et al., 2011), EC teachers and personnel have also indicated they feel unprepared to meet the needs of children with social-emotional delays or challenging behavior (Snell et al., 2012). The issue of challenging behavior in EC settings is further compounded by the fact that methods for managing this behavior often vary by program. While some programs advocate for the prevention and replacement of challenging behavior, others rely on punitive discipline practices such as suspension or expulsion

(Gilliam, 2005). In response to this issue, the U.S. Department of Health and Human Services and U.S. Department of Education released a joint policy statement in 2014 indicating that EC programs should move away from punitive discipline practices such as suspension and expulsion and toward positive behavior support approaches for young children who engage in challenging behavior.

Managing Challenging Behavior

Consequence-based interventions and procedures have traditionally been used to reduce or replace challenging behavior (Conroy et al., 2005). While many consequence-based procedures have been shown to be effective across a range of behaviors, disabilities, and age groups, concerns remain about the use of punitive and/or restrictive procedures (e.g., exclusionary timeout, corporal punishment). Additionally, consequence-based interventions that employ punitive or restrictive procedures may limit opportunities for children to learn socially appropriate replacement behaviors, as their access to peers is reduced. An alternative to consequence-based interventions are antecedent-based interventions (ABIs) which utilize preventive procedures to manage behavior.

ABIs designed to reduce and prevent challenging behavior have been shown to be an effective method of reducing challenging behavior of young children (Kretzer & Hemmeter, 2018). ABIs typically require manipulating the environment to alter contextual conditions or removing environmental variables that have previously set the occasion for challenging behavior (e.g., being alone in a center, not knowing what is expected in an activity). Making a change to the environment (e.g., increasing teacher proximity in a center) is an example of a planned

procedure that could be used as an ABI to reduce or prevent the occurrence of challenging behavior.

In addition to utilizing preventive rather than reactive procedures, ABIs offer several advantages. First, ABI procedures can be easy to implement and can result in important changes in behavior. ABI procedures as simple as greeting students as they enter the classroom have resulted in decreased disruptive behavior (Cook et al., 2018). Second, ABIs have been used by classroom teachers to achieve desired behavior change. Stichter et al. (2009) used a variety of ABI components (e.g., increased structure, increased proximity to instructional materials, decreased structure) to increase pro-social behaviors of elementary school children with autism. Finally, ABIs have the potential to make general improvements to instructional environments for all children by minimizing environmental variables that are predictive of challenging behavior and increasing variables that are associated with desired classroom behavior (Kern & Clemens, 2007).

If progress is to be made in the effort to move away from punitive approaches and toward positive behavior support, then systematic methods for developing behavior intervention plans to manage, reduce, and most importantly, prevent challenging behavior in EC settings are needed. Functional behavior assessments (FBAs) are one method of developing behavior intervention plans that can be used to address the challenging behavior of individual children.

Functional Behavior Assessment

The Individuals with Disabilities Education Act (2004) requires the use of FBAs to develop positive behavioral interventions and supports for children whose behavior impedes their own learning or that of others. FBA is defined as “a process of identifying functional

relationships between environmental events and the occurrence or non-occurrence of a target behavior” (Dunlap et al., 1993, p. 275). Information from the FBA is focused on the identification of environmental events that reliably predict and maintain challenging behavior (Steege & Watson, 2009). The FBA process may involve a variety of procedures including indirect assessments (e.g., questionnaires, structured interviews) and descriptive assessments (e.g., direct observations of antecedents and consequences surrounding identified challenging behavior). FBAs may also include functional analyses (FAs) as a method of directly testing the effects of environmental variables on challenging behavior (Beavers et al., 2013; Lloyd et al., 2016).

Traditionally, FAs have been conducted based on procedures first used by Iwata et al. (1994), which involve the systematic manipulation of both antecedents and consequences surrounding challenging behavior within analog test and control conditions (e.g., escape, attention, tangible, alone, play). Iwata and colleagues developed the FA to be used in a controlled clinical setting to identify functional relationships between environmental events and self-injurious behaviors of individuals with developmental disabilities. Since then, FAs have been implemented in increasingly diverse settings (e.g., special education classrooms, general education classrooms) and by an expanding body of personnel (e.g., teachers, paraprofessionals; Lloyd et al., 2016).

More recently, the term FA has been used to describe the expanded practice of using experimental analysis procedures to identify functional relations between environmental variables and challenging behavior (Hanley, 2012; Lloyd et al., 2016). Structural analysis (SA), which examines the effects of manipulating contextual variables on challenging behavior while holding consequence variables constant (Stichter & Conroy, 2005), is one such approach.

In contrast to FAs, as originally conceived, which identify the role of consequences in maintaining challenging behavior, SAs examine the effects of antecedent or contextual variables that predict the occurrence or non-occurrence of challenging behavior (Sutherland et al., 2008). Conroy and Stichter (2003) found the examination of contextual variables to be particularly relevant in applied settings due to the unpredictable nature of behavior in non-clinical settings. Additionally, variability in the behavior of individuals in natural settings may be due to the spontaneous or inconsistent occurrence of antecedent events, consequences, or both (Conroy & Stichter, 2003). Currently, there is limited research on the use of SAs in natural settings to inform and develop ABIs (Conroy & Stichter, 2003; Losinski et al., 2014).

A meta-analysis conducted by Losinski et al. (2014) examined the quality and effectiveness of interventions developed following the assessment of contextual variables (e.g., SAs). This meta-analysis evaluated 24 single-case design studies but only five examined the effects on children age five or younger. Further, results of the meta-analysis indicated that while ABIs developed following the assessment of contextual variables were generally effective, most of the studies did not meet the quality indicators for single-case design studies proposed by Horner et al. (2005). Of the five studies in the meta-analysis (Losinski et al., 2014) that included children age five or younger, two met all seven quality indicators and were determined to be high quality (Blair et al., 1999; Park & Scott, 2009) and three met either four or five indicators and were determined to be of medium quality (Asmus et al., 1999; Camp et al., 2000; Umbreit & Blair, 1997). Four of these studies (Asmus et al., 1999; Blair et al., 1999; Park & Scott, 2009; Umbreit & Blair, 1997) conducted SAs to inform their development of ABIs to reduce challenging behavior and are discussed next. The fifth study focused on reducing stereotypy (Camp et al., 2000) and is not discussed.

Asmus and colleagues (1999) conducted an FBA that included direct observation, parent interview, structural analysis, functional analysis, and the generation of hypothesis statements before developing and introducing ABIs to reduce challenging behavior of three young children age three to five years in a home setting. ABIs were effective in reducing the challenging behavior of two participants with the third participant's behavior remaining stable from baseline to intervention. Unfortunately, this study made a series of A-B comparisons across the participants which does not meet contemporary design standards (i.e., at least three potential demonstrations of effect; Gast et al., 2018) and therefore limits the application and interpretation of their findings. Additionally, measures of social validity, procedural fidelity, and generalization were not collected.

Umbreit and Blair (1997) used SA to develop an ABI to reduce the challenging behavior of a four-year-old at school. The ABI was developed following a functional assessment that included direct observation, interviews with school personnel familiar with the target child, structural analysis, and the generation of hypothesis statements. A multiple baseline across school activities (i.e., morning transition, nap time, afternoon transition) demonstrated the effectiveness of the ABI in increasing child compliance to task demands and the number of minutes of appropriate behavior. However, the child's challenging behavior was not tracked with a single case design which again limits findings related to the use of structural analysis to create ABIs to reduce challenging behavior. Additionally, while Umbreit and Blair (1997) collected data on the social validity of the intervention, they did not collect social validity data on the SA process, nor did they collect procedural fidelity or generalization data.

Blair and colleagues (1999) conducted a functional assessment that included direct observation, structured interviews with classroom teachers and the program director, hypothesis

development from interviews and observations, and structural analysis. Confirmed hypotheses from the SAs were used to inform ABIs for target children. They used a multiple baseline design across four preschool-age children and demonstrated the effectiveness of ABIs in reducing the challenging behavior of each child. However, pre-determined criterion levels for challenging behavior in intervention conditions were not identified by the authors, and ABIs were introduced in successive tiers before a sufficient number of data points (i.e., at least three) were collected in the preceding tier. While there were clear and immediate changes in level between baseline and intervention in each tier, the presence of a functional relation is called into question because of how quickly intervention was introduced in successive tiers.

Park and Scott (2009) used A-B-A-B withdrawal designs to demonstrate the effectiveness of ABIs in reducing challenging behavior with two children in preschool classrooms. The functional assessment process included direct observations, teacher and parent interviews, brief structural analysis, and hypothesis development. While each ABI resulted in reduced levels of challenging behavior, the withdrawal designs in this study failed to demonstrate a functional relation between ABIs and challenging behavior of participants because insufficient data were collected during withdrawal conditions for both participants.

There are exciting and promising findings from the small body of studies described above. First, each of the studies used SA to inform the development of ABIs, and each ABI was effective in reducing challenging behavior of preschool-age children. Second, three of the four studies collected social validity data following the ABIs and teachers reported that (1) both the assessment process which included brief structural analysis and the ABI procedures were feasible (Park & Scott, 2009) and (2) ABIs were effective in reducing challenging behavior (Blair et al., 1999; Park & Scott, 2009; Umbreit & Blair, 1997). Finally, EC teachers were responsible for

conducting the SAs in three of the four studies (Blair et al., 1999; Park & Scott, 2009; Umbreit & Blair, 1997) and were also responsible for implementing each ABI. These findings lend support for the feasibility of implementing SAs to inform development of ABIs and then implementing ABIs to reduce challenging behavior in EC settings.

Unfortunately, limitations were also evident. Most significantly, no functional relations between ABIs and challenging behavior were demonstrated in these studies due to insufficient data or design flaws. Further, procedural fidelity and generalization were measured inconsistently. Finally, almost no information was provided on the type of teacher training or support that was provided during the SA and intervention conditions of the studies. Additional research is needed to demonstrate the effectiveness of including SA as part of an FBA to develop ABIs intended to reduce challenging behavior and increase the engagement of young children in EC settings.

Purpose

The purpose of the current study was to assess the effectiveness of ABIs, developed from FBAs that include SAs, in reducing challenging behavior and increasing engagement of preschool children at risk for social-emotional delays. Specifically, the study aimed to answer the following research questions: (1) Can teachers in EC settings implement SAs and ABIs with fidelity? (2) Do ABIs developed following SAs reduce the challenging behavior and increase the engagement of preschool children in EC settings? (3) Do teachers generalize use of ABI procedures to similar classroom activities? (4) Do teachers in EC settings find the SA process to be feasible and effective? (5) How do raters blind to study conditions rate the challenging behavior and engagement of young children in intervention conditions compared to baseline

conditions? and (6) How do raters blind to study conditions rate the behavior of EC teachers in intervention conditions compared to baseline conditions?

CHAPTER II

METHOD

Participants

Upon receiving approval from the institutional review board, the researcher contacted the director of three university-affiliated child care centers about interest in the study and to identify potential teacher participants. The researcher met with interested teachers to discuss study requirements, their potential role as implementers, and answer questions. To be included in the study, teachers had to meet the following criteria: (a) teach children 2-5 years old, (b) have at least one child who engages in behavior that is disruptive to their daily classroom routine(s), and (c) be a fluent English speaker. Participating teachers did not need to meet specific criteria related to prior teaching experience or certification/licensure.

Two, full-time, early childhood teachers consented and met criteria for participation in the study. Teacher 1 was a 48-year-old African-American female with an associate degree, and 6 years of teaching experience with children age 5 or younger. Teacher 2 was a 27-year-old African American female with a master's degree and 6 years of teaching experience with children age 5 or younger. Neither teacher held a teaching certification. Both teachers served as implementers for the target participant(s) in their respective classrooms.

Participants included three 3-year old children at-risk for social-emotional delays who engaged in challenging behavior or had low levels of engagement during routine classroom activities (see Table 1). Classroom teachers identified potential child participants for the study. Teacher report (See Appendix A) and direct observations were used to determine whether child

participants met the following inclusion criteria: (a) have consistent school attendance, (b) engage in challenging behaviors that occur frequently and interfere with learning and/or social engagement opportunities in the classroom, and (c) have parental consent to participate in the study. Participants were excluded if they met one or more of the following criteria: (a) do not communicate verbally, or (b) have a behavior support plan in place in the classroom. Two children qualified for the study as at-risk for social emotional delays due to challenging behavior and one qualified as at-risk for social emotional delays due to low levels of engagement in the classroom. Following the identification of child participants, The Caregiver-Teacher Report Form for ages 2 to 5 (C-TRF) of the Child Behavior Checklist (CBCL; Achenbach, 1991) and the Ages and Stages Questionnaire®: Social-Emotional, Second Edition (ASQ®:SE-2; Squires et al., 2015) were completed by the lead teacher for each target child.

Table 1
Child Participant Information

Name	Age ^a , gender, race	Disability	Classroom	Primary DV	ASQ-SE 2 Raw Score	C-TRF T Scores		Total Problem
						Internalizing	Externalizing	
Chester	44, M, W	None	Teacher 1	CB	105 ^c	56	64 ^e	61 ^d
Sara	36, F, W	None	Teacher 2	CB	95 ^b	61 ^d	73 ^e	69 ^e
Ann	36, F, W	None	Teacher 2	Engage ment	170 ^c	69 ^e	70 ^e	69 ^e

Note. ASQ-SE = Ages and Stages Questionnaires – Social Emotional; C-TRF = Caregiver Teacher Report Form. ASQ-SE and C-TRF assessments were completed by the classroom teacher for each child. M = male; F = female; W = white; CB = challenging behavior.

^aAge in months.

^bInterpretation = monitor behavior

^cInterpretation = refer for further assessment

^dBorderline clinical range

^eClinical range

Three children were identified as participants. Chester was a 44-month-old White male without a diagnosed disability who was identified as at-risk due to challenging behavior and was in Teacher 1’s classroom. He frequently engaged in aggression towards others, taking materials forcefully, throwing materials, and screaming during free play/centers. Chester scored in the clinical range on the ASQ:SE and clinical range for externalizing symptoms on the CBCL. He used spoken language to communicate with adults and peers in the classroom, participated in teacher-directed activities, and did not have an individualized education program (IEP).

Sara was a 36-month-old white female without a diagnosed disability who was identified as at-risk due to challenging behavior and was in Teacher 2’s classroom. Sara frequently engaged in noncompliance, screaming, inappropriate use of materials, taking materials forcefully, and aggression towards others during free play/centers. Sara scored in the clinical range for externalizing symptoms on the CBCL. She used spoken language to communicate with adults

and peers in the classroom, participated in teacher-directed activities with adult support, and did not have an IEP.

Ann was a 36-month-old white female without a diagnosed disability who was identified as at-risk due to challenging behavior and low engagement and was in Teacher 2's classroom. Ann frequently left the center area she selected, laid on the floor without attending to peers or materials, and occasionally engaged in challenging behaviors (i.e., throwing materials, spinning in circles). Ann scored in the clinical range on the ASQ:SE and in the clinical range for internalizing and externalizing symptoms on the CBCL. She used spoken language to communicate with adults and peers in the classroom, participated in teacher-directed activities, and did not have an IEP.

Settings

All study sessions were conducted in inclusive preschool classrooms in the university-affiliated child care centers. Class sizes ranged from 12 to 14 students. Sessions were 10-min in duration and occurred during free-play center times that occurred in each classroom each day. During each session, at least three adults, including the researcher, were present in the classroom in addition to target and non-target children. Each classroom had defined classroom centers that were simultaneously available to all children each day. Classroom 1 had seven centers: Home living, books, science, manipulatives, blocks, and art, and sensory. Classroom 2 had six centers: Blocks, manipulatives, home living, science, books, and art.

The Teaching Pyramid Observation Tool for Preschool Classrooms Research Edition (TPOT; Hemmeter et al., 2014) was conducted in each classroom to measure the fidelity with which participating teachers implemented practices related to components of the Pyramid Model.

The TPOT was completed once in each teacher's classroom by graduate students in early childhood special education, prior to introducing ABIs. The graduate students were each trained to use the TPOT in coordination with other ongoing research studies. TPOTs were not conducted post intervention due to the end of the school year. Each TPOT observation and teacher interview lasted approximately 2 hrs and 20-30 min, respectively. The version of the TPOT used in this study had 112 indicators organized within 14 key Pyramid Model practice items. Indicators are scored either *yes* (practice was observed or reported by teacher during the interview) or *no* (practice was not observed or reported by the teacher during the interview). Additionally, 17 red flag items (i.e., practices that are contrary to Pyramid Model practices) were scored as *yes* or *no*. Teacher 1 scored yes on 48% of TPOT indicators on the Key Practices Subscale and Teacher 2 scored yes on 29% of these indicators. Teacher 1 scored yes for the presence of 1 red flag item and Teacher 2 scored yes for the presence of 6 red flag items.

