# EFFECTS OF A COACHING PACKAGE ON TEACHER DELIVERY OF SUPPORTED OPPORTUNITIES TO RESPOND

by

Melissa Cook Tapp

A dissertation submitted to the faculty of
The University of North Carolina at Charlotte
in partial fulfillment of the requirements
for the degree of Doctor of Philosophy in
Special Education

Charlotte

2022

Approved by:

_____
Dr. Robert C. Pennington

_____
Dr. Charles L. Wood

_____
Dr. Virginia L. Walker

_____
Dr. Erin K. Washburn

# ABSTRACT

MELISSA COOK TAPP. Effects of a Coaching Package on Teacher Delivery of Supported Opportunities to Respond. (Under the direction of DR. ROBERT C. PENNINGTON)

Researchers have provided evidence of the effects of academic engagement on the achievement of all students. Despite the known benefits of academic engagement, low rates of engagement have been reported across studies examining engagement rates of students with extensive support needs (ESN). Students with ESN are often placed in more restrictive environments for intense instruction; however, researchers have observed students as less engaged and provided with fewer opportunities to respond (OTRs) during instruction in these settings.

Fortunately, researchers have identified effective practices for increasing student academic engagement. One practice is to increase teacher delivery of OTRs; however, students with ESN may require more intensive instruction and supports than what is provided through traditional OTRs. Often, students with ESN also have complex communication needs (CCN) and require supports to communicate. In addition to needing communication supports, students with ESN often benefit from systematic prompting to promote skill acquisition and maintenance. Students with ESN may be supported through a supported OTRs intervention. During instruction, this involves the delivery of an OTR, access to communication supports, and the delivery of a response prompt.

Efforts to increase teacher practices are often not sustained over time. Fortunately, coaching is form of professional development with a large research base demonstrating lasting impact on teacher behavior. There are several components in the coaching literature that have been shown to be effective. Therefore, the purpose of this study was to examine the effects of a

coaching package comprised of an initial training, a goal setting and meeting cancellation contingency, daily performance feedback, and follow-up coaching sessions on the frequency of teacher-delivered supported OTRs (i.e., deliver OTR, provide communication support, deliver prompt) to increase student engagement across three teachers and three students with ESN. All three teachers increased delivery of supported OTRs for the target student during small group instruction, while also increasing OTRs for all students in the group. In addition, all three target students increased active student responses (ASRs) during academic reading instruction and these results were maintained over time for two of the students.

This study extends the extant research on coaching in three ways. First, this study contributes to the research on the use of coaching by providing an effective model implemented by natural change agents (i.e., teachers) in natural settings (i.e., schools), specifically for teachers of students with ESN. Second, this investigation adds to the research on OTRs by examining the effects of supported OTRs for students with ESN. Third, this research adds to the literature on academic engagement and the use of communication supports and systematic prompting specifically for students with ESN. Researchers have long studied academic engagement, but less research has been conducted on the use of effective practices for increasing academic engagement with targeted supports for students with ESN.

# ACKNOWLEDGEMENTS

First, I would like to acknowledge my dissertation committee members. To Dr. Robert Pennington, thank you for being my advisor for the last three years. Without your support and guidance, I wouldn't be where I am today. I appreciate you continually pushing me to think deeper and am grateful to have you as a colleague and friend. Dr. Virginia Walker, thank you for providing me the opportunity to work on a wide range of projects. I have learned so much from you and appreciate your guidance, support, and friendship. Dr. Charles Wood, thank you for your support and encouragement throughout my master's and doctoral program. Your confidence in me as a student, teacher, and researcher has contributed to my overall growth. Dr. Erin Washburn, thank you for the time you have dedicated to my work. I appreciate your feedback and the expertise you bring to my team.

I also would like to thank the UNC Charlotte Department of Special Education and Child Development faculty. I am so thankful to have had the opportunity to learn from such a strong, supporting, and successful group.

Next, to my fellow doctoral students, I am so lucky to know you and work with you. Andy Masud-Werner, thank you for all of your support with my dissertation, I couldn't have done it without you. Monique Pinczynski, thank you for the time you dedicated to this project. Janet Enriquez, thank you for being a part of several of my projects. Amy Clausen, thank you for always being available to think through anything and everything. Paula Williams, you have been my rock throughout this program and I appreciate you so much. Thank you all so much for being amazing colleagues, but above all for being there to support me throughout this program.

Finally, to my husband, children, and family for supporting me throughout the last three years. Thank you for believing in me and for your patience, guidance, and love along the way.

TABLE OF CONTENTS

# LIST OF TABLES

# LIST OF FIGURES

# LIST OF ABBREVIATIONS

| | |
|---|---|
| AA-AAS | alternate assessments based on alternate achievement standards |
| AAC | augmentative and alternative communication |
| ASR | active student response |
| BST | behavioral skills training |
| CCN | complex communication needs |
| CISSAR | code for instructional structure and student academic response |
| CTD | constant time delay |
| CPR | communication opportunity, prompt, respond |
| CWPT | class wide peer tutoring |
| DD | developmental delay |
| EBASS | ecobehavioral assessment systems software |
| EBP | evidence-based practice |
| ECAT | ecobehavioral classroom assessment tool |
| ESN | extensive support needs |
| MOOSES | multiple option observation system for experimental studies |
| MS-CISSAR | mainstream version of the code for instructional structure and student academic response |
| OTR | opportunity to respond |
| PECS | picture exchange communication system |
| PF | performance feedback |
| SGD | speech generating device |
| SLP | system of least prompts |
| SES | socioeconomic status |

# CHAPTER 1: INTRODUCTION

## Statement of the Problem

Several decades of research show that academic engagement leads to gains in student achievement (Fisher et al., 1981; Greenwood, 1991; Hattie, 2008; Klem & Connell, 2004; Rosenshine & Berliner, 1978; Scott et al., 2014; Sutherland et al., 2003); however, researchers have reported low levels of academic engagement in schools. Academic engagement can be defined as an enabler in promoting academic skills and achievement that involves specific classroom behaviors (e.g., writing, reading aloud, talking about academic content, asking, and answering questions). Ysseldyke and colleagues (1987) gathered descriptive data on student responses and found that students were academically engaged (i.e., active and passive engagement) for about half of the observed time and students spent even less time actively responding during instruction. Greenwood et al. (2002) observed and collected data on student behaviors, classroom ecology, and teacher behaviors and found wide variability in academic engagement and responding across students. In a more recent study, Hirn and Scott (2014) observed teachers and students during academic instruction. They found that rates of teacher-delivered opportunities to respond (OTRs), rates of feedback, and levels of student engagement were overall low, and more so for students exhibiting challenging behavior.

Despite the known benefits of academic engagement, low rates of engagement also have been reported across studies examining engagement rates of students with extensive support needs (ESN; Carter et al., 2008; Gross Toews et al., 2021; Kurth et al., 2016; Pennington & Courtade, 2015). Individuals with ESN are those with a disability label of autism, developmental disability, multiple disability, or intellectual disability who require ongoing pervasive support

and often participate in alternate assessments based on alternate achievement standards (AA-AAS; Taub et al., 2017). Students with ESN are often placed in more restrictive environments for intensive instruction. As such, researchers have observed students as less engaged and provided with fewer OTRs during instruction in these settings. Pennington and Courtade (2015) conducted 35 observations of programs for students with ESN examining multiple variables (e.g., instructional arrangement, active and passive student engagement, OTRs, teacher-delivered feedback). Findings indicated low levels of active engagement, high levels of passive engagement, and low presentation of OTRs. In another study, Kurth et al. (2016) examined ecobehavioral characteristics of presumed high quality self-contained high school classrooms for students with ESN and found similar results. Students were provided few OTRs and often passive observers in instructional activities, and there was a lack of individualization and communication supports. Most recently, Gross Toews and colleagues (2020) investigated inclusive classrooms serving students with ESN. Data revealed that students were minimally engaged in small group activities and were observed to use limited communication supports. Overall, the researchers reported a lack of academic instruction, frequent breaks, lack of access to communication supports, and limited time with certified teachers.

**Increasing Engagement**

Fortunately, researchers have identified effective practices for increasing the academic engagement of students. For example, several researchers have examined the effects of teacher-delivered OTRs on active student engagement (Common et al., 2020; Greenwood et al., 1984). OTRs are teacher-delivered directions, questions, or prompts (i.e., verbal, visual, written) that occasion student active responses (i.e., verbal, written, gestural, action; MacSuga-Gage & Gage, 2015). Sutherland and Wehby (2001) reviewed studies that examined the effects of OTRs for

students with emotional and behavior disorders. They found that increased OTRs led to improvements in academic performance and engagement and decreased disruptive behaviors. In a similar review, MacSuga-Gage and Simonsen (2015) reviewed literature on the effects of OTRs for students with and without disabilities. Their findings revealed increases in academic and behavioral outcomes across all student populations. Additionally, increases in responses, participation, and on-task behavior were noted across studies with faster rates of OTR presentation. Finally, in the most recent review, Van Camp et al. (2020) analyzed experimental single-case design research to identify the most common methods used to increase OTRs. From this review, the researchers identified coaching and feedback, response cards, and peer-directed interventions as effective methods to increase delivery of OTRs.

**Supports for Students with ESN**

Although these reviews all provide promising information on the effects of OTRs and effective methods for implementation, the studies included few participants with ESN (Burns, 2007; Kamps et al., 1994; Wolery, Holcombe, et al., 1992). This may be due in part to the instructional supports necessary for teaching students with ESN. For example, students with ESN require intense interventions across multiple skill domains (e.g., academics, communication, behavior) and may have complex communication needs (CCN) that often require augmentative and alternative communication (AAC) supports. Students with ESN are primarily educated in more restrictive educational settings (e.g., self-contained classroom; Kleinert et al., 2015 U. S. Department of Education, 2021) and therefore may be limited in representation across the OTR literature. The current research base on OTRs includes studies that have primarily been conducted with students with high incidence disabilities in general education settings (Leahy et al., 2019; MacSuga-Gage & Simonsen, 2015; Sutherland & Wehby, 2001; Van Camp et al.,

2020), and have not examined OTRs for students with low-incidence disabilities such as students with ESN. Fortunately, researchers have identified effective practices for this student population. For example, researchers have identified ways to increase opportunities to engage in academic and social interactions (e.g., response cards; Berrong et al., 2007; Horn et al., 2010; Schnorr et al., 2016; shared reading; Gross Toews et al., 2021; Hudson & Test, 2011), ways to support communication needs (e.g., AAC; Ganz et al., 2012; O'Neill et al., 2018; Snell et al., 2006; Yorke et al., 2021) and teaching practices to support skill acquisition across all areas (e.g., response prompts; Browder et al., 2007; Cannella-Malone et al., 2021; Mims et al., 2012; Rosenbaum & Breiling, 1976; Saunders et al., 2020; Snell & Gast, 1981).

### *Increasing OTRs*

Two practices that have been demonstrated to be effective in increasing OTRs for students with ESN are response cards and shared reading. Using response cards involves teachers presenting a question or problem to students who then display their independent responses simultaneously (i.e., holding up a card or dry erase board, entering response into digital software). For example, a teacher may stop and ask several questions during a math lesson. Prior to the lesson, a teacher may provide students with preprinted cards or white boards. After asking a question, the teacher signals to students to enter their responses into digital software or hold up their responses (i.e., preprinted cards or white boards). This provides a format for all students to be engaged during instruction while also providing the teacher with a formative assessment of all student responses. Horn et al. (2010) implemented the use of response cards during math instruction for students with ESN. Their results showed increased active participation during the response card condition. Additionally, Berrong et al. (2007) implemented the use of response

cards during small group calendar instruction for students with ESN. The use of response cards increased active responding for all participants.

Shared reading is another practice used to facilitate and increase engagement of students with ESN during reading instruction. Shared reading (also called read aloud, repeated storybook reading, shared story reading, story-based lesson, and literacy-based lesson) involves reading a story aloud while also providing means for a student to interact with the reader about the text (Hudson & Test, 2011). Shared reading components often include repeated story lines, attention getters, picture symbols paired with words, summarized text, targeted vocabulary, repeated readings. Two different research teams have evaluated the research on shared reading (Hudson & Test, 2011; Gross Toews et al., 2021) and both found moderate levels of evidence supporting the use of shared reading as an evidence-based practice (EBP). Overall, implementing shared reading provides the student with several planned opportunities to engage during reading instruction.

### *Communication Supports*

Students with ESN often have CCN, which may impact their academic engagement in school. Snell et al. (2006) reported that natural school environments often are not equipped with available supports for all learners at all times; therefore, it may be that students are not always provided a means to communicate (Rowland & Schweigert, 2000). This may be a contributing factor to the low rates of OTRs in classrooms and the low levels of communicative responses observed by students with ESN, as students have been observed as having limited access to these supports (Gross Toews et al., 2020; Kurth et al., 2016). Students with ESN may require supports to access and attend to instruction (i.e., visual cues, speech-generating devices; Andzik et al.,

2016). These supports may include AAC in the form of pictures, objects, or speech generating devices (SGDs).

### *Response Prompts*

Finally, students with ESN may need support with overall skill acquisition. The research literature is replete with studies examining the effects of prompting systems to increase learning for students with ESN (Browder et al., 2007; Cannella-Malone et al., 2021; Mims et al., 2012; Rosenbaum & Breiling, 1976; Saunders et al., 2020; Snell & Gast, 1981). Two commonly used practices are constant time delay (CTD) and the system of least prompts (SLP). The effectiveness of both practices dates back to the 1960s and 1970s (Rosenbaum & Breiling, 1976; Touchette, 1968). These procedures have been shown to increase academic skill acquisition for students with ESN. For example, Browder et al. (2014) reviewed literature on EBPs for students with ESN and identified CTD and SLP as effective for teaching a variety of literacy skills. In a similar review, Spooner and colleagues (2019) reported that CTD and SLP were used in the majority of studies to teach math skills to students with ESN. More recently, Cannella-Malone et al. (2021) reviewed all literature targeting academic instruction for students with ESN and found that CTD and SLP were often used within intervention packages for improving skill acquisition.

### *Supported OTRs*

In response to the limited research on OTRs for students with ESN, one way to address this need is to combine several of these research-based practices to support the needs of these students. For example, students with ESN have CCN and may require communication supports. In addition, students with ESN may require prompting to increase accurate responding. Therefore, as a way to increase academic engagement for students with ESN, I recommend the

implementation of supported OTRs which includes the delivery of an OTR, access to communication supports, and delivery of a response prompt.

**Translating Research to Practice**

Although it is promising that researchers have identified numerous effective practices to support learners with ESN, researchers also report limited use of these practices in school settings (Cook & Odom, 2013; Fixen et al., 2005). Knight and colleagues (2019) surveyed special education teachers supporting students with autism or intellectual and developmental disabilities and found that teachers implemented a wide range of EBPs. Furthermore, teachers reported limited reliance on using practices supported by research. Brock et al. (2020) also surveyed special education teachers of students with autism spectrum disorder and found that only half of the teachers reported using EBPs. Finally, Andzik et al. (2019) reported on the perspectives special education teachers in relation to factors which impact AAC services of students with IDD gathered through qualitative interviews. Overall, teachers reported inconsistent implementation of communication supports due to inadequate training and preparation time.

Barriers to implementation may include insufficient preparation for preservice teachers (Pennington et al., 2021; Ruppar et al., 2018; Ryndak et al., 2001) and ineffective training for current teachers (Alexander et al., 2015; Hamrick et al., 2021; Hsiao & Sorensen Peterson, 2019). For example, Ryndak and colleagues (2001) interviewed faculty from institutes of higher education and less than half identified their programs as exemplary. Further, Ruppar et al. (2018) summarized the needs of future educators and highlighted the need for development of core practices (e.g., advocacy, systematic instruction) within teacher preparation programs. Additionally, Pennington and colleagues (2021) surveyed a national sample of faculty from

teacher preparation programs on the communication content in coursework and preparedness of their graduates to provide communication instruction. They found that, overall, content was addressed inconsistently across programs (i.e., entire course on communication, one session within a single course). In addition, they reported that teachers may not receive adequate training for communication instruction implementation. Hsaio and Sorensen Peterson (2019) surveyed special education teachers of students with autism and found that only 60% of teachers reported receiving training on specific EBPs. Similarly, Hamrick and colleagues (2021) surveyed special education teachers and only 5% reported accessing free trainings available online.

### *Coaching*

In light of these barriers to implementation, teachers need quality training and ongoing support (Alexander et al., 2015; Fixen et al., 2005). Fortunately, researchers have identified an effective method for scaling up use of effective practices in schools. Coaching is a professional development method with extensive literature support showing its effectiveness, efficiency, and sustainability of practices over time (Joyce & Showers, 1981; Wood et al., 2016). Kretlow and Bartholemew (2010) reviewed research on the use of coaching and identified common components that contributed to improved teacher implementation of EBPs. Overall, important features used during coaching were training, observations, feedback, and ongoing follow-up support. Kraft et al. (2018) conducted a review of studies that measured the impact of coaching on student achievement. They found that coaching had positive effects on teacher instruction and student achievement. Parks Ennis et al. (2018) reviewed studies in which coaching was targeted at increasing teacher delivery of behavior specific praise. Positive findings were demonstrated across all studies.

Additionally, coaching packages have been used to increase teacher use of practices that improve student academic engagement. For example, Reinke et al. (2014) coached teachers to increase delivery of several classroom management practices (e.g., positive teacher-student relationships, praise, precorrection). They coached teachers, which included the use of goal setting and performance feedback, and noted the use of performance feedback was associated with higher rates of implementation. In another study, Simonsen et al. (2010) implemented explicit training and performance feedback to increase teacher delivery of OTR and specific praise. Across participants, limited growth was observed after explicit training; however, with the addition of performance feedback, increases in delivery were observed across participants. These studies provide evidence on the impact that coaching can have on improving teacher implementation of practices that support student progress.

### *Coaching Teachers of Students with ESN*

Although there is extensive research on coaching, there are fewer studies on the effects of coaching for teachers of students with ESN. Bethune and Wood (2013) used coaching to increase teacher use of function-based interventions based on functional behavior assessments. All three teacher participants made substantial growth after coaching. In addition, Ganz et al. (2013) coached teachers to implement the Picture Exchange Communication System (PECS) protocol. After coaching and self-monitoring, the participants increased the number of PECS opportunities provided throughout the day for the student. In a recent study, Ivy et al. (2021) coached teachers and caregivers to deliver a planned instructional sequence (create a communication opportunity, prompt as needed, respond to child communication; CPR). Through coaching, CPR cycles increased across participants. There is a need for more research on the effects of coaching on the implementation of effective practices for students with ESN.

**Research Purpose**

Researchers must continue to disseminate effective strategies to support students with ESN, specifically to increase academic engagement for teacher implementation in schools. There is a need for sustainable implementation of effective practices to improve outcomes for all students. Teachers must be provided access to critical teaching knowledge, but also must be supported in the application of teaching practices in the classroom context. The reviewed studies provide evidence supporting the effects of coaching on increasing implementation of effective practices (e.g., OTRs, praise) for teachers; however, none of the studies directly targeted increasing teacher-delivered OTRs for students with ESN. There is a need for research in this area as researchers have reported that students with ESN are engaged in academic instruction at low levels and are presented with few OTRs. Specifically, more research is needed to examine the effects of coaching on practices designed to increase academic engagement of students with ESN. The purpose of this research is to examine the effects of a coaching package on the frequency of teacher-implemented supported OTRs (i.e., deliver OTR, provide communication support, deliver a response prompt) to increase student academic engagement.

**Research Questions**

1. Is there a functional relation between a multicomponent coaching package and the rate of supported OTRs delivered by teachers of students with ESN?
2. To what degree does the multicomponent coaching package intended to increase the rate of supported OTRs increase the rate of ASRs of students with ESN?
3. How do teacher participants perceive the feasibility and overall effects of the coaching package and supported OTRs interventions?

**Significance of the Study**

This study extends the extant research on coaching in three ways. First, this study contributes to the research on the use of coaching by providing an effective model implemented by natural change agents (i.e., teachers) in natural settings (i.e., schools), specifically for teachers of students with ESN. Second, this investigation adds to the research on OTRs by examining the effects of supported OTRs for students with ESN. Third, this research adds to the literature on academic engagement and the use of communication supports and systematic prompting specifically for students with ESN. Researchers have long studied academic engagement, but less research has been conducted on the use of effective practices for increasing academic engagement with targeted supports for students with ESN.

**Delimitations**

In this study, I will investigate the effects of a multicomponent coaching package on the frequency of supported OTRs delivered by teachers of students with ESN. It is important to note the study will be limited by the following: (a) this study will include a small group of teachers within one school district, therefore limiting the generalizability of results; (b) the primary dependent variable I will measure is teacher behavior, therefore the collateral effects on student outcomes also will be measured; and (c) I implemented this intervention with teachers of students with ESN in self-contained settings as the majority of students with ESN are often educated in self-contained placements, including the sample of students available for participation in this study.

**Definition of Terms**

The following terms will be important to understand within the context of this study.

***Academic Engagement:*** an enabler in promoting academic skills and achievement that involves specific classroom behaviors (e.g., writing, reading aloud, talking about academic content, asking, and answering questions).

***Active Student Response (ASR):*** "an observable response made to an instructional antecedent, which occurs when a student emits a detectable response to ongoing instruction" (Heward, 1994, p. 286).

***Augmentative and Alternative Communication (AAC):*** communication systems that serve as the primary communication mode for students with CCN. AAC may be unaided (e.g., sign language, gestures) with no additional equipment required or aided with the use of auxiliary equipment (e.g., picture cards, speech generating device; Reichle et al., 2019).

***Coaching:*** the delivery of ongoing, individualized feedback and support to promote sustained implementation of new teaching behaviors after initial training (Kretlow & Bartholomew, 2010).

***Complex Communication Needs (CCN):*** any individual who may derive substantial benefits from non-verbal means of communication or AAC interventions to support communication, language and literacy skills, and speech development (Light & McNaughton, 2012).

***Evidence-based Practices (EBPs): "***instructional techniques that meet prescribed criteria related to the research design, quality, quantity, and effect size of supporting research, which have the potential to help bridge the research-to-practice gap and improve student outcomes" (Cook & Cook, 2011, p. 71).

***Extensive Support Needs (ESN):*** individuals with a disability label of autism, developmental disability, multiple disability, or intellectual disability, who require ongoing pervasive support, and often participate in alternate assessments based on alternate achievement standards (AA-

AAS; Taub et al., 2017). This population of students make up 1% to 2% of all K-12 students in the United States (National Center for Education Statistics, 2021).

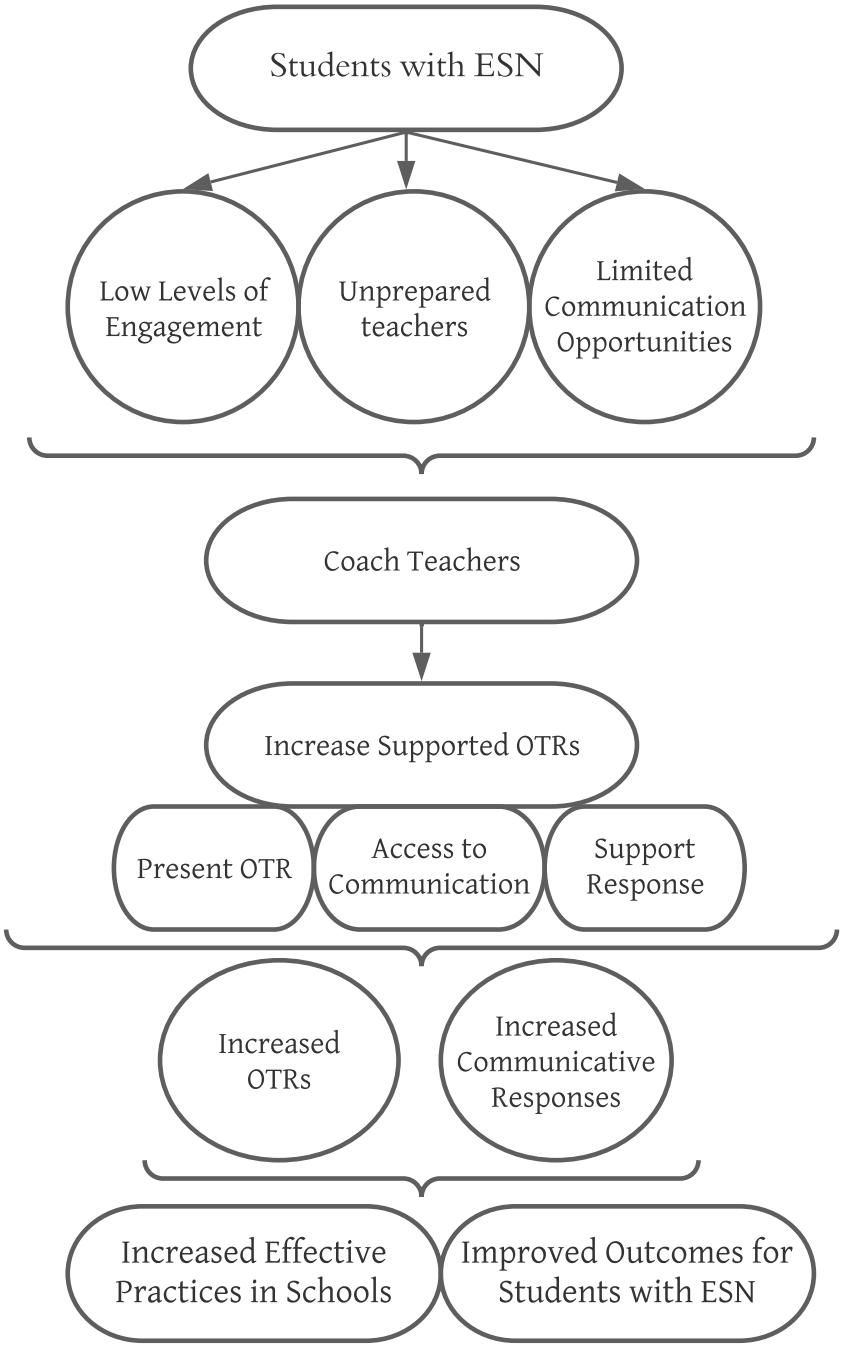
***Opportunity to Respond (OTR):*** "the interaction between (a) teacher formulated instruction (e.g., teacher prompt is given, question is asked, signal is provided to encourage response) and (b) its success in establishing the academic responding desired or implied by materials, the subject matter goals of instruction" (Greenwood et al., 1984, p. 64).

# CHAPTER 2: LITERATURE REVIEW

This chapter consists of the literature on the importance of academic engagement for all students, the needs of students with ESN and CCN, strategies to increase engagement for students with ESN and CCN during academic instruction, and the widely used practice of coaching to guide teachers in implementation of EBPs. The first section of the literature review includes historical information on the importance of academic engagement for all students, an explanation of the characteristics of students with ESN and CCN, and the current levels of engagement and communication opportunities presented for these students in school settings. The second section reviews practices with empirical evidence in increasing students' engagement in instruction. The final section presents literature on increasing teacher behavior through coaching. Figure 1 is a graphic representation of the foundation for this review of literature.

**Figure 1**

*Logic Model*



## Academic Engagement

The construct of academic engagement has received extensive research attention. Over the years, it has evolved from an early focus on the mere allocation of time spent delivering academic content to student engagement with the content (Rosenshine & Berliner, 1978). In 1978, Rosenshine and Berliner defined academic engaged time as both opportunities to learn and student attention or engagement in learning. The researchers reviewed studies from 1973 to 1978 that examined student variables and direct instruction of early elementary students. They observed a pattern across studies that revealed time spent engaged in relevant academic content was essential to achievement. They recommended researchers shift their emphasis to examine academic engaged time and identify specific ways to obtain increased academic engaged time for students.

Rosenshine and Berliner's (1978) seminal work was extended by Fisher and colleagues (1981), who examined teaching activities and classroom conditions that contributed to student learning. Across four years and a series of studies, they examined a range of variables related to allocated time, engagement, and achievement as part of the Beginning Teacher Evaluation Study. They developed the Academic Learning Time model, which identified time engaged in academic tasks as leading to higher levels of achievement. In their final field study, the researchers observed 46 teachers and 261 students during academic instruction and recorded data on student variables (i.e., involvement, on-task behavior, attending, nonengagement, success level) and teacher variables (i.e., presentation, monitoring, feedback) across 4 min intervals. They assessed student achievement in October, December, and May using a comprehensive achievement battery and gathered data on student attitudes. Next, they used a multiple linear regression model

to analyze and identify relations among the data. The researchers reported several significant findings, five of which focused on measures of ongoing student learning and the association with student achievement. A major finding was that academic learning time, allocated time, engagement rates, and success rates were all positively associated with achievement. These findings added to the growing literature base at that time identifying the importance of academic engagement and its impact on student achievement and learning.

Several researchers continued this line of investigation on the effects of academic engagement on achievement. Greenwood (1991) investigated the effects of engagement in academic instruction on academic achievement in a two-year longitudinal study. He sought to identify trends and differences in engagement among groups of students of different socioemotional status (SES) and to evaluate the effects of class-wide peer tutoring (CWPT) on students' time spent engaged. Finally, he assessed the impact of these variables on student achievement. He used a group design with three groups, a control group (low-SES), experimental group (low-SES), and a comparison group (high-SES). Teachers in the experimental group implemented CWPT. Across all conditions, teachers delivered pretests and posttests to assess progress and achievement. Researchers observed 56 target students and coded data using the Code for Instructional Structure and Student Academic Response (CISSAR; Greenwood, 1978). The researchers used momentary time sampling with 10 s intervals to gather data on several ecological and student behavior variables (i.e., academic activities, nonacademic activities, task structure, teacher position, teacher behavior, academic response, task management, competing response) during six observations of academic instructional time per student. Findings revealed students in the comparison group spent more time engaged in instruction over both the experimental and control groups. Additionally, achievement for students in the experimental and

comparison groups outperformed the control groups across subjects. Findings indicated engagement of students from low-SES can be increased with the implementation of specific classroom practices such as CWPT. Finally, the experimental and control groups performed higher on achievement tests which contributes to the literature supporting the effects of academic engagement on academic achievement.

**Rates of Engagement**

Despite extensive literature supporting the importance and benefits of engagement on student learning and achievement, researchers have reported consistently low levels of academic engagement. For example, Ysseldyke et al. (1987) observed 92 second to fourth grade students with and without disabilities in special education and general education classrooms using a modified version of the CISSAR (Greenwood et al., 1978). They collected data via momentary time sampling (i.e., 10 s intervals) for an entire school day (i.e., excluding noncurricular breaks) for each participant. The researchers collected data on specific student responses (i.e., writing, answering questions, raising hand) that were grouped into four composite variables (i.e., active academic response, academic engaged time, management, inappropriate). Findings revealed students in the general education setting spent 57% of the time academically engaged (i.e., active and passive responses), while ASRs occurred 28% of time. In addition, observations conducted in the special education setting revealed slightly higher rates, with academic engagement for 78% of the time and active responding 47% of the time.

In a later study, Greenwood and colleagues (2002) observed 64 teachers and 224 students with and without disabilities across differing achievement levels and schools using the Mainstream Version of the CISSAR (MS-CISSAR; Kamps et al., 1991). The purpose was to identify local normative “benchmarks” for engagement, identify differences among learners,

grades, and schools, and identify specific instructional situations with increased student responses and academic engagement. Researchers gathered data across three groups of variables: student behaviors, classroom ecology, and teacher behaviors. Findings indicated broad disparities in academic engagement and responding across students. For example, student responding ranged from 5 to 100% of intervals. They also noted that academic responding increased from kindergarten to second grade and stayed consistent across third, fourth, and fifth grade; however, it did not vary significantly across student ability levels or between students with and without disabilities. The use of worksheets, paper/pencil tasks, media, workbooks, and readers were conducive to higher levels of time spent engaged. Finally, the use of individual, one-on-one, or small group instruction resulted in higher levels of engagement and academic responding.

Further, Hirn and Scott (2014) gathered descriptive observational data on the rate/percentage of teacher and student behaviors in high school classrooms. They investigated differences in teacher and student engagement for students with and without challenging behavior. They conducted 827 15-min observations of teacher and student dyads within general education high school classrooms. They used the Multiple Option Observation System for Experimental Studies Version 3 (MOOSES$^{TM}$; Tapp et al., 1995) to collect data on teacher variables (i.e., teaching, not teaching, OTR, positive feedback, negative feedback) and student variables (i.e., disruption, off task, active engagement, passive engagement). The researchers reported teachers were observed teaching during 54% of the observation time. Group OTRs were delivered at a rate of 0.47 per min (once every 2.17 min) and individual OTRs to the target student were delivered at 0.06 per min (once every 16.67 min). Feedback was delivered to students in a ratio of 1:2.43 (positive to negative) at rates of 0.03 per min (once every 33 min)

positive to 0.08 per min negative (once every 12 min). Students were actively engaged during 42% of observations, passively engaged for 33%, and off task for 18% of observations. In addition, rates of OTRs were lower for students with challenging behaviors and negative feedback occurred at a greater rate (once every 9 min compared to once every 20 min). Finally, students with challenging behavior were observed to be actively engaged 36% of the time and passively engaged 29% of the time, with observed higher rates of challenging behavior and disruption. Findings from this study revealed that rates of teacher-delivered OTRs, feedback, and student engagement appear to be much lower than prior recommendations.

In a similar study, Gage et al. (2018) investigated the frequency of teacher practices (i.e., active teaching, OTRs, positive feedback, and negative feedback) and their relation to student behaviors (i.e., engagement, disruptive behaviors). Researchers observed 1,242 teacher-student dyads across 65 elementary schools using MOOSES$^{TM}$ software during classroom academic instructional routines. A four-class model was used to identify classroom categories (typical classroom management, above average classroom management, low interactions, low rates of classroom management) and teachers were grouped into one of the four classes. One interesting finding is that students were significantly less engaged in classrooms taught by teachers with low interactions and low rates of classroom management practices. This further supports that teacher behavior plays an important role in student engagement.

**Academic Engagement of Students with Extensive Support Needs**

Academic engagement is crucial for learning and achievement of all students; however, one population with historically low rates of academic engagement is students with ESN (Gross Toews et al., 2020; Kamps et al., 1991; Kurth et al., 2016; Pennington & Courtade, 2015). Students with ESN benefit from high-quality, effective instruction that promotes independence

and improves their quality of life (Browder et al., 2020). Individuals with ESN may meet eligibility for special education services with a disability label of autism, developmental disability, multiple disability, or intellectual disability, require ongoing pervasive support, and often participate in AA-AAS (Taub et al., 2017). Previously, individuals with ESN have been identified in the literature by several other terms including mental retardation, moderate to severe disability, and severely and profoundly handicapped. In recent years, terminology has shifted from a deficit perspective to a strengths-based approach focused on the supports an individual needs to be successful. This population of students make up 1% to 2% of all K-12 students in the United States (National Center for Education Statistics, 2021).

Students with ESN often have a range of support needs in the areas of academic instruction, behavior, communication, daily living skills, social skills, sensory, health, and motor skills (Kearns et al., 2011; Kurth et al., 2019; Taub et al., 2017; Towles-Reeves et al., 2009). These areas of need also may have a significant impact on their engagement in academic instruction. For example, students with ESN typically have fewer academic skills and exhibit slower rates of progress (Browder et al., 2020). To address this, students may need extensive and explicit instruction and repetition for learning basic skills (Kleinert et al., 2009). In addition, environmental factors may impact students' attention to academic instruction and supports are needed to minimize distractions. Finally, students' ability to actively engage in academic instruction is significantly impacted by their receptive and expressive language. If a student has limited receptive language skills, they may have difficulty understanding directives. Similarly, if a student needs support with expressive language, they also may need explicit instruction in the use of basic communication skills to respond during instructional activities. In addition, students with ESN and CCN may exhibit challenging behavior as a form of communication to access

preferred activities or escape nonpreferred activities resulting in less engagement in academic instruction.

Further, students with ESN who have limited communication repertoires may be referred to as having CCN. Reichle and colleagues (2019) defined individuals with CCN as "people with severe disabilities who are not verbally communicating and may have limited speech comprehension skills who may benefit from non-verbal means of communication" (p. 841). Students with CCN often require additional communication instruction and supports to participate in and benefit from daily instructional activities (Andzik et al., 2016; Kearns et al., 2011). For example, these students often benefit from the use of AAC and explicit instruction with modeling and repeated practice opportunities. Without access to appropriate instruction in communication and materials to support communication, students may miss out on opportunities for academic and social engagement.

Several researchers have reported on the engagement of students with ESN in schools. Kamps and colleagues (1991) conducted an ecobehavioral analysis using the MS-CISSAR of six self-contained special education classrooms that included 24 students, ages 5 to 11 years, with ESN. The researchers investigated the conditional probability of responses occurring under differing ecological conditions (e.g., ecological, teacher, and student variables) to identify effective teaching procedures. The researchers used a momentary time sampling procedure (i.e., 20 s intervals) and observed each student for a minimum of two full days. Findings indicated high and low student responding correlated with the use of materials and presentation or prompting by teachers. Researchers identified specific discriminative stimuli as accelerators for student responding (i.e., higher- paper/pencil tasks [.53], moderate- use of other manipulatives [hands on, pictures, flash cards], lower- teacher-student discussion [.32]) and observed higher

response rates during teacher facilitated activities during academic instruction. Instructional procedures that evoked higher student response rates included small groups (2-4 students), use of materials to enhance discussion, frequent rotations and different sets of materials, frequent group response, and fast paced random responding. In contrast, instructional arrangements in which academic responses were lower occurred during whole group instruction, turn taking discussions, when minimal materials were used, and during fewer teacher prompts.

Carter and colleagues (2008) conducted observations of secondary students with ESN, ages 12 to 18, across five schools. During observations, the researchers collected data using MOOSES$^{TM}$ software on the social interactions and academic participation of students during core academics or electives within general education settings. The researchers found that students were engaged in instruction 60.2% of the time and unengaged 37.4% of the time during core academic instruction, with similar results during elective courses. Levels of engagement were consistent with previous research indicating higher levels of engagement of students during small group and one-on-one instruction. Additionally, students were observed to be engaged at greater levels when in proximity of either a general education or special education teacher.

Researchers also have observed that students with ESN are often more passively engaged than actively engaged during academic instruction. For example, Pennington and Courtade (2015) observed 35 programs for students with ESN and examined instructional context, teacher behavior, and student engagement. They used the MOOSES$^{TM}$ software to gather data across 15 min intervals using event and duration recording systems. Overall, students spent 29% of the observations actively engaged in academic instruction and 62% of the observations passively engaged. They compared levels of engagement within separate schools to separate classrooms within traditional schools. Within traditional schools, students were observed actively engaged

for 32% of observations and passively engaged for 58% of observations; however, in separate schools, students were observed actively engaged during 24% of observations and passively engaged for 69%. This is concerning, as the intent of a separate school is to deliver more intensive support to students. Other noteworthy findings included that teachers presented low levels of OTRs. Overall, teachers presented OTRs across settings once every 1.6 min (i.e., group OTRs once every 3.13 mins; individual OTRs once every 1.33 mins) at variable rates across settings. Additionally, the researchers noted that across observations, student responses to OTRs were low with minimal error correction to facilitate correct performance.

In a similar observational study, Kurth et al. (2016) examined ecobehavioral characteristics of presumed high quality self-contained high school classrooms for students with ESN and reported similar findings. Researchers observed nine teachers and 19 students in self-contained high school programs across five schools. They used the ecobehavioral assessment systems software (EBASS; Greenwood et al., 1994) to collect data across several variables among three groups (i.e., classroom ecology, teacher behavior, student behavior). During these observations, special education teachers were the primary instructors in only 21% of the observations. Students were observed passively engaged in most instructional activities and were provided few opportunities to respond. Students engaged in academic activities such as reading, writing, and math at very low levels (i.e., 2%, 5%, and 14% of observations, respectively) and engaged in other academic tasks (i.e., stuffing envelopes or completing a puzzle) for 39% of the observations. In addition to academic engagement, students were observed engaging directly with teachers for only 5% of the observation and peers for 11%. Finally, researchers noted the lack of communication supports within the observed classrooms. Overall, students with CCN

interacted with teachers and peers less, were often passively engaged, were presented with limited OTRs, and had limited access to communication supports.

Most recently, Gross Toews et al. (2020) conducted an ecobehavioral analysis of inclusive classrooms serving 10 students with ESN, seven of which had CCN, by examining 76 variables across educator behaviors, student behaviors, and classroom ecology. Researchers conducted 8-min observations and collected data using a 20-s partial interval recording system using the Ecobehavioral Classroom Assessment Tool (ECAT; adapted version of the EBASS). Total observations were between 1hr and 6 hr per student with students engaged (i.e., active and passive) in 78.4% of intervals and responding during 71.6% of intervals. Noteworthy findings include that students with ESN and CCN were engaged in significantly less small group work and communication supports were only observed in 10.1% of intervals. Additionally, these students were educated primarily by paraprofessionals (46.6%). Students with ESN and CCN were more likely observed taking breaks or receiving no instructional action. Finally, students with CCN were more likely to access communication supports; however, there was a general lack of access to these supports. Some key implications include the need for access to communication supports. Lack of access to communication supports also may have contributed to the less frequent occurrence of students with CCN engaging in small group instruction. Researchers suggested future research should focus on the importance of and methods for providing accessible communication supports to students with CCN in inclusive settings.

**Summary**

Academic engagement has received extensive research attention and has evolved from allocation of time allotted for academic content to student engagement with academic content (Rosenshine & Berliner, 1978). Over time, researchers have reported the benefits of academic

engagement and the link between academic engagement and student achievement across multiple studies (Fisher et al., 1981; Greenwood, 1991; Rosenshine & Berliner, 1978), populations of students (e.g., students with and without disabilities), and environments (e.g., general education and special education settings).

Even with extensive literature supporting the importance of academic engagement, researchers have consistently reported low levels of academic engagement (Gage et al., 2018; Greenwood et al., 2002; Hirn & Scott, 2014; Ysseldyke et al., 1987). Additionally, researchers have reported students with ESN to be engaged with academic content at very low rates, have high levels of passive engagement, are presented with limited OTRs (Carter et al., 2008; Gross Toews et al., 2020; Kamps et al., 1991; Kurth et al., 2016; Pennington & Courtade, 2015), and are provided with limited access to communication supports (Gross Toews et al., 2020; Kurth et al., 2016). Students with ESN present with a range of support needs across skill domains and may require more intense interventions and supports to increase engagement in academic instruction. Fortunately, researchers have shown that academic engagement is sensitive to change in teacher behavior and amenable to intervention.

## Strategies to Increase Academic Engagement

Heward and Wood (2016) identified a range of measures used to assess academic engagement, then compared and ranked them from the least important (i.e., available time, allocated time) to the most important (i.e., ASRs, OTRs). OTRs can be teacher-delivered directions, questions, or prompts (i.e., verbal, visual, written) that occasion ASRs (i.e., verbal, written, gestural, action; MacSuga-Gage & Gage, 2015). OTRs are teacher behaviors delivered through lesson-related questions or prompts reported as count or rate. Active student responding is a measure of student behavior (i.e., count or rate) in response to questions or prompts from a

teacher. Both OTRs and ASRs can be measured during any lesson format, setting, or instructional routine or arrangement and are amenable to intervention (Van Camp et al., 2020).

OTRs and ASRs are essential to learning. Basic instruction and learning involve three-term contingencies: antecedents, responses, and consequences (Vargas & Vargas, 1991). As a learning trial, this involves the presentation of an OTR (antecedent), ASR (response), and instructional feedback (consequence; Haydon et al., 2012). The more frequently a student engages in learning trials, the more opportunities they have to learn. When teachers provide more OTRs, students are afforded increased opportunities to practice targeted skills and receive feedback resulting in increased academic engagement and, ultimately, improved academic performance. Further, as students increase engagement, they are less likely to engage in disruptive behavior. Finally, researchers have suggested that increasing OTRs is a practical approach to increasing student academic engagement in that teachers can easily control the delivery of OTRs and it requires few additional resources in terms of cost and time.

Multiple researchers have examined the evidence base for increasing OTRs to improve several classroom variables (e.g., student responding, on-task behavior, disruptive behavior, achievement). There have been several literature reviews of studies examining the effects of OTRs on student behavior. In 2001, Sutherland and Wehby reviewed research on the effects of OTRs on academic and social behaviors of students with emotional and behavior disorders (EBD). They identified six studies, all of which used single-case research designs and targeted academic behavior, task engagement, and/or disruptive classroom behavior. Although this review only included a small number of studies, results from all studies indicated that increased OTRs resulted in improved academic performance in reading and math and task engagement and measurable decreases in disruptive behaviors. The researchers also noted in their findings that

students in these studies were likely afforded more frequent opportunities for positive learning interactions and feedback (e.g., praise) due to increased rates of OTRs and ASRs. Additionally, they reported descriptive data from two studies with alarmingly low rates of OTRs (i.e., 0.02-0.16 per min), well below the recommended rate of 4 to 6 per min (CEC, 1987). The overall scope of this review was limited as it included a small number of studies and only looked at effects on students with EBD.

MacSuga-Gage and Simonsen (2015) extended Sutherland and Wehby's (2001) review by conducting a systematic literature review on the effects of OTRs on the behavioral and academic outcomes of students with and without disabilities. They also considered the effects by response modality (i.e., individual or unison responding) and presentation rates (i.e., fast or slow presentation of OTRs). They identified 15 total studies with 172 participants in first to eleventh grades included in this review. Twelve of the studies took place in elementary level classrooms and three were conducted in secondary settings. Across all studies, findings revealed positive outcomes on student academic and behavioral outcomes for students with and without disabilities. In addition, class-wide unison OTRs (i.e., directed to the whole class) resulted in higher outcomes across academic and behavioral variables versus individual OTRs (i.e., directed to individual students). Additionally, researchers determined these outcomes occurred when OTRs were presented at rates between 3 and 5 per min, suggesting this as an optimal rate of delivery for garnering positive effects.

Most recently, Van Camp et al. (2020) conducted a systematic literature review and meta-analysis of studies aimed at increasing OTRs and extended previous reviews by analyzing the methods (e.g., coaching and feedback, unison responding) used to increase OTRs. Researchers identified 29 studies that met the inclusion criteria of being conducted in school

settings (i.e., pre-kindergarten to twelfth grade), implementing a strategy to increase OTRs, and reporting data on OTRs in baseline and intervention conditions. Among the reviewed studies, the most commonly used methods to increase OTRs were coaching and feedback, response cards, and peer-directed interventions. Meta-analysis of studies using coaching and feedback revealed significant and large increases in OTRs consistently. Overall, coaching and feedback were reported to be an effective practice to increase teacher-delivered OTRs.

Although each of these reviews included articles targeting students with disabilities, few studies involved students with ESN (Kamps et al., 1994; Wolery, Holcombe, et al., 1992). As mentioned above, students with ESN have a range of support needs in the areas of academic instruction, behavior, communication, daily living skills, social skills, sensory, health, and motor skills (Kearns et al., 2011; Kurth et al., 2019; Taub et al., 2017; Towles-Reeves et al., 2009). Rates of academic engagement for this population of students are often low, which may be due in part to the need for supports across these domains. With supports, teachers can facilitate opportunities for increasing academic engagement of students with ESN (Andzik et al., 2016; Ivy et al., 2020).

One novel option may be to combine several effective practices currently used to support this population of students into a targeted, multicomponent intervention to increase OTRs. First, teachers must increase overall opportunities for students to respond. Next, teachers must provide a response form for students who require communication supports to respond. Finally, teachers must deliver response prompts to facilitate student learning. Using these practices simultaneously during instruction can be identified as supported OTRs (i.e., OTR, communication support, prompt). Next, I will review the literature supporting each component of supported OTRs.

**Increasing Opportunities**

The first component of supported OTRs is to increase teacher delivery of OTRs overall. Researchers have reported descriptive findings on the academic engagement of students with ESN in school settings. The available research indicates that students with ESN are provided limited opportunities to engage in academic or social interactions (Carter et al., 2008; Kurth et al., 2016; Mason et al., 2020; Pennington & Courtade, 2015). One reason may be the lack of thoughtful planning and instructional design. Fortunately, researchers have identified practices to increase these interactions within school settings. Two practices that have been demonstrated to be effective in increasing student OTRs are response cards and shared reading.

### *Response Cards*

One method to increase student academic engagement involves the use of response cards (Heward et al., 1996). Using response cards involves teachers presenting a question or problem to a group of students who then simultaneously display their responses by holding up a card or dry erase board or entering a response into digital polling software (e.g., Plickers, Kahoot.it; see Ault & Horn, 2018).

Since 2010, three research teams have reviewed the literature examining the effectiveness of response cards for increasing student responses and engagement. First, Horn (2010) identified six studies using single case experimental designs (i.e., five ABAB, one alternating treatment). Participants ranged from preschool to ninth grade and exhibited a range of disabilities. Studies took place within general education and special education settings. Across all studies, participants increased rates of accurate responses in response card conditions. In half of the studies, researchers reported decreases in disruptive behavior and increases in on-task behavior. Schnorr et al. (2016) extended Horn's review by examining the quality of studies to determine if using response cards to increase OTRs for elementary aged students is an EBP. Six studies with

37 total participants met the final inclusion criteria to be included in the review. They applied Horner et al. (2005) quality indicators to determine the quality of each included study. Two studies met all quality indicators (i.e., high-quality) and the remaining four were rated as acceptable quality. Based on these findings, using response cards to increase OTRs for elementary aged students could not be deemed an EBP with strong evidence; however, it was deemed to be an EBP with a moderate level of evidence. Finally, Owiny et al. (2018) expanded the reviews from Horn and Schnorr et al. to include current literature up to 2016, grades pre-kindergarten to high school, and applied the Council for Exceptional Children's quality indicators (CEC, 2014) to identify the use of response cards as an EBP for teaching individuals with and without disabilities. The researchers found seven methodologically sound studies with 56 total participants. Five of the studies were conducted in general education settings and two in special education settings across academic content areas. Results indicated all studies revealed positive effects during the response card condition and, therefore, the use of response cards was deemed an EBP for increasing academic responding.

Across these reviews, only two studies involved students with ESN (Horn et al., 2006; Berrong et al., 2007), and both studies used response cards to examine the effects on active participation during academic instruction. For example, Horn et al. (2006) used response cards to teach telling time to students with ESN. Two conditions were examined for three students within a middle school self-contained classroom. Condition A measured the effects of hand raising and condition B measured the effects of response cards on active responding, on-task behavior, inappropriate behavior, and acquisition of identified math skills. Findings indicated higher levels of ASRs and on-task behavior, and lower rates of inappropriate behaviors during the response card conditions. In a similar study, Berrong and colleagues (2007) investigated the effects of

response cards on active participation and social behavior of students with ESN. The investigation took place during small group calendar instruction within a self-contained classroom. An ABAB reversal design was used to compare effects of hand raising and response cards on ASRs and inappropriate behavior. Overall, the use of response cards increased ASRs for all eight participants as well as increased on-task behavior and decreased inappropriate behavior.

### *Shared Reading*

Another practice used to increase OTRs and actively engage learners during instruction is shared reading. Shared reading is often used with individuals with ESN to promote basic reading and comprehension skills (Browder et al., 2011; Courtade et al., 2013; Gross Toews et al., 2021; Kim et al., 2018; Mims et al., 2009; Mims et al., 2012). Shared reading (also called read aloud, repeated storybook reading, shared story reading, story-based lesson, and literacy-based lesson) involves reading a story aloud while also providing means for students to interact with the reader about the text (Hudson & Test, 2011). During these interactions, students are provided increased OTRs and engage in meaningful academic instruction versus passively sitting and listening to a story read aloud. Shared reading components often include repeated story lines, attention getters, picture symbols paired with words, summarized text, targeted vocabulary, repeated readings, and planned engagement points.

In 2011, Hudson and Test reviewed the quality of literature examining the effects of shared story reading on literacy skills for students with ESN. Although the focus was on literacy skills, the authors shared a broad definition of literacy, including access to age-appropriate literature and reading independence. This included access to interactions during shared story reading related to the text. Although the dependent variables for the studies were included if they had at least one measure of literacy as a dependent variable, dependent variables across studies

ranged from teacher behaviors (e.g., following a task analysis) to student behaviors (e.g., ASRs). There were six studies included in the review. Researchers reported findings that shared story reading was implemented as a part of an intervention package, all six studies met 19 of the quality indicators (Test et al., 2009), and studies were conducted by research teams from only two independent research teams. Based on these findings, it was concluded that shared story reading had a moderate level of evidence to promote literacy skills for students with ESN. Gross Toews et al. (2021) extended Hudson and Test's review on shared reading to include more recent literature and to synthesize the intervention components and findings across studies. They included 32 total studies targeting at least one component of literacy or emergent literacy skills (i.e., engaging with text). Although there were more studies since the last review, the evidence remained at a moderate level due to limited reporting of cost effectiveness or lack of naturalistic settings or interventionists. The researchers noted the use of systematic instruction (i.e., time delay or system of least prompts) across studies, comprehension was the most frequently targeted literacy skills, and a functional relation between shared reading and emergent literacy skills were reported in 13 of the 26 studies.

Teachers must plan instructional activities to increase opportunities for academic engagement of students with ESN. The use of response cards or shared reading are two instructional strategies that have been effective at increasing OTRs and academic engagement of students with ESN. Additionally, both practices have been shown to be effective across content areas, settings, and a range of students (i.e., ages, disability category).

**Communication Supports**

The second component of supported OTRs is the availability and access to communication supports for the student with ESN. Many individuals with ESN also have CCN,

defined as “people with severe disabilities who are not verbally communicating and may have limited speech comprehension skills who may benefit from non-verbal means of communication” (p. 841; Reichle et al., 2019). These students often need support participating in academic activities and demonstrating their understanding of academic content. Further, these students may not be able to control their access to preferred and nonpreferred stimuli through requests and as a result are more likely to engage in challenging behavior. Fortunately, researchers have identified supports for increasing communication skills for students with CCN. Specifically, students with limited to no vocal communication skills may need alternative response forms (i.e., low-tech picture or object-based support, eye gaze, sign language, speech generating devices, peer supports) to engage in academic instruction. Supporting the communication needs of students with ESN is essential for students to access and demonstrate academic achievement, which has been increasingly important given requirements in federal guidelines (Geist et al., 2014) linking to grade level standards.

### *Augmentative and Alternative Communication*

One common communication support for individuals with ESN is the use of individualized AAC systems. Augmentative and alternative communication systems can be aided or unaided (Reichle et al., 2019). Unaided AAC includes eye gaze, sign language, or gesturing and does not involve any external equipment. Aided systems involve the use of auxiliary equipment, which may be low-tech (e.g., pictures) or high-tech (e.g., speech generating devices). There is a substantial body of research on the positive effects of AAC on communication skills of students with ESN.

Snell and colleagues (2006) reviewed literature on AAC communication interventions from 1997 to 2003. They identified 40 single-case design experimental studies that met inclusion

criteria of participants younger than 21, participants considered to have a severe disability, intervention targeted nonspoken expressive responses, and intervention was educational or involved a teaching intervention. The researchers identified several intervention components demonstrated to improve AAC outcomes (e.g., naturalistic language intervention, environmental supports, prompting, contingent reinforcement, functional communication training). Overall, their results supported the effectiveness of interventions in improving outcomes and supporting academic instruction for non-speaking individuals. The researchers suggested a need for further investigation to better understand the effects of the specific procedures.

O'Neill et al. (2018) included 28 studies in a meta-analysis of aided AAC interventions for individuals with developmental disabilities (DD) who used AAC. The purpose of this review was to examine the effects of aided AAC on expression and comprehension of students with DD who use AAC, to evaluate differing variables and effects, and to identify strengths and limitations of existing evidence. The effect size across studies was large on the measured communicative outcomes suggesting aided AAC can improve the communication skills of individuals with DD. Additionally, aided AAC can be used to support comprehension and expressive communication skills across a range of ages, diagnoses, and language levels. Further, effect sizes across aided AAC forms were large, suggesting that SGD and low-tech aided AAC (i.e., pictures) both had a positive impact on communication. Similarly, the effects were large for interventions with a dosage of less than 5 hr of total intervention time. These are promising results as improvements can occur in short amounts of time for some. Overall, similar to prior reviews (Ganz et al., 2012), this review provides support for the use of aided AAC as intervention for individuals with DD and CCN to improve communicative outcomes.

Common findings across these reviews suggest that communication interventions and supports may be necessary for individuals to access and engage in academic instruction. There is a wealth of empirical evidence supporting the use of communication supports, specifically aided AAC to improve communication outcomes for students with ESN, which is essential to access, engagement, and progress in academic content. For example, Hunt and colleagues (2003) implemented a collaborative teaming approach by designing Unified Plans of Supports to support student engagement for three students with severe disability and three students considered at risk within general education classrooms. The teams designed academic adaptations and communication and social supports and implemented these supports within the general education classrooms. With the prescribed supports, all students increased engagement in classroom activities and interactions with peers and adults. Additionally, Kurth and colleagues (2015) used qualitative methods to analyze observations of six students with ESN across inclusive settings. The students were all provided class-wide (e.g., visual aids) and individualized supports (e.g., behavior, communication, sensory, physical) to increase engagement within the general education setting. With appropriate supports, the students were observed to be engaged in academic and social interactions. Finally, Yorke and colleagues (2021) reviewed literature on the effects of reading interventions for students who use AAC. Across the studies, positive effects were reported across foundational reading skills for students who use AAC. The researchers noted that adaptations were necessary to increase access to the curricular content, but with these adaptations students across the studies made significant gains in early literacy skills. Overall, the use of AAC can improve communication outcomes for students while also providing greater access and opportunities for academic progress.

**Response Prompts**

The third component of supported OTRs is the delivery of response prompts. Learners with ESN require systematic instruction for successful skill acquisition. The research literature is replete with studies examining the effects of the use of prompting systems to increase learning for students with ESN (Browder et al., 2007; Cannella-Malone et al., 2021; Mims et al., 2012; Rosenbaum & Breiling, 1976; Saunders et al., 2020; Snell & Gast, 1981). Response prompting procedures are used to establish stimulus control by increasing chances the behavior will occur when the stimulus is present (Wolery, Ault, & Doyle, 1992). When using response prompting, the instructor inserts a prompt following the presentation of a target instructional stimulus and then fades the prompt over time. The instructor may use a single prompt or hierarchy of prompts that may include gestural, verbal, visual, model, partial physical, and full physical prompts. Two commonly used instructional prompting strategies are constant time delay (CTD) and system of least prompts (SLP). For this dissertation, I will focus on these two strategies as they are components used in the intervention package.

***Constant Time Delay***

Constant time delay is a commonly used response prompting procedure that involves the presentation of a single controlling prompt (i.e., the least intrusive prompt that ensures a correct response). Initially, the prompt is delivered immediately (0 s delay trials) and then an interval of time (e.g., 5 s delay trials) is inserted. This procedure can be used with discrete or chained tasks. Constant time delay was first conceptualized by Touchette (1971) and since has been evaluated by several researchers across many skill domains (i.e., functional skills [Chandler et al., 1993]; reading [Coleman et al., 2012]; math [Hudson et al., 2018]; science [Jimenez et al., 2012]; leisure skills, [Kurt & Tekin-Iftar, 2008, Wall & Gast, 1997]).

In 1992, Wolery, Holcombe, and colleagues reviewed literature on the use of CTD with discrete responses. The search process generated 36 articles, and researchers analyzed the studies' demographic variables (e.g., age, setting, targeted skills), procedural parameters (e.g., opportunities, dosage), outcomes, and methodological adequacy. Results showed rapid learning among participants following the use of CTD, with minimal errors. Additionally, CTD was found to be more efficient than SLD for discrete tasks. Finally, the studies reviewed were of high methodological rigor suggesting the quality of studies to be trustworthy.

Schuster et al. (1998) used the same procedures used by Wolery, Holcombe, et al. (1992) to review literature on the use of CTD with chained tasks. The search process generated 20 articles, which was less than the previous review of CTD used for discrete tasks. The participants in the studies ranged in age from 2 to 48 years. The researchers provided findings on the effectiveness of studies that were conducted across a range of settings (e.g., school, community) and instructional arrangements (e.g., small group, one on one), and across instructional domains (e.g., vocational, academic) indicating the overall versatility of the procedure.

In a recent review, Horn et al. (2020) reviewed studies to compare CTD to other response prompting procedures and to examine the research available implementing CTD across different instructional arrangements and settings. Eighteen total studies were included in this review, six studies compared CTD to other prompting systems. In these studies, other prompting systems provided positive outcomes; however, CTD had fewer trials to criterion and lower student error rates across studies thus showing the efficiency of the practice. Additionally, CTD was demonstrated to be effective across interventionists, instructional arrangements, and settings.

***System of Least Prompts***

The use of prompting hierarchies involves delivering predetermined levels of prompts contingent on student responding during instructional trials. One commonly used procedure is the SLP. The SLP involves the presentation of a target stimulus, a predetermined hierarchy including at least two prompts, and reinforcer delivery. The target stimulus is presented to the student and if the student responds correctly, a reinforcer is provided. If the student responds incorrectly or does not respond, the prompting levels are delivered, beginning with the least intrusive first, until the prescribed hierarchy is terminated with occurrence of a correct response (i.e., controlling prompt). This response prompting system can be used with discrete or chained tasks across several skill domains and settings. Much of the research literature targeting students with ESN involves the use of the SLP.