Materials

The researcher recorded all sessions using a Canon VIXIA HD video camera. During intervention sessions, teachers used laminated 8 x 11 in. scripts and center choice menus with pictures of all available classroom centers to guide target children in selecting a center to play in initially. Each teacher was also provided with a miniature (4 x 4 in.) version of the script and available classroom center pictures on a key ring, which could be used during non-contingent check-ins if target children wanted to switch centers. These materials were available to use during intervention and maintenance sessions and in generalization probes that occurred during either best alone or maintenance conditions. The materials were not available during baseline sessions, or generalization probes that occurred in the initial baseline condition. During

intervention sessions, the researcher also used an iOS app on his phone (IntervalTimer) to prompt teachers to conduct non-contingent check-ins with target children. Both classrooms had child-size sinks, tables, chairs, and bathrooms which were available during all study sessions.

Response Definitions and Data Collection

Response definitions. Frequency of challenging behavior was the primary dependent variable for Chester and Sara, and percentage of intervals engaged served as the primary dependent variable for Ann. Challenging behaviors included physical aggression towards others, inappropriate touching of others, forcefully taking materials from others, inappropriate use of materials, screaming at others, and spinning in circles (see Table 2 for definitions, examples, and non-examples). To be scored as engaged, the target child had to be actively participating in the classroom center(s) they selected, as indicated by their contextually appropriate manipulation of materials, interactions with peers, or interactions with adults (Ridley et al., 2000). Additionally, for engagement to be coded, the observer had to be able to determine what the child was attending to at the end of each interval. If it was not possible to determine what the child was attending to or if the child was not visible in the video frame at the end of an interval, the interval was not included in engagement calculations. Two teacher behaviors were also observed and served as control variables across study conditions. Teacher responses to challenging behavior were recorded when the teacher verbally or physically addressed a target child's behavior within 10 s of the behavior occurrence. Positive behavior specific praise was recorded when the teacher made a statement to a target child that was positive and descriptive (e.g., "you're doing a great job coloring") at any time during the observation.

Table 2

Target Behavior Operational Definitions, Examples, and Non-examples

Behavior	Operational definition	Examples	Non-Examples
Challenging behavior	• Physical aggression towards others	• Pushing peers, hitting peers with an open or closed hand, kicking throwing objects at others, putting face in another child's face (within 2 inches)	• Giving a high five, hugging a peer
	• Inappropriate touching of others	• Pushing body onto peers or adults	• Shaking hands
	• Forcefully taking materials from others	• Grabbing a block from a peer and pulling it away	• Waiting next to a peer for a turn with their toy
	• Inappropriate use of materials	• Dumping materials out of a basket onto the floor, throwing objects, coloring on classroom materials, destroying what another child is working on, climbing on furniture	• Coloring with markers on paper, putting blocks in a basket, sitting in a chair
	• Screaming at others (i.e., using a voice volume that could be heard over the typical classroom noise)	• Yelling "no" loudly at a peer when asked to share a toy	• Saying "no thank you" when asked if he wants to play
	• Spinning in circles	• Repeatedly spinning in circles within the classroom for longer than 3 s.	• Turning around to say hello to a peer that was behind them
Engaged	• Visually attending to center materials	• Building a tower with blocks in the block center	• Throwing blocks out of the block center
	• Manipulating center materials as they were designed to be used	• Coloring in a coloring book	• Drawing on the table with a marker, engaging in challenging behavior
	• Transitioning within a center	• Walking from a pillow to put a book away on the shelf	• Walking around the classroom

Table 2, cont.

Target Behavior Operational Definitions, Examples, and Non-examples

	Operational Definitions	Examples	Non-examples
Unengaged	<ul style="list-style-type: none"> Visually attending to peers in their center or an adjoining center 	<ul style="list-style-type: none"> Talking to peers in the home living center while playing in the adjoining block center 	<ul style="list-style-type: none"> Staring across the room
	<ul style="list-style-type: none"> Visually attending to adults (excluding the videographer) in the classroom (does not have to be in same center) 	<ul style="list-style-type: none"> Looking at the teacher as she gave directions to the class 	<ul style="list-style-type: none"> Staring at the videographer or video camera
	<ul style="list-style-type: none"> Target child outside of the center they selected 	<ul style="list-style-type: none"> Playing at the sink 	<ul style="list-style-type: none"> Reading a book in the book center (book center selected)
	<ul style="list-style-type: none"> Visually attending to peers or materials outside of the center they are in 	<ul style="list-style-type: none"> Talking to a peer in a center that is across the room 	<ul style="list-style-type: none"> Talking to a peer in an adjoining center
	<ul style="list-style-type: none"> Laying on the floor without attending to peers, adults, or center materials 	<ul style="list-style-type: none"> Taking a nap in the home living center 	<ul style="list-style-type: none"> Laying on the floor while looking at a book in the book center
	<ul style="list-style-type: none"> Engaging in challenging behavior 	<ul style="list-style-type: none"> Throwing puzzle pieces 	<ul style="list-style-type: none"> Drawing a picture on paper
	<ul style="list-style-type: none"> Transitioning between centers, to/from bathroom, to/from water fountain or sink 	<ul style="list-style-type: none"> Leaving center to get a drink of water 	<ul style="list-style-type: none"> Walking to teacher to answer a question

Note. Engaged and unengaged definitions were adapted from Ridley, McWilliam, and Oates, (2000) and developed with teacher input on center time expectations.

Data collection. All study sessions across conditions were video recorded. Data for dependent variables, control variables, reliability, and procedural fidelity were collected from video. ProCoder DV (Tapp, 2003) was used to code child behavior (i.e., challenging behavior, engagement) and adult behavior (i.e., positive behavior specific praise, responses to challenging behavior) for each session. Timed event recording was used to measure the frequency of challenging behavior, and event recording was used to measure the frequency of positive

behavior specific praise and teacher responses to challenging behavior. Child engagement was estimated using a 10 s momentary time sampling procedure. Percentage of intervals engaged was calculated for each session (number of intervals where target child is engaged / total number of intervals in the session x 100). The total number of intervals in each session was adjusted to account for intervals when a target child was not visible from video.

Experimental Design

Single-case alternating treatments designs (ATDs; Barlow & Hayes, 1979) were used to evaluate comparisons between ABIs and baseline conditions for each child. While ATDs are traditionally used to compare two different interventions, for reversible behaviors (e.g., challenging behavior, engagement) they can also be used to demonstrate the effectiveness of an intervention relative to a baseline or business as usual condition by rapidly alternating between these conditions (Wolery et al., 2018; Zimmerman et al., 2019). Each ATD compared ABIs, developed by the teacher and researcher for target children, with a baseline condition. Specific condition descriptions are provided below.

A random number generator was used to semi-randomly order baseline and intervention sessions by block (i.e., sessions in the same condition could not occur more than twice in a row) during comparison conditions for each child. Visual analysis was used to evaluate the presence of a functional relation by examining changes in level, trend, overlap, and variability within the comparison conditions (Barton, Lloyd et al., 2018). Additionally, initial baseline and best alone conditions were conducted as part of each ATD to account for possible multi-treatment interference.

Procedures

This study was conducted in three phases: (1) FBA descriptive assessment procedures and hypothesis development, (2) SA procedures to verify hypotheses, and (3) development and experimental validation of ABIs for target children. All sessions were led by the lead teacher in the target child's classroom.

Phase 1. Phase 1 included indirect and descriptive assessments of each target child followed by hypothesis development. Lead teachers first completed a structured interview with the researcher, and then direct observations using A-B-C recording (Bijou et al., 1968) were conducted by the researcher based on information from the interview. Information from the descriptive assessments was used to develop hypotheses about what predicted the occurrence or non-occurrence of challenging behavior or classroom engagement for each target child. Descriptive assessment procedures were consistent across target children.

Structured interviews. Structured interviews were conducted with lead teachers using the Prevent-Teach-Reinforce Functional Behavior Assessment Checklist (Dunlap et al, 2010), with supplemental questions taken from the adapted version of the Functional Assessment Interview Form – Young Child (FAI; O'Neill et al., 1997). Through the structured interviews, teachers provided information on behaviors of concern, events that may affect these behaviors, strengths and weaknesses of the child, communication methods the child uses, child preferences, and previous interventions that had been used. This information was used to inform decisions on how

to define challenging behavior, when to conduct direct observations in the classroom, and which contextual variables to consider in the SAs.

Direct observations. The researcher conducted direct observations of each target child using an A-B-C assessment recording form (Bijou et al., 1968) to provide detailed information on the contextual stimuli preceding and following defined challenging behaviors for each child. Target children were observed during the times and in the activities when challenging behavior was most and least likely to occur in the classroom, according to the structured interview conducted with their teacher. Data from direct observations was used to confirm initial teacher hypotheses from the structured interview about the function of the target child's challenging behavior. Direct observation sessions were recorded in 10 min segments during activities identified by lead teachers as most and least likely for the challenging behavior to occur.

Direct observation data were collected during seven sessions for each child. Five observations were conducted during the activity the teacher identified as the activity in which challenging behaviors were most likely to occur. Additionally, one observation was conducted during an activity similar to the activity in which the teacher reported the target behavior was most likely to occur. For example, if the teacher identified morning center time as challenging, then afternoon center time was observed as well. This second classroom activity was ultimately used as an activity for generalization probes that were conducted during the initial baseline, best alone, and maintenance conditions. Finally, one observation was conducted during an activity in which the teacher thought target behaviors were least likely to occur.

Hypothesis development. Hypotheses were developed using antecedent-based information from the indirect and direct assessments of each child. Direct observation data confirmed the occurrence of challenging behavior for Chester, Sara, and Ann during center time activities in the classroom. However, because Ann's level of classroom engagement was so low, the researcher and Teacher 2 made the decision to pivot from the initial focus on challenging behavior, to instead address her low level of classroom engagement. The researcher and lead teacher worked together to complete the Functional Assessment Hypothesis Formulation Protocol (FAHFP; Larson & Maag, 1998) to develop hypotheses that predicted the occurrence and non-occurrence of challenging behavior or engagement for each target child. Hypotheses included an operational definition of the challenging behavior(s) or engagement for each target child and identified possible setting events and contextual variables for the challenging behavior or engagement.

Phase 2. Phase 2 included SAs for each target child that were conducted by the lead teacher during the activities in which challenging behavior or low engagement was most likely to occur. To confirm hypotheses for antecedent predictors of challenging behavior or low levels of engagement, a series of antecedent manipulations was made for each target child using SA procedures (Stichter et al., 2009). Each SA utilized a single-case withdrawal design (i.e., A-B-A) to systematically introduce, withdraw, and compare antecedent variables hypothesized to affect each child's challenging behavior or level of engagement (e.g., proximity to an adult). Replication of observed behavior across brief (i.e., 1 data point) conditions was used to demonstrate control over antecedent variables, without demonstrating a functional relation. Child

behavior was analyzed using visual analysis conventions for single-case designs to assess changes in level between conditions during each SA (Barton, Lloyd, et al., 2018).

Antecedent manipulations in the SAs were different for each target child and were informed by hypotheses based on information from their respective direct and indirect assessments. SAs were conducted by the lead teacher in each target child's classroom during the classroom activity in which challenging behavior or low engagement was most likely to occur according to the structured interview and direct observations. Procedural fidelity data were collected to monitor teacher adherence to antecedent variable manipulations throughout each SA.

Phase 3. Phase 3 began with development of ABIs for each target child using information from Phases 1 and 2. Once the researcher and lead teacher developed ABIs the teacher thought would be feasible in the classroom, experimental validation of ABIs for target children began, using single-case ATDs. Each ATD in Phase 3 included four types of sessions: (a) baseline, (b) intervention/best alone, (c) generalization, and (d) maintenance. Teacher training on ABI procedures occurred following the initial baseline condition and before the onset of the comparison condition for each child. The ABI development process, general session procedures, teacher training procedures, and specific characteristics of each session type (e.g., baseline, intervention) are described below.

Antecedent-based intervention development. The researcher collaborated with each lead teacher to develop specific ABIs for each target child using information from Phase 1 and Phase 2. ABIs were designed to include the systematic manipulation of contextual variables during target classroom activities to replicate antecedent contexts from the SAs that were least

predictive of challenging behavior or low engagement for target children. For example, if increased teacher proximity to a target child resulted in the lowest rates of challenging behavior during the SA for that child, the researcher and teacher would increase teacher proximity to the child in intervention sessions during the target activity in the classroom. To facilitate teacher selection of possible antecedent intervention components, a framework of ABI interventions that have been shown to be effective for addressing challenging behavior in various classroom activities was developed (see Appendix B). The suggestions and examples provided in the ABI framework for application in preschool classrooms were based on recommendations from Building Blocks for Teaching Preschoolers with Special Needs 2nd Edition (Sandall et al., 2008) and Cara's Kit for Toddlers: Creating Adaptations for Routines and Activities (Campbell et al., 2012). Teacher input on the anticipated feasibility of ABIs during target activities was emphasized during the development of each ABI. This effort was made in an attempt to reduce the likelihood of low implementation fidelity during intervention conditions and to increase the likelihood that effective intervention practices would maintain in the classroom.

General procedures. All sessions, across conditions, occurred once per day and lasted for 10 min during center time in the morning or afternoon. Classroom personnel engaged in typical classroom activities (e.g., helping children access/engage with center materials, facilitating trips to the bathroom) during center time across all study conditions unless explicitly directed not to (e.g., low proximity SA sessions). Procedures for children to begin center time were similar for all target children. In each classroom, morning and afternoon center time began immediately following snack. When a child was finished eating, they threw away their trash, washed their hands, and selected an available center to engage in. The researcher began recording each session

as soon as the target child got up to throw away their trash. Sessions began and a timer was started after the target child was in the classroom center they selected. Sessions ended when the 10 min timer elapsed. The researcher held the camera and moved within the classroom to record the behaviors of the target child within the center they selected. The researcher did not engage with children other than to direct them to a teacher or adult in the classroom if they needed assistance.

Baseline. Baseline sessions began as soon as the target child was in the center they selected for that day (e.g., blocks, art). During baseline sessions, lead teachers were instructed to engage in their typical center time routines and fidelity checklists were used to ensure they did not manipulate or introduce the contextual variables included in the ABI for the target child. The following procedures remained consistent across baseline, intervention, best alone, generalization, and maintenance sessions. Materials typically used in the classroom during center time were present. While filming, the researcher did not respond to challenging behavior of the target child or provide any prompts to the target child. Lead teachers and classroom personnel were instructed to respond to challenging behavior using their typical classroom procedures (e.g., ignore instances of yelling, block and re-direct instances of physical aggression toward peers).

Teacher Training. Following the initial baseline condition, teachers completed a one-on-one training session with the researcher to learn how to implement the ABI during intervention sessions. Teacher training sessions were audio recorded. Topics covered during the training included an introduction to all intervention materials (e.g., classroom center menu) and contextual manipulations (e.g., increased proximity), explicit directions on how and when to

introduce these materials during target activities during intervention sessions, how to continue responding to instances of challenging behavior during intervention sessions, an explanation of the procedural fidelity form that was used when coding sessions, and an opportunity to ask questions. Once the researcher explained the ABI components to the teacher, he modeled how the ABI should be implemented during the target activity. The teacher then had an opportunity to practice implementing the ABI with the researcher providing performance feedback. Following training, if procedural fidelity fell below 90% in a baseline or intervention session, the researcher met briefly with the teacher to review the topics covered in the initial training.

Intervention. Specific intervention components for the target children included increased teacher proximity and increased structure. These components are described in more detail in the results section after the description of the SA results. Intervention sessions began in the same manner as baseline sessions as soon as each target child was fully in the classroom center they selected. During intervention sessions, teachers implemented the same target activities as in baseline while also manipulating or introducing the contextual variables (i.e., non-contingent check-ins, pre-planning) that were components of the ABI for their target child. In addition to filming, the researcher provided prompts to teachers to use the ABI procedures for each target child (i.e., visual cue to initiate a non-contingent teacher check-in). These prompts were provided consistently across intervention sessions and were not faded. Procedures for best alone sessions were the same as intervention session procedures for each target child and the researcher continued to provide prompts to teachers to use ABI procedures.

Generalization. Generalization sessions were conducted once during each baseline and best alone condition for each target child. Generalization sessions were also conducted once during maintenance for Chester and Sara. The school year ended before a maintenance generalization session could be conducted for Ann. Generalization sessions occurred during morning center time for Chester and during afternoon center time for Sara and Ann. During initial generalization sessions, teachers were instructed to engage in their typical center time routines, as ABIs for target children had not been developed. For generalization sessions that occurred in the best alone and maintenance conditions, teachers had access to all intervention materials and were familiar with intervention procedures; however, the researcher did not provide prompts to the teacher to use the intervention procedures (e.g., non-contingent check-ins).

Maintenance. Maintenance sessions were conducted during center time three, four, and five weeks after the completion of the best alone condition for Chester and Sara. A single maintenance session was conducted for Ann one week after the completion of her best alone condition. Additional maintenance sessions were not possible for Ann because the school year ended. Procedures for maintenance sessions were identical to those of generalization sessions that occurred during the best alone condition. Teachers had access to all intervention materials but the researcher did not provide prompts for them to use the intervention procedures.