The SLP was first conceptualized by Rosenbaum and Breiling (1976) to teach reading comprehension skills to a student with autism. Cuvo and colleagues also used the SLP procedures to teach cleaning skills (1987) and laundry skills (1981) to individuals with ESN. In 1988, Doyle and colleagues reviewed the extant literature on the use of SLP. They sought information on the specific population and skills targeted using SLP, parameters of the strategy, and the overall effectiveness. They identified 90 articles that met the inclusion criteria. Findings revealed the versatility of this procedure as it was used across a diverse population (i.e., preschool to adult) and used to teach a wide range of skills (e.g., bus riding skills, manual sign). The procedure was more frequently used to teach chained tasks and 71% of studies addressed social, leisure, or community living skills. The number of prompts within the hierarchy ranged from two to six prompts, while most interventions used a 4-level sequence (i.e., 66%). Additionally, researchers identified the most often used prompts during SLP were verbal, visual,

model, and physical prompts. Researchers reported positive findings across all studies included in the review.

Thirty years after Doyle's review, Shepley and colleagues (2019) conducted a critical review of the literature on SLP. Due to the continued use of these procedures in schools, research, and teacher preparation programs, Shepley reviewed the literature on SLP to determine the parameters (i.e., for whom, conditions, procedures, target behaviors) under which these procedures were effective. Researchers identified 119 manuscripts consisting of 123 studies, and 413 participants who met the inclusion criteria for this review. As the focus of policy and instruction has shifted in the past 30 years, the specific skills targeted shifted from 71% addressing functional skills to 36.6%, with an increase in studies targeting academic skills (i.e., 26.8%). Participants ranged in age from 6 and 12 years old. The researchers identified SLP as an EBP based on What Works Clearinghouse guidelines for teaching individuals with moderate intellectual disability. In the studies, SLP was primarily used as a stand-alone intervention (62%); however, it was also reported effective when used within intervention packages. Shepley recommended practitioners use SLP especially for teaching chained responses as the evidence reveals single prompt strategies are more effective and efficient for discrete skills.

In addition to the several reviews reported above, CTD and SLP procedures also have been included in reviews examining the literature specifically for practices used to teach academic skills to students with ESN. For example, Browder et al. (2014) reviewed the literature to identify the most effective and prominent EBPs for students with ESN. Within this review, they provided evidence supporting specific instructional procedures. CTD was reported as effective for teaching picture and word recognition skills, vocabulary, and for functional skills. Additionally, SLP was reported effective for teaching early literacy skills, listening

comprehension, and reading comprehension. Similarly, Spooner et al. (2019) reported findings on procedures used to teach math to students with ESN. Within this review, systematic instruction (i.e., including CTD and SLP) was used in the majority of studies to teach math to students with ESN. Finally, in the most recent review, Cannella-Malone and colleagues (2021) reviewed all literature on academic instruction for students with ESN. They reviewed a total of 222 studies. Most studies involved intervention packages or a combination of three or four instructional strategies, which often included systematic prompting (i.e., CTD and SLP). Time delay was used in 91 studies and SLP was used in 45, across academic skill domains. The use of response prompting strategies for improving skill acquisition across all domains are clear. Both CTD and SLP are effective methods for teaching this population of students.

**Summary of Strategies to Increase Student Engagement for Students with ESN**

OTRs and ASRs are essential for learning and increased academic engagement for all students (Heward & Wood, 2016). Increasing student engagement is critical for improving student outcomes and achievement. Researchers have shown the impact of increasing teacher-delivered OTRs and the effects on academic responding and engagement for all students (MacSuga-Gage & Simonsen, 2015; Sutherland & Wehby 2001; Van Camp et al., 2020). It is especially critical for students with ESN to engage in academic instruction; however, additional supports, through supported OTRs (OTR, communication supports, response prompt) may be necessary to increase levels of engagement for this population of students.

Federal laws and policies encourage the use of EBPs for teaching students with ESN (Every Student Succeeds Act, 2015; Individuals with Disabilities Act, 2004; No Child Left Behind Act, 2001). Researchers have identified EBPs for increasing opportunities for engagement including the use of response cards (Heward et al., 1996; Horn, 2010; Schnorr et al.,

2016; Owiny et al., 2018) and shared story reading (Gross Toews et al., 2021; Hudson & Test, 2011). These practices have been shown to be effective for students with ESN (Berrong et al., 2007; Browder et al., 2011; Courtade et al., 2013; Horn et al., 2006; Kim et al., 2018; Mims et al., 2009; Mims et al., 2012).

Additionally, students with ESN often have support needs in the area of communication to access and engage in academic and social interactions. Researchers have provided evidence of the effects of alternate response forms (i.e., aided and unaided AAC) to support the communication skills of students with ESN (O'Neill et al., 2018; Reichle et al., 2019; Snell et al., 2006). The use of AAC has been shown to improve access and engagement within academic instruction as well (Hunt et al., 2003; Kurth et al., 2015; Yorke et al., 2021).

Finally, students with ESN often require the use of response prompts to support instruction. Two commonly used EBPs for teaching students with ESN are the use of CTD and SLP. These practices have an abundance of supporting literature with evidence of their effectiveness for supporting the instruction of students with ESN (Browder et al., 2014; Cannella-Malone et al., 2021; Cuvo et al., 1981, 1987; Doyle et al., 1988; Rosenbaum & Breiling, 1976; Shepley et al., 2019; Spooner et al., 2017).

Although researchers have identified several effective practices for students with ESN, the next step is bridging the research-to-practice gap by increasing teacher implementation of EBPs within school settings with natural change agents. Several studies involve researchers as the change agent and, although this is common in experimental studies involving students with ESN (Berrong et al., 2007; Mims et al., 2009), it does little to contribute to further implementation in school settings. Future research must examine the effects of training teachers

as the naturalistic change agents to improve access and engagement in academic instruction for students with ESN.

## Supporting Teachers to implement EBPS

Researchers have identified numerous EBPs for improving outcomes across student populations (e.g., low- and high-incidence disability) and skills areas (e.g., academics, social, functional). Despite the availability of these practices, adoption of these practices is lacking within schools (Cook & Odom, 2013; Fixen et al., 2005). This research-to-practice gap serves as a barrier to improving student outcomes. In response to this barrier, the field of special education has increased its focus on the application of implementation science to scale up the use of EBPs in schools (Cook & Odom, 2013). There is an overarching need in education to identify the gaps in translating research to practice to improve outcomes for students (Abbott et al., 1999; Cook & Odom, 2013; Greenwood & Abbott, 2001; Snell, 2003).

Researchers have identified the need for programming to support the implementation of new practices in schools (Noell & Gansle, 2009). Furthermore, the implementation of EBPs for students with ESN is of significant concern. Specifically, there is evidence that EBPs are not consistently used for students with ESN. For example, Knight and colleagues (2019) surveyed 535 special education teachers to gain information on the instructional preparedness of special education teachers supporting students with autism or intellectual and developmental disabilities. Results indicated that teachers reported implementing a range of EBPs; however, some reported the use of ineffective or harmful procedures more than EBPs (e.g., rapid prompting method more than PECS or video modeling). Additionally, teachers reported that they did not rely on practices supported by research, books, special education experts, or information from preservice programming to make instructional decisions. In a similar survey study, Brock et al. (2020)

gathered information from 99 teachers across Ohio on teacher-reported priorities and practices for students with autism spectrum disorder (i.e., mild to intensive support needs). Findings revealed that only half of teachers reported use of EBPs and a majority reported their students made inadequate progress. Teachers reported that many students had not met targeted goals, and many goals remained on students' individualized education programs (IEPs) for years. On particular finding was that teachers did indicate that the limited use of EBPs was a contributing factor or barrier to the lack of student progress, which highlights that teachers may be receptive to receive training to improve their knowledge and ability to implement EBPs with fidelity.

**Professional Development**

The quality of professional development for teachers and the sustained use of effective practices to improve outcomes for all children has long been an area of concern for researchers in the field of education (Brock & Carter, 2017; Cook & Odom, 2013; Fixen et al., 2005). Darling-Hammond and colleagues (2017) defined effective professional development as "structured professional learning that results in changes in teacher practices and improvements in student learning outcomes" (p. v). Professional development is necessary for teacher improvement to enhance knowledge and implementation of effective practices (Darling-Hammond et al., 2009). Much of the professional development provided for teachers are one-time workshops or presentations with limited support provided afterward (Odom, 2009). Unfortunately, this method does not often result in implementation and sustainability of effective practices (Cook & Odom, 2009; Fixen et al., 2005).

Traditionally, professional development is delivered during full or half day in-service training by district or outside consultative professionals. After training, teachers are often expected to return to their classrooms and implement practices without much additional support

(Brock et al., 2014; Guskey & Yoon, 2009; Wei et al., 2010). Although this approach may be effective for some, it is likely not for most teachers (Fixen et al., 2005; Kraft et al., 2018; Wei et al., 2010). According to Joyce and Showers (1981), it is essential not only to ensure teachers gain content knowledge from professional development, but also the skills to implement practices within their classrooms.

Fortunately, researchers have identified several essential elements used in effective professional development (Darling-Hammond et al., 2017; Gross et al., 2001; Guskey & Yoon, 2009; Yoon et al., 2007). Darling-Hammond and colleagues (2017) reviewed 30 years of research and identified several essential elements of effective professional development including: (a) content focused, (b) active learning and engagement in learning, (c) collaboration, (d) modeling and examples, (e) coaching and support, (f) built-in feedback and time for reflection, and (g) timely. These components can guide researchers in designing implementation efforts to contribute to improving the research to practice gap.

**Coaching**

One well-established method of professional development is coaching. Coaching is often needed to provide follow up support for teachers to improve implementation fidelity of a newly learned practice (Wood et al., 2016). Coaching involves a cycle of observations and feedback to provide support for accurate and sustained implementation of new teaching behaviors (Joyce & Showers, 1981, 1995). Coaching can improve teacher knowledge, skills, and implementation of EBPs (Desimone & Pak, 2017, Snyder et al., 2015) and is a way to provide support for teachers to facilitate high quality instruction (Denton & Hasbrouck, 2009). In a seminal paper, Joyce and Showers (1982) reported effects on teacher implementation of prescribed practices after traditional professional development, training with demonstration and feedback, and with direct

coaching. Although after traditional professional development and after demonstrations, practice, and feedback during training, teachers exhibited some knowledge and skills related to training material, minimal teachers actually implemented the practices as intended. Finally, they found that with direct coaching, at least 95% of teachers implemented the procedures with fidelity and sustained use.

Coaching is an alternative to the traditional professional development models in which teachers receive training and return to their classroom to implement practices taught during training. Researchers have identified several key components that are critical for effective instructional coaching. Kretlow and Bartholomew (2010) reviewed 20 years of research examining the effects of coaching on preservice and in-service teacher implementation of EBPs. They identified 13 studies evaluating coaching of 110 teachers. Across these studies, data indicated that the use of coaching contributed to improved teacher fidelity of delivering EBPs. The researchers identified critical components across the coaching interventions, including engaging in small group training, conducting observations, and providing feedback. They also highlighted the importance of providing follow-up support for teachers (e.g., evaluating video recordings, identifying strengths and opportunities for improvement, reciprocal and peer observations and feedback, modeling, and practice). The researchers noted that coaching was delivered across a wide range of dosages and teacher performance levels, suggesting the need for more research to identify the most feasible and efficient elements of coaching.

A few years later, Kraft and colleagues (2018) examined the overall effects of teacher coaching on instruction and student achievement. They reviewed the available coaching literature and their search resulted in 60 experimental or quasi-experimental studies (i.e., with likely causal status). Findings revealed large positive effects on teachers' instructional practice

and a positive effect on student achievement. Similar to Kretlow and Bartholomew (2010), dosage of coaching varied across studies ranging from 10 hr or less to 21 hr or more. Kraft et al. (2018) also found no evidence indicating that coaching must be delivered at high dosages to be effective, suggesting quality and focus of coaching as more important than higher dosage.

Additionally, coaching has been shown as effective for increasing teacher instructional behaviors, while simultaneously decreasing student disruptive behaviors. Parks Ennis and colleagues (2020) conducted a review of studies implementing coaching to increase teacher use of behavior specific praise. Forty-five total studies were included in the review dating from 1973 to 2018 across a range of settings (e.g., general education, inclusion, special education), with 16 studies meeting methodological rigor for the Council for Exceptional Children's standards. Overall, a variety of procedures were used for the initial training and coaching, including various formats (e.g., individual, small group, school wide), performance feedback (e.g., written, emailed, verbal), bug-in-ear in vivo coaching, self-monitoring, and goal setting. Although a range of components were reported across studies, the majority of studies included some form of performance feedback delivery to teacher participants.

**Coaching Models and Elements**

Two common models of coaching supported in the literature (Kretlow & Bartholomew, 2010, Wood et al., 2016) are supervisory coaching (Joyce & Showers, 1995) and side-by-side coaching (Blakely, 2001). During supervisory coaching, coaches observe teachers implementing a strategy and provide positive and constructive feedback after the observation to enhance improved application (Kretlow & Bartholomew, 2010). During this type of coaching, feedback is not provided to teachers during the observation, but rather, delivered systematically after the observation to discuss successful implementation and areas for improvement (Wood et al.,

2016). Supervisory coaching often occurs after an initial professional development training. Side-by-side coaching involves the delivery of feedback in the moment. While a teacher is implementing the intervention, the coach provides models and opportunities for the teacher to practice. Across these models, there are several coaching elements that have been demonstrated to be consistent. Common elements included in coaching packages are training, goal setting, and performance feedback. Next, I will describe the common features of each element and empirical evidence that supports the use within a coaching intervention package.

### *Training*

The first step in coaching involves an initial training. One common and effective training package for training teachers to implement interventions with fidelity is behavior skills training (BST; DiGennaro Reed et al., 2018; Kirkpartick et al., 2019; Koegel et al., 1997). Behavior skills training involves several components. First, trainers describe the intervention (verbal, written), model steps for implementation (in vivo or via video), practice via role-play with participants, and provide feedback (positive and corrective) on the intervention implementation or role-play procedures (DiGennaro Reed et al., 2018). In the first reported study using BST, Koegel and colleagues (1977) used a modified multiresponse baseline design to investigate the effects of BST on teachers' implementation of behavior intervention procedures. Eleven teacher participants were trained to implement behavior intervention procedures for students with autism. Following BST, all teachers improved use of the procedures and, as a result, all students increased responding. In addition, the teachers generalized their skills across students and behaviors. Since this first study, BST has been used extensively to train staff and families working with students with ESN (Hogan et al., 2015; Lalli et al., 1993; Nigro-Bruzzi & Sturmey, 2010; Sarokoff & Sturmey, 2004; Sawyer et al., 2017; Shaefer & Andzik, 2021). For example,

Fetherston and Sturmey (2014) used BST in three experiments to train teachers to implement discrete trial teaching, incidental teaching, and use of activity schedules. Across all three experiments, following BST, all participants increased the percentage of correctly implementing intervention steps. Additionally, disruptive behaviors across all students decreased.

### *Goal Setting*

Another critical component of coaching is goal setting. Goal setting is a form of self-management that begins with selecting a criterion level of a target behavior and setting a time frame to meet the criterion (Miltenberger, 2008). During coaching meetings, the coach and teacher discuss the teacher's current performance for a specific skill and then establish explicit goals to compare and evaluate teacher effectiveness of implementation (Martens et al., 1997). For example, Martens and colleagues (1997) used a multiple baseline across participants design to determine if goal setting and feedback (i.e., daily note) on teacher behavior had an effect on students' challenging behavior. Prior to the baseline condition, teachers and consultants met to identify target routines and student behaviors to be addressed. They then selected praise statements for improvement. During baseline sessions, the teacher delivered praise statements three times during a 30 min period. Using these data, the teacher identified a goal of doubling praise statements to at least six times per 30 min. Each day, she was provided a feedback note stating if she met or did not meet her goal. During the intervention phase, teacher-delivered praise statements increased to at least 14 praise statements per 30 min. Further, data indicated improved student outcomes. The results from this study show that goal setting and feedback can have a positive effect on teacher implementation of EBPs. In another study, Cohrs and colleagues (2016) used a concurrent multiple baseline design across participants to evaluate the effects of specific goal statements on teachers' goal achievement. They found that teacher

behavior did not change when general goal statements were presented, but that teachers improved performance when permitted to specify target goal frequencies. The researchers then replicated the first study with three elementary school teachers. During baseline sessions, participants were instructed to follow their regular teaching routine and were not provided any feedback. During the second phase, they were provided goal statements and selected a goal based on each participant's highest baseline data to work toward. Similar results occurred in this replication with a demonstrated functional relation across three participants with specific goal statements.

In addition to the variations of goal setting presented above, there is another aspect of goal setting that may be included within coaching interventions. This variation involves the use of negative reinforcement through a meeting cancellation contingency. First, the teacher sets a goal, if the goal is met, the coach and teacher do not have to meet for their supervisory coaching session; if the goal is met, the meeting occurs as planned. Only a few researchers have examined the effects of meeting cancellation contingencies, with promising results. DiGennaro and colleagues (2005) used a multiple-baseline design across dyads to examine the effects of a negative reinforcement contingency on teacher implementation of behavioral interventions steps. First, general education teachers were trained on the intervention. Next, they were provided daily graphs of performance. If the teacher did not implement the plan with 100% accuracy, they had to meet with the consultant the next day to review and practice incorrect steps. If the teacher did meet the goal of 100%, there was no meeting. After three sessions at 100%, dynamic fading was used to thin the schedule from once a week to every other week. If teachers did not maintain 100%, they returned to the previous schedule. Three of the four participants consistently met their goal during the negative reinforcement contingency and maintained performance during

dynamic fading. These results suggest that teacher implementation can remain high even without daily or weekly coaching meetings and may be enhanced through the use of negative reinforcement of meeting cancellations. In a replication of their previous study, DiGennaro et al. (2007) again evaluated the effects of goal setting and performance feedback with a meeting cancellation contingency with three special education teachers. If the teachers met their goal, they were able to avoid attending a coaching meeting. Further, if teachers maintained consistent performance across three observations, their schedule of observations were systematically thinned with a final observation schedule of only once every two weeks. The researchers reported similar results to their first study with all teachers consistently maintaining treatment integrity levels above 90%. The results from this study further support the effects of goal setting with a negative reinforcement contingency.

***Performance Feedback***

Performance feedback (PF) is another component used during coaching to increase the fidelity of implementation of practices by teachers. Performance feedback is defined as "monitoring a behavior that is the focus of concern and providing feedback to the individual regarding that behavior" (Noell et al., 2005, p. 88). It can be delivered using a range of formats (e.g., in person, e-mail, bug in ear) and schedules (e.g., daily, weekly, contingent on fidelity levels).

The first known use of PF in educational research occurred in 1973, by Cossairt and colleagues. The researchers used a multiple baseline across participants design with component analysis to examine the effects of three experimental conditions: instructions, feedback, and feedback plus social reinforcement to increase teacher praise. During the instruction condition, the researcher explained the effects of positive praise on student behavior, provided a visual

reminder of this, and instructed the teacher to praise students who followed instructions. During this condition, no changes were noted in teacher praise rates or student behavior. Next, during the feedback condition, researchers provided feedback (i.e., review of interval data) at the end of each instructional session and observed slight increases for only one participant, which were not maintained and dropped to zero after four sessions. Finally, during the feedback plus social reinforcement phase, all participants increased praise rates after receiving feedback and social praise. These results support the need for reinforcement-based procedures paired with PF.

Solomon and colleagues (2012) conducted a meta-analysis of single-case literature on the effects of performance feedback on teachers' treatment integrity. All studies included in the review had dependent variables targeting change in teacher behavior in classroom settings. Thirty-six studies were included in the review. Findings indicated significant behavioral change with the implementation of performance feedback across study variables (i.e., setting, dependent variable, delay of feedback, type of intervention). The findings were supported across all grade levels with significance not specific to grade. Most teachers responded to weekly feedback, with some requiring higher dosage or more immediate feedback. Within most of these studies, outside consultants provided performance feedback delivery. In addition to providing verbal feedback, providing graphed results to teachers added to the effectiveness of feedback.

Finally, Fallon et al. (2015) examined the research literature on PF to determine whether it could be deemed an EBP. The researchers used the What Works Clearinghouse (WWC) guidelines (Kratochwill et al., 2010) to evaluate study quality. They evaluated 169 total studies; 81 met design standards and 45 met design standards with reservations. Of these 126 studies, 54 demonstrated strong evidence of effectiveness and 48 had moderate evidence based on visual analysis of graphs. Based on these findings, it was determined that the use of PF is an EBP.

**Coaching Teachers of Students with ESN**

Many of the reviewed studies implemented coaching for teachers of students with and without disabilities; however, few studies have been conducted examining the effects of coaching packages for teachers of students with ESN. In one study, Bethune and Wood (2013) used a delayed multiple baseline across participants design to examine the effects of side-by-side coaching to special education teachers on implementing function-based interventions for students with severe disabilities. First, the researcher provided a 6-hr initial training. Next, side-by-side coaching occurred in which the researcher provided direct coaching with immediate feedback in the moment as the teacher worked with an individual student. Coaching was provided until teachers scored at least 90% accuracy in implementation across two consecutive sessions. Findings indicated a functional relation between coaching and teacher fidelity of implementation. Additionally, teachers' higher level of implementation fidelity generalized to other settings and routines and maintained for 2.5 weeks after intervention. This study demonstrated that coaching could increase EBP implementation by teachers of ESN and can be maintained over time.

In another study, researchers investigated the effects of instructional coaching on opportunities for students to request using the PECS (Ganz et al., 2013). The coaching package consisted of an initial 3-hr training prior to baseline and then an additional training session with role-play, and feedback, goal setting, and self-monitoring. Follow-up booster coaching sessions were delivered when a therapist provided two or fewer opportunities for requesting to students across two consecutive sessions. During baseline for all three participants, there were no opportunities provided for students to request. After training, opportunities for communication and independent communicative exchanges increased.

Brown et al. (2014) used a multiple probe design to implement a multicomponent training with coaching and PF to examine the effects on teacher implementation of simultaneous prompting with students with ESN. First, teachers watched a video on the procedures for simultaneous prompting. Next, they participated in a training session (i.e., average length of training session was 1 hr and 43 min) and were provided training notes, checklists of steps for implementation, and participated in role-play until participants demonstrated mastery. Then, after each intervention session, the coach and teacher met to review videos of the lesson. Coaching sessions lasted on average 22 min and continued until teacher participants performed all steps of simultaneous prompting for two consecutive sessions. All participants had significant increases in performance and maintained skills at 100% mastery for up to 7.5 weeks.

In another study, Brock et al. (2018) combined brief coaching sessions with video modeling to investigate the effects on teacher implementation of CTD procedures. During phase one, teachers were provided access to video models and checklists for implementing time delay with their target student. After two consecutive sessions of no student progress, researchers implemented brief coaching sessions. Coaching sessions occurred after each observation and lasted for 5 min or less and continued until teacher implementation improved to 100% accuracy. One teacher performed procedures with 100% accuracy after the video modeling phase. The other two participants improved after video modeling; however, direct coaching was needed to improve implementation. Additionally, student academic performance improved during teacher use of the time delay procedure.

Finally, Ivy et al. (2020) used a multiple baseline design across participants to examine the effectiveness of coaching teachers and caregivers to implement a planned instructional sequence: create a CPR cycle. The researchers used a practice-based coaching approach within a

team-based model. Within this model, the caregivers and teachers were trained to implement the CPR sequence at home and school. Prior to baseline sessions, all participants attended a 2-hr long training workshop. After baseline session, researchers provided an additional training which lasted 1 hr. Coaching occurred immediately after this training and was repeated weekly for 30 min per session. During coaching sessions, the teams reviewed feedback on graphed data, set goals, and practiced the CPR procedure. Overall, results showed increased implementation of CPR cycles and increased AAC use across participants, with no documented maintenance data.

Although these studies target different areas of need for teachers of students with ESN, there are limited studies that have examined the effects of coaching on teacher implemented interventions to increase engagement of students with ESN. Engagement in academic instruction leads to higher achievement levels, so it is critical to identify ways to increase implementation of effective practices to increase engagement for this student population.

### Summary

In summary, coaching has been demonstrated to be an effective intervention across several important variables (e.g., accurate implementation of practices, increased rates of critical teacher behaviors, improved student performance), settings (e.g., general education, special education), and when paired with additional intervention components (e.g., PF). Based on the literature, coaching is effective for improving teacher implementation of EBPs; however, there are gaps in the research on coaching teachers of students with ESN. This is important because teachers need to implement highly specialized and intensive supports to promote positive student outcomes. Specifically, more research is needed to examine the effects of coaching on teacher implemented interventions to increase the academic engagement of students with ESN.

## Summary of the Literature Review

In this chapter, I presented literature on the importance of academic engagement for all students and the rates of engagement reported by researchers. Next, I reviewed the needs of students with ESN and CCN and strategies to increase engagement for students with ESN and CCN during academic instruction. Finally, I discussed the widely used practice of coaching to guide teachers in implementation of EBPs.

In summary, academic engagement is important for all students and has been shown to increase achievement of students across populations and settings. Despite the evidence supporting the positive impact academic engagement has on student performance, rates of academic engagement are low within schools. One population with significantly low rates of engagement are students with ESN.

Fortunately, researchers have identified practices that increase engagement rates for students with ESN. Implementing supported OTRs is one strategy teachers may use. This involves implementing teaching strategies that provide increased numbers of OTR. In addition, they must ensure that students are provided a way to respond during instruction (i.e., aided or unaided AAC). Finally, teachers may need to implement response prompting to increase skill acquisition and learning for these students.

Unfortunately, teachers may not be adequately prepared or may not have access to quality professional development. Often, teachers are provided with one-time in-service professional development training with limited follow-up support. One method of professional development with substantial research evidence showing improvement in teacher behavior is coaching. Researchers have shown that implementing various elements of coaching (e.g., goal setting, PF) can have a positive impact on teacher behavior with sustainable results; however, more research

is needed on the effects of coaching for teachers of students with ESN, specifically on practices to increase academic engagement.

# CHAPTER 3: METHOD

In this study, I used an experimental single-case, multiple probe across participants design (Horner & Baer, 1978; Ledford & Gast, 2018) to analyze the effects of a coaching package on teachers' delivery of supported OTRs during small group direct academic instruction. I also examined the collateral effects of teachers' implementation of supported OTRs on ASRs of students with ESN during small group instruction. The following sections include descriptions of the participants, setting, materials, dependent variables, data collection methods, research design, procedures for each experimental condition, social validity measure, procedural fidelity measures, and data analysis.

1. Is there a functional relation between a multicomponent coaching package and the rate of supported OTRs delivered by teachers of students with ESN?
2. To what degree does the multicomponent coaching package intended to increase the rate of supported OTRs increase the rate of ASRs of students with ESN?
3. How do teacher participants perceive the feasibility and overall effects of the coaching package and supported OTRs interventions?

## Participants and Setting

Participants in this study included three certified special education teachers and three middle school students with ESN (i.e., sixth to eighth grades). For this study, I used convenience sampling to select both teacher and student participants. The inclusion criteria for teachers were as follows: (a) had special education licensure in the area of adapted curriculum standards in North Carolina, (b) provided daily direct academic instruction to a small group of students with ESN (i.e., two or more) daily, (c) taught students with ESN, (d) had low rates of OTRs (i.e., less

than 3 per min) based on screening observation(s). After receiving signed consent, all teacher participants completed a demographic information Google form at the beginning of the study (see Appendix N) and a social validity survey at the end of the study (see Appendix P). Additionally, during initial screening observations (see Appendix S), I identified and observed the teacher's targeted routine, identified whether the format of the lesson was similar across participants (i.e., subject, type of instruction), and identified their current rate of OTRs. The student participants were recommended by their teachers if they met the following inclusion criteria: (a) 5-22 years old, (b) met eligibility criteria for special education services under disability categories of intellectual disability, autism, developmental disability, or multiple disabilities, (c) participated in instruction on adapted curriculum standards in North Carolina, (d) qualified for their state's alternate assessment, and (c) had low rates of responses during small group academic instruction (i.e., based on screenings). All students received direct academic instruction with a teacher throughout the school day in a small group (i.e., two or more students). Assent and informed consent were obtained for students to participate.

This study took place in three self-contained special education middle school classrooms in a suburban public school district in southeastern United States. Within each classroom, there were between 8 and 11 students ranging in age from 11 to 16 years old, one teacher, and between one and two teacher assistants. All students in each classroom were instructed on adapted curriculum standards and all students participated in AA-AAS. Initial training and coaching sessions occurred in the classroom without students present. Across all conditions, students followed their typical daily routine.

Each teacher participant identified a student participant within their classroom based on students' low levels of engagement and ASRs during academic instruction and based on the

inclusion criteria set above. Teacher 1, Ms. Bolick identified student 1, Walker as her target student. Teacher 2, Ms. Christenbury identified student 2, Terrell as her target student. Teacher 3, Ms. Lindsay identified student 3, Ashton as her target student.

***Recruitment of Participants***

I contacted district representatives via email, shared information about the research study (see Appendix A), and requested written permission to work with teachers who served students with ESN within the school district (see Appendix B). I worked with district representatives to recruit special education teachers who taught adapted curriculum (see Appendix C); contacted teachers, provided information about the study, and identified interested teachers. Next, I sent teacher consent forms via DocuSign (see Appendix E and F) to interested teachers. The teachers then identified potential students based on the above referenced eligibility criteria, contacted parents via email (see Appendix D) to inform them of the opportunity to participate, and explicitly indicated that there was no requirement to participate in this study. Next, if interested, the parent entered their email into the parent interest Google form (see Appendix O). I then sent parents the informed consent forms via DocuSign (see Parent Informed Consent Permission Form; see Appendix G and H). Parents were asked to seek assent from students prior to beginning the study (see Appendix I). All students needed picture cues that were included on the form. The student assent form was sent to parents with consent forms. Parents and teachers completed permission forms within 2 weeks. I then immediately downloaded consent forms from DocuSign and added them to a secure University Dropbox account. Additionally, because video recording occurred during instruction, teachers (see Appendix F) and parents (see Appendix H) provided consent for video recording. The videos were only shared with members of the research team for coding purposes.

### *Classroom 1*

**Teacher 1 (Ms. Bolick).** Ms. Bolick was a 28-year-old White female with 6 years of teaching experience across elementary, middle, and high school settings. She was a special education teacher and has served in her current role for 1 year. She completed her bachelor's degree and held certifications in general curriculum special education and adapted special education in North Carolina. She reported previously participating in TEACCH training and professional development on the use of high-tech communication supports. Ms. Bolick reported no prior training on OTRs but some training within her undergraduate programming on low-tech and high-tech communication supports and systematic prompting. Ms. Bolick had experiences using different communication supports and systematic prompting with previous and current students.

**Student 1 (Walker).** Walker was a 13-year-old White male in seventh grade with intellectual disability and an educational diagnosis of autism. He was primarily served in a middle school classroom for students who received instruction on adapted curriculum standards and qualified for the state's alternate assessment. Walker used 1-to-2-word vocal utterances with visual or model prompts and his vocal speech was intelligible only to familiar listeners. In addition, Walker used a personal iPad with LAMP Words for Life AAC device. He received speech and language therapy, occupational therapy, and services and support from an assistive technology specialist.

**Setting.** Those included in the study participated in teacher-led reading instruction within a small group (i.e., 5-7 students) daily in the main area of the classroom. All students had their own desks spaced six feet apart and facing the front of the classroom. Each student was seated at

their individual desks during the study. There were 11 total students and one teacher assistant in the classroom who continued their daily schedule and routine throughout the study.

### *Classroom 2*

**Teacher 2 (Ms. Christenbury).** Ms. Christenbury. was a 59-year-old White female with 22 years of teaching experience across elementary, middle, and high school special education. She was a special education teacher and served in her current role for 5 years. She was previously employed as a college coordinator of disability services for students. She completed her bachelor's degree in special education, master's degree in learning disabilities, and held a certification in reading. She reported receiving professional development on functional behavior assessment and behavior intervention planning, crisis prevention and intervention, and direct instruction. Ms. Christenbury reported no prior training on OTRs or high-tech communication supports but some professional development on low-tech communication supports and systematic prompting. Ms. Christenbury had experience using OTRs, different communication supports (i.e., low-tech and high-tech), and systematic prompting with her current students.

**Student 2 (Terrell).** Terrell was a 14-year-old Black male in eighth grade with multiple disabilities. He was primarily served in a middle school classroom for students who received instruction on extended content standards and qualified for the NC Extend 1 alternate assessment. Terrell used 1–2-word vocal utterances with visual or model prompts and his vocal speech was intelligible only to familiar listeners. Terrell was provided low-tech AAC in the form of picture symbols and visual cues throughout his day. He received speech and language therapy and occupational therapy.

**Setting.** Those included in the study participated in teacher-led reading instruction within a small group (i.e., 5-7 students) daily in a back corner of the classroom. Students were seated at

a kidney-shaped table facing the teacher. There were 11 total students and one teacher assistant in the classroom who continued their daily schedule and routine throughout the study.

### *Classroom 3*

**Teacher 3 (Ms. Lindsay).** Ms. Lindsay was a 22-year-old White female with one year of teaching experience within a middle school setting. She was a special education teacher and served in her current role for one year. She completed her bachelor's degree and held certification in adapted special education. She reported receiving professional development on functional behavior assessment and behavior intervention planning. Ms. Lindsay reported no prior training on OTRs but some training within her undergraduate programming on low-tech and high-tech communication supports and systematic prompting. Ms. Lindsay had experiences using different communication supports (i.e., low-tech and high-tech) and systematic prompting with current students.

**Student 3 (Ashton).** Ashton was a 12-year-old White male in sixth grade. He was primarily served in a middle school classroom for students receiving instruction on the extended content standards and qualified for the NC Extend 1 alternate assessment. Ashton used 1–2-word vocal utterances with visual or model prompts and his vocal speech was intelligible only to familiar listeners. In addition, Ashton used a personal Accent® 1000 AAC device programmed with LAMP Words for Life®. He received speech and language therapy, occupational therapy, and services and support form an assistive technology specialist.

**Setting.** Those included in the study participated in teacher-led reading instruction within a small group (i.e., 2-3 students) daily in the front of the classroom. Students were seated at a kidney-shaped table facing the teacher. There were 8 total students and two teacher assistants in the classroom who continued their daily schedule and routine throughout the study.

## Experimenter

I served as the primary experimenter for this study. I was a doctoral candidate licensed in general education (K-6) and special education (K-12) in North Carolina with 11 years of experience at the school level as a teacher, and 3 years as district support. As the experimenter, I submitted IRB; developed the coaching model; recruited participants; delivered training; and collected baseline, intervention, and fidelity data.

## Materials

Materials used in this study included any instructional materials the teachers currently used for direct academic instruction. All teachers used current event reading passages and worksheet activities from the Unique™ Learning System platform. During initial trainings, a second and third observer completed the researcher developed procedural fidelity checklist for my use of behavior skills training (BST; see Appendix K) procedures. During the initial trainings, I provided teachers with a written summary of the instructional procedures (see Appendix L). I created a teacher demographics questionnaire (see Appendix N) that teachers completed prior to baseline and a social validity questionnaire (see Appendix P) teachers completed after the intervention was complete.

Communication materials for students were used during this study. The students used any materials prescribed in their individualized education program (e.g., AAC, visual supports). In addition to communication supports already used by student participants, teachers designated additional tools for student use during academic instruction (e.g., Go Talk 9+™; response cards). Supports were implemented and used by the target students as well as non-target students during the academic instructional lesson.

## Dependent Variables

The primary dependent variable was the rate of teacher-delivered supported OTRs. A supported OTR was present when these three components occurred: teacher-delivered OTR, communication response tool was available for the target student (i.e., within one arm's reach of the student and contained stimuli related to the current lesson), and teacher provided prompt as needed. If the student responded correctly within the delivery of the OTR and the predetermined wait time, the prompt was not needed. Although not a primary dependent variable, I also collected descriptive data on the components (i.e., OTR, communication support, prompt) of the supported OTR. The secondary nonexperimental dependent variable was the rate of student responses (i.e., target student). See below for operationalized definitions, examples, and nonexamples.

Each observation session started when the teacher began delivering direct academic instruction. Observations were videotaped for up to 15 min per session (Rowley, 1978) and data were collected during this time. Data were collected from video recordings of the instructional routines 1 to 4 times per week. The teachers set up computers to record the lesson via Zoom. Zoom was used for feasibility purposes (i.e., during initial meeting with teachers, each teacher selected Zoom versus using a video camera). After the Zoom session, I downloaded each video into a secure UNC Charlotte Dropbox account. Only IRB approved researchers viewed videos to collect data. This included three doctoral students who collected data via video recordings.

***Teacher-Delivered Supported OTRs***

I used event recording to collect data on the number of teacher-delivered OTRs and teacher-delivered supported OTRs and converted each session's data to rate per min by dividing the total number of occurrences by the length of the session (e.g., 13 OTRs/13 min = 1 per min). I recorded each occurrence of OTRs and supported OTRs. OTRs occurred when the teacher

delivered an OTR. Supported OTRs occurred when the teacher delivered an OTR, provided communication support, and when necessary, provided a response prompt to support students' accurate responding.

**Teacher-Delivered OTRs.** Teacher-delivered OTRs were operationally defined as the teacher providing the group or target individual with an OTR to a question or direction. *Examples:* This included anytime the teacher asked a question (e.g., "what is the main idea…?") or gave a direction (e.g., "point to the main character…") to facilitate student responses (see operational definition below). To be considered an OTR, questions or directions were related to academic content (e.g., questions about text). *Nonexamples:* OTRs were not counted if they specifically targeted behaviors not related to academic content (e.g., "Sit in your seat").

**Communication Support.** Providing communication support was operationally defined as ensuring that, if a student needed an aided communication support (e.g., speech generating device, response options), it was placed within an arm's reach of the student, contained stimuli related to the current lesson, and, if needed, was charged and turned on. *Examples:* During a small group lesson, the teacher read aloud a story about apples. The student's communication device was a BIGMack™ switch with the repeated story line preprogrammed into the device. The student was seated at the table and the switch was turned on and within one arm's reach of the student. *Nonexamples:* During a small group lesson, the teacher read aloud a story about apples. The student's communication device was a BIGMack™ switch but was set up with a preprogrammed repeated story line about bats. The student was seated at the table and the switch was in the student's backpack away from the small group area.

**Prompt.** A prompt was defined as the delivery of a verbal, gestural, model, or physical prompt that resulted in a response from the target student. *Example:* The teacher asked a question

about the story, “Who was the main character?,” waited 5 s, used physical prompting to assist the student in selecting the correct answer. *Nonexample:* The teacher asked a question about the story, “Who was the main character?,” and does not deliver prompt within predetermined amount of time (e.g., 5 s) or does not deliver a prompt at all leading to no response. Additionally, if the student responded correctly within the delivery of the OTR and the predetermined wait time, the prompt was not needed.

***Student responses***

I also collected data on students’ unprompted, prompted, and no responses. *Unprompted student responses:* any independent response related to teacher OTRs including vocal (i.e., speech), gestural, written, or SGD/AAC device supported responses. *Prompted student responses:* response to teacher OTRs including vocal (i.e., speech), gestural, written, or SGD/AAC device supported response supported by teacher-delivered response prompt. I measured student responses using event recording and converted the frequency to rate per min.

**Experimental Design**

I used an experimental single-case, multiple probe across participants design (Horner & Baer, 1978; Ledford & Gast, 2018) to measure the effects of a coaching package on the rate of teacher-delivered supported OTRs and the collateral effects on the rate of student responses. I selected this design for its robust ability to control for threats to internal validity. Within this design, there is a time-lag across participants to demonstrate experimental control, which means that participants were introduced to the intervention at three different points in time. In addition, during pre-intervention conditions, data were intermittently collected. The multiple probe design reduced testing effects by limiting the number of times participants were subjected to observation without support (i.e., coaching). Further, this design was able to detect history and

maturation threats. I collected data for teacher participants until the data were stable for five consecutive sessions defined as within plus or minus 20% of the mean (Ledford & Gast, 2018). The teacher with the lowest rate of OTRs entered intervention first. After the first teacher (i.e., Ms. Bolick) met her initial goal for at least three consecutive sessions, the second teacher (i.e., Ms. Christenbury) with the second lowest rate of OTRs during baseline entered intervention. After Ms. Christenbury met her initial goal for at least three consecutive sessions, the third teacher (i.e., Ms. Lindsay) entered intervention.

**Measurement**

All sessions were video recorded for data collection purposes. The teacher logged into a Zoom meeting and placed the laptop computer within view of the session that captured the teacher and target student (i.e., not in view of other students). The researcher recorded the session via Zoom. For one week prior to baseline (i.e., 3 to 5 sessions), the teacher placed the computer in the identified location to control for setting effects.

I trained each research team member (i.e., two doctoral students) to code videos. During this training session, we practiced coding videos together until consensus (i.e., agreement of 90% or higher) was achieved across three sessions. Then, after each session, members of the research team coded videos. Researchers used event recording to count the total frequency of supported OTRs accurately delivered by the teacher, counted the availability of communication supports for each OTR, and counted the total frequency of unprompted, prompted, and no responses from the student(s).

**Data Analysis**

I used visual analysis of graphed data to determine if a functional relation was present between the independent and dependent variables. I examined the data for changes in level,

trend, variability, immediacy of effect, proportion of overlapping data, and replication of effect across conditions and phases. In addition, I also used descriptive analyses (i.e., mean) to analyze rates of OTRs and ASRs across participants, social validity, IOA, and procedural fidelity data.

## Procedures

### *Screening*

I observed all teacher and student participants prior to baseline for two to three 15-min sessions. During these observations, I collected data as prescribed to ensure teacher and student participants met inclusion criteria. In addition, I observed the teachers and students and collected information on screening observation forms (see Appendix Q and S). I identified students' communication level, communication system primarily used, and the levels of prompting needed to communicate or respond to teacher directives. I recorded these data using the pre-baseline screening observation form (see Appendix Q). For teacher participants, I identified if the target routine lent itself to OTRs and identified an estimated current rate of OTRs per min for each teacher.

### *Baseline*

During baseline sessions, the condition was business as usual and teachers conducted their typical daily teacher-led direct academic reading instruction within a small group setting. All teachers used the same curriculum which included reading passages and worksheets from the Unique™ Learning System platform. During these sessions, teachers instructed students within small groups. During each session, students participated in oral reading, answering oral questions about the text, completed worksheets based on the text with support from the teacher. During each session, data collection (i.e., via video recording) began once the teacher started the small group academic instruction and continued for up to 15 min or until the lesson ended. Once data

were stable for at least five consecutive sessions, I introduced the intervention to the teacher with the lowest rate of supported OTRs.

***Intervention***

The intervention began with an initial training. As needed based on performance toward individual goals, teachers also received follow-up supervisory coaching. The components of the coaching package included training on the supported OTR intervention, goal setting and meeting cancellation contingency, performance feedback, and supervisory coaching.

**Initial Training.** I delivered one professional development training to each teacher participant lasting approximately 1 hr, in a one-to-one arrangement, using BST (DiGennaro Reed et al., 2018). A member of the research team (i.e., trained doctoral student) observed the training and recorded procedural fidelity and a second observer viewed the video recording of each training session and collected data using the procedural fidelity checklist (see Appendix K). First, I explained the importance and rationale for each intervention component and provided written procedures to the teachers (See appendix L). I then reviewed the intervention components and procedures for implementing supported OTRs (i.e., OTR delivery, communication supports, prompting) with teachers and modeled each component. Next, the teacher participated in role-play activities to practice each skill (i.e., OTR delivery, communication supports, prompting) while I provided constructive feedback on components implemented correctly or incorrectly. For example, for each component of the supported OTR, I modeled the skill using a Unique™ Learning System reading passage. First, I modeled how to deliver a variety of OTRs with the teacher as the student. Then the teacher practiced this step with the researcher serving as the student. During these role-play activities, I provided teachers positive and constructive feedback on their performance. This was done for each component of the supported OTR.

**Goal Setting.** After the initial training, I provided each participant with their graphed baseline data including rate of delivery of OTRs and supported OTRs. After reviewing the data, teachers chose one of three goals (see Figure 2) for increasing delivery of supported OTRs as follows: (a) 10% increase in rate of supported OTRs, (b) 20% increase in rate of supported OTRs, or (c) 30% or higher increase in rate of supported OTRs.

**Performance Feedback.** After the initial goal was set, I informed each teacher I would provide daily graphed data. The daily PF included graphed data displaying the rate of supported OTRs and rate of overall OTRs each day and a note indicating if their goal was met or not. Daily PF graphs were sent to teachers each day via email during the intervention phase.

**Supervisory Coaching.** I met with teachers one time per week during the intervention phase (see Appendix R) for supervisory follow-up coaching. Each weekly coaching meeting ranged from 9 to 27 min. During this time, I provided graphed data for each teacher participant of their current rate of supported OTRs, overall OTRs, and ASRs. The teachers each identified if their goal was met or not. If their goal was met, the teacher chose to set a new goal or continue with the same goal. If their goal was not met, they continued with the same goal, and I used BST to provide follow-up coaching. First, I reviewed all components of supported OTRs (with a focus on errors; i.e., OTRs, communication support, prompt) with the teacher. Examples of errors included: missed opportunities for OTR delivery, communication supports not present or available, and/or incorrect prompting procedures. I showed the teacher a clip of intervention sessions and stopped the video at times when the intervention procedures were followed correctly and not followed correctly. Next, I modeled correct implementation of supported OTRs. Then, the teacher role played and practiced delivering missed steps of the supported OTR. Finally, I provided feedback on intervention sessions. The teachers reviewed and practiced

missed or incorrect steps until all steps were performed with 100% accuracy. The duration of coaching meetings ranged based on teacher performance with delivery of supported OTRs from 9 min to 27 min.

After three consecutive sessions of meeting their goal, supervisory coaching meetings were canceled. If the teacher did not meet their goal, weekly supervisory coaching continued. If teachers did not maintain meeting their goal consistently 100% of the time, supervisory coaching meetings would increase.

After teachers met their goal for six consecutive sessions, they were given an option to increase their goal or move into maintenance. If they increased their goal, intervention procedures continued as prescribed. If teachers choose to continue, they moved into maintenance (see Figure 2).

### *Maintenance*

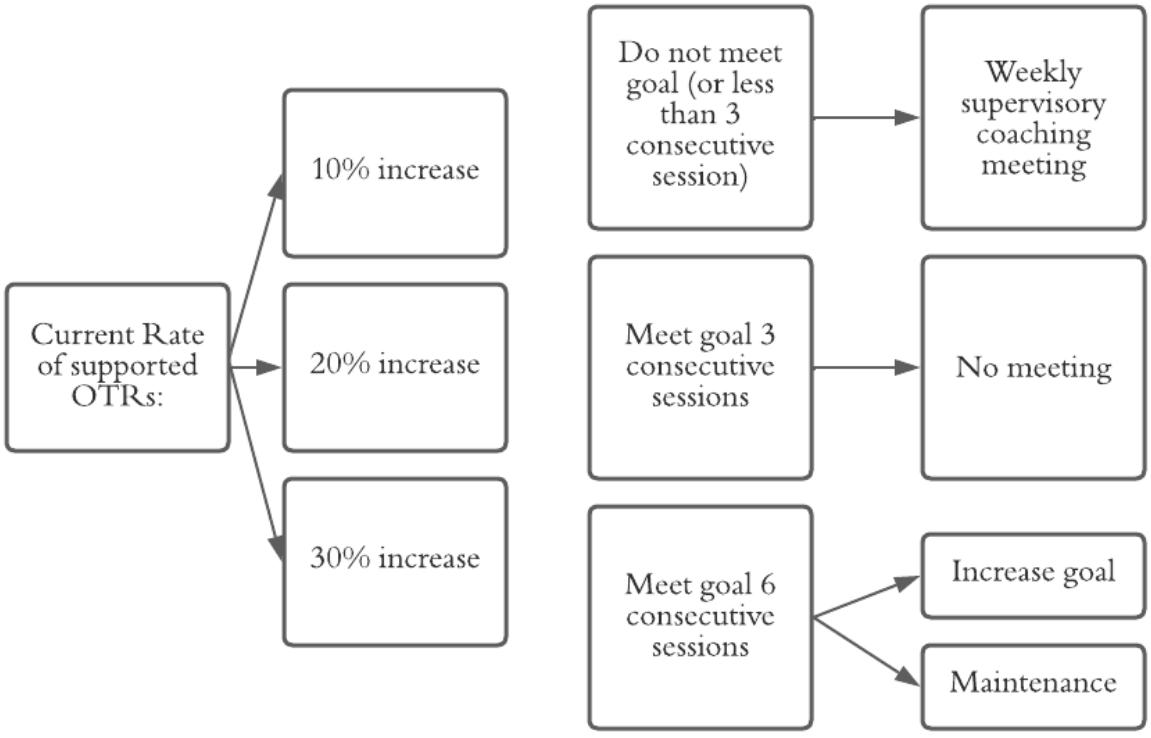
After six consecutive sessions of meeting their goal, teachers were given the option to increase their goal and continue intervention procedures or to move into maintenance and continue at their current goal level. If they chose to increase their goal, they remained in the intervention phase. If they chose maintenance, the researcher collected data at one week, two weeks, and up to two months after intervention and discontinued daily PF and supervisory follow-up coaching meetings. If teachers did not consistently meet their goal for 100% of observations, they returned to the intervention phase (i.e., daily performance feedback and coaching meetings one time per week). Maintenance data were collected for two of the three teacher participants. Maintenance data were not collected for Ms. Lindsay due to the school year ending.

## Social Validity

In order to determine social significance of goals, social appropriateness of procedures, and social importance of effects, each teacher participant completed a social validity questionnaire (see Appendix P; Wolf, 1978). At the end of the study, teachers were asked to rate on a Likert-type scale (1= *strongly disagree* to 5= *strongly agree*) their agreement on questions related to the intervention. For example, teachers were asked to rate whether the intervention was easy to implement; whether the intervention was appropriate for the selected students; if coaching meetings were effective; if goal setting impacted teacher progress; and if meeting cancellation contingency impacted teacher progress.

**Figure 2**

*Goal Setting/Meeting Cancellation Contingency*



**Interobserver Agreement**

I trained a second observer who was a member of the research team (i.e., special education doctoral student) to collect dependent variable reliability data for at least 33% of observations per condition. The second observer and I independently coded correct frequency of supported OTRs, components of supported OTRs, and ASRs (i.e., independent response, prompted response, no response) until we met criterion of 100% agreement. Once this criterion was met, the second observer independently collected data for at least 33% of sessions for each condition across each participant.

I coded all sessions for each participant across all conditions. To measure the extent to which the same values are reported after measuring the same events, a secondary observer viewed at least 33% of sessions for each participant across all conditions (Cooper et al., 2020). I then calculated IOA data for overall delivery of OTRs and delivery of supported OTRs for each teacher participant. Total count IOA (Cooper et al., 2020) was used to calculate IOA for delivery of OTRs and delivery of supported OTRs. To calculate IOA, I divided the smaller number of OTRs or supported OTRs by the larger number of OTRs or supported OTRs and multiplied by 100. The target IOA was 90% agreement (Cooper et al., 2020). If IOA fell below 90%, I met with the second observer, discussed disagreements, and I provided additional training if needed until consensus was achieved.

The mean IOA across participants for supported OTRs was 100% during baseline, 96% (range = 91.11%-100%) during intervention, and 97.28% (range = 94.29%-100%) during maintenance. The mean IOA across participants for overall OTRs was 96.97% (range = 90.90%-100%) during baseline, 97.34% (range = 94%-100%) during intervention, and 96.9% (range = 95.24%-100%) during maintenance.

***Ms. Bolick***

For Ms. Bolick, I calculated IOA for 40% baseline sessions, 42.86% intervention sessions, and 40% maintenance sessions for both OTRs and supported OTRs. During baseline, the mean IOA was 96.43% (range = 92.86%-100%) for OTRs and 100% for supported OTRs. During intervention, the mean IOA was 99.24% (range = 97.72%-100%) for OTRs and 97.02% (range = 94.29%-100%) for supported OTRs. During maintenance, the mean IOA was 97.62% (range = 95.24%-100%) for OTRs and 97.15% (range = 94.29%-100%) for supported OTRs.

***Ms. Christenbury***

For Ms. Christenbury, I calculated IOA for 37.5% baseline sessions, 33.3% intervention sessions, and 50% maintenance sessions for both OTRs and supported OTRs. During baseline, the mean IOA was 95.58% (range = 90.9%-100%) for OTRs and 100% for supported OTRs. During intervention, the mean IOA was 96.52% (range = 94.34%-100%) for OTRs and 96.6% (range = 92.31%-100%) for supported OTRs. During maintenance, the mean IOA was 95.45% for OTRs and 97.56% for supported OTRs.

***Ms. Lindsay***

For Ms. Lindsay I calculated IOA for 40% baseline sessions and 97.5% intervention sessions for both OTRs and supported OTRs. During baseline, the mean IOA was 99.04% (range = 96.15%-100%) for OTRs and 100% for supported OTRs. During intervention, the mean IOA was 97.15% (range = 94%-100%) for OTRs and 94.63% (range = 91.11%-97.14%) for supported OTRs.

**Procedural Fidelity**

A trained second observer collected procedural fidelity data for 100% of training sessions. In addition, a third trained observer viewed videos of each training session and

collected procedural fidelity data for 100% of training sessions. We used a researcher created checklist (see Appendix K) that corresponded to the training procedures. Procedural fidelity was calculated by dividing the total number of correctly implemented steps by the total number of opportunities. A minimum of 90% agreement was accepted (Cooper et al., 2020). Procedural fidelity across all initial training sessions was 100%. I also collected procedural fidelity on 100% of supervisory follow-up coaching sessions to determine if procedures were implemented as described and a second observer (i.e., member of the research team) collected procedural fidelity on 33% of coaching sessions.

### *Initial Training*

I held a total of three initial training sessions, one per teacher. A second observer attended the training session for each participant and completed a procedural fidelity checklist (see Appendix K). The checklist consisted of the elements of behavior skills training including written procedures and description of intervention, modeling, role play, feedback. The secondary observer recorded + (i.e., observed), - (i.e., not observed), or 0 (i.e., no opportunity) for each step. The third observer viewed videos of each training and completed the same procedural fidelity checklist. All training sessions were implemented with 100% fidelity.

### *Coaching Sessions*

I held a total of three coaching sessions, one per teacher based on each teacher's performance. Coaching sessions lasted a range of 9 min to 27 min. The coaching session for Ms. Lindsay occurred over two sessions due to an extenuating circumstance in which the teacher had to end the session. For each coaching session, I recorded procedural fidelity using the coaching meeting fidelity checklist (see Appendix R). A second observer viewed coaching session videos

for 33% of coaching sessions and completed the same coaching meeting fidelity checklist. All coaching sessions were implemented with 100% fidelity.

# CHAPTER 4: RESULTS

In this chapter, I report the outcomes of this study, for each research question. Data for research questions 1 and 2 are reported based on visual analysis of graphed data. I examined the data for changes in level, trend, variability, immediacy of effect, proportion of nonoverlapping data, and replication of effect across conditions. In addition, I used descriptive analyses (i.e., mean) to analyze social validity data for research question 3.

## Results for Research Question 1: Is there a functional relation between a multicomponent coaching package and the rate of supported OTRs delivered by teachers of students with ESN?

The primary dependent variable was the rate of teacher-delivered supported OTRs. In addition, data were collected on delivery of OTRs to the group and to individual students (i.e., target and nontarget). Changes in the mean rate of OTRs and supported OTRs are reported in Figure 3 and Table 1. During baseline sessions, supported OTRs were delivered at a mean rate of 0 per min and OTRs were delivered at a mean rate of 1.48 per min across all three teachers. During the intervention phase, post initial training, supported OTRs were delivered at a mean rate of 2.40 per min and OTRs were delivered at a mean rate of 3.18 per min across all three teachers. During the maintenance phase, supported OTRs were delivered at a rate of mean 2.65 per min and OTRs were delivered at a mean rate of 2.60 per min across two teachers. A functional relation was established for the primary dependent variable, supported OTRs.

### *Ms. Bolick*

During baseline sessions, Ms. Bolick delivered OTRs at a mean rate of 1.36 per min and supported OTRs at a mean rate of 0 per min. Visual analysis of baseline data indicated a low level, stable data, with no trend. Ms. Bolick entered intervention first because her OTR delivery

rates were the lowest among the three teachers during the first five baseline sessions. During the initial training, baseline data were shared with Ms. Bolick. After viewing the data, she set a goal to increase her current rate of supported OTRs (i.e., 0) by 20%, which set her initial goal at 2 supported OTRs per min for Walker.

Visual analysis of the data indicated an immediate effect and change in level for supported OTRs and overall OTRs; however, Ms. Bolick did not meet her goal of two supported OTRs per min for the first three consecutive sessions and therefore required a supervisory coaching meeting. The first coaching session occurred after the third intervention session and lasted 9 min. During this session, I presented and reviewed Ms. Bolick's data with her. Because she had not met her goal, we reviewed video clips of incorrect implementation, specifically the immediate response prompt delivery. I modeled correct implementation and Ms. Bolick practiced three times to ensure mastery. She was given an opportunity to ask questions and at the end of the session, we reviewed her goal. Because she did not meet her goal, she would continue the same goal (i.e., two supported OTRs per min).

Ms. Bolick remained in the intervention phase for a total of seven sessions, with only one session in which she did not meet her goal (i.e., intervention session one). After intervention session seven (i.e., after six consecutive sessions meeting goal), Ms. Bolick was given the option to increase her goal or move into the maintenance phase; she chose maintenance. During the intervention phase, Ms. Bolick delivered supported OTRs at a mean rate of 2.52 per min and overall OTRs at a mean rate of 3.37. Data suggest a stable, increasing trend for supported OTRs and no overlapping data points. In addition, Ms. Bolick maintained stable levels of implementation across both supported OTRs and OTRs for two months after the intervention phase ended. Maintenance data were collected at 1 week, 3 weeks, 5 weeks, 7 weeks, and 8

weeks after intervention ended. Data remained stable during maintenance at mean rates of 2.61 supported OTRs per min and 3.33 OTRs per min with no overlapping data points.

***Ms. Christenbury***

During baseline sessions, Ms. Christenbury delivered OTRs at a mean rate of 1.34 per min and supported OTRs at a mean rate of 0 per min. Visual analysis of baseline data indicated a low level, stable data, with no trend. Ms. Christenbury entered intervention second because her OTR delivery rates were the second lowest among the three teachers during the first five baseline sessions. During the initial training, baseline data were shared with Ms. Christenbury. After viewing the data, she set a goal to increase her current rate of supported OTRs (i.e., 0 per min) by 10%, which set her goal at 1 supported OTR per min for Terrell.

Visual analysis of the data indicated an immediate effect and change in level for supported OTRs and overall OTRs; however, Ms. Christenbury did not meet her goal of one supported OTR per min for the first three consecutive sessions and therefore required a supervisory coaching meeting. The first coaching session occurred after the third intervention session and lasted 27 min. During this session, I presented and reviewed Ms. Christenbury's data with her. Because she had not met her goal, we reviewed video clips of incorrect implementation, specifically the availability and use of communication supports. I modeled correct implementation and Ms. Christenbury practiced three times to ensure mastery. She was given an opportunity to ask questions and at the end of the session, we reviewed her goal. Because she did not meet her goal, she would continue the same goal (i.e., one supported OTR per min).

Ms. Christenbury remained in the intervention phase for a total of nine sessions, with only one session in which she did not beet her goal (i.e., intervention session three). After

intervention session nine, (i.e., after six consecutive sessions meeting goal), Ms. Christenbury was given the option to increase her goal or move into the maintenance phase; she chose maintenance. During the intervention phase, Ms. Christenbury delivered supported OTRs at a mean rate of 2.50 per min and overall OTRs at a mean rate of 2.98 per min. Data suggest a stable, increasing trend for supported OTRs. There was one overlapping data point post initial training in which Ms. Christenbury did not provide communication supports for Terrell. This was reviewed during the coaching session that week, and Ms. Christenbury implemented all components of supported OTRs for the remaining sessions. In addition, Ms. Christenbury maintained stable levels of implementation across both supported OTRs and OTRs for 3 weeks after the intervention phase ended. Maintenance data were collected 2 weeks and 3 weeks after intervention ended. Data remained stable during maintenance at mean rates of 2.77 supported OTRs per min and 2.90 OTRs per min with no overlapping data points.

***Ms. Lindsay***

During baseline sessions, Ms. Lindsay delivered OTRs at a mean rate of 1.66 per min and supported OTRs at a mean rate of 0 per min. Visual analysis of baseline data indicated a low level, stable data, with no trend. Ms. Lindsay entered intervention last because her OTR delivery rates were the highest among the three teachers during the first five baseline sessions. During the initial training, baseline data were shared with Ms. Lindsay. After viewing the data, she set a goal to increase her current rate of supported OTRs (i.e., 0) by 20%, which set her goal at 2 supported OTRs per min for Ashton.