Interobserver Agreement (IOA)

A graduate student in special education was trained by the researcher as a secondary data collector using video recordings. The researcher was a doctoral student in early childhood special

education with 10 years of experience working as a behavior analyst with young children who engage in challenging behavior. The secondary data collector had experience working in early childhood classrooms and was working towards a master's degree in early childhood special education. The researcher provided the secondary data collector with operational definitions for dependent variables (i.e., challenging behavior, engagement) and reviewed them for each participant. Following the review, the researcher and secondary data collector coded one session video together before independently coding a second session. IOA was calculated for the second video and the data collectors met to review any disagreements and come to a consensus using the operational definitions. The researcher and secondary data collector repeated this step until IOA was greater than 90% for two consecutive sessions for each dependent variable.

IOA data were collected for a minimum of 33% of randomly selected sessions in each condition (i.e., baseline, comparison, best alone, maintenance) for all participants. IOA data were also collected during at least 33% of SA sessions and generalization probes for each participant. IOA data were collected during 40% of baseline, 35% of comparison, 40% of best alone, 42% of generalization, 55% of maintenance, and 66% of SA sessions. IOA data were coded via video using ProCoderDV (Tapp, 2003) and IOA was calculated using point-by-point agreement for all dependent variables $[(\text{agreements} / (\text{agreements} + \text{disagreements})) \times 100]$ (Ledford et al., 2018). The mean percent agreement across all IOA sessions was 89.75% (range = 50%-100%) for challenging behaviors and 92.92% (range = 76.67%-100%) for child engagement. IOA data for target children are reported in Table 3.

Table 3
Child Behavior IOA by Condition

	Challenging Behavior		Engagement	
	<i>M</i>	Range	<i>M</i>	Range
Chester				
Baseline	83.33	70 – 100	95	93.33 – 96.67
Intervention	95	80 – 100	97.5	95 – 100
Generalization	100	100	96.67	96.67
Maintenance	100	100	95	93.33 – 96.67
SA	85.39	61.54 – 100	92.5	81.67 – 100
Sara				
Baseline	81.07	75 – 88.89	91.25	76.67 – 100
Intervention	91.43	80 – 100	97.08	95 – 98.33
Generalization	100	100	85	85
Maintenance	100	100	90.84	85 – 96.67
SA	85.18	75 – 100	87.5	78.33 – 95
Ann				
Baseline	95	80 – 100	90	86.67 – 91.67
Intervention	87.5	50 – 100	93.33	88.33 – 100
Generalization	100	100	93.33	93.33
Maintenance	100	100	95	95
SA	88.89	66.67 – 100	91.95	90 – 93.33

Note. Reported means and ranges are percentages. IOA was calculated using point-by-point agreement for challenging behavior and engagement. Best alone sessions were included in intervention calculations for IOA. Baseline calculations include initial baseline session and baseline sessions from the comparison condition.

Procedural Fidelity

A fidelity checklist was used to ensure the researcher implemented all training procedures consistently across participating teachers prior to their implementation of each ABI. The fidelity checklist included each step of the training process and was assessed from audio recordings following each teacher training by a graduate student in early childhood special education who was also trained as a secondary data collector. The steps of the training process included: an introduction to ABI materials and/or contextual manipulations, explicit instruction on how and when to introduce these materials and/or contextual manipulations during the target activity

according to the study condition, modeling of ABI implementation by the trainer, an opportunity for the teacher to practice implementing the ABI, performance feedback from the trainer on teacher use of the ABI, instruction on how to continue responding to instances of challenging behavior during all sessions, an explanation of the procedural fidelity form used for coding, and an opportunity for the teacher to ask questions. Using audio recordings of each training, an independent observer recorded whether or not the trainer completed each checklist item during the training (see Appendix C). Procedural fidelity of teacher training was calculated by dividing the number of correct steps completed by the sum of correct and incorrect steps and then multiplying by 100 $[(\text{correct} / (\text{correct} + \text{incorrect})) \times 100]$ (Barton, Meadan-Kaplansky, & Ledford, 2018). Procedural fidelity was 100% for all training sessions, indicating each step of the training was implemented as designed.

Procedural fidelity of teacher implemented procedures was assessed via video for 100% of sessions in each condition (i.e., SA comparisons, baseline, intervention, generalization, maintenance) for each participant and are reported in Table 4. Fidelity was assessed from session videos using a combined yes/no checklist and a tally-per-occurrence component. Fidelity of implementation for sessions was calculated by dividing the number of correct steps completed by the sum of correct and incorrect steps and then multiplying by 100 $[(\text{correct} / (\text{correct} + \text{incorrect})) \times 100]$ (Barton, Meadan-Kaplansky, & Ledford, 2018). Unique procedural fidelity checklists were used for each participant's SA comparisons and ATD sessions. Two session components were held constant across target children and conditions: (1) target child was free to select a center(s) and (2) target child had at least 10 min of access to centers in the classroom. Additionally, responses to challenging behavior and positive behavior specific praise delivered by the lead teacher that directly addressed the behavior of target children were coded as control

variables on the procedural fidelity checklist. Procedural fidelity scores of pre (i.e., initial baseline) and post (i.e., best alone, maintenance) generalization probes were calculated using the same checklist criteria across pre/post conditions. This was done in order to demonstrate any generalized increases in teacher implementation of ABI procedures from pre-intervention to post-intervention.

Table 4
Teacher Procedural Fidelity by Child and Condition

	Teacher 1 (Chester)		Teacher 2 (Sara)		Teacher 2 (Ann)	
	<i>M</i>	Range	<i>M</i>	Range	<i>M</i>	Range
Baseline	95.83	75 – 100	98.86	87.5 – 100	100	100
SA	100	100	97.92	87.5 – 100	97.78	90 – 100
Intervention	90.63	75 – 100	97.73	87.5 – 100	95.89	71.43 – 100
Gen.-Pre	25	25	25	25	28.57	28.57
Gen.-Post	43.75	25 – 62.5	37.5	25 – 50	85.71	85.71
Maintenance	66.67	62.5 – 75	33.33	25 – 37.5	71.43	71.43

Note. Reported means and ranges are percentages. Best alone sessions were included in intervention calculations for IOA. Baseline calculations include initial baseline session and baseline sessions from the comparison condition. Gen.-Pre = generalization probes that occurred during the initial baseline condition; Gen.-Post = generalization probes that occurred in either the best alone condition or maintenance condition. There was no opportunity to conduct a generalization probe during the maintenance condition for Ann because the school year ended.

Social Validity

Researcher developed questionnaire. Following development of the ABIs, participating teachers completed a questionnaire developed by the researcher that assessed the feasibility and importance of the FBA and SA process using a six-point Likert-type scale (1: *strongly disagree*; 6: *strongly agree*; see Appendix D). This questionnaire was completed by Teacher 2 twice as she completed the assessment and SA process for both Sara and Ann. Means across teacher responses were calculated for each question, rather than a cumulative score because for some

questions, lower scores were indicative of higher social validity. For example, when asked if the direct observations conducted by the researcher interfered with ongoing classroom activities, a score of 1 (i.e., strongly disagree) is preferable to a score of 6 (i.e., strongly agree).

IRP-15. The feasibility of the ABI procedures and the effectiveness of the ABI were assessed by teachers prior to and following the implementation of ABIs using the Intervention Rating Profile – 15 (IRP-15; Witt & Elliott, 1985). Again, Teacher 2 completed the IRP-15 before and after implementing the ABIs for both Sara and Ann. The IRP-15 consisted of 15 items and utilized a six-point Likert-type scale (1: *strongly disagree*; 6: *strongly agree*) with higher scores indicating greater levels of perceived acceptability for every question. Possible cumulative scores on the IRP-15 range from 15 to 90, again with higher scores indicating greater levels of acceptability.

Blind raters. Graduate students in special education or early childhood professionals blind to study conditions were recruited to view randomly selected video clips of baseline and intervention sessions, after data collection had ended for each target child. Blind raters were consented to participate in the study by the researcher and then were sent an email with instructions on how to (1) complete an online social validity questionnaire (see Appendix E) adapted from Pokorski (2019), and (2) access the video clips of the target child to which they were assigned. After watching the videos, blind raters used a five-point Likert-type scale (1: *strongly disagree*; 5: *strongly agree*) to rate any perceived change in child behavior and the acceptability of teacher behavior from the videos.

CHAPTER III

RESULTS

Results are presented individually for each child. Each child's descriptive assessment, hypothesis development, SA, and ABI are described, followed by results of the ATD comparison and procedural fidelity.

Chester

Assessment to inform ABI development. The assessment included a structured interview with Chester's teacher followed by direct observations. The interview was conducted during nap time and lasted approximately 30 min. The target behavior, challenging behavior, was defined as (a) physical aggression towards others (e.g., pushing, hitting with an open or closed hand, throwing objects at others, putting his face in another child's face), (b) inappropriate touching (i.e., pushing his body onto others), (c) taking toys forcefully from others, (d) inappropriate use of materials (e.g., throwing objects, coloring on classroom materials), and (e) screaming (see Table 2). Chester's teacher did not report any setting events outside of the school day that she thought were predictive of his challenging behavior. His teacher also reported that he had no history of behavior support at school, and that there was no current behavior management system in place.

Chester engaged in challenging behavior throughout the school day; however, these behaviors were most frequent and disruptive in the afternoon during center time. During

afternoon center time, children could select one of seven centers (i.e., blocks, home living, manipulatives, art, books, science, sensory) and were free to switch centers as space allowed. Chester was least likely to engage in challenging behavior during teacher-directed activities (e.g., circle time, small groups).

Hypothesis development. Two hypotheses were developed based on direct observations that occurred during afternoon center time (5 observations), morning center time (1 observation), and circle time (1 observation). Hypothesis 1 was that when adults in the classroom were in close proximity to Chester he would engage in fewer challenging behaviors. A-B-C data and a review of video from direct observations indicated that Chester engaged in less challenging behavior when adults were proximal within the classroom (e.g., in the same center, in the circle time area) than when they were not. Hypothesis 2 was that Chester would engage in fewer challenging behaviors during structured classroom activities. A-B-C data and a review of video from direct observations indicated that challenging behaviors increased during unstructured activities (i.e., center time) and decreased during structured activities (i.e., circle time).

Structural analyses. Two independent SAs were used to test the hypotheses. The first SA compared high and low teacher proximity during center time to test the hypothesis that the frequency of Chester's challenging behavior decreased when he was proximal to adults (see Figure 1). This SA showed clear differentiation between Chester's frequency of challenging behavior during high and low teacher proximity sessions. During high proximity sessions when the teacher remained in the same center as Chester for the duration of the 10 min session, he engaged in 0 and 1 instances of challenging behavior. During the low proximity session when the

teacher did not spend any time in the same center as Chester, he engaged in 10 instances of challenging behavior.

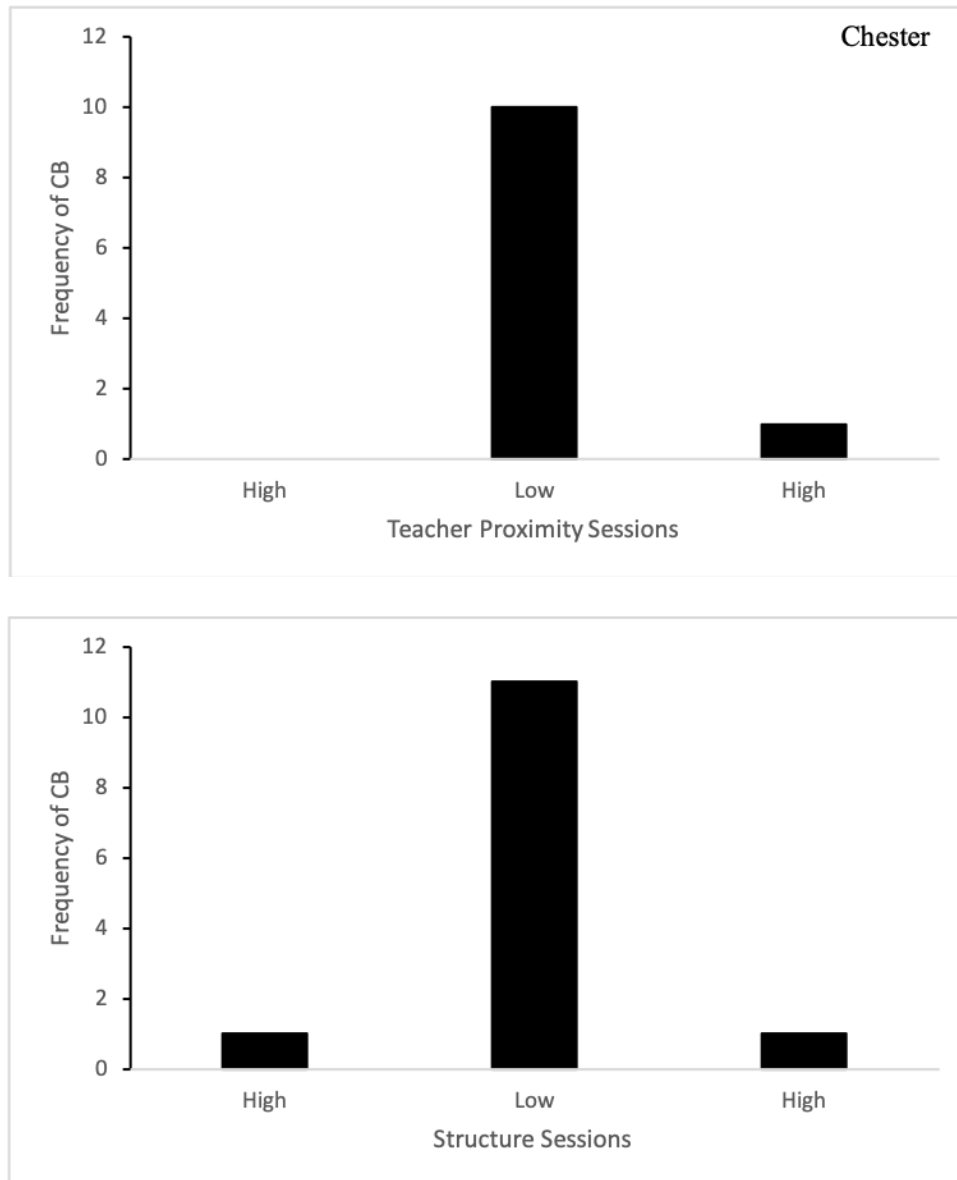


Figure 1: Structural Analysis Data for Chester

The second SA compared high and low levels of structure during center time sessions to test the hypothesis that the frequency of Chester's challenging behavior decreased when

classroom activities were structured. This SA also showed a clear differentiation in Chester's challenging behavior frequency between high and low levels of structure during center time. In the low structure session, Chester was not given any directions prior to center time. High structure sessions consisted of the teacher asking Chester which center he wanted to play in and providing him with a visual choice menu of each of the seven centers from which to choose. Once Chester selected a center, the teacher asked him what he was going to do in the center. If Chester responded with a play idea, the teacher sent him to play. If Chester did not provide a play idea, the teacher provided one for him before sending him to the center he selected. Additionally, the teacher was not present in the same center as Chester during high and low structure SA sessions. During each high structure session, Chester engaged in 1 instance of challenging behavior. In the low structure session, he engaged in 11 instances of challenging behavior (see Figure 1).

ABI development. Chester's ABI included components from each SA as increased teacher proximity and increased structure both consistently reduced his challenging behavior. The decision to use both antecedent manipulations in the ABI was made by the teacher and researcher in an attempt to increase the likelihood that the ABI would be effective and efficient in reducing Chester's challenging behavior during center time. To increase the structure during center times, a script was created that guided the teacher and Chester through a pre-planning routine that occurred immediately before centers during intervention sessions (see Appendix F). Pre-planning steps required the teacher to (1) ask Chester which center he wanted to play in first using the visual center menu (see Figure 2), (2) acknowledge his selection and provide one play suggestion that he could do in the center by himself and one play suggestion of something he

could do in the center with a friend, (3) have Chester tell her what he was going to do in the selected center, (4) acknowledge his play idea, and (5) send him to the center. The script included play suggestions that Chester could engage in by himself or with a friend in each of the classroom centers for the teacher to reference.

Centers!!



Figure 2: Center Menu for Chester

To increase adult proximity, the teacher indicated it would not be feasible to continuously stay in the same center as Chester like she did during the SA but checking in with him occasionally would be manageable. Teacher proximity was included in the ABI through non-contingent teacher check-ins with Chester every 4 min. Each teacher check-in consisted of the teacher entering the center he was in and commenting on what he was doing (e.g., “I see you’re

building a tower with those blocks!”). The 4 min interval was selected as this was the longest period of time during baseline observations that Chester went without an instance of challenging behavior. The researcher held up a green “go” sign to cue the teacher to provide each non-contingent check-in.