Visual analysis of the data indicated an immediate effect and change in level for supported OTRs and overall OTRs; however, Ms. Lindsay did not meet her goal of two supported OTRs per min for the first three consecutive sessions and therefore required a

supervisory coaching meeting. The first coaching session occurred after the third intervention session and was broken into two sessions due to an emergency situation, lasting a total of 17 min. During these sessions, I presented and reviewed Ms. Lindsay's data with her. Because she had not met her goal, we reviewed video clips of incorrect implementation, specifically the availability and use of communication supports. I modeled correct implementation and Ms. Lindsay practiced three times to ensure mastery. She was given an opportunity to ask questions and at the end of the session, we reviewed her goal. Because she did not meet her goal, she would continue the same goal (i.e., two supported OTRs per min).

Ms. Lindsay remained in the intervention phase for a total of eight sessions, with two sessions in which she did not meet her goal (i.e., intervention sessions one and two). After intervention session eight (i.e., after six consecutive sessions meeting goal), Ms. Lindsay was given the option to increase her goal or move into the maintenance phase; she chose maintenance. During the intervention phase, Ms. Lindsay delivered supported OTRs at a mean rate of 2.20 per min post initial training and overall OTRs at a mean rate of 3.23. Data suggest a stable, increasing trend for supported OTRs and no overlapping data points. Maintenance data were not collected for Ms. Lindsay due to the school year ending.

**Results for Research Question 2: To what degree does the multicomponent coaching package intended to increase the rate of supported OTRs increase the rate of ASRs of students with ESN?**

Although the primary dependent variable was the rate of teacher-delivered supported OTRs, we also collected data on the collateral effects of the coaching intervention on each target student's ASRs. Changes in the mean rate of ASRs are reported in Figure 4 and Table 2. During baseline, ASRs occurred at a mean rate of 0.61 per min across all three target students. During

the intervention phase, post initial training, ASRs occurred at a mean rate of 2.60 per min and during the maintenance phase, ASRs occurred at a mean rate of 2.72 per min.

***Walker***

During baseline sessions, Walker's mean rate of total ASRs (i.e., unprompted and prompted responses) was 0.28 per min. Visual analysis of baseline data indicated a low level, stable data, with no trend. After the initial training was provided to Ms. Bolick, there was an immediacy of effect for Walker's total ASRs. Walker's mean rate of total ASRs during the intervention phase increased to 2.53 per min. Visual analysis of the data indicated an immediate effect and change in level for Walker's total ASRs. Walker maintained this rate of total ASRs during the maintenance phase with a mean rate of 2.67 ASRs per min.

***Terrell***

During baseline sessions, Terrell's mean rate of total ASRs (i.e., unprompted and prompted responses) was 0.33 per min. Visual analysis of baseline data indicated a low level, stable data, with no trend. After the initial training was provided to Ms. Christenbury, there was an immediacy of effect for Terrell's total ASRs. Terrell's mean rate of total ASRs during the intervention phase increased to 2.82 per min. Visual analysis of the data indicated an immediate effect and change in level for Terrell's total ASRs. Terrell maintained this rate of ASRs during the maintenance phase with a mean rate of total 2.77 ASRs per min.

***Ashton***

During baseline sessions, Ashton's mean rate of total ASRs (i.e., unprompted and prompted responses) was 1 per min. Visual analysis of baseline data indicated a low level, stable data, with no trend. After the initial training was provided to Ms. Lindsay, there was an immediacy of effect for Ashton's total ASRs. Ashton's mean rate of total ASRs during the

intervention phase was 2.42 per min. Visual analysis of the data indicated an immediate effect and change in level for Ashton's total ASRs.

**Results for Research Question 3: How do teacher participants perceive the feasibility and overall effects of the intervention?**

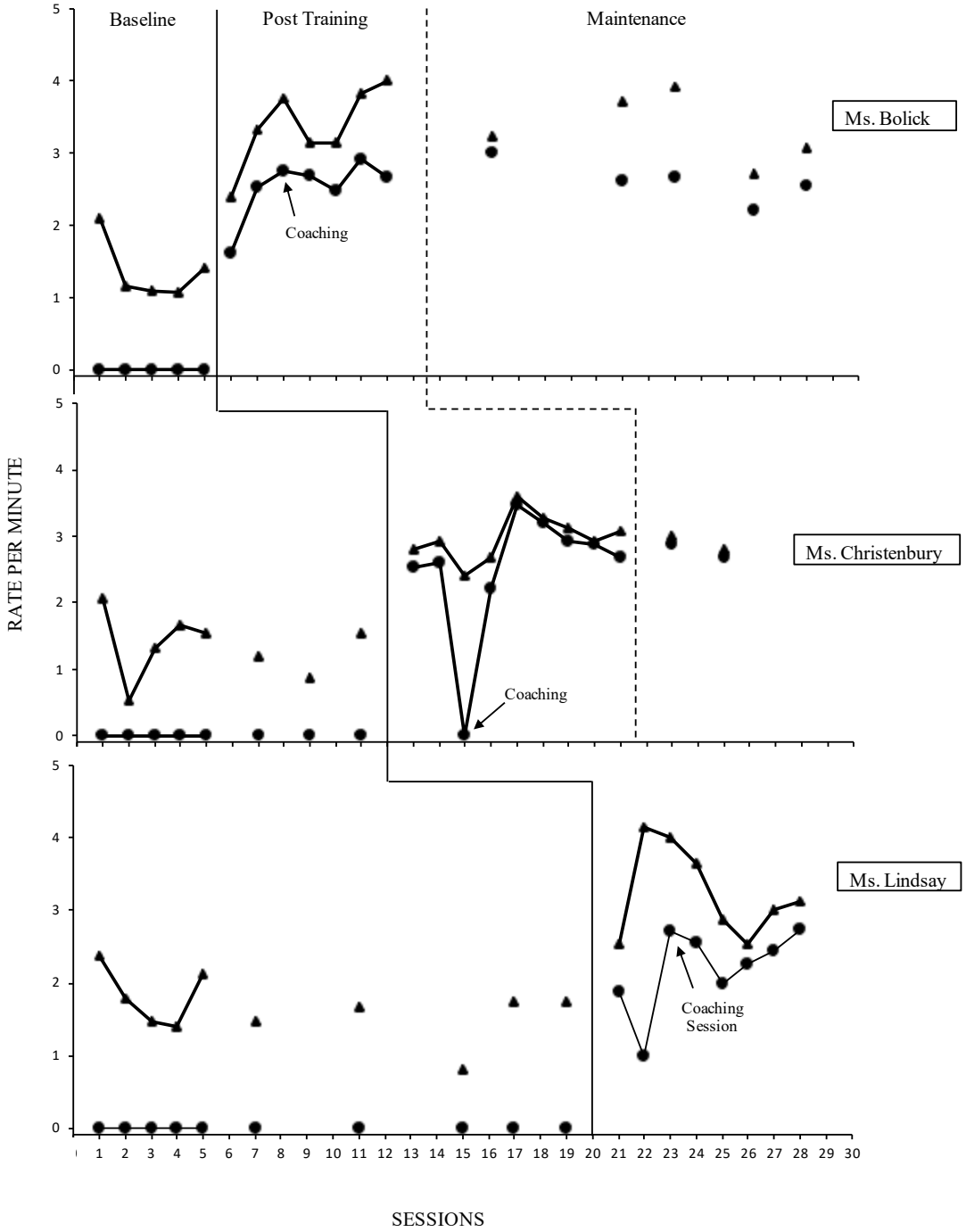
In order to evaluate the social significance of the goals, social appropriateness of procedures, and social importance of effects, each teacher participant was asked to complete a social validity questionnaire (Wolf, 1978; see Appendix P). The researcher designed the questionnaire using a Likert-type five-point scale (1 = *strongly disagree*; 2 = *disagree*, 3 = *neutral*, 4 = *agree*, 5 = *strongly agree*) to measure teacher perceptions of the intervention and research study. All three teachers completed the survey after all data were collected. Mean ratings are presented in Table 3 and percentages across participants are presented in Table 4. Next, I will present several key findings.

First, all three teachers indicated that implementing supported OTRs was acceptable and beneficial for their students who follow the adapted curriculum standards and would suggest the use of the intervention to other teachers. Next, the majority of teacher participants reported that the intervention was easy to implement and required minimal time and resources. Finally, there was some variability among teacher perceptions of coaching components. All teachers found coaching meetings effective. Additionally, all three teachers indicated goal setting and having a choice for goal setting positively impacted their implementation progress. The majority of teachers reported the benefit of seeing the graphed data on their progress. The most variability was reported regarding the effects for the opportunity of a canceled meeting. One teacher indicated the opportunity for a canceled meeting did not affect her progress, and the two other

teacher participants agreed and strongly agreed that the opportunity for a canceled meeting did impact their progress.

**Figure 3**

*Rate per Minute of OTRs and Supported OTRs*




*Note:* Closed circles represent supported OTRs. Closed triangles represent OTRs.

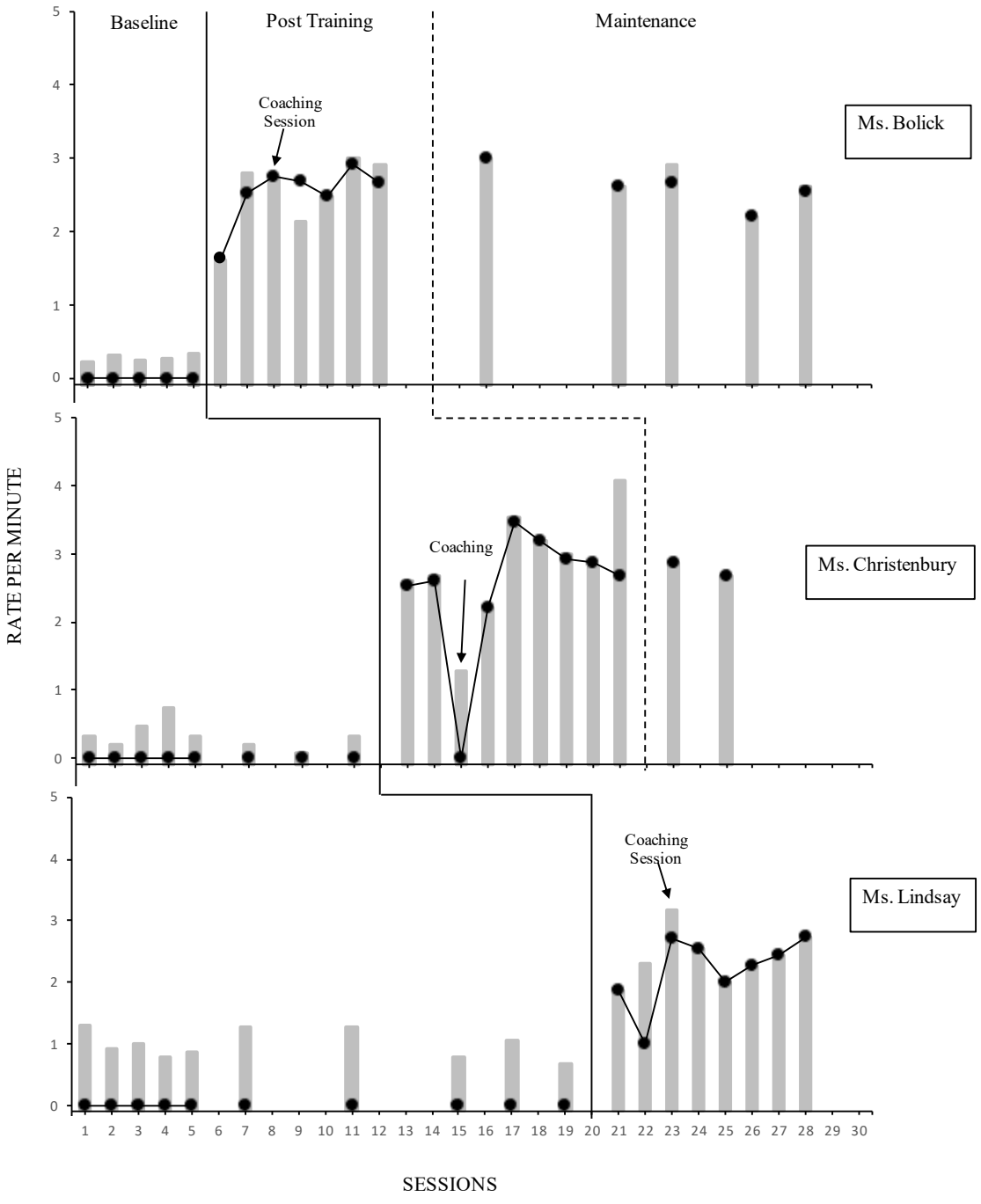
**Table 1**

*Mean Rates per Minute of OTRs and Supported OTRs*

| Teacher | Baseline Mean | Intervention Mean | Rate of Change | Maintenance Mean |
|---|---|---|---|---|
| Ms. Bolick | | | | |
| OTRs | 1.36 | 3.37 | + 2.01 | 3.33 |
| Supported OTRs | 0 | 2.52 | + 2.52 | 2.61 |
| Ms. Christenbury | | | | |
| OTRs | 1.34 | 2.98 | + 1.64 | 2.90 |
| Supported OTRs | 0 | 2.50 | + 2.50 | 2.77 |
| Ms. Lindsay | | | | |
| OTRs | 1.66 | 3.23 | + 1.57 | |
| Supported OTRs | 0 | 2.20 | + 2.20 | |

**Figure 4**

*Rate per minute Supported OTRs and ASRs*




*Note:* Closed circles represent supported OTRs. Shaded bars represent total ASRs.

**Table 2**

*Mean Rates per Minute of ASRs*

| Student | Baseline Mean | Intervention Mean | Rate of Change | Maintenance Mean |
|---|---|---|---|---|
| Walker | | | | |
| Total responses | 0.28 | 2.53 | + 2.25 | 2.67 |
| Independent responses | 0.2 | 0.17 | - 0.03 | 0.2 |
| Prompted responses | 0.26 | 2.36 | + 2.10 | 2.45 |
| No responses | 0.40 | 0.52 | + 0.12 | 0.45 |
| Terrell | | | | |
| Total responses | 0.33 | 2.82 | + 2.49 | 2.77 |
| Independent responses | 0.04 | 0.93 | + 0.89 | 0.87 |
| Prompted responses | 0.29 | 1.88 | + 1.59 | 1.90 |
| No responses | 0.48 | 0.25 | + 0.23 | 0.04 |
| Ashton | | | | |
| Total responses | 1.00 | 2.42 | + 1.42 | |
| Independent responses | 0.22 | 0.34 | + 0.12 | |
| Prompted responses | 0.78 | 2.08 | + 1.30 | |
| No responses | 0.06 | 0.26 | + 0.20 | |

**Table 3**

*Mean Results of Social Validity Survey*

| *Item* | *M* |
|---|---|
| This was an acceptable intervention for my students. | 5 |
| This intervention was effective in meeting the purpose. | 5 |
| I would suggest the use of this intervention to other teachers. | 5 |
| This intervention was easy to implement. | 4.33 |
| This intervention required minimal time and resources. | 4.33 |
| Coaching meetings were effective. | 5 |
| Setting a goal impacted my progress. | 5 |
| Having a choice for goal setting impacted my progress. | 5 |
| The opportunity for a canceled meeting impacted my progress. | 3.33 |
| Seeing the graphed data impacted my progress. | 4.67 |
| Overall, this intervention was beneficial for my students who follow the adapted curriculum. | 5 |

*Note:* 1 = *strongly disagree*; 2 = *disagree*, 3 = *neutral*, 4 = *agree*, 5 = *strongly agree*

**Table 4**

*Results of Social Validity Questionnaire Across Total Participants*

| *Item* | *Strongly Disagree* | *Strongly Agree* | *Neutral* | *Agree* | *Strongly Agree* |
|---|---|---|---|---|---|
| This was an acceptable intervention for my students. | | | | | 3<br>100% |
| This intervention was effective in meeting the purpose. | | | | | 3<br>100% |
| I would suggest the use of this intervention to other teachers. | | | | | 3<br>100% |
| This intervention was easy to implement. | | | | 2<br>66.7% | 1<br>33.3% |
| This intervention required minimal time and resources. | | | | 2<br>66.7% | 1<br>33.3% |
| Coaching meetings were effective. | | | | | 3<br>100% |
| Setting a goal impacted my progress. | | | | | 3<br>100% |
| Having a choice for goal setting impacted my progress. | | | | | 3<br>100% |
| The opportunity for a cancelled meeting impacted my progress. | 1<br>33.3% | | | 1<br>33.3% | 1<br>33.3% |
| Seeing the graphed data impacted my progress. | | | | 1<br>33.3% | 2<br>66.7% |
| Overall, this intervention was beneficial for my students who follow the adapted curriculum. | | | | | 3<br>100% |

*Note:* 1 = *strongly disagree*; 2 = *disagree*, 3 = *neutral*, 4 = *agree*, 5 = *strongly agree*

# CHAPTER 5: DISCUSSION

The purpose of this study was to examine the effects of a coaching package on the rate of teacher-delivered supported OTRs. Specifically, I used an experimental single-case, multiple probe across participants design (Horner & Baer, 1978; Ledford & Gast, 2018) to evaluate the effectiveness of a coaching package comprised of an initial training, teacher-directed goal setting, meeting cancellation contingency, daily PF, and follow-up supervisory coaching sessions in increasing teachers' use of supported OTRs during academic instruction for students with ESN. I also examined the collateral effects of teachers' implementation of supported OTRs on ASRs of students with ESN during small group instruction. Finally, I collected information from teacher participants on their perceptions of the feasibility and overall effectiveness of the intervention. Results indicated that each teacher increased their delivery of supported OTRs for their target student and also increased overall delivery of OTRs during small group instruction. In addition, when teacher rates of supported OTRs increased, ASRs across all three target students increased. Social validity data indicated teachers found this to be an acceptable, easy to implement, and beneficial intervention for their students and would recommend it to other teachers. In this chapter, I will discuss outcomes from the study for each research question and themes that emerged from the results of the intervention. Lastly, I will present contributions, limitations, suggestions for future research, and implications for practice.

**Research Question 1: Is there a functional relation between a multicomponent coaching package and the rate of supported OTRs delivered by teachers of students with ESN?**

Visual analysis of results indicated a functional relation between the multicomponent coaching package and the rates of supported OTRs delivered by teachers. Prior to intervention,

teachers delivered OTRs at a mean rate of 1.48 per min, which is below recommended levels (i.e., 4-6 per min; CEC, 1987; 3-5 per min; MacSuga-Gage & Simonsen, 2015) and teachers did not deliver supported OTRSs (i.e., mean rate of 0). Following an initial 1-hr training and one follow-up coaching session per teacher, comprised of descriptions, modeling, role play, and feedback of each supported OTR component (i.e., OTRs, communication supports, response prompting), mean rates of supported OTRs and OTRs increased to 2.40 per min and 3.18 per min, respectively. These rates are consistent with recommended OTR rates in the current literature (CEC, 1987; MacSuga-Gage & Simonsen, 2015). Further, two of the three teacher participants maintained levels of supported OTRs at three weeks to two months post intervention. These findings indicate that teachers can be trained and supported in increasing both the rate and quality of delivering OTRs to students with ESN.

***Multicomponent Coaching Package***

Interestingly, data indicated that minimal training and coaching was required to increase teacher's performance. Following an initial 1-hr training, the mean rates of supported OTRs and OTRs across teachers increased to 1.96 per min and 3.14 per min, respectively. Further, teachers required only a single coaching session to increase supported OTR rates to 2.66 and OTRs to 3.22 across teachers. These findings are compelling in light of previous studies indicating a need for longer trainings or more coaching sessions. For example, Bethune and Wood (2013) delivered a 6-hr training prior to baseline sessions for teachers of students with ESN and then provided coaching after every intervention session until teachers scored 90% accuracy across two consecutive sessions of the intervention. Ganz and colleagues (2013) delivered a 3-hr training prior to baseline sessions for teachers of students with ESN, an individualized training session as the intervention, and booster coaching sessions until a therapist met the preset

criterion for two consecutive sessions. Similarly, Ivy and colleagues provided a 2-hr long training prior to baseline, a 1-hr training intervention session, and weekly 30-min coaching sessions for collaborative teams supporting students with ESN.

Despite these studies providing general information regarding training and coaching dosage, Snyder et al. (2015) reported the need for researchers to further report dosage to guide understanding related to efficiency of different coaching models. As school districts consider instructional coaching, there is a need to know the amount of coaching that will be needed. It has been previously reported that coaching interventions may required high doses of coaching sessions to achieve fidelity of implementation (Fox et al., 2011; Snyder et al., 2015). Contrary to these studies, this current study provides an example of a coaching model involving a multicomponent intervention that required minimal time spent in training and coaching. This is extremely important as time and resources are limited for teachers and school personnel. School support personnel (e.g., instructional coaches, related service providers) may have high caseloads and duties that extend beyond the scope of just "coaching" teachers, therefore the potential for a less time intensive intervention could be extremely beneficial for supporting teachers.

**Goal Setting.** The effectiveness and efficiency of this coaching package may have been partially contributed to by the use of teacher-directed goal setting. Goal setting may have impacted effectiveness of the coaching package in two ways. First, it may have facilitated a collaborative relationship. Providing teachers with the option to self-select goals is consistent with the collaborative coaching relationship described by Snyder and colleagues (2015), in that it considers teachers' preferences, strengths, and needs. Second, it may have increased agency and accountability for the teacher and provides opportunity for the coach to acknowledge growth

(Snyder et al., 2015). By giving teachers the opportunity to choose and set their own goals, the coaching relationship is strengthened by affording teachers a level of accountability.

Within this study, following their initial training, the teacher participants were provided their baseline data and were prompted to independently select a goal for increasing their delivery rate of supported OTRs. Each teacher was given the choice to increase their supported OTR delivery by 10%, 20%, or 30%. Two teachers chose to increase their rate of supported OTRs delivered by 20% (i.e., Ms. Bolick and Ms. Lindsay) and one teacher chose to increase by 10% (i.e., Ms. Christenbury). By allowing teachers to self-select their goal from preset levels, it provided them the opportunity to set a goal they believed they could achieve (Knowles et al., 2005). However, this option also may have provided teachers the opportunity to select a minimal criterion for terminating the coaching package and thus potentially demonstrate less improvement. For example, Cohrs et al. (2016) investigated the impact of several different goal-setting contingencies on teacher delivery of behavior-specific praise statements. In one phase of the study, teachers set goals that were low relative to their previous delivery rates, which resulted in minimal to no improvements across study participants. Interestingly, Ms. Christenbury chose the lowest goal of a 10% increase, but post intervention, maintained levels of implementation at 20%. Although she opted for a lower goal that could have led to a smaller increase in supported OTRs delivered, she maintained similar levels to other teacher participants. This may have influenced her choice to move into the maintenance phase as she had consistently met the goal beyond her initial target.

Another key feature of goal setting within this study was that the criteria provided teacher participants a specific target to achieve, versus setting an indefinite goal of increasing supported OTRs in general. Within this model, teachers had a numerical goal of a specific rate of supported

OTRs. Prior researchers have noted that goal specificity enhances teachers progress toward goals (Cohrs et al., 2016; Martens et al., 1997). This is important for designing coaching interventions as our findings support the need for researchers and coaches to identify specific goals for teachers to work towards. This is a simple addition to a coaching intervention that could potentially have a significant impact.

A final opportunity for choice-making embedded within goal setting occurred after each teacher met their predetermined goal across six consecutive sessions. Teachers were given the choice to increase their goal (e.g., 10% to 20% increase) or to maintain their current goal. Interestingly, all teachers chose to move into maintenance versus increasing their goal. This could be due in part to several factors. First, current expectations (i.e., due to COVID-19; societal pressures) are high for teachers, which may have impacted their choice to move on as continuing required additional daily tasks for the teacher to complete (e.g., set up computer, login to Zoom). Although the response effort for these tasks is relatively low, they require more from teachers already busy with multiple responsibilities and often pressed for time. Another reason all teachers may have chosen to maintain versus increase their goal could simply be that teachers were pleased with their levels, as they made substantial increases in their delivery of supported OTRs which resulted in increased responding for the target student. Further, the conclusion of this study occurred close to the end of the school year and state testing, when teacher burnout and exhaustion are common. These factors may have impacted teachers' choice to move into maintenance.

**Meeting Cancellation Contingency.** Another component of the coaching package involved the use of negative reinforcement through a meeting cancellation contingency. If teachers met their goal for three consecutive sessions, they would not have to participate in

follow-up coaching sessions that week. All three teacher participants required coaching during the first week of intervention (i.e., after session 3). After one coaching session, all three teachers met and maintained their goal for the remainder of the study. These findings are consistent with previous studies demonstrating that a meeting cancellation contingency can contribute to maintained implementation without consistent follow up coaching sessions (DiGennaro Reed et al., 2005). In the past, coaches may have relied on positive reinforcement contingencies in the form of positive praise from coaches. The findings from this study may suggest that the option to not participate in frequent meetings (i.e., negative reinforcement contingency) is a powerful reinforcer for teachers to implement effective practices with fidelity over time, whereas positive reinforcement contingencies may not be enough for sustained teacher behavior change.

**Performance Feedback.** An additional component of the coaching package was the daily PF provided to teachers. Following each intervention session, the researcher sent the teacher an email containing graphed data representing rates of teacher-delivered supported OTRs and rates of ASRs for the target student, and a note indicating whether or not the goal was met. It is possible that the use of daily PF embedded within this coaching package contributed to the overall positive results, which is consistent with prior research (Cavanaugh, 2013; Cossairt et al., 1973; Fallon et al., 2015; Sinclair et al., 2020; Solomon et al., 2012). Daily PF is important because it provides teachers with a visual representation of their progress. It was especially important during this study because teachers were able to view their daily progress toward their selected goal. If teachers were not making progress toward their goal, it seems logical that they would adjust their behavior to meet the goal that they selected.

Finally, changes in teacher-delivered OTRs likely may be a result of daily PF including student ASR data. Kretlow and Bartholomew (2010) reported that teachers may continue

implementing practices as a result of seeing real changes in student progress. Results of social validity data indicated that all three teachers reported they agreed or strongly agreed that seeing the graphed data impacted their progress. Although it is unclear whether seeing teacher or student data made a direct impact, overall, the impact of seeing daily PF likely contributed to the effects of the intervention.

**Coaching Sessions.** As aforementioned, each teacher participant required a single coaching session to meet their supported OTRs goal. During these coaching sessions, each teacher participant's specific performance on their delivery of OTRs was addressed. The sessions were highly individualized based on the teacher's strengths and needs. One benefit of coaching is the flexibility to address individual areas of needs across teachers (Kretlow & Bartholemew, 2010). Because the intervention in the study involved several components, it seems logical that different teachers would require support on different components. For example, Ms. Bolick required coaching on the delivery of response prompts. Ms. Christenbury required coaching on the availability of communication supports. Ms. Lindsay required coaching on ensuring communication supports were available and programmed for the lesson. The opportunity for individualization during coaching allowed for teachers with differing areas of need to receive professional development, while still following a systematic coaching plan. This coaching model was able to address each individual teacher's specific needs.

### *Maintenance*

Finally, it is notable that teachers for which maintenance data were collected maintained performance for three weeks and up to two months post intervention. Ms. Bolick maintained a mean rate of 2.61 supported OTRs per min, which was higher than the rate during intervention and Ms. Christenbury also had a higher rate at 2.77 supported OTRs per min. These findings are

compelling in light of previous investigations involving coaching interventions in which limited maintenance data were collected (e.g., Brock et al., 2018; Ganz et al., 2013; Ivy et al, 2020), or in which data reflected poor maintenance of improvements in teacher behavior (e.g., Duchaine et al., 2011; Reinke et al., 2007). The maintenance of teacher performance is critical, particularly because coaches are not always available to provide consistent support for long periods of time to teachers. This model provides a means for which coaches can train teachers while providing initial support, and then fade as teacher make progress toward their goals.

**Research Question 2**: **To what degree does the multicomponent coaching package intended to increase the rate of supported OTRs increase the rate of ASRs of students with ESN?**

Overall, findings indicated that the multicomponent coaching package intended to increase the rate of supported OTRs also increased the rate of ASRs across all three student participants with ESN during small group instruction. During baseline sessions, ASRs occurred at a mean rate of 0.61 per min, which suggests low rates of engagement during academic instruction. These results are not surprising as prior studies have reported low rates of engagement for students with ESN in schools. For example, Kurth et al. (2016) reported that students with ESN were infrequently engaged in academic instructional tasks, had limited interactions with teachers or peers, and were less likely afforded opportunities to participate in learning activities. Similarly, Pennington and Courtade (2015) observed students with ESN and reported them actively engaged in instruction for only 29% of observations. During the screening observations and baseline sessions, students were observed to be engaged in academic instruction at very low rates. Although these results are not surprising based on prior research, they are still concerning. This study took place across three self-contained special education classrooms. Within the continuum of placements, self-contained separate settings exist as

alternative placements with the intent to provide the most intense level of services that a student presumably couldn't otherwise receive in a less restrictive placement (Causton-Theoharis et al., 2011; Kleinert et al., 2015). Although separate environments are supposedly designed to support students with ESN, these results suggest otherwise.

Fortunately, after the initial training, rates of ASRs increased to 2.60 per min. Changes in student ASRs were likely due to the changes in teacher-delivered supported OTRs, because when teacher supported OTR delivery rates increased, so did students' ASRs. These findings highlight that, although current rates in school settings may be low, implementing interventions to increase supported OTRs may provide a means to increase student engagement and mitigate current low rates. Furthermore, when students are presented with more opportunities to engage in academic instruction while provided appropriate supports, their rates of responses can be increased. These results are consistent with prior research suggesting increasing OTRs results in higher rates of engagement of students (MacSuga-Gage & Gage, 2015; MacSuga-Gage & Simonsen, 2010; Sutherland & Wehby, 2001; Van Camp et al., 2020). The results from the current study are compelling because through the addition of effective supports, delivering supported OTRs seems to be a feasible intervention that may be used to increase engagement of students with the most intensive level of support needs.

Student increases in ASRs are likely due to features of the supported OTRs. The relation between OTR delivery and student engagement is well established (Heward & Wood, 2016; MacSuga-Gage & Gage, 2015, MacSuga-Gage & Simonsen, 2015; Sutherland & Wehby, 2001; Van Camp et al., 2020). I extended the traditional conceptualization of OTR for students with ESN by incorporating access to communication supports and delivery of response prompts to increase probability of correct responding. These additional features have been demonstrated to

be necessary in supporting student with ESN during academic instruction (Browder et al., 2008; Cannella-Malone et al., 2021; Ganz et al., 2012; Horn et al., 2020; O'Neill et al., 2018; Saunders et al., 2020; Snell et al., 2006). Through the use supported OTRs, students with ESN were provided instructional supports comprised of three research-based components and targeted foundational instructional elements to increase engagement during academic instruction.