Experimental analysis of ABI effects. Figure 3 displays frequency data for Chester’s challenging behavior during center time for each session. The x axis displays study sessions and the y axis displays the frequency count of Chester’s challenging behavior. Chester’s frequency of challenging behavior was variable in the initial baseline condition (range = 0 – 25) but with the exception of the first session, it remained relatively high with nine or more occurrences per session. The first baseline observation occurred on a day when there was an irregular attendance pattern in the classroom, and several students that Chester typically engaged with were absent.

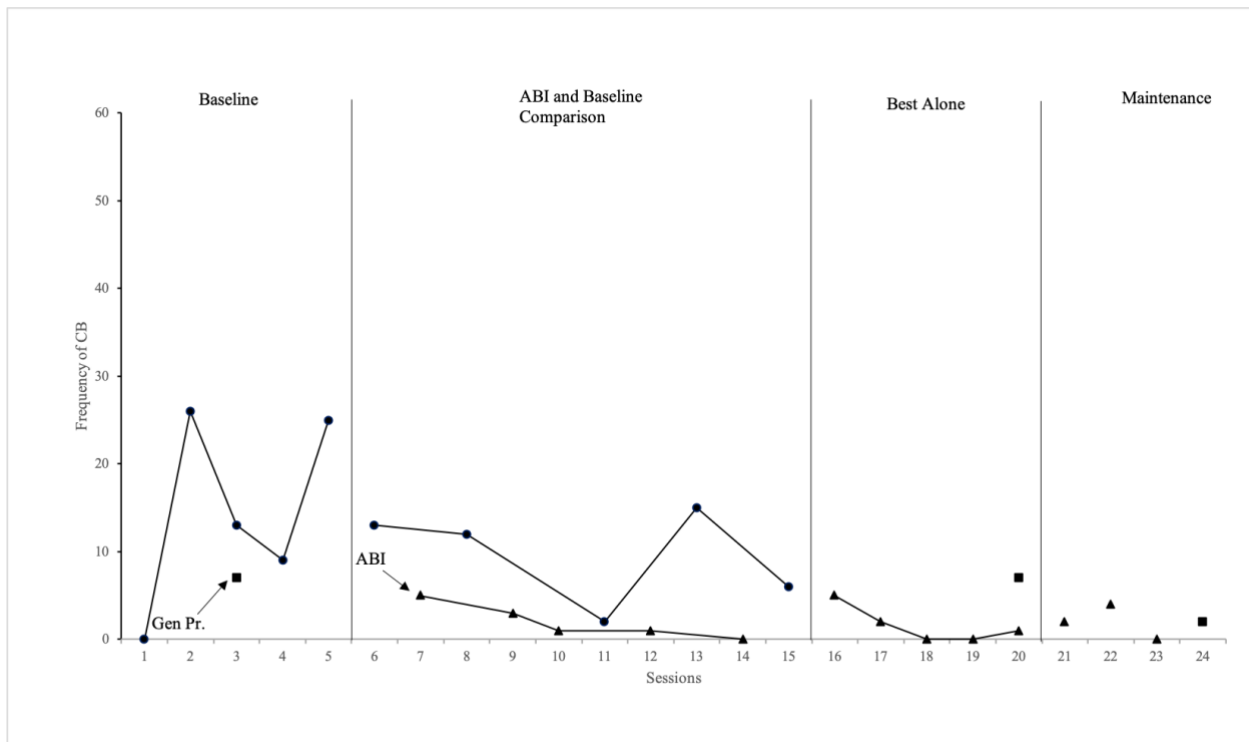


Figure 3: Frequency of Chester’s Challenging Behavior per Session

An immediate decrease in Chester’s frequency of challenging behavior was observed at the onset of the comparison condition for both the baseline and ABI sessions. The ABI sessions demonstrated a downward trend in frequency of challenging behavior through the comparison condition (range = 0 – 5) and a point by point comparison with baseline sessions (range = 2 – 15) indicated that challenging behavior was lower in all five of the ABI sessions.

Frequency of challenging behavior remained low during the best alone condition for Chester (range = 0 – 5) and remained low and relatively stable during maintenance probes (range = 0 – 4). A functional relation between the ABI and reduced levels of challenging behavior was demonstrated through differentiation during the comparison condition with fewer occurrences of challenging behavior occurring in the intervention sessions compared with the baseline sessions.

Chester's frequency of challenging behavior during the initial baseline generalization probe was relatively low ($n = 7$) compared to the final four baseline sessions in the afternoon center time setting. His challenging behavior remained at seven occurrences during the best alone generalization probe, which was higher than his level of challenging behavior in any of the best alone sessions. His challenging behavior dropped to two occurrences during the generalization probe in the maintenance condition.

Engagement data for Chester are displayed in Figure 4. He displayed high and stable levels of engagement in the first four sessions of the initial baseline condition (range = 81.67% - 93.33%) before dropping considerably to 40.35% in the final baseline session of the condition. In the comparison condition, a point by point comparison between baseline and ABI sessions showed that Chester's level of engagement was relatively stable and undifferentiated. One exception was observed during the comparison condition when Chester's engagement dropped considerably in the second baseline session and remained high during the second ABI session. His level of engagement remained high and stable during the best alone condition (range = 89.09% - 100%) and it dropped just slightly during the maintenance condition (range = 86.67% - 93.33%), though it was still within the range observed throughout each previous condition. Chester's level of engagement during the initial baseline generalization probe was relatively low (72.55%) compared to his engagement in the other initial baseline sessions. His engagement increased slightly in the best alone generalization probe (84.75%) and continued to increase in the maintenance generalization probe (91.67%).

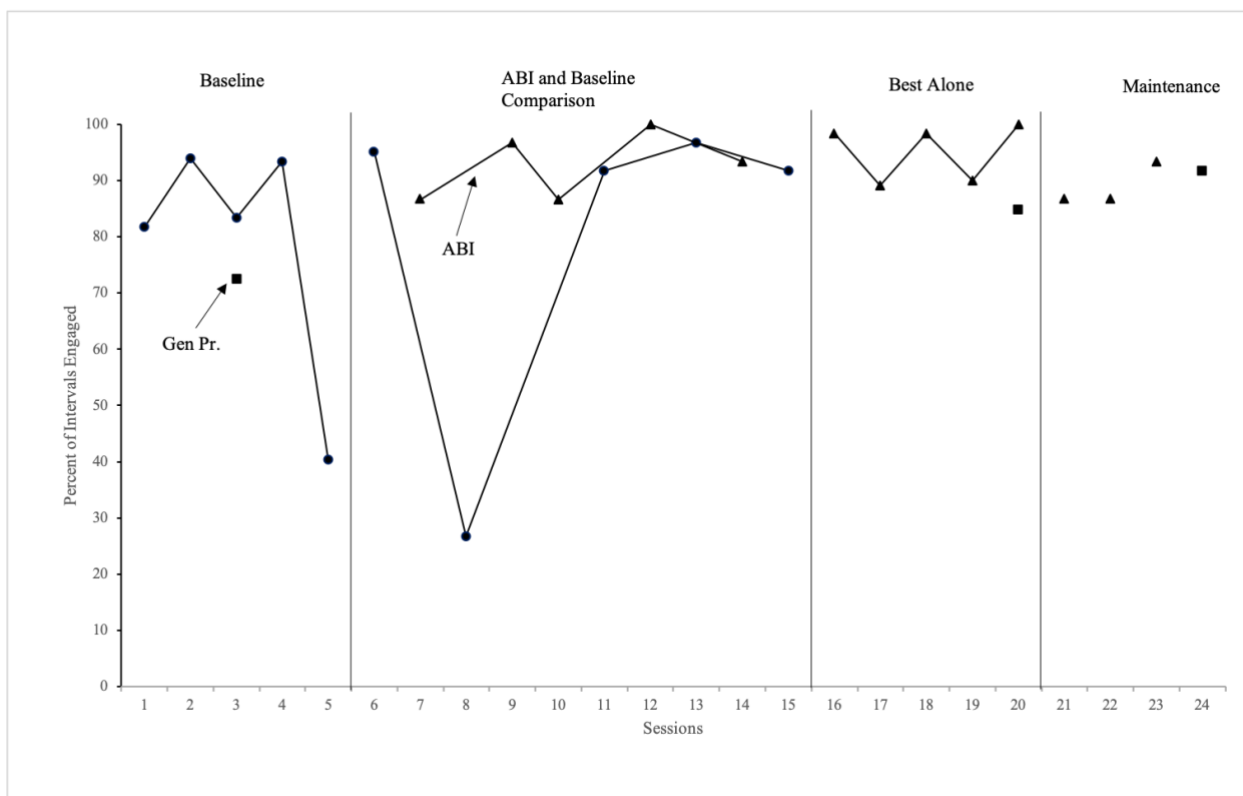


Figure 4: Engagement Data for Chester

Procedural fidelity. Procedural fidelity of teacher implementation was assessed on 100% of sessions across conditions. Average procedural fidelity across baseline, intervention, maintenance, and SA sessions was 95.83%, 90.63%, 66.67%, and 100%, respectively (range = 62.5% - 100%). Procedural fidelity of teacher implementation in the pre-generalization probe was 25%. Average procedural fidelity across both post-generalization probes was 43.75%, demonstrating a small increase in Teacher 1’s generalized use of ABI procedures following intervention training. Chester’s teacher responded to his challenging behavior an average of 0.67 times per session in baseline conditions and 0.5 times per session in intervention conditions (see Table 5). Chester’s teacher directed slightly more positive behavior specific praise to Chester, during intervention sessions compared to baseline sessions. Chester’s teacher delivered positive

behavior specific praise to him an average of 0 times per session in baseline sessions and 0.5 times per session in intervention sessions (see Table 6).

Table 5
Summary of Teacher Responses to Challenging Behavior of Target Children

Condition	Teacher 1 (Chester)		Teacher 2 (Sara)		Teacher 2 (Ann)	
	<i>M</i>	Range	<i>M</i>	Range	<i>M</i>	Range
Baseline	0.67	0 – 2	0.91	0 – 5	0.5	0 – 2
Intervention	0.5	0 – 1	0.36	0 – 1	0.2	0 – 1
Generalization	0	0	0.67	0 – 2	0	0
Maintenance	0	0	0	0	0	0

Note. Baseline means and ranges are calculated across baseline sessions from the initial baseline comparison conditions. Intervention means and ranges are calculated across intervention sessions from the comparison and best alone conditions.

Table 6
Summary of Behavior Specific Praise Statements Delivered by Teachers to Target Children

Condition	Teacher 1 (Chester)		Teacher 2 (Sara)		Teacher 2 (Ann)	
	<i>M</i>	Range	<i>M</i>	Range	<i>M</i>	Range
Baseline	0	0	0.18	0 – 1	0.1	0 – 1
Intervention	0.5	0 – 1	1	0 – 3	0.4	0 – 2
Generalization	0	0	2.33	0 – 6	0	0
Maintenance	0.67	0 – 2	0.33	0 – 1	2	2

Note. Baseline means and ranges are calculated across baseline sessions from the initial baseline comparison conditions. Intervention means and ranges are calculated across intervention sessions from the comparison and best alone conditions.

Sara

Assessment to inform ABI development. The assessment included a structured interview with Sara’s teacher followed by direct observations in the classroom during activities identified by the teacher. The interview was conducted during nap time and lasted approximately 30 min. Challenging behavior was Sara’s primary dependent variable and was defined as (a)

physical aggression towards peers (e.g., pushing, hitting with an open or closed hand, kicking), (b) taking toys forcefully from others, (c) inappropriate use of materials (e.g., throwing objects, knocking materials off of tables/shelves), and (d) screaming (see Table 2). Sara's teacher did not report any setting events outside of the school day that she thought were predictive of Sara's challenging behavior. Her teacher also reported that she had no history of behavioral support at school, and that there was no current behavior management system in place.

Sara engaged in challenging behavior throughout the school day; however, these behaviors were most frequent and disruptive during morning and afternoon center time. During each center time, children could select one of six centers (i.e., blocks, home living, art, books, science, manipulatives) and could switch centers if they asked an adult. Sara was least likely to engage in challenging behavior during teacher directed activities (e.g., circle time, small groups).

Hypothesis development. Two hypotheses were developed based on direct observations that occurred during morning center time (5 observations), afternoon center time (1 observation), and circle time (1 observation). Hypothesis 1 was that when adults in the classroom were in close proximity to Sara, she would engage in fewer challenging behaviors. A-B-C data and a review of video from direct observations indicated that Sara engaged in less challenging behavior when adults were in the same center or area of the classroom as Sara than when they were not. Hypothesis 2 was that Sara would engage in fewer challenging behaviors during structured classroom activities. A-B-C data and a review of video from direct observations indicated that challenging behaviors increased during unstructured activities (i.e., center time) and decreased during structured activities (i.e., circle time).

Structural analyses. Two independent SAs were used to test the hypotheses. The first SA compared high and low teacher proximity during center time sessions to test the hypothesis that the frequency of Sara's challenging behavior decreased when she was proximal to adults in the classroom. This SA showed clear differentiation between Sara's frequency of challenging behavior during high and low teacher proximity sessions. During high proximity sessions, when the teacher remained in the same center as Sara for the duration of the 10 min session, she engaged in 0 and 3 instances of challenging behavior. During the low proximity session, when the teacher did not spend any time in the same center as Sara, she engaged in 9 instances of challenging behavior (see Figure 5).

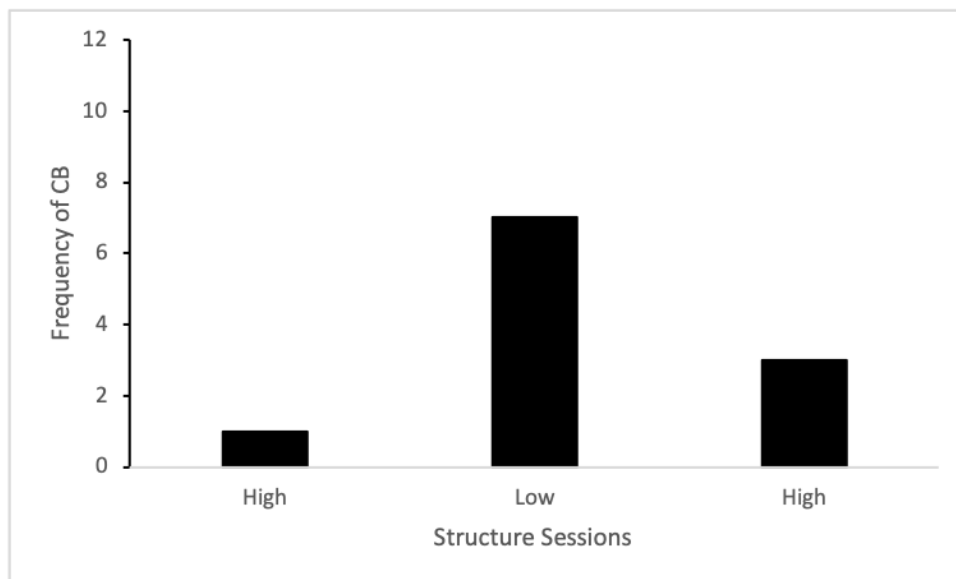
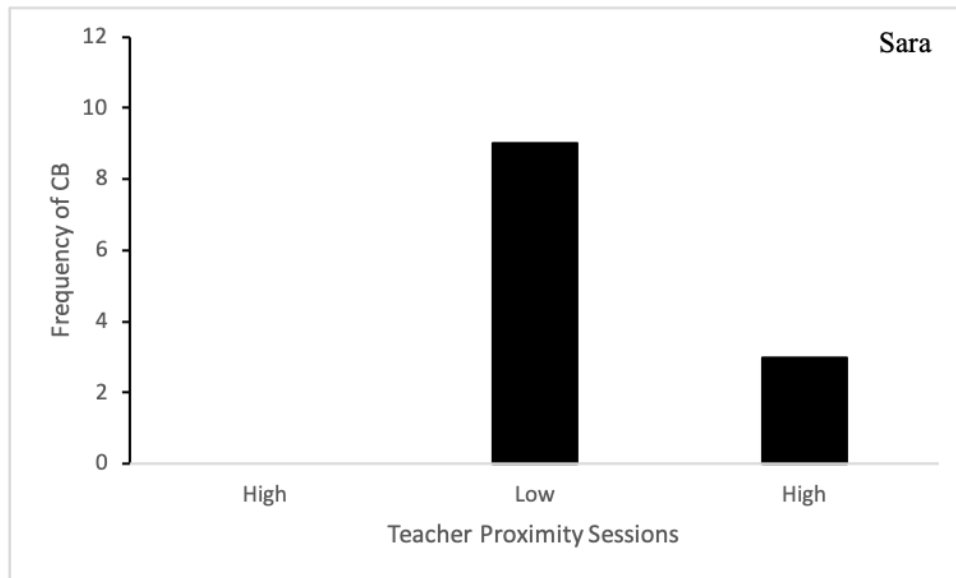


Figure 5: Structural Analysis Data for Sara

The second SA compared high and low levels of structure during center time sessions to test the hypothesis that the frequency of Sara’s challenging behavior decreased when classroom activities were structured. This SA also showed a clear differentiation in Sara’s challenging behavior frequency between high and low levels of structure during center time sessions. In the low structure session, Sara was not given any directions prior to center time, was free to engage

in any classroom center, and could switch centers without asking an adult. High structure sessions consisted of the teacher asking Sara which center she wanted to play in and providing her with a visual choice menu of each of the six centers from which she could choose. Once Sara selected a center, the teacher asked her what she was going to do in the center. If Sara responded with a play idea, the teacher sent her to play. If Sara did not provide a play idea the teacher provided one for her before sending her to the center she selected. Additionally, the teacher was not present in the same center as Sara during high and low structure SA sessions. During the high structure sessions, Sara engaged in 1 and 3 instances of challenging behavior. In the low structure session, she engaged in 7 instances of challenging behavior (see Figure 5).