### *Communication Supports*

One major component of the supported OTR intervention was the inclusion of communication supports. Communication is a fundamental right for all and access to communication supports are critical for individuals with ESN and CCN (Brady et al., 2016; Light & McNaughton, 2014). To address this within schools, communication supports must be provided for students across all aspects of their day. During baseline sessions, when teachers conducted business as usual, target students were not provided with communication supports, or if they were, students did not use them to participate in academic instruction. During these sessions, ASRs occurred at a mean rate of 0.61 across teacher participants. Without communication systems, students had no tools to respond during academic instruction, and therefore ASRs and engagement in the instructional tasks were low, highlighting the potential need for communication supports. This is further supported by Ms. Christenbury's third intervention session. During this session, she did not provide communication supports as operationalized within the supported OTR intervention, but rather relied on the pictures within the instructional task (i.e., picture symbols supporting textual responses on a worksheet) in the same manner in which she had during baseline sessions. When Terrell was not provided the communication supports for the intervention, ASRs decreased. Data also were collected on the number of "no responses" across target students. During the third session, Terrell emitted "no

responses" at a rate of 1.2 per min (when presented OTRs), in comparison to the other sessions in which he was provided communication supports (rate of no responses; $M = 0.13$ per min). The results from this study are not surprising, as prior studies have reported that students with ESN and CCN are often passive learners (Chung et al., 2012; Kurth et al., 2016; Pennington & Courtade, 2015), which may be a result of not having consistent access to communication supports (Ganz, 2015; Gross Toews et al., 2020; Kurth et al., 2016; Towles Reeves et al., 2012, 2022). Access to communication supports and interventions have long been reported as an area of need for supporting individuals with ESN (Brady et al., 2016; DaFonte et al., 2022; Light & McNaughton, 2012; Snell et al., 2010). Gross Toews and colleagues (2020) reported that although students with CCN often have access to AAC devices, they observed students using these devices for only 10.1% of observed intervals. Similarly, Chung et al. (2012) reported that several students who had AAC devices were never in proximity of their devices during academic or social contexts, and students' AAC devices were not in close proximity during 60% of observations.

Another interesting finding was that two of the three target students had their own high-tech AAC devices and received services from an assistive technology specialist, yet these devices were not used functionally in the school setting. During screening observations and baseline sessions, one student's device was often left in his bookbag, uncharged, or set on the table but never used. The other student's device was always available, yet he often pressed the same buttons repeatedly identifying his preferred items and although programmed for academic instruction, the student never used the device to engage in academic instruction. These findings are consistent with prior research that several factors often contribute to AAC device abandonment. First, several researchers have reported on the great disparities in teacher training

in the area of communication instruction and AAC (Andzik et al., 2017; Baxter et al., 2012; DaFonte et al., 2022; Johnston et al., 2004). For example, Andzik et al, (2017) reported teacher perceptions regarding the use of AAC for their students with CCN. Most teachers expressed they believed AAC to be valuable to their students, but felt they were inadequately trained to implement in their classrooms effectively. In a more recent study, DaFonte et al. (2022) surveyed special education teachers across the United States and found that the majority of teachers reported low levels of knowledge and skills in AAC. One plausible explanation for these gaps in knowledge and skills is that teachers may not be adequately prepared to support communication instruction during their teacher preparation programs. Pennington and colleagues (2021) found that undergraduate and graduate faculty preparing teachers in ESN felt their programs were not adequately preparing their students to teach communication skills. Further, they extended this work by surveying preservice teachers at the end of their teacher preparation program on their perceived level of preparedness (Walker et al., 2022). Participants indicated varied responses in terms of communication instruction preparedness; however, 32.8% indicated they received inadequate or no preparation in teaching students to use AAC systems. These results are alarming based on the importance of AAC in supporting students with CCN (Chung et al., 2010; Ganz, 2015; Geist et al., 2014; Light & McNaughton, 20212; Snell et al., 2010). Finally, Light and McNaughton (2012) reported that, although the field has substantial research on the effects of AAC and several interventions to support students use of communication supports to improve their development of communication, language, and literacy skills across all settings, the reality is that this is not always occurring in schools (Kurth et al., 2016; Gross Toews et al., 2020). The practical application of AAC interventions to supports students with ESN and CCN can be challenging for teachers, particularly when not provided adequate training and support for

implementation. Therefore, teachers need better training, teacher preparation programming specifically targeting communication instruction, and support with implementation. The results from this study may potentially provide school personnel a feasible intervention option to increase availability and access to communication supports for students with ESN and CCN.

### *Response Prompts*

The third component of the supported OTR intervention was the delivery of response prompts to support student responding. The inclusion of response prompts as a part of the supported OTRs is necessary for (a) supporting skill acquisition of students with ESN, (b) facilitating correct responding, and (c) establishing stimulus control. During screening observations and baseline sessions, students were observed as minimally engaged in academic instruction with low rates of responses. Therefore, it can be presumed that the implementation of this intervention occurred at the initial, acquisition stage of learning. During this stage of learning, supports in the form of response prompts may be necessary to help students perform the desired behaviors (i.e., communicative response) correctly. All teachers in this study used CTD, with each student requiring different controlling prompts to facilitate correct responding. It is hypothesized that over time (i.e., not over the course of this study) with repetition, stimulus control would be established, and the frequency and level of response prompts may be reduced. This means that eventually prompted responses would decrease while independent responses would increase. Although the length of this study did not allow for us to observe these effects, prior research supports the use of response prompts (Browder et al., 2014; Cannella-Malone et al., 2021; Collins, 2012; Wolery, Ault, & Doyle, 1992; Wolery & Gast, 1984).

## Research Question 3: How do teacher participants perceive the feasibility and overall effects of the intervention?

In order to determine the social significance of the goals, social appropriateness of procedures, and social importance of effects, each teacher participant completed a social validity questionnaire (Wolf, 1978; see Appendix P). The questionnaire included questions pertaining to supported OTRs and the multicomponent coaching package. Overall, participants provided positive feedback regarding all components of the interventions.

Consistent with previous research, the positive results may be attributed to (a) the ease of intervention implementation, (b) daily access to PF reflecting improvements in teacher progress toward self-selected goals, and (c) observed increases in student ASRs (i.e., target students and other students participating in small group instruction). Overall, teacher participants agreed or strongly agreed the supported OTRs intervention was acceptable, effective, easy to implement, and required minimal time and materials. The provision of daily PF may have contributed to positive teacher perceptions as teachers were able to observe their own progress. This is consistent with previous research that suggested providing graphed results to teachers added to the effectiveness of the feedback and teacher performance on targeted skills (Solomon et al., 2012). Finally, teachers also reported that viewing student performance data impacted their progress. This suggests that when teachers are provided with positive student data, it may contribute to their future responding (Kretlow & Bartholomew, 2010). Additionally, during informal conversations after the study concluded, teachers reported that all students who participated in the small group benefited from the intervention, and they saw increases in ASRs among all students. This suggests that being able to view teacher and student progress data can have a positive impact on teacher perceptions.

Regarding the coaching intervention, all teachers reported that coaching meetings were effective and setting a goal or having a choice for goal setting impacted their progress.

Additionally, further written feedback provided by one teacher supported coaching meetings by reporting “coaching meetings were brief and focused, no suggestions.” Similar to what past researchers have reported (DiGennaro Reed et al., 2007), the present study also shows mixed perceptions regarding the meeting cancellation component. DiGennarro Reed and colleagues (2007) reported two of the teacher participants rated the use of PF and directed rehearsal with meeting cancellations as unacceptable. Although it is not clear which component was unacceptable to these teachers, the current study adds to these findings, which highlight the differences between teachers and their preferences. In the current study, one teacher strongly disagreed that the opportunity for a canceled meeting impacted her progress while others agreed and strongly agreed it impacted their progress. It is possible that this teacher preferred to have coaching meetings as a means of support. Teacher preferences may vary, further supporting the use of choice in coaching interventions as some teachers may prefer meeting with coaches whereas others do not. These results are consistent with Knowles et al. (2005) principles of adult learners which suggests we must account for individual learner differences when trying to change teacher behavior.

Despite the positive results reported across teacher participants regarding the supported OTRs intervention and overall coaching package, all three teacher participants chose maintenance over continuing on with the coaching. Although each teacher had the opportunity to select and work toward a higher goal of supported OTRs delivery, when given the choice, each elected to maintain at their current level. It seems plausible that even though teachers may have gained skills from participating, it was still one more task on an already busy teacher’s plate. Researchers have reported detrimental effects of the COVID-19 pandemic for teachers (Rabaglietti et al., 2021; Pressley & Ha, 2021) and teachers report this school year to be

extremely overwhelming and tiresome (Cormier et al., 2022). These effects and the approaching end of the school may have contributed to all teachers choosing to end the study.

Overall, the positive perceptions across all three teacher participants could be attributed to a few factors. First, the lead researcher's prior relationship with participants may have contributed to positive results as an effort to supporting my dissertation work. This is consistent with prior reports on social validity indicating overall consumers often rate programs positively and even when given opportunities to criticize, will not (Schwarz & Baer, 1991). Next, while the social validity questionnaire was anonymous, there were only three teacher participants. Teachers may have filtered their responses at the expense of the researcher identifying specific participant comments.

**Contributions of this Study**

This study contributes in several ways to the literature on coaching, OTRs, and supporting students with ESN. First, through this model, effective practices were implemented by natural change agents (i.e., teachers) in natural settings (i.e., schools), specifically for teachers of students with ESN. By training teachers directly, this study addresses the research to practice gap by increasing implementation of EBPs in schools specifically for the often underrepresented population of students with ESN. While there are several studies on coaching, there is limited research on coaching teachers of students with ESN, especially for increasing practices to increase academic engagement. The procedures used in this study provide a coaching model that connects practices together to simultaneously address the needs of teachers (i.e., through coaching) and students (i.e., supported OTRs) that requires minimal time and resources to implement. This is important in that it may help in school districts (a) with limited support and funding and (b) in rural communities. School districts with limited funding typically do not have

access to instructional coaches or the resources to pay for professional development for teachers (Archibald et al., 2011, Desimone et al., 2002; Dhuey & Libscomb, 2013). Similarly, districts in rural communities may not have personnel available to provide direct coaching and support for teachers and students (Broadley, 2010; Harmon et al., 2007; Powell et al., 2009).

Next, this study extends previous research on OTRs. Extensive research has been conducted on the effects of OTRs in classrooms (i.e., increased engagement, reduced disruptive behaviors; Common et al., 2020; Greenwood et al., 1984; MacSuga-Gage & Gage, 2015; Sutherland & Wehby, 2001; Van Camp et al., 2020). Most of this research has focused on general education teachers, general education students, or students with mild disabilities. There are few studies on OTRs for students with ESN, and none that focus on ensuring students are provided supports to benefit from OTRs. This study expanded the literature first, by simply including students with ESN and their teachers. This is important because prior research on OTRs has primarily targeted students with high incidence disabilities. Next, this study adds to the research based on OTRs by extending beyond the OTR to include strategies to facilitate active student responding. Finally, there could potentially be even broader application of this intervention. Past researchers have found that when students were afforded increased opportunities with AAC, these additional opportunities translated to increased overall use of AAC (Ganz, 2015). Effective communication is a necessary skill across all environments; however, two of the three students in this study have personal high-tech devices that travel back and forth daily between school and home, yet having access to an AAC device did not ensure consistent use. During screening observations and baseline sessions, neither student used the device consistently. The device often remained inactive on the student's desk, if it was even taken out of the backpack. By providing increased opportunities for communication along with

the necessary supports (i.e., AAC, prompts), students could potentially increase communication across all settings versus just during academic instruction. For example, the current study took place only during reading instruction with supported OTRs delivered by the special education teacher. Potentially, the use of supported OTRs could be applied across all academic content areas (i.e., train general education teachers) and even into social settings (i.e., train peers and community members) which could lead to greater gains in communication for students with ESN and ultimately, increased membership in inclusive settings.

Finally, this study contributes to the research on increasing engagement of students with ESN, specifically during small group instruction. Several researchers have reported on the limited engagement opportunities provided to students with ESN in schools across all settings (Carter et al., 2008; Gross Toews et al., 2021; Kurth et al., 2016; Pennington & Courtade, 2015). In addition, these opportunities are presented even less for those with CCN (Chung et al., 2011; Gross Toews et al., 2021; Kurth et al., 2016). Those students who require communication supports have often not provided them during instruction (Gross Toews et al., 2021; Kurth et al., 2016; Rowland & Schweigert, 2000; Snell et al., 2006). The three student participants within this study were engaged in academic instruction at low levels prior to beginning this study, even those with access to communication supports. The supports were either not programmed for use given the particular instructional context or the student required some support to facilitate use (i.e., and this didn't occur). Researchers have shown that academic engagement is strongly correlated with higher achievement (Fisher et al., 1981; Greenwood, 1991; Hattie, 2008; Klem & Connell, 2004; Rosenshine & Berliner, 1978; Scott et al., 2014; Sutherland et al., 2003). Although current levels of engagement across studies have shown low rates for this population of students, our study contributes to the literature by providing a method for teachers to implement

that may result in increased engagement. Potential distal outcomes include higher engagement rates and overall improved outcomes for students with ESN.

**Limitations of this Study**

There are several potential limitations concerning the results of this study. First, this intervention involved a coaching package with several components. Though the package was effective, it was not clear as to whether all components were necessary. For example, it may be that we didn't need follow up coaching sessions. Follow up coaching sessions were brief (i.e., 9-27 min) and each teacher needed only one. Additionally, substantial increases in teacher performance were not observed immediately following coaching. Potentially, the specific skills we coached teachers on could have been simply addressed within the performance feedback email. For example, at the end of the email we could have provided simple reminders, "don't forget to deliver the response prompt immediately" or "make sure you have communication supports ready and available for the target student."

A second limitation may be that observer effects occurred as a result of my presence for each session. For every session, I logged into the Zoom virtual meeting and observed the lesson. These sessions were preplanned. Thus, it is possible that teachers only implemented procedures as intended when the recordings took place. In addition, history effects may have occurred due to the addition of the computer for recording purposes to the environment for the study. Although these effects may have happened, they potentially were reduced through preplanned sessions with the computer set up within teachers' classrooms prior to beginning the study.

A third limitation is that the lead researcher had prior relationship with two of the three participants, which may have resulted in a familiarity effect as teacher participants wanted to help me and support my dissertation work. Due to this, it is possible that teachers implemented

the intervention with fidelity to please the researcher versus having a true interest in self growth pertaining to this intervention. Although, this may have been reduced as all three participants volunteered to participate in this study.

**Suggestions for Future Research**

Although these results support the efficacy of the coaching package on teacher-delivered supported OTRs and the collateral effects of supported OTRs on student ASRs, it would be useful to scale up these practices. Within the current study, the researcher delivered the initial training and coaching sessions. Kraft et al. (2018) proposed future researchers seek out avenues for scaling up interventions to be timely and more cost effective with the ability to address teachers of mixed levels across schools with varying levels of support and different school climates. One way to extend this research to build capacity within schools is to examine the effects of this coaching package in a variety of ways. Two models with substantial research supporting the effectiveness of "scaling up" are pyramidal training (Andzik & Cannella-Malone, 2017; Kuhn et al., 2003; Parsons et al., 2013; Walker et al., 2021) and multilevel coaching (Brock et al., 2021; Gage et al., 2017; Simonsen et al., 2014; Wood et al., 2016). First, teachers supporting students with ESN often collaborate with general education teachers, paraprofessionals, and related service providers. It may be useful to use a pyramidal, train-the-trainer model in which the researcher trains one teacher who then trains the others (Andzik & Cannella-Malone, 2017). This supporting model has been effective for implementing several EBPs for students with ESN (e.g., opportunities to initiate, functional communication training; Andzik & Cannella-Malone, 2019; Walker et al., 2021). Another coaching intervention with a growing literature base that may address the issue of scaling up interventions at a lower cost in less time is multi-level coaching (Wood et al., 2016). Multi-level coaching is a model developed

based on the principles and procedures used within the multi-tiered systems of support framework. A multi-tiered system of support is a tiered model which involves providing increasing levels of support based on student performance (Sugai & Horner, 2009). The overarching purpose of the multi-level coaching approach is to provide targeted support based on performance. The process involves providing more intensive support only when less intensive approaches are insufficient (Brock et al., 2021). For example, a researcher or district level coach may provide training on supported OTRs delivery at the beginning of the school year. Next, coaches collect data on implementation of the intervention and provide leveled coaching support based on teacher performance. This has implications for building capacity of effective practices in schools while providing support as needed for teachers.

Next, it would be useful for future researchers to extend the current findings by examining the use of choice within coaching packages. In the current study, teachers were provided two opportunities for choice: (a) selecting a criterion for meeting their goal, and (b) choosing whether to maintain or extend their improved performance. There is need to evaluate the contribution of choice within these packages. For example, future researchers might compare the teacher performance under choice and no choice conditions. Further, there is a need to evaluate teacher preferences for coaching. The principles of adult learning suggest that adults require motivation, self-direction, and readiness to learn (Knowles, 2005); therefore, it is important to include choices when designing professional development for teachers. As a result of this study and prior literature (DiGennarro Reed et al., 2005, 2007), preferences for specific coaching elements also may vary across teacher participants. Coaching has an extensive research base on its effectiveness, but there is a need for a clearer understanding of what teachers prefer. One of the three teachers in this study indicated the meeting cancellation did not impact her

progress, which suggests that teacher preferences for coaching differ. Future research is needed on overall teacher experiences with and preferences for coaching. This information could serve as a guide when designing coaching models and procedures to best support teachers.

The results from this study support the use of the supported OTR intervention. In this study, we examined the effects on the frequency of student responses versus the accuracy. It is plausible that while students increased responding, they may not have accurately responded. Although several studies link academic engagement to achievement (Fisher et al., 1981; Greenwood, 1991; Hattie, 2008; Klem & Connell, 2004; Rosenshine & Berliner, 1978; Scott et al., 2014; Sutherland et al., 2003), the results from this study only contribute to increasing ASRs. Therefore, future research could examine the effects of the increased supported OTRs on ASRs and accuracy of responses.

Finally, this intervention was implemented across three teachers during reading instruction, using the same curriculum at the middle school level. In terms of future research, it would be useful to extend the current findings by examining the effects of the coaching intervention across content areas, grade levels, and change agents (i.e., general education teachers, peers). It also may be of value to solely measure the effects of the supported OTR intervention across a range of contexts (e.g., content areas, grades, change agents). These data would be useful for determining if coaching is necessary or if the supported OTR intervention can be effectively implemented and sustained without coaching supports. This would be important for extending the work on improving practices for teachers of students with ESN.

**Implications for Practice**

The findings from this study have three practical implications for teachers. First, there is a need for improving the use of effective practices for increasing engagement of students with

ESN during academic instruction. Several studies have reported that students with ESN are not engaged and are often provided inadequate instruction in schools (Carter et al., 2008; Gross Toews et al., 2021; Kurth et al., 2016; Pennington & Courtade, 2015). Fortunately, the findings from this study indicate that teachers of students with ESN can increase their delivery of OTRs and maintain, with minimal training and coaching. Given the limited amount of time and resources needed, the model may be useful for rural communities that don't have access to instructional coaches or professional development.

Another noteworthy implication is that the results of this study suggest that choice may play an important role in supporting teachers. Teachers within this study were provided several choice opportunities (i.e., goal setting, maintenance) and also reported that these impacted their progress with the intervention. Professional development for teachers is an area that has long been studied and often, teacher implementation rates fade over time (Duchaine et al., 2011; Reinke et al., 2007). This study adds to the growing literature base on the importance of embedding choice within coaching packages (DiGennaro Reed, 2005, 2007; Martens et al., 1997).

Finally, the results of this study show the potential impact of supported OTRs on the academic engagement of students with ESN. Whereas past researchers have found that increasing academic engagement is a result of increasing OTRs (MacSuga-Gage & Simonsen, 2015; Sutherland & Wehby, 2001; Van Camp et al., 2020), in the present study, the data show that increasing supported OTRs for students with ESN also increases student ASRs. All three student participants increased academic responding during small group instruction. By providing students with ESN research-based supports, engagement during academic instruction can increase which is extremely important for increasing skill repertoires and overall outcomes for

students with ESN. Additionally, the majority of students with ESN currently receive special education services in separate settings versus general education settings (Agran et al., 2020; Kleinert et al., 2015; Kurth et al., 2014; Morningstar et al., 2017). While this study was not implemented in a general education setting, these data have some potential implications as a highly effective practice for increasing academic engagement during instruction within all settings. For example, researchers have long reported the importance of increasing OTRs for students (MacSuga-Gage & Simonsen, 2015; Sutherland & Wehby 2001; Van Camp et al., 2020) and the effects on engagement. After a single training and coaching session, teachers were able to implement supported OTRs to increase student responding for students with ESN. Overall, the use of supported OTRs can increase engagement, potentially across subject areas and may be a way to increase the utility of an already effective intervention (i.e., increase OTRs) to increase engagement in inclusive settings, particularly during small group instruction. This is of high importance moving forward when training teachers to increase OTRs, we must always include methods for supporting students with ESN to respond.

**Summary**

In this study, I investigated the effects of a multicomponent coaching package on rates of teacher-delivered supported OTRs of three middle school teachers of students with ESN during small group instruction. Results showed that the coaching model was effective as all teachers increased rates of supported OTRs. Additionally, all students increased ASRs as a result of the coaching intervention on supported OTRs. Although this coaching model was effective and teachers provided positive feedback regarding the interventions, all teachers preferred to move to maintenance over increasing their goal. Future research should continue to examine this coaching model and the effects of supported OTRs for students with ESN. Moving forward, it is

critical that all training models for all teachers include a means to support students with the most intensive needs to increase inclusion across school settings and instructional activities.

# REFERENCES

Abbott, M., Walton, C., Tapia, Y., & Greenwood, C. R. (1999). Research to practice: A "blueprint" for closing the gap in local schools. *Exceptional Children*, *65*(3), 339–352. https://doi.org/10.1177/001440299906500305

Agran, M., Jackson, L., Kurth, J. A., Ryndak, D., Burnette, K., Jameson, M., Zagona, A., Fitzpatrick, H., & Wehmeyer, M. (2020). Why aren't students with severe disabilities being placed in general education classrooms: Examining the relations among classroom placement, learner outcomes, and other factors. *Research and Practice for Persons with Severe Disabilities*, *45*(1), 4–13. https://doi.org/10.1177/1540796919878134

Alexander, J. L., Ayres, K. M., & Smith, K. A. (2015). Training teachers in evidence-based practice for individuals with autism spectrum disorder: A review of the literature. *Teacher Education and Special Education*, *38*(1), 13–27. https://doi.org/10.1177/0888406414544551

Andzik, N. R., Chung, Y. C., Doneski-Nicol, J., & Dollarhide, C. T. (2019). AAC services in schools: a special educator's perspective. *International Journal of Developmental Disabilities*, *65*(2), 89–97. https://doi.org/10.1080/20473869.2017.1368909

Andzik, N. R., Chung, Y. C., & Kranak, M. P. (2016). Communication opportunities for elementary school students who use augmentative and alternative communication. *Augmentative and Alternative Communication*, *32*(4), 272–281. https://doi.org/10.1080/07434618.2016.1241299

Andzik, N., & Cannella-Malone, H. I. (2017). A review of the pyramidal training approach for practitioners working with individuals with disabilities. *Behavior Modification*, *41*(4), 558–580. https://doi.org/10.1177/0145445517692952

Andzik, N. R., & Cannella-Malone, H. I. (2019). Practitioner implementation of communication intervention with students with complex communication needs. *American Journal on Intellectual and Developmental Disabilities*, *124*(5), 395–410. https://doi.org/10.1352/1944-7558-124.5.395

Archibald, S., Coggshall, J. G., Croft, A., & Goe, L. (2011). *High-quality professional development for all teachers: Effectively allocating resources* [Policy Brief]. National Comprehensive Center for Teacher Quality. https://files.eric.ed.gov/fulltext/ED520732.pdf

Ault, M. J., & Horn, C. K. (2018). Increasing active engagement: Guidelines for using student response systems. *Journal of Special Education Technology*, *33*(3), 207–216. https://doi.org/10.1177/0162643418775745

Baxter, S., Enderby, P., Evans, P., & Judge, S. (2012). Barriers and facilitators to the use of high-technology augmentative and alternative communication devices: a systematic review and qualitative synthesis. *International Journal of Language & Communication Disorders*, *47*(2), 115–129. https://doi.org/10.1111/j.1460-6984.2011.00090.x

Berrong, A. K., Schuster, J. W., Morse, T. E., & Collins, B. C. (2007). The effects of response cards on active participation and social behavior of students with moderate and severe disabilities. *Journal of Developmental and Physical Disabilities, 19*(3), 187–199. https://doi.org/10.1007/s10882-007-9047-7

Bethune, K. S., & Wood, C. L. (2013). Effects of coaching on teachers' use of function-based interventions for students with severe disabilities. *Teacher Education and Special Education*, *36*(2), 97–114. https://doi.org/10.1177/0888406413478637

Blakely, M. R. (2001). A survey of levels of supervisory support and maintenance of effects reported by educators involved in direct instruction implementations. *Journal of Direct Instruction*, *1*(2), 73–83.

Brady, N. C., Bruce, S., Goldman, A., Erickson, K., Mineo, B., Ogletree, B. T., Paul, D., Romski, M. A., Sevcik, R., Siegel, E., Schoonover, J., Snell, M., Sylvester, L., & Wilkinson, K. (2016). Communication services and supports for individuals with severe disabilities: Guidance for assessment and intervention. *American Journal on Intellectual and Developmental Disabilities*, *121*(2), 121–138. https://doi.org/10.1352/1944-7558-121.2.121

Broadley, T. (2010). Digital revolution or digital divide: Will rural teachers get a piece of the professional development pie?. *Education in Rural Australia*, *20*(2), 63–76.

Brock, M. E., Barczak, M. A., Anderson, E. J., & Bordner-Williams, N. M. (2021). Efficacy of tiered training on paraeducator implementation of systematic instructional practices for students with severe disabilities. *Exceptional Children*, *87*(2), 217–235. https://doi.org/10.1177/0014402920947641

Brock, M. E., & Carter, E. W. (2017). A meta-analysis of educator training to improve implementation of interventions for students with disabilities. *Remedial and Special Education*, *38*(3), 131–144. https://doi.org/10.1177/0741932516653477

Brock, M. E., Dynia, J. M., Dueker, S. A., & Barczak, M. A. (2020). Teacher-reported priorities and practices for students with autism: Characterizing the research-to-practice gap. *Focus on Autism and Other Developmental Disabilities*, *35*(2), 67–78. https://doi.org/10.1177/1088357619881217

Brock, M. E., Huber, H. B., Carter, E. W., Juarez, A. P., & Warren, Z. E. (2014). Statewide assessment of professional development needs related to educating students with autism

spectrum disorder. *Focus on Autism and Other Developmental Disabilities*, *29*(2), 67–79. https://doi.org/10.1177/1088357614522290

Brock, M. E., Seaman, R. L., & Gatsch, A. L. (2018). Efficacy of video modeling and brief coaching on teacher implementation of an evidence-based practice for students with severe disabilities. *Journal of Special Education Technology*, *33*(4), 259–269. https://doi.org/10.1177/0162643418770639

Browder, D. M., Lee, A., & Mims, P. (2011). Using shared stories and individual response modes to promote comprehension and engagement in literacy for students with multiple, severe disabilities. *Education and Training in Autism and Developmental Disabilities, 46*(3), 339–351. https://www.jstor.org/stable/23880590

Browder, D. M., Mims, P. J., Spooner, F., Ahlgrim-Delzell, L., & Lee, A. (2008). Teaching elementary students with multiple disabilities to participate in shared stories. *Research & Practice for Persons with Severe Disabilities*, *33*(1), 3–12. https://doi.org/10.2511/rpsd.33.1-2.3

Browder, D. M., Spooner, F., & Courtade, G. R. (2020). *Teaching students with moderate and severe disabilities* (2nd ed.). Guilford Publications.

Browder, D. M., Wood, L. A., Thompson, J. L., & Ribuffo, C. (2014). *Evidence-based practices for students with severe disabilities* (CEEDAR Document NO. IC-3). CEEDAR Center. http://ceedar.education.ufl.edu/tools/innovation-configurations/

Brown, P., Stephenson, J., & Carter, M. (2014). Multicomponent training of teachers of students with severe disabilities. *Teacher Education and Special Education*, *37*(4), 347–362. https://doi.org/10.1177/0888406414546873

Burns, M. K. (2007). Comparison of opportunities to respond within a drill model when rehearsing sight words with a child with mental retardation. *School Psychology Quarterly*, *22*(2), 250–263. https://doi.org/10.1037/1045-3830.22.2.250

Cannella-Malone, H. I., Dueker, S. A., Barczak, M. A., & Brock, M. E. (2021). Teaching academic skills to students with significant intellectual disabilities: A systematic review of the single-case design literature. *Journal of Intellectual Disabilities*, *25*(3), 387–404. https://doi.org/10.1177/1744629519895387

Carter, E. W., Sisco, L. G., Brown, L., Brickham, D., & Al-Khabbaz, Z. A. (2008). Peer interactions and academic engagement of youth with developmental disabilities in inclusive middle and high school classrooms. *American Journal on Mental Retardation*, *113*(6), 479–494. https://doi.org/10.1352/2008.113:479-494

Causton-Theoharis, J., Gheoharis, G., Orsati, F., & Cosier, M. (2011). Does self-contained special education deliver on its promises? A critical inquiry into research and practice. *Journal of Special Education Leadership, 24*(2), 61–78.

Cavanaugh, B. (2013). Performance feedback and teachers' use of praise and opportunities to respond: A review of the literature. *Education and Treatment of Children*, *36*(1), 111–136. https://doi.org/10.1353/etc.2013.0001

Chandler, W., Schuster, J. W., & Stevens, K. B. (1993). Teaching employment skills to adolescents with mild and moderate disabilities using a constant time delay procedure. *Education and Training in Mental Retardation*, *28*(2), 155–168. https://www.jstor.org/stable/23878851

Chung, Y. C., Carter, E. W., & Sisco, L. G. (2012). Social interactions of students with disabilities who use augmentative and alternative communication in inclusive classrooms. *American Journal on Intellectual and Developmental Disabilities*, *117*(5), 349–367. https://doi.org/10.1352/1944-7558-117.5.349

Cohrs, C. M., Shriver, M. D., Burke, R. V., & Allen, K. D. (2016). Evaluation of increasing antecedent specificity in goal statements on adherence to positive behavior-management strategies. *Journal of Applied Behavior Analysis*, *49*(4), 768–779. https://doi.org/10.1002/jaba.321

Coleman, M. B., Hurley, K. J., & Cihak, D. F. (2012). Comparing teacher-directed and computer-assisted constant time delay for teaching functional sight words to students with moderate intellectual disability. *Education and Training in Autism and Developmental Disabilities*, 47(3), 280–292. https://www.jstor.org/stable/23879965

Collins, B. C. (2012). *Systematic instruction for students with moderate and severe disabilities*. Paul H. Brookes Publishing Company.