ABI development. Similar to Chester, Sara's ABI included components from each SA as increased teacher proximity and increased structure both consistently reduced her challenging behavior, and both the teacher and researcher agreed that using a combination of these antecedent manipulations presented the best approach to reducing Sara's challenging behavior. To increase the structure during center times, a script was created that guided the teacher and Sara through a pre-planning routine that occurred immediately before centers during intervention sessions (see Appendix G). Pre-planning steps required the teacher to: (1) ask Sara which center she wanted to play in first using the visual center menu (see Figure 6), (2) acknowledge her selection and provide one play suggestion that she could do in the center by herself and one play suggestion of something she could do in the center with a friend, (3) have Sara tell her what she was going to do in the selected center, and (4) acknowledge her play idea and send her to the center. The script included play suggestions that Sara could engage in by herself or with a friend in each of the classroom centers for the teacher to reference.

Centers!!



Blocks



Home Living



Art



Books



Science



Manipulatives

Figure 6: Center Menu for Sara

The procedure used to increase teacher proximity for Sara during intervention sessions was similar to that used with Chester, as Sara's teacher indicated that it would not be feasible to stay in the same center as Sara for the duration of each session as she had done during the SA. Teacher proximity was included in the ABI through non-contingent teacher check-ins with Sara every 2.5 min. Each teacher check-in consisted of the teacher entering the center Sara was in and commenting on what she was doing (e.g., "You're still drawing pictures!"). The 2.5 min interval was selected as this was the longest period of time during baseline observations that Sara went

without an instance of challenging behavior. The teacher was cued to provide each non-contingent check-in by the researcher who held up a green “Go” sign.

Experimental analysis of ABI effects. Figure 7 displays frequency data for Sara’s challenging behavior during center time for each session. The x axis displays study sessions and the y axis displays the frequency count of Sara’s challenging behavior. Sara’s frequency of challenging behavior was variable in the initial baseline condition (range = 9 – 18) with an increasing trend for the last three baseline sessions. In the comparison condition, Sara’s challenging behavior was highly variable in baseline sessions (range = 5 – 22) while low and relatively stable in the intervention sessions (range = 0 – 6). Challenging behavior during intervention sessions was lower than that observed in baseline sessions for five out of the six pairwise comparisons in the comparison condition. In the fourth baseline session of the comparison condition, five challenging behaviors were observed while six were observed in the fourth intervention session of the condition. As a result of this single overlapping data point, a sixth baseline and intervention session were conducted in the comparison condition to provide further support for differentiated effects between the ABI and baseline conditions. Frequency of challenging behavior stabilized and remained low during the best alone condition for Sara (range = 1 – 2) and remained low and stable during maintenance probes (range = 1 – 2). A functional relation between the ABI and reduced levels of challenging behavior was demonstrated through differentiation between baseline and intervention sessions with lower and more stable occurrences of challenging behavior occurring in the intervention sessions compared with the baseline sessions throughout the comparison condition.

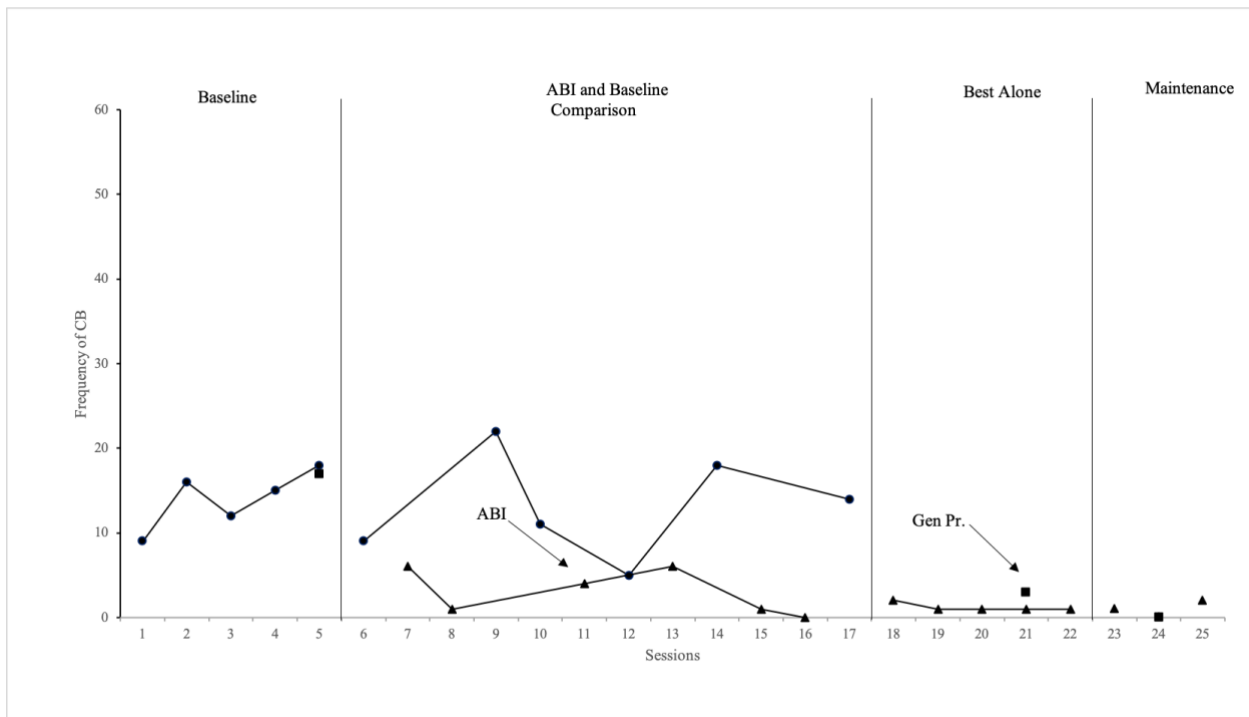


Figure 7: Frequency of Sara's Challenging Behavior per Session

Sara's frequency of challenging behavior during the initial baseline generalization probe (n = 17) was comparable to her frequency of challenging behavior in initial baseline sessions. Her challenging behavior dropped to three occurrences during the best alone generalization probe, which was higher than each of the best alone sessions but lower than levels observed in all of her baseline sessions. In the maintenance generalization probe, Sara's challenging behavior fell to zero.

Engagement data for Sara are displayed in Figure 8. Engagement was high in the first baseline session and then dropped before demonstrating an increasing trend in the final four sessions of the initial baseline condition (range = 61.67% - 89.66%). In the comparison condition, a point by point comparison between baseline and intervention sessions showed that Sara's level of engagement was undifferentiated and variable for both baseline (range = 63.33% -

98.31%) and intervention (range = 78.33% - 95%) sessions. Sara's engagement was higher in intervention than baseline for the first, second, and fifth pairwise comparisons and higher in baseline than intervention for the third, fourth, and sixth pairwise comparisons. Her level of engagement increased and became stable during the best alone condition (range = 93.33% - 100%) and dropped slightly, finishing with an upward trend, during the maintenance condition (range = 86.67% - 91.67%). Sara's level of engagement during the initial baseline generalization probe was relatively low (66.67%) compared to her engagement in the other initial baseline sessions. Her engagement increased considerably in the best alone generalization probe (94.92%) but fell to 75% in the maintenance generalization probe.

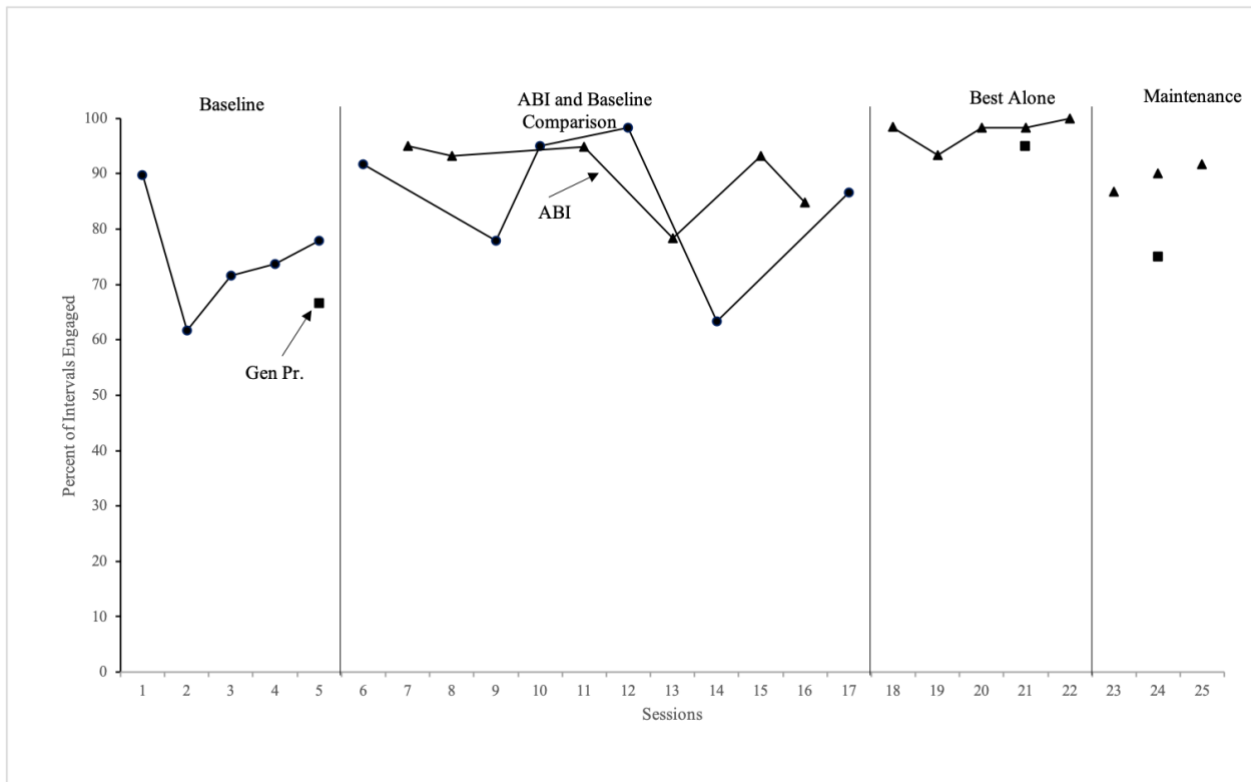


Figure 8: Engagement Data for Sara

Procedural fidelity. Procedural fidelity of teacher implementation was assessed on 100% of sessions across conditions. Average procedural fidelity across baseline, intervention, maintenance, and SA sessions was 98.86%, 97.73%, 33.33%, and 97.92%, respectively (range = 25% - 100%). Procedural fidelity of teacher implementation in the pre-generalization probe was 25%. Average procedural fidelity across both post-generalization probes was 37.5%, demonstrating a small increase in teacher 1's generalized use of ABI procedures following intervention training. Sara's teacher responded to her challenging behavior an average of 0.91 times per session in baseline conditions and 0.36 times per session in intervention conditions (see Table 5). Sara's teacher used slightly more positive behavior specific praise when interacting with her during intervention sessions compared to baseline sessions. Sara's teacher delivered positive behavior specific praise to her an average of 0.18 times per session in baseline conditions and 1 time per session in intervention conditions (see Table 6).

Ann

Assessment to inform ABI development. The assessment included a structured interview with Ann's teacher followed by direct observations in the classroom during activities identified by the teacher. The interview was conducted during nap time and lasted approximately 30 min. While Ann was initially identified for the study by her teacher because of her challenging behavior in the classroom, her low levels of engagement during the initial baseline condition prompted the teacher and researcher to target engagement as her primary dependent variable. To be coded as engaged, she had to be in the center she selected while (a) visually attending to center materials, (b) attending to peers or adults in the center, or (c) attending to an

adult outside of her center (see Table 2 for examples and nonexamples). Ann's teacher reported that she occasionally engaged in challenging behavior (e.g., inappropriate use of materials, forcefully taking objects from others), however these behaviors were not a primary concern. Ann's teacher did not report any setting events outside of the school day that she thought were predictive of her engagement behavior. Her teacher also reported that she had no history of behavioral support at school, and that there was no current behavior plan in place.

Ann's teacher reported that her engagement was lowest during center time. During centers, Ann would often wander around the classroom, lay down in centers, or sit and stare at what other peers were doing. During each center time, children could select one of six centers (i.e., blocks, home living, art, books, science, manipulatives) and could switch centers if they asked an adult. Ann was most likely to be engaged during meal times (i.e., snack, lunch) and during teacher directed activities (e.g., circle time, small groups).

Hypothesis development. Two hypotheses were developed based on direct observations that occurred during morning center time (5 observations), afternoon center time (1 observation), and circle time (1 observation). Hypothesis 1 was that when adults in the classroom were in close proximity to Ann, she would be more engaged. A review of video from direct observations indicated that Ann was more engaged when adults were in the same center or area of the classroom as Ann than when they were not. Hypothesis 2 was that Ann would be more engaged during structured classroom activities. A review of video from direct observations indicated that engagement was lower during unstructured activities (i.e., center time) than during structured activities (i.e., circle time). Ann's teacher reported that she followed a general circle time routine which included reading a story, looking at the calendar, and identifying the day's weather.

Additionally, Ann’s teacher said that during circle time children were expected to remain on the blue carpet and were redirected back to it if they left.

Structural analyses. Three independent SAs were used to test the hypotheses. The first SA compared high and low teacher proximity during center time sessions to test the hypothesis that Ann’s engagement increased when she was proximal to adults in the classroom. This SA showed clear differentiation between Ann’s engagement during high and low teacher proximity sessions. During high proximity sessions, when the teacher remained in the same center as Ann for the duration of the 10 min session, Ann was engaged for 95 and 86.67 percent of intervals. During the low proximity session when the teacher did not spend any time in the same center as Ann, she was only engaged for 20% of intervals (see Figure 9).