Common, E. A., Lane, K. L., Cantwell, E. D., Brunsting, N. C., Oakes, W. P., Germer, K. A., & Bross, L. A. (2020). Teacher-delivered strategies to increase students' opportunities to respond: A systematic methodological review. *Behavioral Disorders*, *45*(2), 67–84. https://doi.org/10.1177/0198742919828310

Cook, B. G., & Cook, S. C. (2013). Unraveling evidence-based practices in special education. *The Journal of Special Education*, *47*(2), 71–82. https://doi.org/10.1177/0022466911420877

Cook, B. G., & Odom, S. L. (2013). Evidence-based practices and implementation science in special education. *Exceptional Children*, *79*(2), 135–144. https://doi.org/10.1177/001440291307900201

Cooper, J. O., Heron, T. E., & Heward, W. L. (2020). *Applied behavior analysis* (3rd ed.). Pearson.

Cormier, C. J., McGrew, J., Ruble, L., & Fischer, M. (2022). Socially distanced teaching: The mental health impact of the COVID-19 pandemic on special education teachers. *Journal of Community Psychology*, *50*(3), 1768–1772. https://doi.org/10.1002/jcop.22736

Cossairt, A., Hall, R. V., & Hopkins, B. (1973). The effects of experimenter's instructions, feedback, and praise on teacher praise and student attending behavior. *Journal of Applied Behavior Analysis*, *6*(1), 89–100. https://doi.org/10.1901/jaba.1973.6-89

Council for Exceptional Children. (1987). *Academy for effective instruction: Working with mildly handicapped students.* Reston, VA: Author.

Council for Exceptional Children. (2014). *Council for exceptional children standards for evidence-based practices in special education.* Council for Exceptional Children.

Courtade, G. R., Lingo, A. S., & Whitney, T. (2013). Using story-based lessons to increase academic engaged time in general education classes for students with moderate intellectual disability and autism. *Rural Special Education Quarterly*, *32*(4), 3–14. https://doi.org/10.1177/875687051303200402

Cuvo, A. J., Leaf, R. B., & Borakove, L. S. (1978). Teaching janitorial skills to the mentally retarded: Acquisition, generalization, and maintenance. *Journal of Applied Behavior Analysis*, *11*(3), 345–355. https://doi.org/10.1901/jaba.1978.11-345

Cuvo, A. J., Jacobi, L., & Sipko, R. (1981). Teaching laundry skills to mentally retarded students. *Education and Training of the Mentally Retarded*, *16*(1), 54–64. https://www.jstor.org/stable/23877051

Da Fonte, A. M., Boesch, M. C., DeLuca, E. R., Papp, S. K., Mohler, A. E., Holmes, E. E., Clouse, K. A., Young R. D., & Urbano, R. (2022). Current preparation status in AAC: perspectives of special education teachers in the United States. *Augmentative and Alternative Communication*, *38*(1), 29–40. https://doi.org/10.1080/07434618.2022.2046851

Darling-Hammond, L., Hyler, M. E., & Gardner, M. (2017). *Effective teacher professional development*. Learning Policy Institute. https://learning-policyinstitute.org/sites/default/files/productfiles/Effective_Teacher_Professional_Development_REPORT.pdf

Darling-Hammond, L., Wei, R. C., Andree, A., Richardson, N., & Orphanos, S. (2009) State of the profession: Study measures status of professional development, *Journal of Staff Development*, *30*(2), 42–50. https://doi.org/10.1002/pits.21741

Denton, C. A., & Hasbrouck, J. A. N. (2009). A description of instructional coaching and its relationship to consultation. *Journal of Educational and Psychological Consultation*, *19*(2), 150–175. https://doi.org/10.1080/10474410802463296

Desimone, L. M., & Pak, K. (2017). Instructional coaching as high-quality professional development. *Theory Into Practice*, *56*(1), 3–12. https://doi.org/10.1080/00405841.2016.1241947

Desimone, L., Porter, A. C., Birman, B. F., Garet, M. S., & Yoon, K. S. (2002). How do district management and implementation strategies relate to the quality of the professional development that districts provide to teachers?. *Teachers college record*, *104*(7), 1265–1312.

DiGennaro, F. D., Martens, B. K., & Kleinmann, A. E. (2007). A comparison of performance feedback procedures on teachers' treatment implementation integrity and students' inappropriate behavior in special education classrooms. *Journal of Applied Behavior Analysis*, *40*(3), 447–461. https://doi.org/10.1901/jaba.2007.40-447

DiGennaro, F. D., Martens, B. K., & McIntyre, L. L. (2005). Increasing treatment integrity through negative reinforcement: Effects on teacher and student behavior. *School Psychology Review*, *34*(2), 220–231. https://doi.org/10.1080/02796015.2005.12086284

DiGennaro Reed, F. D., Blackman, A. L., Erath, T. G., Brand, D., & Novak, M. D. (2018). Guidelines for using behavioral skills training to provide teacher support. *Teaching Exceptional Children*, *50*(6), 373–380. https://doi.org/10.1177/0040059918777241

Doyle, P. M., Wolery, M., Ault, M. J., & Gast, D. L. (1988). System of least prompts: A literature review of procedural parameters. *Journal of the Association for Persons with Severe Handicaps*, *13*(1), 28–40. https://doi.org/10.1177/154079698801300104

Duchaine, E. L., Jolivette, K., & Fredrick, L. D. (2011). The effect of teacher coaching with performance feedback on behavior-specific praise in inclusion classrooms. *Education and Treatment of Children*, *34*(2), 209–227. https://doi.org/10.1353/etc.2011.0009

Dhuey, E., & Lipscomb, S. (2013). Funding special education by total district enrollment: Advantages, disadvantages, and policy considerations. *Education Finance and Policy*, *8*(3), 316–331. https://doi.org/10.1162/EDFP_a_00098

Every Student Succeeds Act, 20 U.S.C. § 6301 (2015). https://www.congress.gov/114/plaws/publ94/PLAW-114publ95.pdf

Fallon, L. M., Collier-Meek, M. A., Maggin, D. M., Sanetti, L. M. H., & Johnson, A. H. (2015). Is performance feedback for educators an evidence-based practice? A systematic review and evaluation based on single-case research. *Exceptional Children*, *81*(2), 227–246. https://doi.org/10.1177/0014402914551738

Fetherston, A. M., & Sturmey, P. (2014). The effects of behavioral skills training on instructor and learner behavior across responses and skill sets. *Research in Developmental Disabilities*, *35*(2), 541–562. https://doi.org/10.1016/j.ridd.2013.11.006

Fisher, C. W., Berliner, D. C., Filby, N. N., Marliave, R., Cahen, L. S., & Dishaw, M. M. (1981). Teaching behaviors, academic learning time, and student achievement: An overview. *The Journal of Classroom Interaction*, *17*(1), 2–15. https://www.jstor.org/stable/43997772

Fixsen, D. L., Naoom, S. F., Blase, K. A., Friedman, R. M. & Wallace, F. (2005). *Implementation research: A synthesis of the literature*. University of South Florida, Louis de la Parte Florida Mental Health Institute, The National Implementation Research Network (FMHI Publication #231).

Gage, N. A., Grasley-Boy, N. M., & MacSuga-Gage, A. S. (2018). Professional development to increase teacher behavior-specific praise: A single-case design replication. *Psychology in the Schools*, *55*(3)*,* 264–277. https://doi.org/10.1177/1098300717693568

Gage, N. A., MacSuga-Gage, A. S., & Crews, E. (2017). Increasing teachers' use of behavior-specific praise using a multitiered system for professional development. *Journal of Positive Behavior Interventions*, *19*(4), 239–251. https://doi.org/10.1177/1098300717693568

Ganz, J. B. (2015). AAC interventions for individuals with autism spectrum disorders: State of the science and future research directions. *Augmentative and Alternative Communication*, *31*(3), 203–214. https://doi.org/10.3109/07434618.2015.1047532

Ganz, J. B., Earles-Vollrath, T. L., Heath, A. K., Parker, R. I., Rispoli, M. J., & Duran, J. B. (2012). A meta-analysis of single case research studies on aided augmentative and alternative communication systems with individuals with autism spectrum disorders. *Journal of Autism and Developmental Disorders*, *42*(1), 60–74. https://doi.org/10.1007/s10803-011-1212-2

Ganz, J. B., Goodwyn, F. D., Boles, M. M., Hong, E. R., Rispoli, M. J., Lund, E. M., & Kite, E. (2013). Impacts of a PECS instructional coaching intervention on practitioners and children with autism. *Augmentative and Alternative Communication*, *29*(3), 210–221. https://doi.org/10.3109/07434618.2013.818058

Geist, L., Hatch, P., & Erickson, K. (2014). Promoting academic achievement for early communicators of all ages. *Perspectives on Augmentative and Alternative Communication*, *23*(4), 173–181. https://doi.org/10.1044/aac23.4.173

Greenwood, C. R. (1991). Longitudinal analysis of time, engagement, and achievement in at-risk versus non-risk students. *Exceptional Children*, *57*(6), 521–535. https://doi.org/10.1177/001440299105700606

Greenwood, C. R., & Abbott, M. (2001). The research to practice gap in special education. *Teacher Education and Special Education*, *24*(4), 276–289. https://doi.org/10.1177/088840640102400403

Greenwood, C. R., Carta, J. J., Kamps, D., & Delquadri, J. (1994). Ecobehavioral assessment systems software (EBASS): Practitioner's manual. Kansas City, KS: Juniper Gardens Children's Project, University of Kansas.

Greenwood, C. R., & Delquadri, J. (1978). Code for instructional structure and student academic response: CISSAR. In M. Hersen & A. S. Bellack (Eds.), Dictionary of behavioral assessment techniques (pp. 120–122). New York: Pergamon.

Greenwood, C. R., Delquadri, J., & Hall, R. V. (1984). Opportunity to respond and student academic performance. In W. L. Heward, T. E. Heron, D. S. Hill, & J. Trap-Porter (Eds.), *Focus on behavior analysis in education* (pp. 58–88). Charles Merrill.

Greenwood, C. R., Horton, B. T., & Utley, C. A. (2002). Academic engagement: Current perspectives on research and practice. *School Psychology Review*, *31*(3), 328–349. https://doi.org/10.1080/02796015.2002.12086159

Gross, D., Truesdale, C., & Bielec, S. (2001). Backs to the wall: Supporting teacher professional development with technology. *Educational Research and Evaluation*, *7*(2-3), 161–183. https://doi.org/10.1076/edre.7.2.161.3867

Gross Toews, S., Kurth, J. A., Turner, E. L., & Lyon, K. J. (2020). Ecobehavioral analysis of inclusive classrooms and instruction that support students with extensive support needs. *Inclusion*, *8*(4), 259–274. https://doi.org/10.1352/2326-6988-8.4.259

Gross Toews, S., McQueston, J., & Kurth, J. A. (2021). Evaluation of the evidence base for shared reading to support literacy skill development for students with extensive support needs. *Research and Practice for Persons with Severe Disabilities*, *46*(2), 77-–3. https://doi.org/10.1177/15407969211008531

Guskey, T. R., & Yoon, K. S. (2009). What works in professional development? *Phi Delta Kappan*, *90*(7), 495–500.

Hamrick, J., Cerda, M., O'Toole, C., & Hagen-Collins, K. (2021). Educator knowledge and preparedness for educating students with autism in public schools. *Focus on Autism and Other Developmental Disabilities*, *36*(4), 213–224. https://doi.org/10.1177/1088357621989310

Harmon, H. L., Gordanier, J., Henry, L., & George, A. (2007). Changing teaching practices in rural schools. *The Rural Educator*, *28*(2). https://doi.org/10.35608/ruraled.v28i2.480

Hattie, J. (2008). *Visible learning: A synthesis of over 800 meta-analyses relating to achievement*. Routledge.

Haydon, T., MacSuga-Gage, A. S., Simonsen, B., & Hawkins, R. (2012). Opportunities to respond: A key component of effective instruction. *Beyond Behavior*, *22*(1), 23–31. https://doi.org.10.1177/107429561202200105

Heward, W. L. (1994). Three "low-tech" strategies for increasing the frequency of active student response during group instruction. In R. Gardner III, D. M. Sainato, J. O. Cooper, T. E. Heron, W. L. Heward, J. W. Eshleman, & T. A. Grossi (Eds.), *Behavior analysis in education: Focus on measurably superior instruction* (pp. 283–320). Thomson Brooks/Cole Publishing Co.

Heward, W. L., & Wood, C. L. (2016). Improving educational outcomes in America: Can a low-tech, generic teaching practice make a difference. *Wing Institute for Evidence Based Practice. Retrieved from https://www.researchgate. net/profile/Charles_Wood7/publication/274898416_Im proving_educational_outcomes_in_America_Can_a_lowtech_generic_teaching_practice _make_a_difference/links/552c68b70cf29b22c9c4 53cc. pdf*.

Heward, W. L., Gardner III, R., Cavanaugh, R. A., Courson, F. H., Grossi, T. A., & Barbetta, P.M. (1996). Everyone participates in this class: Using response cards to increase active student response. *Teaching Exceptional Children*, *28*(2), 4–10. https://doi.org/10.1177/004005999602800201

Hirn, R. G., & Scott, T. M. (2014). Descriptive analysis of teacher instructional practices and student engagement among adolescents with and without challenging behavior. *Education and Treatment of Children*, *37*(4), 589–610. DOI:10.1353/etc.2014.0037

Hogan, A., Knez, N., & Kahng, S. (2015). Evaluating the use of behavioral skills training to improve school staffs' implementation of behavior intervention plans. *Journal of Behavioral Education*, *24*(2), 242–254. https://doi.org/10.1007/s10864-014-9213-9

Horn, A. L., Gable, R. A., & Bobzien, J. L. (2020). Constant time delay to teach students with intellectual disability. *Preventing School Failure: Alternative Education for Children and Youth*, *64*(1), 89–97. https://doi.org/10.1080/1045988X.2019.1680946

Horn, C. (2010). Response cards: An effective intervention for students with disabilities. *Education and Training in Autism and Developmental Disabilities*, *45*(1) 116–123. https://www.jstor.org/stable/23880155

Horn, C., Schuster, J. W., & Collins, B. C. (2006). Use of response cards to teach telling time to students with moderate and severe disabilities. *Education and Training in Developmental Disabilities, 41*(4), 382–391. www.jstor.org/stable/23879664

Horner, R. D., & Baer, D. M. (1978). Multiple probe technique: A variation of the multiple baseline. *Journal of Applied Behavior Analysis*, *11*(1), 189–196. https://doi.org/10.1901/jaba.1978.11-189

Horner, R. H., Carr, E. G., Halle, J., McGee, G., Odom, S., & Wolery, M. (2005). The use of single-subject research to identify evidence-based practice in special education. *Exceptional children*, *71*(2), 165–179. https://doi.org/10.1177/001440290507100203

Hsiao, Y. J., & Sorensen Petersen, S. (2019). Evidence-based practices provided in teacher education and in-service training programs for special education teachers of students with autism spectrum disorders. *Teacher Education and Special Education*, *42*(3), 193–208. https://doi.org/10.1177/0888406418758464

Hudson, M. E., Rivera, C. J., & Grady, M. M. (2018). Research on mathematics instruction with students with significant cognitive disabilities: Has anything changed?. *Research and Practice for Persons with Severe Disabilities*, *43*(1), 38–53. https://doi.org/10.1177/1540796918756601

Hudson, M. E., & Test, D. W. (2011). Evaluating the evidence base of shared story reading to promote literacy for students with extensive support needs. *Research and Practice for Persons with Severe Disabilities*, *36*(1), 34–45. https://doi.org/10.2511/rpsd.36.1-2.34

Hunt, P., Soto, G., Maier, J., Müller, E., & Goetz, L. (2002). Collaborative teaming to support students with augmentative and alternative communication needs in general education classrooms. *Augmentative and Alternative Communication*, *18*(1), 20–35. https://doi.org/10.1080/aac.18.1.20.35

Individuals with Disabilities Education Improvement Act, 20 U.S.C. § 1400 (2004). https://sites.ed.gov/idea/statute-chapter-33

Ivy, S. E., Therrien, M. C., Whalon, K., Bilgin, M., Cox, S., & Hammons, N. (2021). RouTEAM: Home and school partnerships to support communication for children with complex communication needs. *Journal of Developmental and Physical Disabilities*, *33*(3), 351–372. https://doi.org/10.1007/s10882-020-09752-y

Jimenez, B. A., Browder, D. M., Spooner, F., & Dibiase, W. (2012). Inclusive inquiry science using peer-mediated embedded instruction for students with moderate intellectual disability. *Exceptional Children*, *78*(3), 301–317. https://doi.org/10.1177/001440291207800303

Johnston, S. S., Reichle, J., & Evans, J. (2004). Supporting augmentative and alternative communication use by beginning communicators with severe disabilities. *American Journal of Speech-Language Pathology*, *13*(1), 20–30. https://doi.org/10.1044/1058-0360(2004/004)

Joyce, B. R., & Showers, B. (1981). Transfer of training: The contribution of "coaching." *Journal of Education*, *163*(2), 163–172. https://doi.org/10.1177/002205748116300208

Joyce, B. & Showers, B. (1982). The coaching of teaching. *Educational Leadership*, 40 (1), 4–10.

Joyce, B., & Showers, B. (1995). Student achievement though staff development. White Plaines, Longman.

Kamps, D. M., Dugan, E. P., & Leonard, B. R. (1994). Enhanced Small Group Instruction Using Choral Responding and Student. *American Journal on Mental Retardation*, *99*(1), 60–73.

Kamps, D. M., Leonard, B. R., Dugan, E. P., Boland, B., & Greenwood, C. R. (1991). The use of ecobehavioral assessment to identify naturally occurring effective procedures in classrooms serving students with autism and other developmental disabilities. *Journal of Behavioral Education*, *1*(4), 367–397. https://doi.org/10.1007/BF00946773

Kearns, J. F., Kleinert, H. L., Thurlow, M. L., Gong, B., & Quenemoen, R. (2015). Alternate assessments as one measure of teacher effectiveness: Implications for our field. *Research and Practice for Persons with Severe Disabilities*, *40*(1), 20–35. https://doi.org/10.1177/1540796915585105

Kearns, J. F., Towles-Reeves, E., Kleinert, H. L., Kleinert, J. O. R., & Thomas, M. K. K. (2011). Characteristics of and implications for students participating in alternate assessments based on alternate academic achievement standards. *The Journal of Special Education*, *45*(1), 3–14. https://doi.org/10.1177/0022466909344223

Kim, S. Y., Rispoli, M., Lory, C., Gregori, E., & Brodhead, M. T. (2018). The effects of a shared reading intervention on narrative story comprehension and task engagement of students with autism spectrum disorder. *Journal of Autism and Developmental Disorders*, *48*(10), 3608–3622. https://doi.org/10.1007/s10803-018-3633-7

Kirkpatrick, M., Akers, J., & Rivera, G. (2019). Use of behavioral skills training with teachers: A systematic review. *Journal of Behavioral Education*, *28*(3), 344–361. https://doi.org/10.1007/s10864-019-09322-z

Kleinert, H. L., Browder, D. M., & Towles-Reeves, E. A. (2009). Models of cognition for students with significant cognitive disabilities: Implications for assessment. *Review of Educational Research*, *79*(1), 301–326. https://doi.org/10.3102/0034654308326160

Kleinert, H., Towles-Reeves, E., Quenemoen, R., Thurlow, M., Fluegge, L., Weseman, L., & Kerbel, A. (2015). Where students with the most significant cognitive disabilities are taught: Implications for general curriculum access. *Exceptional Children*, *81*(3), 312–328. https://doi.org/10.1177/0014402914563697

Klem, A. M., & Connell, J. P. (2004). Relationships matter: Linking teacher support to student engagement and achievement. *Journal of School Health*, *74*(7), 262–273. https://doi.org/10.1111/j.1746-1561.2004.tb08283.x

Knight, J. (2009). Research on coaching. In J. Knight (Ed.), *Coaching: Approaches and perspectives* (pp. 29–55). Corwin Press.

Knight, V. F., Huber, H. B., Kuntz, E. M., Carter, E. W., & Juarez, A. P. (2019). Instructional practices, priorities, and preparedness for educating students with autism and intellectual disability. *Focus on Autism and Other Developmental Disabilities*, *34*(1), 3–14. https://doi.org/10.1177/1088357618755694

Knowles, M. S., Holton, E. F., Swanson, R. A. (2005). *The adult learner* (6th ed.). Elsevier.

Koegel, L. K., Camarata, S. M., Valdez-Menchaca, M., & Koegel, R. L. (1997). Setting generalization of question-asking by children with autism. *American Journal on Mental Retardation*, *102*(4), 346–357. https://doi.org/10.1352/0895-8017(1998)102<0346:SGOQBC>2.0.CO;2

Koegel, R. L., Russo, D. C., & Rincover, A. (1977). Assessing and training teachers in the generalized use of behavior modification with autistic children. *Journal of Applied Behavior Analysis*, *10*(2), 197–205. https://doi.org/10.1901/jaba.1977.10-197

Kraft, M. A., Blazar, D., & Hogan, D. (2018). The effect of teacher coaching on instruction and achievement: A meta-analysis of the causal evidence. *Review of Educational Research*, *88*(4), 547–588. https://doi.org/10.3102/0034654318759268

Kratochwill, T. R., Hitchcock, J., Horner, R. H., Levin, J. R., Odom, S. L., Rindskopf, D. M., & Shadish, W. R. (2010). Single-case designs technical documentation. *What Works Clearinghouse*.

Kretlow, A. G., & Bartholomew, C. C. (2010). Using coaching to improve the fidelity of evidence-based practices: A review of studies. *Teacher Education and Special Education*, *33*(4), 279–299. https://doi.org/10.1177/0888406410371643

Kuhn, S. A., Lerman, D. C., & Vorndran, C. M. (2003). Pyramidal training for families of children with problem behavior. *Journal of Applied Behavior Analysis*, *36*(1), 77–88. https://doi.org/10.1901/jaba.2003.36-77

Kurt, O., & Tekin-Iftar, E. (2008). A comparison of constant time delay and simultaneous prompting within embedded instruction on teaching leisure skills to children with autism. *Topics in Early Childhood Special Education*, *28*(1), 53–64. https://doi.org/10.1177/0271121408316046

Kurth, J. A., Born, K., & Love, H. (2016). Ecobehavioral characteristics of self-contained high school classrooms for students with severe cognitive disability. *Research and Practice for Persons with Severe Disabilities, 41*(4), 227–243. https://doi.org/10.1177/1540796916661492

Kurth, J. A., Lyon, K., & Shogren, K. A. (2015). Supports provided to students with severe disabilities in inclusive schools: Lessons learned from schools implementing inclusive practices. *Research and Practice for Persons with Severe Disabilities*, *40*(4), 261–274. https://doi.org/10.1177/1540796915594160

Kurth, J. A., Morningstar, M. E., & Kozleski, E. B. (2014). The persistence of highly restrictive special education placements for students with low-incidence disabilities. *Research and Practice for Persons with Severe Disabilities*, *39*(3), 227–239. https://doi.org/10.1177/1540796914555580

Kurth, J. A., Ruppar, A. L., Toews, S. G., McCabe, K. M., McQueston, J. A., & Johnston, R. (2019). Considerations in placement decisions for students with extensive support needs: An analysis of LRE statements. *Research and Practice for Persons with Severe Disabilities*, *44*(1), 3–19. https://doi.org/10.1177/1540796918825479

Lalli, J. S., Browder, D. M., Mace, F. C., & Brown, D. K. (1993). Teacher use of descriptive analysis data to implement interventions to decrease students' problem behaviors. *Journal of Applied Behavior Analysis*, *26*(2), 227–238. https://doi.org/10.1901/jaba.1993.26-227

Leahy, L. R., Miller, F. G., & Schardt, A. A. (2019). Effects of teacher-directed opportunities to respond on student behavioral outcomes: A quantitative synthesis of single-case design research. *Journal of Behavioral Education*, *28*(1), 78–106. https://doi.org/10.1007/s10864-018-9307-x

Ledford, J. R., & Gast, D. L. (2018). *Single case research methodology: Applications in special education and behavioral sciences* (3rd ed.). Routledge.

Light, J., & McNaughton, D. (2012). Supporting the communication, language, and literacy development of children with complex communication needs: State of the science and future research priorities. *Assistive Technology*, *24*(1), 34–44. https://doi.org/10.1080/10400435.2011.648717

Light, J., & McNaughton, D. (2014). Communicative competence for individuals who require augmentative and alternative communication: A new definition for a new era of communication?. *Augmentative and Alternative Communication*, *30*(1), 1–18. https://doi.org/10.3109/07434618.2014.885080

MacSuga-Gage, A. S., & Gage, N. A. (2015). Student-level effects of increased teacher-directed opportunities to respond. *Journal of Behavioral Education, 24*, 273–288. https://doi.org/10.1007/s10864-015-922392

MacSuga-Gage, A.S., & Simonsen, B. (2015). Examining the effects of teacher-directed opportunities to respond on student outcomes: A systematic review of the literature. *Education and Treatment of Children 38*(2), 211–239. https://www.jstor.org/stable/44683954

Martens, B. K., Hiralall, A. S., & Bradley, T. A. (1997). A note to teacher: Improving student behavior through goal setting and feedback. *School Psychology Quarterly*, *12*(1), 33–41. https://doi.org/10.1037/h0088945

Mason, R. A., Wills, H. P., Irvin, D., Jia, F., & Kamps, D. M. (2020). Ecobehavioral assessment of paraeducator behaviors that support engagement of students with disabilities. *Exceptional Children*, *86*(4), 413–429. https://doi.org/10.1177/0014402919893693

Miltenberger, R. G. (2008). Teaching safety skills to children: Prevention of firearm injury as an exemplar of best practice in assessment, training, and generalization of safety skills. *Behavior Analysis in Practice*, *1*(1), 30–36. https://doi.org/10.1007/BF03391718

Mims, P. J, Browder, D., Baker, J., Lee, A., & Spooner, F. (2009). Increasing comprehension of students with significant intellectual disabilities and visual impairments during shared stories. *Education and Training in Developmental Disabilities, 44*(3), 409–420. https://www.jstor.org/stable/24233484

Mims, P. J., Hudson, M. E., & Browder, D. M. (2012). Using read-alouds of grade-level biographies and systematic prompting to promote comprehension for students with moderate and severe developmental disabilities. *Focus on Autism & Other Developmental Disabilities*, *27*(2), 67–80. https://doi.org/10.1177/1088357612446859

Morningstar, M. E., Kurth, J. A., & Johnson, P. E. (2017). Examining national trends in educational placements for students with significant disabilities. *Remedial and Special Education*, *38*(1), 3–12. https://doi.org/10.1177/0741932516678327

Nigro-Bruzzi, D., & Sturmey, P. (2010). The effects of behavioral skills training on mand training by staff and unprompted vocal mands by children. *Journal of Applied Behavior Analysis*, *43*(4), 757–761. https://doi.org/10.1901/jaba.2010.43-757

No Child Left Behind Act (2002). 20 U.S.C. § 6301 et seq.

Noell, G. H., & Gansle, K. A. (2009). Moving from good ideas in educational systems change to sustainable program implementation: Coming to terms with some of the realities. *Psychology in the Schools*, *46*(1), 79–89. https://doi.org/10.1002/pits.20355

Noell, G. H., Witt, J. C., Slider, N. J., Connell, J. E., Gatti, S. L., Williams, K. L., Koeing, J. L., Resetar, J. L., & Duhon, G. J. (2005). Treatment implementation following behavioral consultation in schools: A comparison of three follow-up strategies. *School Psychology Review, 34*(1), 87–106. https://doi.org/10.1080/02796015.2005.12086277

Odom, S. L. (2009). The tie that binds: Evidence-based practice, implementation science, and outcomes for children. *Topics in Early Childhood Special Education*, *29*(1), 53–61. https://doi.org/10.1177/0271121408329171

O'Neill, T., Light, J., & Pope, L. (2018). Effects of interventions that include aided augmentative and alternative communication input on the communication of individuals with complex communication needs: A meta-analysis. *Journal of Speech, Language, and Hearing Research*, *61*(7), 1743–1765. https://doi.org/10.1044/2018_JSLHR-L-17-0132

Owiny, R. L., Spriggs, A. D., Sartini, E. C., & Mills, J. R. (2018). Evaluating response cards as evidence based. *Preventing School Failure: Alternative Education for Children and Youth*, *62*(2), 59–72. https://doi.org/10.1080/1045988X.2017.1344953

Parks Ennis, R., Royer, D. J., Lane, K. L., & Dunlap, K. D. (2020). The impact of coaching on teacher-delivered behavior-specific praise in pre-K–12 settings: A systematic review. *Behavioral Disorders*, *45*(3), 148–166. https://doi.org/10.1177/0198742919839221

Ennis, R. P., Royer, D. J., Lane, K. L., Menzies, H. M., Oakes, W. P., & Schellman, L. E. (2018). Behavior-specific praise: An effective, efficient, low-intensity strategy to support student success. *Beyond Behavior*, *27*(3), 134–139. https://doi.org/10.1177/1074295618798587

Parsons, M. B., Rollyson, J. H., & Reid, D. H. (2013). Teaching practitioners to conduct behavioral skills training: A pyramidal approach for training multiple human service staff. *Behavior Analysis in Practice*, *6*(2), 4–16. https://doi.org/10.1007/BF03391798

Pennington, R. C., & Courtade, G. R. (2015). An examination of teacher and student behaviors in classrooms for students with moderate and severe intellectual disability. *Preventing School Failure: Alternative Education for Children and Youth*, *59*(1), 40–47. https://doi.org/10.1080/1045988X.2014.919141

Pennington, R. C., Walker, V. L., & Tapp, M. C. (2021). Teacher preparation in communication instruction for students with extensive support needs. *Teacher Education and Special Education*, *44*(3), 239–254. https://doi.org/10.1177/0888406420978606

Powell, D., Higgins, H. J., Aram, R. J., & Freed, A. (2009). Impact of no child left behind on curriculum and instruction in rural schools. *The Rural Educator*. https://doi.org/10.35608/ruraled.v31i1.439

Pressley, T., & Ha, C. (2021). Teaching during a pandemic: United States teachers' self-efficacy during COVID-19. *Teaching and Teacher Education*, *106*, 103465. https://doi.org/10.1016/j.tate.2021.103465

Rabaglietti, E., Lattke, L. S., Tesauri, B., Settanni, M., & De Lorenzo, A. (2021). A Balancing act during covid-19: Teachers' self-efficacy, perception of stress in the distance learning experience. *Frontiers in Psychology*, *12*, 644108. https://doi.org/10.3389/fpsyg.2021.644108

Reichle, J., Simacek, J., Wattanawongwan, S., & Ganz, J. (2019). Implementing aided augmentative communication systems with persons having complex communicative needs. *Behavior Modification*, *43*(6), 841–878. https://doi.org/10.1177/0145445519858272

Reinke, W. M., Lewis-Palmer, T., & Martin, E. (2007). The effect of visual performance feedback on teacher use of behavior-specific praise. *Behavior Modification*, *31*(3), 247–263. https://doi.org/10.1177/0145445506288967

Reinke, W. M., Stormont, M., Herman, K. C., & Newcomer, L. (2014). Using coaching to support teacher implementation of classroom-based interventions. *Journal of Behavioral Education*, *23*(1), 150–167. https://doi.org/10.1007/s10864-013-9186-0

Rosenbaum, M. S., & Breiling, J. (1976). The development of functional control of reading comprehension behavior. *Journal of Applied Behavior Analysis*, *9*(3), 323–333. https://doi.org/10.1901/jaba.1976.9-323

Rosenshine, B. V., & Berliner, D. C. (1978). Academic engaged time. *British Journal of Teacher Education*, *4*(1), 3–16. https://doi.org/10.1080/0260747780040102

Rowland, C., & Schweigert, P. (2000). Tangible symbols, tangible outcomes. *Augmentative and Alternative Communication*, *16*(2), 61–78. https://doi.org/10.1080/07434610012331278914

Rowley, G. (1978). The relationship of reliability in classroom research to the amount of observation: An extension of the Spearman-Brown formula. *Journal of Educational Measurement*, *15*(3), 165–180. https://doi.org/10.1111/j.1745-3984.1978.tb00066.x

Ruppar, A. L., Roberts, C. A., & Olson, A. J. (2018). Developing expertise in teaching students with extensive support needs: A roadmap. *Intellectual and Developmental Disabilities, 56*(6), 412–426. https://doi.org/10.1352/2326-6988-8.1.6

Ryndak, D. L., Clark, D., Conroy, M., & Stuart, C. H. (2001). Preparing teachers to meet the needs of students with severe disabilities: Program configuration and expertise. *Journal of the Association for Persons with Severe Handicaps*, *26*(2), 96–105. https://doi.org/10.2511/rpsd.26.2.96

Sarokoff, R. A., & Sturmey, P. (2004). The effects of behavioral skills training on staff implementation of discrete-trial teaching. *Journal of Applied Behavior Analysis*, *37*(4), 535–538. https://doi.org/10.1901/jaba.2004.37-535

Saunders, A. F., Wakeman, S., Reyes, E., Thurlow, M. L., & Vandercook, T. (2020). Instructional practices for students with the most significant disabilities in inclusive settings: A review of the literature (TIES Center Report 104). Minneapolis, MN: University of Minnesota, The TIES Center.