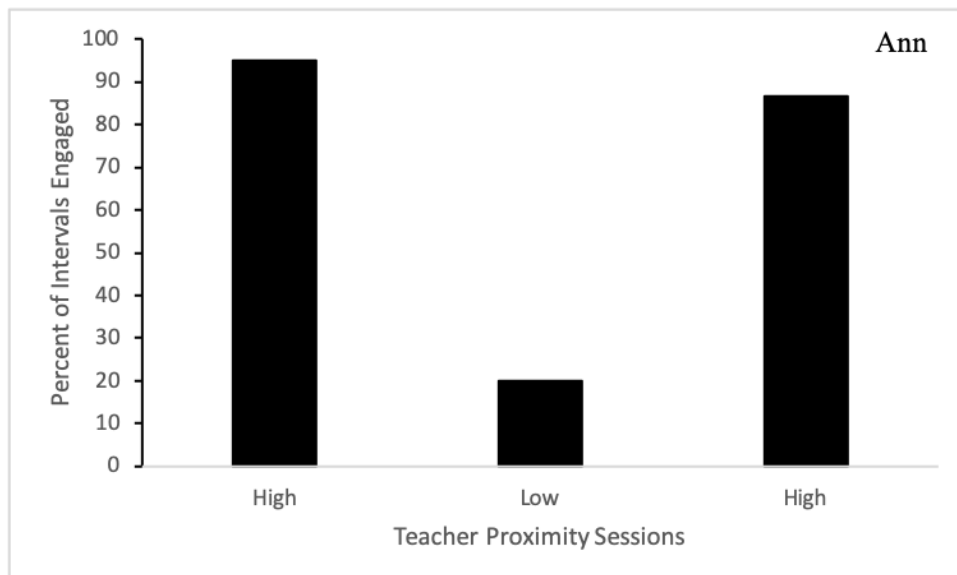


Figure 9: Structural Analysis Data for Ann

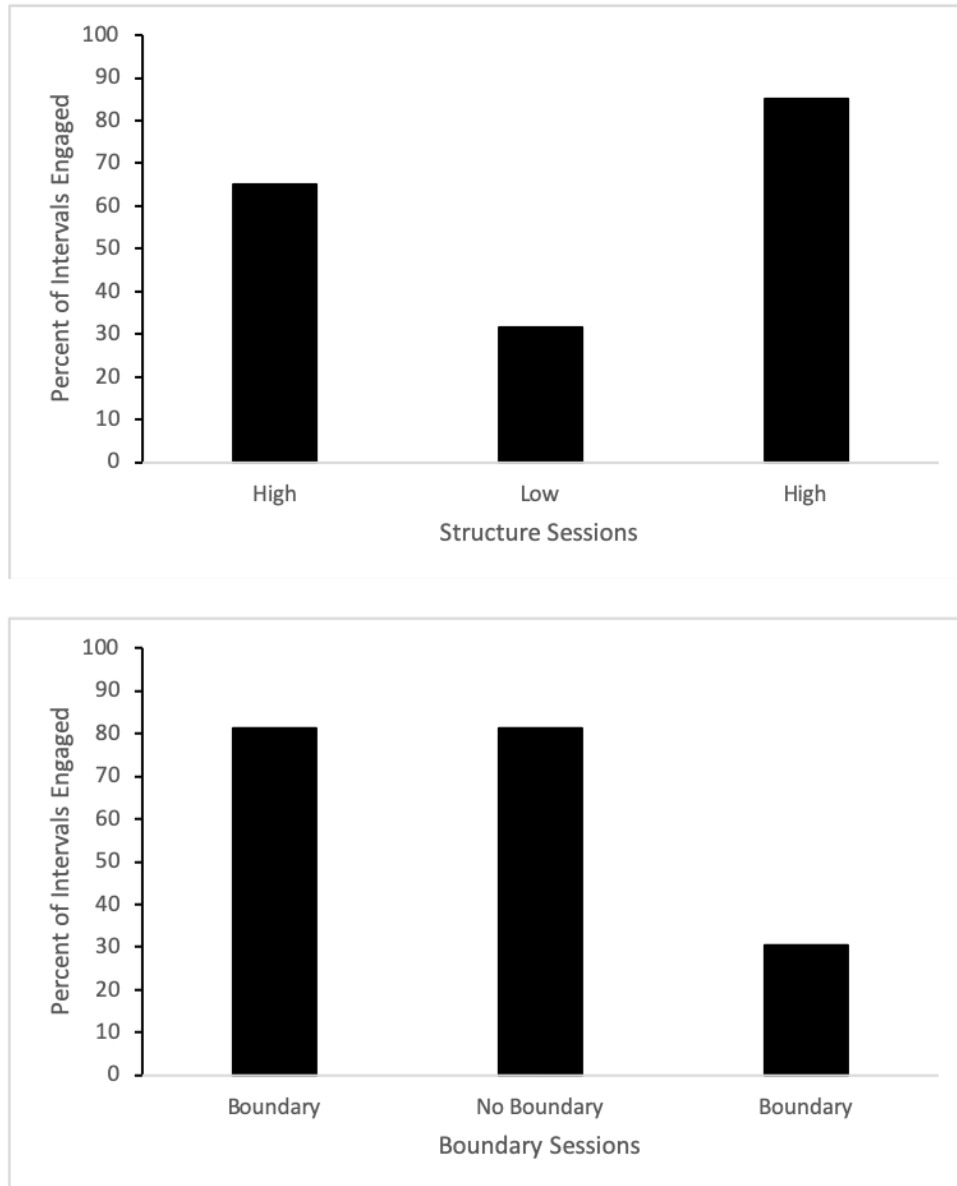


Figure 9 cont.: Structural Analysis Data for Ann

The second SA compared high and low levels of structure during center time to test the hypothesis that engagement increased when classroom activities were structured. This SA showed differentiated effects in Ann’s engagement between high and low levels of structure during center time sessions. In the low structure session, Ann was not given any directions prior to center time, was free to engage in any classroom center, and could switch centers without

asking an adult. High structure sessions consisted of the teacher asking Ann which center she wanted to play in and providing her with a visual choice menu of each of the six centers from which to choose. Once Ann selected a center, the teacher asked her what she was going to do in the center. If Ann responded with a play idea, the teacher acknowledged the idea and provided an additional play idea before sending her to play. If Ann did not provide a play idea, the teacher provided two play ideas to her before sending her to the center she selected. Additionally, the teacher was not present in the same center as Ann during high and low structure SA sessions. During the high structure sessions, Ann was engaged for 65% and 85% of intervals. In the low structure session, she was engaged for 31.67% of intervals (see Figure 9).

A third SA was conducted for Ann that compared providing clearly defined center boundaries to business as usual, in center time. This SA comparison was designed with the second hypothesis in mind, with the intention of increasing structure during center time by clearly identifying center boundaries and expectations in a manner similar to that used during circle time. In sessions with clearly defined boundaries, blue painter's tape was placed on the floor to create a boundary around the center Ann chose, and Ann's teacher explained to her that she needed to stay inside the taped lines while playing in the center she selected. Ann's teacher was not present in the same center as Ann during any of these SA sessions. This SA did not result in differentiated effects on engagement and engagement was actually lowest in one of the defined boundaries sessions (see Figure 9).

ABI development. Ann's ABI included components from two of her SAs as increased teacher proximity and increased structure were both associated with higher engagement during centers. Components from the third SA (defined boundaries) were not included in the ABI. The

decision to include multiple antecedent manipulations in the ABI was again made by the teacher and researcher to maximize the likelihood of the intervention being effective, especially with the limited amount of time remaining before the end of the school year. To increase the structure during center, a script was created that guided the teacher and Ann through a pre-planning routine that occurred immediately before centers during intervention sessions (see Appendix H). Pre-planning steps required the teacher to (1) ask Ann which center she wanted to play in first, (2) acknowledge her selection and provide one play suggestion that she could do in the center by herself and one play suggestion of something she could do in the center with a friend, (3) identify at least one peer who is in the selected center by name, (4) have Ann tell her who she was going to play with in the selected center, and (5) acknowledge her play idea and send her to the center. The script included play suggestions that Sara could engage in by herself or with a friend in each of the classroom centers for the teacher to reference.

The procedure used to increase teacher proximity for Ann during intervention sessions was similar to that used with Sara, as the teacher indicated that it would not be feasible to stay in the same center as Ann for the duration of each session as she had done during the SA. Teacher proximity was included in the ABI through non-contingent teacher check-ins with Ann every 2 min. Each teacher check-in consisted of the teacher entering the center Ann was in and providing a play suggestion (e.g., “you can do a puzzle here”). During baseline observations, Ann was not engaged for longer than 1.5 min at a time in any session. When discussing how often Ann’s teacher would be able to provide non-contingent check-ins, she said every 2 min would be possible. Therefore, a 2 min interval was selected for teacher check-ins during intervention sessions. The teacher was cued to provide each non-contingent check-in by the researcher who held up a green “Go” sign.

Experimental analysis of ABI effects. Engagement data for Ann are displayed in Figure 10. The x axis displays study sessions and the y axis displays the percentage of intervals per session that she was engaged. Engagement was low with a decreasing trend in the initial baseline condition (range = 18.64% - 66.1%). There was clear differentiation between Ann's engagement in baseline and intervention sessions throughout the comparison condition, with all pairwise comparisons favoring the ABI. Engagement data in the baseline sessions remained low and variable throughout the comparison condition (range = 13.33% - 50%) while engagement data during the intervention sessions were high and stable (range = 78.33% - 88.33%). Ann's level of engagement increased slightly in variability during the best alone condition but remained high with an increasing trend (range = 76.27% - 93.33%) and maintained at 88.33% of intervals one week after the best alone condition ended. A functional relation between the ABI and increased engagement was demonstrated through the clear differentiation in the comparison condition with higher and more stable engagement occurring in the ABI sessions compared with the baseline sessions.

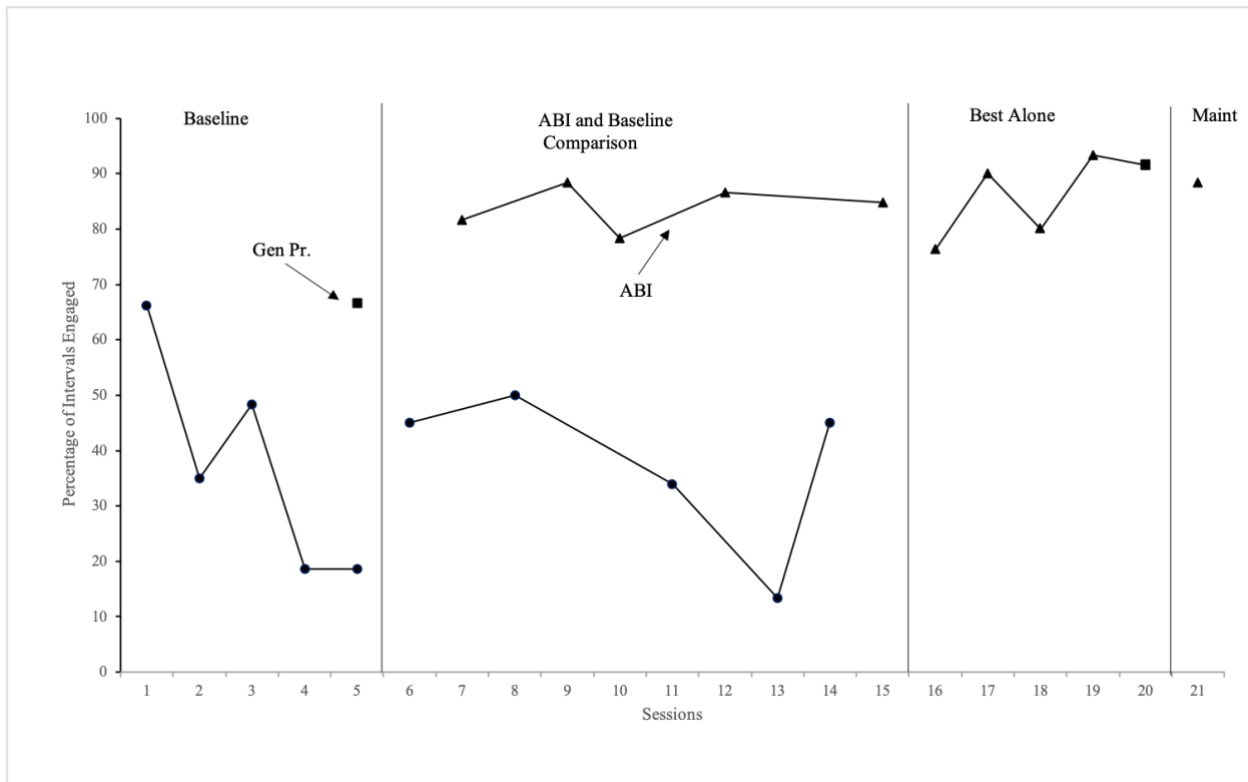


Figure 10: Engagement Data for Ann

Ann’s engagement during the initial baseline generalization probe was higher (66.67% of intervals) than all of her baseline sessions. Her engagement increased to 91.67% of intervals during the best alone generalization probe, which was higher than all but one of the best alone sessions. No generalization probe could be collected during maintenance for Ann because the school year ended.

Figure 11 displays frequency data for Ann’s challenging behavior during center time. With the exception of the second session, when she spent approximately 5 min spinning in circles, Ann’s frequency of challenging behavior was relatively low and stable in the initial baseline condition (range = 4 – 56). During the comparison condition, Ann displayed low and stable levels of challenging behavior in both baseline (range = 0 – 11) and intervention (range = 0 – 2) sessions. While levels of challenging behavior were low in both intervention and baseline

sessions, challenging behavior was lower in the baseline sessions in four out of five pairwise comparisons. Ann’s near zero levels of challenging behavior continued in the best alone condition (range = 0 – 1) and in her maintenance probe (n = 0) one week after the conclusion of the best alone condition. Ann’s frequency of challenging behavior during the initial baseline generalization probe was relatively low (n = 4) compared to her challenging behavior in the other initial baseline sessions. Her frequency of challenging behavior decreased in the best alone generalization probe (n = 0), which was consistent with her level of challenging behavior in the rest of the best alone sessions.

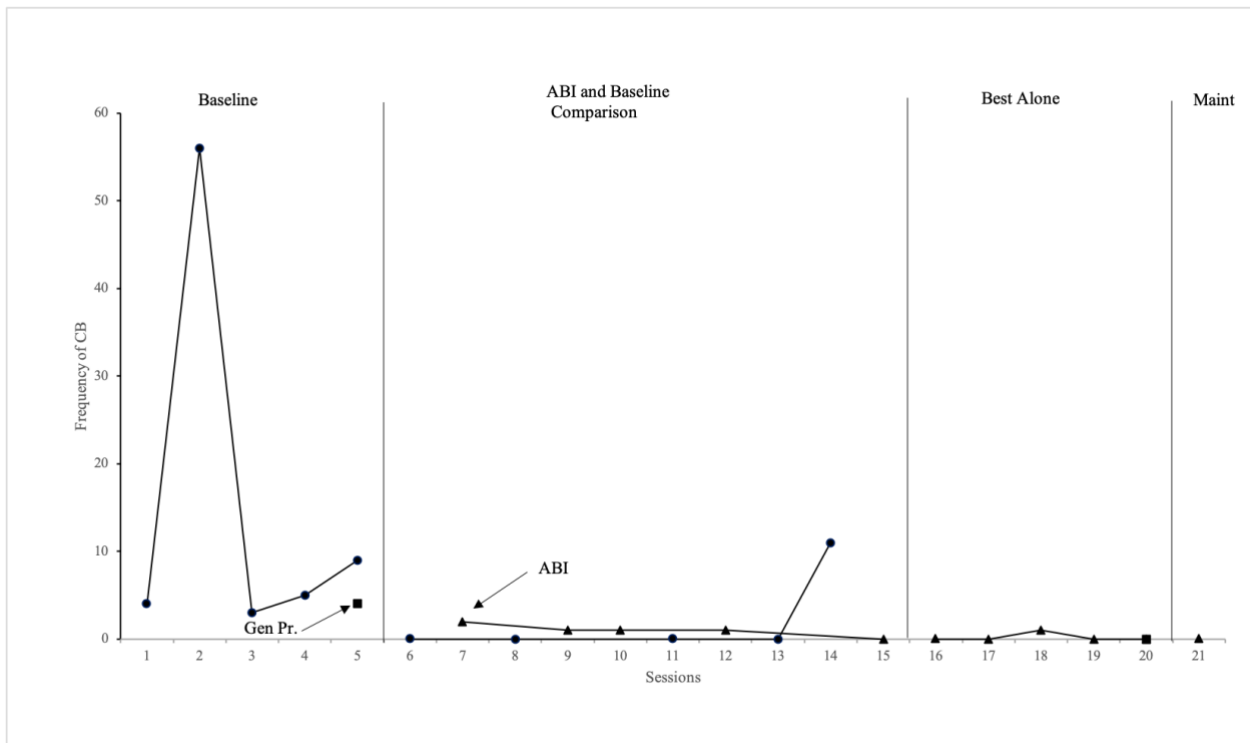


Figure 11: Frequency of Ann’s Challenging Behavior per Session

Procedural fidelity. Procedural fidelity of teacher implementation was assessed on 100% of sessions across conditions. Average procedural fidelity across baseline, intervention, maintenance, and SA sessions was 100%, 95.89%, 71.43%, and 97.78%, respectively (range = 71.43% - 100%). Procedural fidelity of teacher implementation in the pre-generalization probe was 28.57%. Procedural fidelity in the single post-generalization probe was 85.71%, demonstrating a notable increase in Teacher 2's generalized use of ABI procedure following intervention training. Ann's teacher responded to her challenging behavior an average of 0.5 times per session in baseline conditions and 0.2 times per session in intervention conditions (see Table 5). A small difference was observed in Ann's teacher's use of positive behavior specific praise between baseline and intervention sessions, similar to that observed for both Chester and Sara. Ann's teacher delivered positive behavior specific praise to her an average of 0.1 times per session in baseline conditions and 0.4 times per session in intervention conditions (see Table 6).

Social Validity

Researcher-developed questionnaire. Teacher responses on the researcher-developed questionnaire were positive and indicated that teachers found the assessment and SA process to be a valuable use of time when trying to reduce challenging behavior or increase engagement in their classrooms. Calculated means are of teacher responses ($n = 3$) for each item. When asked whether the assessment and SA process took too long to complete, or interfered with their classroom routine, teachers said it did not ($M = 1.67$) and ($M = 1$), respectively. Teachers also reported that the assessment process had value ($M = 5.5$) and would be feasible for them to implement in their classroom ($M = 5.73$). Means for each item are provided in Table 7.

Table 7
Teachers' Perceptions of the FBA and SA Process

Question	<i>M</i>	Range
1. The structured interview and questionnaires took too long to complete	2	1 – 3
2. The structured interview and questionnaires asked questions relevant to the child's challenging behavior and in my classroom	5.33	5 – 6
3. The direct observations conducted by the researcher interfered with ongoing classroom activities	1	1
4. It would be possible for me to complete the direct observations for a student in my classroom	5.67	5 – 6
5. I felt confident using the Functional Assessment Hypothesis Formulation Protocol to develop hypotheses that predicted the occurrence and non-occurrence of challenging behavior or engagement for the child.	5.67	5 – 6
6. Developing hypotheses took too long to complete	1.33	1 – 2
7. Implementing structural analysis sessions was feasible in my classroom	5.67	5 – 6
8. Implementing structural analysis sessions interfered with ongoing classroom activities	1	1
9. Structural analysis sessions provided valuable information on contextual factors that affect the child's challenging behavior or engagement	5.67	5 – 6
10. I felt confident using information from the structural analysis to develop antecedent-based interventions with the researcher	5.67	5 – 6
11. I would feel confident using information from a structural analysis to develop antecedent-based interventions on my own	6	6

Note. 1: strongly disagree; 2: disagree; 3: slightly disagree; 4: slightly agree; 5: agree; 6: strongly agree. Means and ranges in this table are representative of three completed questionnaires. Teacher 1 completed this questionnaire for Chester and Teacher 2 completed this questionnaire independently for Sara and Ann.

IRP-15. Teacher responses on the IRP-15 were collected to assess the acceptability and effectiveness of the ABIs for each of the three target children. Cumulative teacher scores on the IRP-15 prior to implementation of the ABI ranged from 83 – 90 ($M = 87.67$). Cumulative teacher

scores following implementation of the ABI in their classroom ranged from 84 – 90 ($M = 88$). All IRP-15 scores indicated high levels of teacher acceptability and ABI effectiveness for each target child (see Tables 8 and 9).

Table 8
IRP-15 Pre-Intervention Ratings

Question	<i>M</i>	Range
1. This would be an acceptable intervention for the child's needs.	6	6
2. Most teachers would find this intervention appropriate for children with similar needs.	6	6
3. This intervention should prove effective in supporting the child's needs.	5.67	5 – 6
4. I would suggest the use of this intervention to other teachers.	6	6
5. The child's needs are severe enough to warrant use of this intervention.	6	6
6. Most teachers would find this intervention suitable for the needs of this child.	5.67	5 – 6
7. I would be willing to use this intervention in the classroom setting.	6	6
8. This intervention would <i>not</i> result in negative side effects for the child.	6	6
9. This intervention would be appropriate for a variety of children.	6	6
10. This intervention is consistent with those I have used in classroom settings.	5.67	5 – 6
11. The intervention is a fair way to handle the child's needs.	5.67	5 – 6
12. This intervention is reasonable for the needs of the child.	5.67	5 – 6
13. I like the procedures used in this intervention.	5.67	5 – 6
14. This intervention would be a good way to handle this child's needs.	5.67	5 – 6
15. Overall, this intervention would be beneficial for the child.	6	6

Note. 1: strongly disagree; 2: disagree; 3: slightly disagree; 4: slightly agree; 5: agree; 6: strongly agree. Means and ranges in this table are representative of three completed IRP-15 pre-intervention questionnaires. Teacher 1 completed this questionnaire for Chester and Teacher 2 completed this questionnaire independently for Sara and Ann.

Table 9
IRP-15 Post-Intervention Ratings

Question	<i>M</i>	Range
1. This was an acceptable intervention for the child's needs.	6	6
2. Most teachers would find this intervention appropriate for children with similar needs.	5.67	5 – 6
3. This intervention proved effective in supporting the child's needs.	5.67	5 – 6
4. I would suggest the use of this intervention to other teachers.	6	6
5. The child's needs were severe enough to warrant use of this intervention.	6	6
6. Most teachers would find this intervention suitable for the needs of this child.	5.67	5 – 6
7. I would be willing to use this intervention in the classroom setting.	6	6
8. This intervention did <i>not</i> result in negative side effects for the child.	6	6
9. This intervention would be appropriate for a variety of children.	6	6
10. This intervention was consistent with those I have used in classroom settings.	5.67	5 – 6
11. The intervention was a fair way to handle the child's needs.	5.67	5 – 6
12. This intervention was reasonable for the needs of the child.	5.67	5 – 6
13. I liked the procedures used in this intervention.	6	6
14. This intervention was a good way to handle this child's needs.	6	6
15. Overall, this intervention was beneficial for the child.	6	6

Note. 1: strongly disagree; 2: disagree; 3: slightly disagree; 4: slightly agree; 5: agree; 6: strongly agree. Means and ranges in this table are representative of three completed IRP-15 post-intervention questionnaires. Teacher 1 completed this questionnaire for Chester and Teacher 2 completed this questionnaire independently for Sara and Ann.

Blind rater assessment. Twenty-nine graduate students in special education or early childhood professionals blind to study conditions watched video clips of baseline and

intervention sessions to assess the behavior of target children and participating teachers. Eleven raters viewed videos of Chester, nine viewed videos of Sarah, and nine viewed videos of Ann. Fifteen raters viewed videos in an A-B (i.e., baseline first, intervention second) order and fourteen viewed videos in a B-A (i.e., intervention first, baseline second) order. Rater responses to survey questions varied widely with all questions having a range of at least 4 (i.e., 1-4, 1-5; 2-5) with the exception of Question 7 (range 1-3). Means from survey responses are provided in Table 10.

Table 10
Blind Rater Social Validity Assessment

Question	Baseline	Intervention
1. The child in the video appeared to demonstrate acceptable levels of challenging behavior.	3.44 (1-5)	4.07 (1-5)
2. The child in the video appeared to demonstrate appropriate communication with peers and/or adults.	2.72 (1-5)	4.45 (2-5)
3. The child in the video appeared to demonstrate age-appropriate levels of classroom engagement.	2.86 (1-5)	4.52 (2-5)
4. The child in the video appeared to display no negative effects from the procedures	3.65 (1-4)	4.38 (2-5)
5. The adult in the video appeared to respond appropriately to the child, given the child's behavior.	2.07 (1-5)	4.38 (2-5)
6. The adult in the video used strategies I would use in similar circumstances.	1.86 (1-4)	4.14 (2-5)
7. The adult in the video engaged in behavior that upset me.	2.21 (1-5)	1.21 (1-3)
8. The adult behavior from the video is developmentally appropriate for preschool children.	NA	4.45 (2-5)
9. The adult behavior from the video would not be difficult to implement in a 1:1 setting.	NA	4.21 (1-5)
10. The adult behavior from the video would not be difficult to implement in a group setting.	NA	4.24 (1-5)
11. The adult behavior from the video would result in positive behavior change within a short period of time.	NA	3.76 (1-5)
12. The adult behavior from the video could be used across children, behavior, and settings.	NA	4.31 (2-5)

Note. 1: strongly disagree; 2: somewhat disagree; 3: neither agree nor disagree; 4: somewhat agree; 5: strongly agree.

Rater responses from the survey indicated that on average, levels of child behavior and engagement (Questions 1-3) were more appropriate during intervention than during baseline. Responses also indicated that children appeared to respond better to teacher behaviors (Question 4) during intervention than during baseline. Rater responses regarding adult behavior in the

classroom indicated that teacher responses to child behavior were more appropriate (Question 5) and less upsetting (Question 7) during intervention compared to baseline. Further, raters indicated they would be more likely to use strategies observed in intervention videos than strategies used in baseline videos (Question 6). When assessing the ABI by itself, raters indicated that the intervention procedures were developmentally appropriate for preschool children (Question 8; $M = 4.45$), would not be difficult to implement in a 1:1 setting (Question 9; $M = 4.21$), would not be difficult to implement in a group setting (Question 10; $M = 4.24$), and could be used across children, behaviors, and settings (Question 12; $M = 4.31$). Raters were less confident the ABI procedures would result in positive behavior change within a short period of time (Question 11; $M = 3.76$).

CHAPTER IV

DISCUSSION

The purpose of this study was to evaluate the feasibility and effectiveness of supporting teachers to use SAs to inform development of ABIs to reduce challenging behavior or increase engagement of children at risk for social-emotional delays in EC classrooms. This study contributed to the existing literature by addressing the following issues: continued evaluation of classroom personnel as SA implementers (Huber et al., 2018, Park & Scott, 2009), assessing generalization and maintenance of intervention effects (Park & Scott, 2009; Stichter et al., 2009), assessing social validity of the assessment and intervention process (Kretzer & Hemmeter, 2018; Losinski et al., 2014), and replicating SA and ABI development procedures used with older children (Stichter et al., 2009).

This study utilized ATDs to evaluate the effectiveness of each ABI, implemented by classroom teachers, within targeted classroom activities on children's target behaviors. For Chester and Sara, the ABI resulted in decreased levels of challenging behavior, and for Ann, the ABI resulted in higher levels of engagement when compared to baseline. Further, decreased levels of challenging behavior for Chester and Sara and increased levels of engagement for Ann were observed during post-generalization probes that occurred following the initial baseline condition (i.e., best alone, maintenance) and in maintenance probes. Consistent with prior research, results of this study demonstrate that with support, EC teachers were able to conduct SAs, develop ABIs, and implement ABI procedures in their classrooms with fidelity (Park & Scott, 2009; Stichter et al., 2009). Teachers also reported that the procedures were feasible and

effective methods of developing ABIs and addressing challenging behavior or increasing engagement in their classrooms. This is further supported by procedural fidelity of teacher implemented ABI procedures in maintenance probes and generalization probes that occurred following the initial baseline condition. In each of the three maintenance probes conducted in Teacher 1's classroom, she used either five or six of the eight ABI fidelity steps with Chester. While she only implemented two of the eight ABI fidelity steps in the best alone generalization probe, she increased her fidelity in the maintenance generalization probe and used six of the eight steps. Teacher 2 did not maintain high levels of fidelity to ABI procedures with Sara during maintenance or generalization probes, using between two and four of the eight ABI fidelity steps in each probe. However, when working with the second target child in her classroom, Ann, she used five of seven ABI fidelity steps in the single maintenance session and used six of the seven steps in the best alone generalization probe. The increase and maintained use of ABI procedures demonstrated by both participating teachers is further validation of the process and its results.

In contrast to functional analysis procedures that seek to determine broad functions of behavior (e.g., escape), the SA process used in this study as part of each child's FBA provided teachers with a direct link between identified antecedent variables (i.e., teacher proximity, structure) and challenging behavior or engagement in their classroom. Chester and Sara's teachers used SAs to confirm teacher proximity and increased structure as antecedent variables that were effective for decreasing challenging behavior during center time. Increased structure was provided via teacher led pre-planning before center time and teacher proximity was provided through non-contingent teacher check-ins during centers. These findings were consistent with previous studies (Park & Scott, 2009; Stichter et al., 2009). Prior research was also supported by

the SA for Ann which confirmed that increased structure and teacher proximity were effective ways to increase her engagement in the classroom (Stichter et al., 2009).

This study expanded upon the work of Park and Scott (2009) by controlling for and measuring consequence variables (i.e., teacher responses to CB, teacher provision of positive behavior specific praise). Across baseline, assessment, and intervention sessions, teachers were instructed to continue responding to challenging behavior as they typically would, and these responses along with behavior specific praise statements were tracked and compared between baseline and intervention conditions. Teacher responses to challenging behavior of all target children were inconsistent but low across all conditions. A slight increase in positive behavior specific praise made by teachers was demonstrated between baseline and intervention sessions for all target children. While no explicit instruction was provided to teachers to provide positive behavior specific praise, teachers were instructed to interact more with target children as part of their increased proximity, and this is likely the reason for the small increase observed between baseline and intervention conditions. This study further expanded upon previous work by including generalization (Park & Scott, 2009; Stichter et al., 2009) and maintenance (Park & Scott, 2009) probes. Reduced levels of challenging behavior for Chester and Sara and increased levels of engagement for Ann were observed in both maintenance and generalization probes when compared to probes during the initial baseline condition.

Limitations

While the ABIs used in this study were effective for reducing challenging behavior and increasing engagement of target children, several limitations must be considered. First, while the EC teachers were directly involved in the SA, ABI development, and ABI implementation

processes, it remains unclear how much training would be needed for teachers to effectively implement these processes without ongoing support from a researcher. Second, direct comparisons between individual antecedent manipulations (i.e., teacher proximity, increased structure) found to be effective in SAs were not evaluated. Rather, effective antecedent manipulations from SAs were combined into an ABI package and compared to baseline conditions using ATDs for each child. Third, the researcher provided visual cues to teachers in every intervention session to provide non-contingent check-ins with target children which limits the interpretation of how feasible each ABI would have been for the teacher to implement independently.

Implications for future research

The FBA components used to develop hypotheses to be tested via SAs in this study included questions taken from structured interview questionnaires (i.e., PTR-YC, FAI) and ABC observations. While this combination of assessment procedures proved to be effective when constructing hypotheses, additional research is needed to evaluate whether each component is necessary, or if a more efficient process exists. It is possible that hypotheses could have been developed more quickly (e.g., following a single ABC observation, immediately following the teacher interview), though this might result in conducting SAs to confirm hypotheses that are, in fact, not predictive of the target behaviors.

During the process of developing hypotheses, testing them via SA, and developing ABIs, teachers' input was considered relative to their preferences and perceived feasibility of implementing the ABIs within their daily classroom routines. However, the process was facilitated from beginning to end by the researcher who provided high levels of support to the

teacher (i.e., design of SAs, ABI framework with suggestions of antecedent variables to examine in SAs, suggestions for ABI components). The original intent was for this process to be largely led and completed by teachers. Ultimately though, participating teachers required support to complete the process as they had little prior training in behavior support. It is encouraging that teachers reported that they would feel confident using information from a SA to develop ABIs on their own. This is an interesting finding that should be examined in future studies, perhaps by helping a teacher through the process initially and then having the teacher complete it for an additional child on their own. While this process was not attempted with Teacher 2 (who had two children in the study), she indicated anecdotally that she felt more comfortable with the study procedures when working the second target child (Ann). Future studies should seek to determine (1) which part(s) of the process are most difficult for teachers so that additional training can be targeted for those procedures, and (2) whether ABIs developed independently by teachers are effective.

Additional research is also needed to directly compare and evaluate the effectiveness of individual antecedent manipulations (e.g., teacher proximity, increased structure), identified during SAs, on challenging behavior and engagement of children at risk for social emotional delays in EC classrooms. Both teachers in this study expressed interest in combining effective antecedent variables into a package with the assumption that this approach would increase the likelihood of reducing challenging behavior or increasing engagement of the target child in their classroom. However, it is possible that a single antecedent component would be as effective as a combined ABI package in creating desirable behavior change for this population. It is also possible that a single antecedent component would be effective but not as efficient or less effective than a combined ABI package. Additionally, while procedural fidelity was high for

ABI implementation across teachers during intervention sessions, individual antecedent manipulations may require less teacher attention and/or time, which could further increase its social validity and likelihood of maintenance in the classroom.

Finally, the length of intervals between non-contingent teacher check-ins was determined in this study based on baseline levels of challenging behavior or engagement for target children, according to the longest observed length of time without challenging behavior or with active engagement within the classroom. Intervals between check-ins for Chester and Sara were directly aligned with their baseline data; however, the interval for Ann was determined by the teacher to be too short (i.e., 1.5 min) to be feasible within the classroom. The interval for Ann was therefore increased to 2 min between non-contingent teacher check-ins, and this was found to be effective as part of her ABI package. Based on the ABIs found to be effective for the children in this study, future studies should make direct comparisons between non-contingent teacher check-ins at different interval lengths to determine the ideal interval that maximizes therapeutic effects for target children.

Implications for practice

This study demonstrated the effectiveness of ABIs as a minimally invasive procedure to reduce challenging behavior or increase engagement of children at risk for social-emotional delays, in EC classrooms. The antecedent manipulations made for each child were relatively simple, and ABI components were implemented with high levels of fidelity by both teachers for all target children. High fidelity implementation speaks to the feasibility of each ABI and potentially, the level of buy-in teachers felt towards the entire behavior support process. This outcome was no accident. Involving teachers directly in the development of ABIs was a priority

in this study as it seemed to be the surest way to increase teacher investment. Having teachers guide the ABI development process also helped ensure that the identified interventions would be feasible and sustainable within their classroom. Findings from this study serve to validate this process as observed decreases in challenging behavior and increased levels of engagement maintained for target children following intervention.

Second, when conducting SAs in EC classrooms, it may be necessary to provide a framework similar to the one used in this study (see Appendix B) to guide teachers in the selection of antecedent manipulations to compare. When conducting a functional analysis, the options for analog comparisons are clearly established (i.e., escape, attention, tangible, alone/ignore, control; Beavers et al., 2013; Hanley et al., 2003) and training can be provided to teachers to conduct this process with fidelity (Lloyd et al., 2016). However, because there are so many potential antecedent variables that may play a role in a child's classroom behavior, a framework to assist teachers in narrowing down potential antecedent variables that are relevant in different classroom activities, may be key.

Third, it is interesting that the ABIs developed with teachers ended up being very similar across target children, even though their target behaviors were different (i.e., challenging behavior, engagement). Each child's ABI included antecedent components that increased both structure and teacher proximity with them. While the sample size of the study is small, it is possible that certain antecedents (e.g., increased teacher proximity, high structure) are simply good practices to be mindful of in EC classrooms. Training and support for teaching practices such as these in EC settings should be a priority.

Conclusion

The effectiveness of ABIs to reduce challenging behavior (Kretzer & Hemmeter, 2018; Machalicek et al., 2007; Park & Scott, 2009; Stichter et al., 2009) and increase engagement (Stichter et al., 2009) has been demonstrated previously and there is an emerging body of work that demonstrates the utility of SA practices within school-based settings (Lloyd et al., 2016; Losinski et al., 2015; Umbreit & Blair, 1997). The current study extended the research on ABIs and SA by enlisting EC teachers to conduct the assessment, develop ABIs, and implement ABIs with young children at risk for social emotional delays. With support from the researcher, teachers in this study successfully implemented SA procedures and developed effective ABIs for target children in their classrooms. Decreases in challenging behavior were observed and maintained for Chester and Sara, while increased levels of engagement were observed and maintained for Ann. Continued research and systematic replications utilizing EC classroom personnel as developers and implementers of ABIs is needed to better understand what level of training and support are required for independent behavior management and prevention in EC settings.

Appendix A

Teacher Report

Student Initials: _____ Teacher: _____ Date: _____

1. Student demographics:
 - a. Date of birth: _____
 - b. Sex: _____
 - c. Race: _____
 - d. Diagnosis: _____
 - e. Special Education eligibility (please circle): Yes No
 - f. Currently receiving special education services: Yes No
 - g. Currently has a behavior support plan in place: Yes No
2. Does the student use verbal communication in your classroom?
Yes No Not Sure
3. Is the student a non-native English speaker with limited English comprehension?
Yes No Not Sure
4. Does the student have consistent school attendance (no more than 2 absences per month)?
Yes No Not Sure
5. During teacher led activities, does the child engage in high rates of challenging behavior (e.g., verbal disruptions, aggression towards others, being off-task by leaving the activity area or playing with objects)?
Yes No Not Sure

Appendix B

ABI Framework by Classroom Activity

ABI Framework by Classroom activity		
Child Behavior to Address	Possible ABI Components	Examples
Circle Time		
CB occurs when child is given a direction	<ul style="list-style-type: none"> • Provide choices 	<ul style="list-style-type: none"> • Where to sit • Order/sequence of activity • Song • Peer buddy
Child engages in CB or is not engaged in circle time	<ul style="list-style-type: none"> • Embed preferences into activity 	<ul style="list-style-type: none"> • Hold a favorite toy • Sit next to a preferred adult/peer
	<ul style="list-style-type: none"> • Increase structure 	<ul style="list-style-type: none"> • Activity schedule • Visual of rules/expectations
	<ul style="list-style-type: none"> • Environmental arrangement 	<ul style="list-style-type: none"> • Assigned seat • Proximity to teacher • Proximity to specific peer
Free Play/Centers		
CB occurs when child is given a direction	<ul style="list-style-type: none"> • Provide choices 	<ul style="list-style-type: none"> • Which center to play in • Peer buddy • Materials to use
Child engages in CB or is not engaged	<ul style="list-style-type: none"> • Embed preferences in to activity 	<ul style="list-style-type: none"> • Play with preferred peer/adult • Preferred materials
	<ul style="list-style-type: none"> • Increase structure 	<ul style="list-style-type: none"> • Activity schedule • Visual play sequence • Pre-planning • Provide play ideas
	<ul style="list-style-type: none"> • Environmental arrangement 	<ul style="list-style-type: none"> • Proximity to teacher • Define center boundaries
Small Group		
CB occurs when child is given a direction	<ul style="list-style-type: none"> • Provide choices 	<ul style="list-style-type: none"> • Where to sit • Order/sequence of activity • materials

Child engages in CB or is not engaged	<ul style="list-style-type: none"> • Embed preferences into activity 	<ul style="list-style-type: none"> • Preferred materials • Sit next to preferred peer/adult • Hold a favorite toy
	<ul style="list-style-type: none"> • Increase structure 	<ul style="list-style-type: none"> • Activity schedule • Visual of rules/expectations
	<ul style="list-style-type: none"> • Environmental arrangement 	<ul style="list-style-type: none"> • Proximity to teacher • Number of children in group • Where group is conducted • Change peers who are in the group
Child does not complete activity/task	<ul style="list-style-type: none"> • Activity simplification 	<ul style="list-style-type: none"> • Break down task/activity into smaller, more manageable parts • Change or reduce number of required steps

Arrival/Departure

Child engages in CB or is not engaged when entering or leaving the classroom	<ul style="list-style-type: none"> • Increase structure 	<ul style="list-style-type: none"> • Activity schedule • Visual of rules/expectations
	<ul style="list-style-type: none"> • Embed preferences into activity 	<ul style="list-style-type: none"> • If possible, have child engage in a preferred activity upon entering classroom • Talk with the child about their favorite part of the day and what they want to do tomorrow

Transitions

CB occurs when child is given a direction	<ul style="list-style-type: none"> • Provide choices 	<ul style="list-style-type: none"> • Choice of how to transition (e.g., hop, walk sideways) • Choice of transition song
Child engages in CB or is not engaged in transition	<ul style="list-style-type: none"> • Adult support 	<ul style="list-style-type: none"> • Provide individualized verbal warnings prior to transition • Use short, explicit, consistent language for transition

	<ul style="list-style-type: none"> • Visual supports 	<ul style="list-style-type: none"> • Visual timer • Visual schedule • Visual of rules/expectations • Transition song
	<ul style="list-style-type: none"> • Embed preferences into transition 	<ul style="list-style-type: none"> • Child's preferred transition song • Transition with a preferred item • Transition with a preferred peer/adult
	<ul style="list-style-type: none"> • Environmental arrangement 	<ul style="list-style-type: none"> • Proximity to teacher • Lights on/off

Meal Time		
CB occurs when child is given a direction	<ul style="list-style-type: none"> • Provide choices 	<ul style="list-style-type: none"> • Where to sit • What to eat/drink first
Child engages in CB or is not engaged in mealtime activities	<ul style="list-style-type: none"> • Embed child preferences 	<ul style="list-style-type: none"> • Sit next to preferred peer/adult • Use preferred eating utensils/materials • Hold favorite toy • What to talk about during meal time
	<ul style="list-style-type: none"> • Visual supports 	<ul style="list-style-type: none"> • Visual timer • Visual activity schedule • Visual of rules/expectations
	<ul style="list-style-type: none"> • Environmental arrangement 	<ul style="list-style-type: none"> • Teacher proximity • Where to sit at table

Nap Time		
CB occurs when child is given a direction	<ul style="list-style-type: none"> • Provide choices 	<ul style="list-style-type: none"> • Where to place mat • Which way to lay on mat •
Child engages in CB or is not quiet	<ul style="list-style-type: none"> • Embed child preferences 	<ul style="list-style-type: none"> • Hold favorite toy • Select quiet activity to do on mat • Place mat next to preferred peer/adult
	<ul style="list-style-type: none"> • Visual supports 	<ul style="list-style-type: none"> • Visual timer • Visual activity schedule

		<ul style="list-style-type: none"> • Visual of rules/expectations
	<ul style="list-style-type: none"> • Environmental arrangement 	<ul style="list-style-type: none"> • Teacher proximity • Proximity to classroom materials • Lights on/off

Note: Framework suggestions and examples were pulled from Building Blocks for Teaching Preschoolers with Special Needs 2nd Edition (Sandall & Schwartz, 2008) and Cara's Kit for Toddlers: Creating Adaptations for Routines and Activities (Campbell, Kennedy, & Milbourne, 2012).

Appendix C

Procedural Fidelity form for Teacher Training

Teacher ID: _____ Trainer ID: _____

Session date: _____

Date fidelity completed: _____ Fidelity coder ID: _____

Reliability: Yes No Reliability coder ID: _____

Training Components	Rater Score
Opening the Meeting	
Trainer thanked teacher for participating in the study	Yes / No
ABI components	
Trainer introduced ABI materials and/or contextual manipulations	Yes / No
Implementing the ABI	
Trainer explained to the teacher that the ABI should not be implemented during the target activity in baseline sessions	Yes / No
Trainer explained to the teacher that the ABI will be implemented during the target activity in all intervention sessions	Yes / No
Trainer explained to the teacher that during intervention sessions they will implement the same target activity as in baseline while also manipulating and/or introducing the contextual variables that are components of the ABI for their target child.	Yes / No
Trainer explained to the teacher how to use ABI materials and/or make contextual manipulations during the target activity	Yes / No
Trainer modeled how the ABI should be implemented during the target activity	Yes / No
Teacher practiced implementing the ABI with the trainer	Yes / No
Trainer provided performance feedback to the teacher while they practiced implementing the ABI	Yes / No
Responding to Challenging Behavior	
Trainer explained to the teacher that they should continue to interact with the target child and respond to challenging behavior	Yes / No

using their typical classroom procedures in every study session (i.e., SA, baseline, intervention, generalization, maintenance).	
Explanation of the Procedural Fidelity form for Study Sessions	
Trainer explained to the teacher that a procedural fidelity form will be used to track their adherence to study procedures in each of the study conditions (i.e. SA, baseline, intervention, generalization, maintenance).	Yes / No
Opportunity for Teacher to ask Questions	
Trainer asked the teacher if they had any questions.	Yes / No
Trainer answered all teacher questions and checked for teacher affirmation of comprehension.	Yes / No
Closing the meeting	
Trainer thanked the teacher for participating in the training and the study.	Yes / No
Number of “yes” responses	Y =
Number of “no” responses	N =
$Y / (Y + N) \times 100$	PF score:

Appendix D

Social Validity Questionnaire on Acceptability and Feasibility of FBA and SA

Please answer the following questions on a scale of 1-6 using the scoring guidance below

1	2	3	4	5	6
Strongly disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly agree

1. The structured interview and questionnaires took too long to complete

1 2 3 4 5 6

2. The structured interview and questionnaires asked questions relevant to the child's challenging behavior and in my classroom

1 2 3 4 5 6

3. The direct observations conducted by the researcher interfered with ongoing classroom activities

1 2 3 4 5 6

4. It would be possible for me to complete the direct observations for a student in my classroom

1 2 3 4 5 6

5. I felt confident using the Functional Assessment Hypothesis Formulation Protocol to develop hypotheses that predicted the occurrence and non-occurrence of challenging behavior or engagement for the child.

1 2 3 4 5 6

6. Developing hypotheses took too long to complete

1 2 3 4 5 6

Please answer the following questions on a scale of 1-6 using the scoring guidance below. Structural analysis sessions occurred before the development of the antecedent-based intervention and included all sessions when contextual manipulations were implemented to determine which contextual manipulations would be effective antecedent-based intervention components.

1	2	3	4	5	6
Strongly disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly agree

7. Implementing structural analysis sessions was feasible in my classroom

1 2 3 4 5 6

8. Implementing structural analysis sessions interfered with ongoing classroom activities

1 2 3 4 5 6

9. Structural analysis sessions provided valuable information on contextual factors that affect the child's challenging behavior or engagement

1 2 3 4 5 6

10. I felt confident using information from the structural analysis to develop antecedent-based interventions with the researcher

1 2 3 4 5 6

11. I would feel confident using information from a structural analysis to develop antecedent-based interventions on my own

1 2 3 4 5 6

Appendix E

Blind Rater Social Validity Questionnaire

Confidential

Page 1

ABI Social Validity AB

Please complete the survey below (for video order A-B).

Thank you!

Please complete the following demographic questions.

What is your highest educational degree and in what field (e.g., MS in Applied Behavior Analysis, PhD in Special Education)?

How old are you (in years)?

What is your gender?

- Female
- Male
- Other
- Prefer not to say

What is your race/ethnicity? Choose all that apply.

- Black
- White
- Hispanic
- Asian descent
- Middle Eastern descent
- Other
- Prefer not to say

What other race/ethnicity do you identify with?

Confidential

Page 2

Please complete the following questions related to your experience with young children (aged 0-5 yrs).

What is/was your role working with young children (aged 0-5 yrs)? Choose all that apply.

- Special education teacher
- Regular education teacher
- BCBA
- RBT
- Other

What other role did you serve when working with preschool children?

What population of young children have you had direct experience working with (in a professional capacity)? Choose all that apply.

- children with disabilities
- children without disabilities
- children with ASD
- children with severe challenging behavior

Please select the following:

Please select your video set.

- Chester
- Sara
- Ann

Please select which video you've been assigned to watch first.

- A
- B

STOP!

Please watch Video A before completing the next section. A description of the target child in video A is provided in the email you received with instructions on completing the social validity assessment.

Please answer the following questions in response to the child behavior in Video A.

The child in the video appeared to:

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Demonstrate acceptable levels of challenging behavior.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Demonstrate appropriate communication with peers and/or adults.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Demonstrate age-appropriate levels of classroom engagement.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Display no negative effects from the procedures.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please answer the following questions in response to the adult behavior in Video A.

The adult in the video:

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Responded appropriately to the child, given the child's behavior.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Used strategies I would use in similar circumstances.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Engaged in behavior that upset me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

STOP!

Please watch Video B before completing the survey. A description of the target child in video B is provided in the email you received with instructions on completing the social validity assessment.

Please answer the following questions in response to the child behavior in Video B.

The child in the video appeared to:

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Demonstrate acceptable levels of challenging behavior.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Demonstrate appropriate communication with peers and/or adults.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Demonstrate age-appropriate levels of classroom engagement.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Display no negative effects from the procedures.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please answer the following questions in response to the adult behavior in Video B.

The adult in the video:

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Responded appropriately to the child, given the child's behavior.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Used strategies I would use in similar circumstances.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Engaged in behavior that upset me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please answer the following questions in response to the adult behavior in Video B.

The adult behavior depicted in the video:

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Is developmentally appropriate for preschool children.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Would not be difficult to implement in a 1:1 setting.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Would not be difficult to implement in a group setting.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Would result in positive behavior change within a short period.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Could be used across children, behaviors, and settings.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Appendix F

Chester's ABI Script

Which center would you like to play in first?

Wait for a response. If no response, prompt C to pick a center from the visual

That's great! In the _____ center you can _____ or you can _____.

Provide a suggestion of something he can do in the center by himself **AND** something he can do with a friend (**One of each**). See below for examples to provide.

Center	Alone	With a Friend
Blocks	Build a tower or a house	Build a city with a friend
Home Living	Cook something you want to eat	Cook a meal to eat with a friend
Manipulatives	Do a puzzle	Play a game with a friend
Art	Draw a picture of yourself	Make a picture with a friend
Books	Read quietly	Tell a story to a friend
Science	Explore the center with a magnifying glass	Pretend to have a plant store with a friend
Sensory	Sort rice and beans	You can sort rice and a friend can sort beans

Tell me what you are going to do in the _____ center

Have C. tell you what he is going to do in the center. It is alright if he wants to do something other than the suggestions you provided. Once he has told you what he wants to do, he is free to go play in the center.

Awesome! Have fun!

Appendix G

Sara's ABI Script

Which center would you like to play in first?

Wait for a response. If no response, prompt S to pick a center from the visual

That's great! In the _____ center you can _____ or you can _____.

Provide a suggestion of something she can do in the center by herself **AND** something she can do with a friend (**One of each**). See below for examples to provide.

Center	Alone	With a Friend
Blocks	Build a tower or a house	Build a city with a friend
Home Living	Cook something you want to eat	Cook a meal to eat with a friend
Manipulatives	Do a puzzle	Play a game with a friend
Art	Draw a picture of yourself	Make a picture with a friend
Books	Read quietly	Tell a story to a friend
Science	Explore the center with a magnifying glass	Pretend to have a plant store with a friend

Tell me what you are going to do in the _____ center

Have S. tell you what she is going to do in the center. It is alright if she wants to do something other than the suggestions you provided. Once she has told you what she wants to do, she is free to go play in the center.

Awesome! Have fun!

Appendix H

Ann's ABI Script

Which center would you like to play in first?

Wait for a response.

That's great! In the _____ center you can _____ or you can _____.

Provide a suggestion of something she can do in the center by herself **AND** something she can do with a friend (**One of each**). See below for examples to provide.

Center	Alone	With a Friend
Blocks	Build a tower or a house	Build a city with a friend
Home Living	Cook something you want to eat	Cook a meal to eat with a friend
Manipulatives	Do a puzzle	Play a game with a friend
Art	Draw a picture of yourself	Make a picture with a friend
Books	Read quietly	Tell a story to a friend
Science	Explore the center with a magnifying glass	Pretend to have a plant store with a friend

I see that (name of peer) is over in the (selected center)

Tell me who you are going to play with in the _____ center and what you're going to play

Have A. tell you who she is going to play with in the center and what she is going to do. It is alright if she wants to do something other than the suggestions you provided. Once she has told you what she wants to do and who she is going to play with, she is free to go play in the center.

Awesome! Have fun!

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