Sawyer, M. R., Andzik, N. R., Kranak, M. P., Willke, C. P., Curiel, E. S., Hensley, L. E., & Neef, N. A. (2017). Improving pre-service teachers' performance skills through behavioral skills training. *Behavior Analysis in Practice*, *10*(3), 296–300. https://doi.org/10.1007/s40617-017-0198-4

Schaefer, J. M., & Andzik, N. R. (2021). Evaluating behavioral skills training as an evidence-based practice when training parents to intervene with their children. *Behavior Modification*, *45*(6), 887–910. https://doi.org/10.1177/0145445520923996

Schnorr, C. I., Freeman-Green, S., & Test, D. W. (2016). Response cards as a strategy for increasing opportunities to respond: An examination of the evidence. *Remedial and Special Education*, *37*(1), 41–54. https://doi.org/10.1177/0741932515575614

Schuster, J. W., Morse, T. E., Ault, M. J., Crawford, M. R., & Wolery, M. (1998). Constant time delay with chained tasks: A review of the literature. *Education and Treatment of Children*, 74–106. https://www.jstor.org/stable/42899522

Scott, T. M., Hirn, R. G., & Alter, P. J. (2014). Teacher instruction as a predictor for student engagement and disruptive behaviors. *Preventing School Failure: Alternative Education for Children and Youth*, *58*(4), 193–200. https://doi.org/10.1080/1045988X.2013.787588

Schwartz, I. S., & Baer, D. M. (1991). Social validity assessments: Is current practice state of the art?. *Journal of Applied Behavior Analysis*, *24*(2), 189–204. https://doi.org/10.1901/jaba.1991.24-189

Shepley, C., Lane, J. D., & Ault, M. J. (2019). A review and critical examination of the system of least prompts. *Remedial and Special Education*, *40*(5), 313–327. https://doi.org/10.1177/0741932517751213

Simonsen, B., MacSuga-Gage, A. S., Briere III, D. E., Freeman, J., Myers, D., Scott, T. M., & Sugai, G. (2014). Multitiered support framework for teachers' classroom-management practices: Overview and case study of building the triangle for teachers. *Journal of Positive Behavior Interventions*, *16*(3), 179–190. https://doi.org/10.1177/1098300713484062

Simonsen, B., Myers, D., & DeLuca, C. (2010). Providing teachers with training and performance feedback to increase use of three classroom management skills: Prompts, opportunities to respond, and reinforcement. *Teacher Education in Special Education, 33*(4), 300–318. https://doi.org/10.1177/0888406409359905

Sinclair, A. C., Gesel, S. A., LeJeune, L. M., & Lemons, C. J. (2020). A review of the evidence for real-time performance feedback to improve instructional practice. *The Journal of Special Education*, *54*(2), 90–100. https://doi.org/10.1177/0022466919878470

Snell, M. E. (2003). Applying research to practice: The more pervasive problem?. *Research and Practice for Persons with Severe Disabilities*, *28*(3), 143–147. https://doi.org/10.2511/rpsd.28.3.143

Snell, M. E., Brady, N., McLean, L., Ogletree, B. T., Siegel, E., Sylvester, L., Mineo, B., Paul, D., Romski, M. A., & Sevcik, R. (2010). Twenty years of communication intervention research with individuals who have severe intellectual and developmental disabilities. *American Journal on Intellectual and Developmental Disabilities*, *115*(5), 364–380. https://doi.org/10.1352/1944-7558-115-5.364

Snell, M. E., Chen, L. Y., & Hoover, K. (2006). Teaching augmentative and alternative communication to students with severe disabilities: A review of intervention research

1997–2003. *Research and Practice for Persons with Severe Disabilities*, *31*(3), 203–214. https://doi.org/10.1177/154079690603100301

Snell, M. E., & Gast, D. L. (1981). Applying time delay procedure to the instruction of the severely handicapped. *Journal of the Association for the Severely Handicapped*, *6*(3), 3–14. https://doi.org/10.1177/2F154079698100600301

Snyder, P. A., Hemmeter, M. L., & Fox, L. (2015). Supporting implementation of evidence-based practices through practice-based coaching. *Topics in Early Childhood Special Education*, *35*(3), 133–143. https://doi.org/10.1177/0271121415594925

Solomon, B. G., Klein, S. A., & Politylo, B. C. (2012). The effect of performance feedback on teachers' treatment integrity: A meta-analysis of the single-case literature. *School Psychology Review*, *41*(2), 160–175. https://doi.org/10.1080/02796015.2012.12087518

Spooner, F., Root, J. R., Saunders, A. F., & Browder, D. M. (2019). An updated evidence-based practice review on teaching mathematics to students with moderate and severe developmental disabilities. *Remedial and Special Education*, *40*(3), 150–165. https://doi.org/10.1177/0741932517751055

Sugai, G., & Horner, R. H. (2009). Responsiveness-to-intervention and school-wide positive behavior supports: Integration of multi-tiered system approaches. *Exceptionality*, *17*(4), 223–237. https://doi.org/10.1080/09362830903235375

Sutherland, K. S., Alder, N., & Gunter, P. L. (2003). The effect of varying rates of opportunities to respond to academic requests on the classroom behavior of students with EBD. *Journal of Emotional and Behavioral Disorders, 11*(4), 239–248. https://doi.org/10.1177/10634266030110040501

Sutherland, K. S., & Wehby, J. H. (2001). Exploring the relationship between increased opportunities to respond to academic requests and the academic and behavioral outcomes of students with EBD: A review. *Remedial and Special Education*, *22*(2), 113–121. https://doi.org/10.1177/074193250102200205

Tapp, J., Wehby, J., & Ellis, D. (1995). A multiple option observation system for experimental studies: MOOSES. *Behavior Research Methods, Instruments, & Computers*, *27*(1), 25–31. https://doi.org/10.3758/BF03203616

Taub, D. A., McCord, J. A., & Ryndak, D. L. (2017). Opportunities to learn for students with extensive support needs: A context of research-supported practices for all in general education classes. *The Journal of Special Education*, *51*(3), 127–137. https://doi.org/10.1177/0022466917696263

Test, D. W., Fowler, C. H., Richter, S. M., White, J., Mazzotti, V., Walker, A. R., Kohler, P., & Kortering, L. (2009). Evidence-based practices in secondary transition. *Career Development for Exceptional Individuals*, *32*(2), 115–128. https://doi.org/10.1177/0885728809336859

Touchette, P. E. (1971). Transfer or stimulus control: Measuring the moment of transfer. *Journal of the Experimental Analysis Behavior*, *15*(3), 347-354. https://doi.org/10.1901/jeab.1971.15-347

Towles-Reeves, E., Kearns, J., Kleinert, H., & Kleinert, J. (2009). An analysis of the learning characteristics of students taking alternate assessments based on alternate achievement standards. *The Journal of Special Education*, *42*(4), 241–254. https://doi.org/10.1177/0022466907313451

United States Department of Education. (2019). IDEA Section 618 data products. https://www2.ed.gov/programs/osepidea/618-data/index.html

United States Department of Education, National Center for Education Statistics. (2021). *Digest of Education Statistics, 2019* (NCES 2021-009), Table 204.30.

Van Camp, A. M., Wehby, J. H., Martin, B. L. N., Wright, J. R., & Sutherland, K. S. (2020). Increasing opportunities to respond to intensify academic and behavioral interventions: a meta-analysis. *School Psychology Review*, *49*(1), 31–46. https://doi.org/10.1080/2372966X.2020.1717369

Vargas, E. A., & Vargas, J. S. (1991). Programmed instruction: What it is and how to do it. *Journal of Behavioral Education*, *1*(2), 235–251. https://doi.org/10.1007/BF00957006

Walker, V. L., Carpenter, M. E., Clausen, A., Ealer, K., & Lyon, K. J. (2021). Special educators as coaches to support paraprofessional implementation of functional communication training. *Journal of Positive Behavior Interventions*, *23*(3), 174–184. https://doi.org/10.1177/1098300720957995

Walker, V. L., Pennington, R. C., Andzik, N. R., Tapp, M. C., & Masud-Werner, A. (2022). Preservice teachers' preparation in communication instruction for students with extensive support needs. *Research and Practice for Persons with Severe Disabilities*, *47*(1), 57–64. https://doi.org/10.1177/15407969221074720

Wall, M. E., & Gast, D. L. (1997). Caregivers' use of constant time delay to teach leisure skills to adolescents or young adults with moderate or severe intellectual disabilities. *Education and Training in Mental Retardation and Developmental Disabilities*, *32*(4), 340–356. https://www.jstor.org/stable/23879211

Wei, R. C., Darling-Hammond, L., & Adamson, F. (2010). *Professional development in the United States: Trends and challenges* (Vol. 28). National Staff Development Council.

Wolery, M., Ault, M. J., & Doyle, P. (1992). *Teaching students with moderate to severe disabilities: Use of response prompting strategies*. Longman Publishing Group.

Wolery, M., & Gast, D. L. (1984). Effective and efficient procedures for the transfer of stimulus control. *Topics in Early Childhood Special Education*, *4*(3), 52–77. https://doi.org/10.1177/027112148400400305

Wolery, M., Holcombe, A., Cybriwsky, C., Doyle, P. M., Schuster, J. W., Ault, M. J., & Gast, D. L. (1992). Constant time delay with discrete responses: A review of effectiveness and demographic, procedural, and methodological parameters. *Research in Developmental Disabilities*, *13*(3), 239–266.

Wolf, M. M. (1978). Social validity: The case for subjective measurement or how applied behavior analysis is finding its heart. *Journal of Applied Behavior Analysis, 11*(2), 203–214. https://doi.org/10.1901/jaba.1978.11-203

Wood, C. L., Goodnight, C. I., Bethune, K. S., Preston, A. I, & Cleaver, S. L. (2016). Role of professional development and multi-level coaching in promoting evidence-based practice in education. *Learning Disabilities: A Contemporary Journal, 14*(2), 159–170.

Yoon, K. S., Duncan, T., Lee, S. W. Y., Scarloss, B., & Shapley, K. L. (2007). Reviewing the evidence on how teacher professional development affects student achievement. issues & answers. rel 2007-no. 033. *Regional Educational Laboratory Southwest (NJ1)*.

Yorke, A. M., Caron, J. G., Pukys, N., Sternad, E., Grecol, C., & Shermak, C. (2021). Foundational reading interventions adapted for individuals who require augmentative and alternative communication (AAC): A systematic review of the research. *Journal of Developmental and Physical Disabilities*, *33*(4), 537–582. https://doi.org/10.1007/s10882-020-09767-5

Ysseldyke, J. E., Christenson, S. L., Thurlow, M. L., & Skiba, R. (1987). Academic Engagement and Active Responding of Mentally Retarded, Learning Disabled, Emotionally Disturbed and Nonhandicapped Elementary Students. Research Report No. 4. Instructional Alternatives Project.

APPENDIX A

**Study Recruitment Information Sheet**

UNIVERSITY OF NORTH CAROLINA
CHARLOTTE

CATO College of Education
Department of Special Education and Child Development
9201 University City Boulevard, Charlotte, NC 28223-0001

**Title of the Project:** *Effects of a Coaching Package on Teacher Delivery of Supported Opportunities to Respond*

**Principal Investigator:** Melissa Tapp, M.Ed.

**Co-investigators:** Janet Enriquez, M.S., BCBA, Monique Pinczynski, M.Ed., BCBA, Andy Werner, M.A.T., Robert Pennington, Ph.D., BCBA-D, University of North Carolina at Charlotte

Teachers are invited to participate in a research study. Their participation in this research study is voluntary.

**Important information:**

- The purpose of this study is to examine the effects of a coaching package on teacher delivery of supported opportunities to respond and active student responses.
- Research is needed on the implementation of effective practices for increasing engagement of students with extensive support needs during small group academic instruction.
- These data are needed to gain a better understanding of effective interventions to increase engagement of students with extensive support needs during small group academic instruction.
- This study will involve 20-30 sessions and each session will last up to 15 min. The sessions will occur during typical instructional time and daily routines to measure the effectiveness of the intervention.

**Teacher Requirements:**

1. Provide teacher consent and complete teacher information form.
2. Send email (drafted by researcher) to parents of potential student participants.
3. Provide typical instruction (screening and baseline).
4. Participate in training session (60 min).
5. Implement intervention during daily targeted routine.
6. Video record daily targeted routine of up to 15 min (3-5 times per week).
7. After each lesson is completed, upload video to Dropbox folder (provided by researcher).
8. Meet with researcher weekly to review progress toward goal.
9. Complete social validity survey at the conclusion of the study.

**What will students do in this study?**

Students will participate in instruction as they typically do. There will be no interruption to their instruction or services.

**What benefits might teachers or students experience?**

While there are no guaranteed direct benefits to teacher or student participants, teachers and students may experience increased levels of engagement during academic instruction.

For questions about this research, you may contact Melissa Tapp at 716-472-7736 or mcook42@uncc.edu

APPENDIX B

**District Letter of Support**

Add District Letterhead

**, 2020

To Whom It May Concern:

I am in support of a research project, entitled *Effects of a Coaching Package on Teacher Delivery of Supported Opportunities to Respond.* The purpose of this study is to examine the effects of a coaching package on teacher delivery of supported opportunities to respond and active student responses. I understand that the study will involve 20 to 30, 15 min sessions during typical instructional time and daily routines to measure the effects of the intervention. The study is being conducted by a research team in the Department of Special Education and Child Development at the University of North Carolina at Charlotte. I look forward to this project.

Regards,

_____
Signature

_____
Printed Name

_____
Title

_____
Date

APPENDIX C

## Teacher Recruitment Script

**The district representative (EC Coaches, Cabarrus County Schools) will cover the following information when recruiting teachers:**

A research team in the Department of Special Education and Child Development at the University of North Carolina at Charlotte (i.e., Melissa Tapp, Janet Enriquez, Monique Pinczynski, Andy Werner, and Robert Pennington) is interested in examining the effects of a coaching package on teacher delivery of supported opportunities to respond and active student responses.

If teachers agree to participate, their role will include:

1. Provide teacher consent and complete teacher information form.
2. Send email (drafted by researcher) to parents of potential student participants.
3. Provide typical instruction (screening and baseline).
4. Participate in training session (60 min).
5. Implement intervention during daily targeted routine.
6. Video record daily targeted routine of up to 15 min.
7. After each lesson is completed, upload video to Dropbox folder (provided by researcher).
8. Meet with researcher weekly to review progress toward.
9. Complete social validity survey at the conclusion of the study.

District representative will ask potential participants to confirm whether they are interested in participating.

Participation and consent:

District representative will inform potential participants that informed consent which provides important information will be sent to them via DocuSign. District representative will inform potential participants to take some time to review the informed consent document and to determine whether he/she would like to participate in the study. If he/she would like to participate, they will complete consent forms sent via DocuSign. After all teacher consent and all parent consent forms are returned, the researchers will reach out to participants to schedule time to set up sessions for screenings. District representative will provide my email addresses to potential participants: mcook42@uncc.edu.

APPENDIX D

**Parent Recruitment Email**

Date

Dear Sir or Madam,

A research team at the University of North Carolina at Charlotte is currently seeking participants for a research study. The research team consists of four doctoral students, Melissa Tapp, Janet Enriquez, Monique Pinczynski, Andy Werner, and their advisor Dr. Robert Pennington. The purpose of the study is to examine the effects of a coaching package on teacher delivery of supported opportunities to respond and active student responses. This study will involve 20-30 sessions and each session will last up to 15 minutes. The sessions will occur during typical instructional time and daily routines to measure the effectiveness of the intervention.

If you are interested in your child's participation in this research study, please click this link to fill out a Google Form to indicate your interest. Next, the research team will send an Informed Consent Form which will be sent to you through UNCC's Docusign. This will allow you to sign the form digitally and once completed will immediately be delivered back to the research team.

Should you have any questions about the study, please do not hesitate to contact the research team:

Melissa Tapp- mcook42@uncc.edu, 716-472-7736

Thank you for your time.

Sincerely,

Teacher

APPENDIX E

## Teacher Consent Form


CATO College of Education
Department of Special Education and Child Development
9201 University City Boulevard, Charlotte, NC 28223-0001

### Teacher Consent for Participation in Research

**Title of the Project:** *Effects of a Coaching Package on Teacher Delivery of Supported Opportunities to Respond*

**Principal Investigator:** Melissa Tapp, M.Ed.

**Co-investigators:** Janet Enriquez, M.S., BCBA, Monique Pinczynski, M.Ed., BCBA, Andy Werner, M.A.T., Robert Pennington, Ph.D., BCBA-D, University of North Carolina at Charlotte

You are invited to participate in a research study. Your participation in this research study is voluntary. The information provided is to help you decide whether or not to consent to participate. If you have any questions, please ask.

**Important information you need to know**

- The purpose of this study is to examine the effects of a coaching package on teacher delivery of supported opportunities to respond and active student responses.
- Research is needed on the implementation of effective practices for increasing engagement of students with extensive support needs during small group academic instruction.
- These data are needed to gain a better understanding of effective interventions to increase engagement of students with extensive support needs during small group academic instruction.
- This study will involve 20-30 sessions and each session will last up to 15 minutes. The sessions will occur during typical instructional time and daily routines to measure the effectiveness of the intervention.

**Why are we doing this study?**

The purpose of this study is to examine the effects of a coaching package on teacher delivery of supported opportunities to respond and active student responses during small group instruction.

**Why am I being asked to be in this research study?**

You are being asked to participate because you currently provide academic small group instruction for students with extensive support needs.

**What will student do in this study? What is my role?**

Students will participate in instruction as they typically do. There will be no interruption to their instruction or services.

If you agree to participate, your role will include:

1. Provide teacher consent and complete teacher information form.
2. Send email (drafted by researcher) to parents of potential student participants.
3. Provide typical instruction (screening and baseline).

4. Participate in training session (60 min).
5. Implement intervention during daily targeted routine.
6. Video record daily targeted routine of up to 15 min.
7. After each lesson is completed, upload video to Dropbox folder (provided by researcher).
8. Meet with researcher weekly to review progress toward.
9. Complete social validity survey at the conclusion of the study.

The sessions will be recorded so the research team can collect and analyze the data. Sessions will be videoed. There is nothing you will need to do differently as a result of being videotaped. All information will be kept confidential. No one other than myself or members of the research team will be able to identify you.

**What benefits might student experience?**
While there are no guaranteed direct benefits to teacher or student participants, data gathered from this study may be used to inform practices for teacher and students with extensive support needs and for future research studies for this population.

**What risks might I experience?**
There are minimal risks to participate in this study.

**How will information be protected?**
Electronic materials will be stored in a University password-protected Dropbox folder that the research team can access. Only the research team will have routine access to the study information. Other people with approval from the Investigator, may need to see the information we collect, including people who work for UNC Charlotte and other agencies as required by law or allowed by federal regulations.

**How will information be used after the study is over?**
These data may be shared through publication of our results. The data shared for publication will NOT include information that could identify you and your students.

**Will I receive an incentive for taking part in this study?**
You will receive $100 total for participating in this study. After all components of the study are completed, you will be sent your incentive payment. Incentive payments are considered taxable income. Therefore, we are required to give the University's Financial Services division a log/tracking sheet with the names of all individuals who received a gift card. This sheet is for tax purposes only and is separate from the research data, which means the names will not be linked to (survey or interview) responses.

**What other choices are there if I don't to take part in this study?**
If you decline participation or choose to stop, you and your students will not be penalized, and you will not lose any benefits to which you are otherwise entitled.

**What are rights I take part in this study?**
Participating in this study is voluntary. Even if you decide to be part of the study now, you may change your mind and stop your participation at any time. You and your students will not lose any benefits to which you are entitled.

**Who can answer my questions about this study and participant rights?**
For questions about this research, you may contact Melissa Tapp at 716-472-7736 or mcook42@uncc.edu or Dr. Robert Pennington (responsible faculty) at 704-687-8850 or Robert.Pennington@uncc.edu.

If you have questions about research participant's rights, or wish to obtain information, ask questions, or discuss any concerns about this study with someone other than the researcher(s), please contact the Office of Research Protections and Integrity at 704-687-1871 or uncc-irb@uncc.edu.

**Consent to Participate**

By signing this document, you are agreeing to participate in this study. Make sure you understand what the study is about before you sign. You will receive a copy of this document for your records. If you have any questions about the study after you sign this document, you can contact the study team using the information provided above.

I understand what the study is about, and my questions so far have been answered.
I consent to my participation in:

*"Effects of a Coaching Package on Teacher Delivery of Supported Opportunities to Respond"* ☐ Yes ☐ No

I consent to the use of audiotape and videotape during the sessions: ☐ Yes ☐ No

(Please see a separate videotape consent form)

_____

Participant Name (PRINT)

_____

Signature Date

Melissa Tapp **/**/21

Name and Signature of person obtaining consent Date

APPENDIX F

**Teacher Video Consent Form**

I hereby consent and agree to be audio recorded and videotaped by the University of North Carolina at Charlotte (herein "UNC Charlotte") or anyone authorized by UNC Charlotte, including but not limited to Principal Investigators and researchers (herein "Agents"), while I participate in the research "*Effects of a Coaching Package on Teacher Delivery of Supported Opportunities to Respond*" (herein "Research"). I give permission to UNC Charlotte and its Agents to use or reproduce any such videos or recordings for the following purposes (initial):

Scholarship and the dissemination of research findings; and/or

Classroom and professional training and education.

I agree that the use herein may be without compensation. I hereby waive any right to inspect or approve the finished photographs, videos, or recordings and expressly release UNC Charlotte and its Agents, from any and all claims which I may have for invasion of privacy, right of publicity, defamation, copyright infringement, or any other causes of action arising out of the use, adaptation, reproduction, distribution, broadcast, or exhibition of such photographs or videos.

I understand that my name will not be associated with the any videos or recordings and that all recordings will be destroyed after the coding process. I further understand that I have the right to revoke this permission, which must be in writing. However, any such revocation shall not affect disclosures or publications previously made by UNC Charlotte and its Agents prior to the receipt of such written revocation.

**I HAVE READ THIS AGREEMENT, I UNDERSTAND IT AND I AGREE TO BE BOUND BY IT.**

_____ _____

(Signature) (Date)

_____

(Printed Name)

APPENDIX G

## Parent Consent Form


CATO College of Education
Department of Special Education and Child Development
9201 University City Boulevard, Charlotte, NC 28223-0001

**Parent or Legal Guardian Consent for Child/Minor Participation in Research**

**Title of the Project:** *Effects of a Coaching Package on Teacher Delivery of Supported Opportunities to Respond*

**Principal Investigator:** Melissa Tapp, M.Ed.

**Co-investigators:** Janet Enriquez, M.S., BCBA, Monique Pinczynski, M.Ed., BCBA, Andy Werner, M.Ed., Robert Pennington, Ph.D., BCBA-D, University of North Carolina at Charlotte

Your child is invited to participate in a research study. Your child's participation in this research study is voluntary. The information provided is to help you decide whether or not to allow your child to participate. If you have any questions, please ask.

**Important information you need to know**

- The purpose of this study is to examine the effects of a coaching package on teacher delivery of supported opportunities to respond and active student responses.
- Research is needed on the implementation of effective practices for increasing engagement of students with extensive support needs during small group academic instruction.
- These data are needed to gain a better understanding of effective interventions to increase engagement of students with extensive support needs during small group academic instruction.
- This study will involve 20-30 sessions and each session will last up to 15 minutes. The sessions will occur during typical instructional time and daily routines to measure the effectiveness of the intervention.

**Why are we doing this study?**

The purpose of this study is to examine the effects of a coaching package on teacher delivery of supported opportunities to respond and active student responses during small group instruction.

**Why is your child being asked to be in this research study?**

Your child is being asked to participate because he/she currently receives instruction for in a classroom for students with extensive support needs and has complex communication needs.

**What will children do in this study?**

Students will participate in instruction as they typically do. There will be no interruption to their instruction or services.

**What benefits might children experience?**

While there are no guaranteed direct benefits to teacher or student participants, data gathered from this study may be used to inform practices for teacher and students with extensive support needs and for future research studies for this population.

**What risks might children experience?**
There are minimal risks to participate in this study. The research team will ensure your child's safety at all times while supporting your child in learning academic and social skills.

**How will information be protected?**
Electronic materials will be stored in a University password-protected Dropbox folder that the research team can access. Only the research team will have routine access to the study information. Other people with approval from the Investigator, may need to see the information we collect, including people who work for UNC Charlotte and other agencies as required by law or allowed by federal regulations.

**How will information be used after the study is over?**
These data may be shared through publication of our results. The data shared for publication will NOT include information that could identify you and your child.

**Will children receive an incentive for taking part in this study?**
Your child will not receive any payment for being in this study.

**What other choices are there if I don't want my [child/legal ward] to take part in this study?**
If you decline participation or choose to stop, you and your child will not be penalized, and you and your child will not lose any benefits to which you are otherwise entitled. **Your child will continue to receive ALL eligible services and supports as outlined if he/she has an individual education program (IEP).**

**What are my child's/legal ward's rights if he/she takes part in this study?**
Participating in this study is voluntary. Even if you decide to allow your child to be part of the study now, you may change your mind and stop his/her participation at any time. You and your child will not lose any benefits to which you are entitled.

**Who can answer my questions about this study and participant rights?**
For questions about this research, you may contact Melissa Tapp at 716-472-7736 or mcook42@uncc.edu or Dr. Robert Pennington (responsible faculty) at 704-687-8850 or Robert.Pennington@uncc.edu.
If you have questions about research participant's rights, or wish to obtain information, ask questions, or discuss any concerns about this study with someone other than the researcher(s), please contact the Office of Research Protections and Integrity at 704-687-1871 or uncc-irb@uncc.edu.

**Parent or Legally Authorized Representative Consent**
By signing this document, you are agreeing to your child's participation in this study. Make sure you understand what the study is about before you sign. You will receive a copy of this document for your records. You will also be asked to document assent by your child on a separate document. If you have any questions about the study after you sign this document, you can contact the study team using the information provided above.

I understand what the study is about and my questions so far have been answered.

I consent to my child's participation in "*Effects of a Coaching Package on Teacher Delivery of Supported Opportunities to Respond"*: ☐ Yes ☐ No

I consent to the use of audiotape and videotape during the sessions: ☐ Yes ☐ No
(Please see a separate videotape consent form)

_____
Participant Name (PRINT)

_____
Parent/Legally Authorized Representative Name and Relationship to Participant (PRINT)

_____
Signature Date

Melissa Tapp **/**/21
Name and Signature of person obtaining consent Date

APPENDIX H

**Parent Video Consent Form**

I hereby consent and agree to allow my child to be photographed, audio recorded, and videotaped by the University of North Carolina at Charlotte (herein "UNC Charlotte") or anyone authorized by UNC Charlotte, including but not limited to Principal Investigators and researchers (herein "Agents"), while my child is participating in the research *"Effects of a Coaching package on Teacher Delivery of Supported Opportunities to Respond"* (herein "Research"). I give permission to UNC Charlotte and its Agents to use or reproduce any such videos or recordings for the following purposes (initial):

Scholarship and the dissemination of research findings; and/or

Classroom and professional training and education.

I agree that the use herein may be without compensation to me or my child. I hereby waive any right to inspect or approve the finished photographs, videos, or recordings and expressly release UNC Charlotte and its Agents, from any and all claims which I, or my child, may have for invasion of privacy, right of publicity, defamation, copyright infringement, or any other causes of action arising out of the use, adaptation, reproduction, distribution, broadcast, or exhibition of such photographs or videos.

I understand that my name will not be associated with the any videos or recordings and that all recordings will be destroyed after the coding process. I further understand that I have the right to revoke this permission, which must be in writing. However, any such revocation shall not affect disclosures or publications previously made by UNC Charlotte and its Agents prior to the receipt of such written revocation.

**I HAVE READ THIS AGREEMENT, I UNDERSTAND IT AND I AGREE TO BE BOUND BY IT.**

_____ _____

(Signature or Parent/Guardian) (Date)

_____ _____

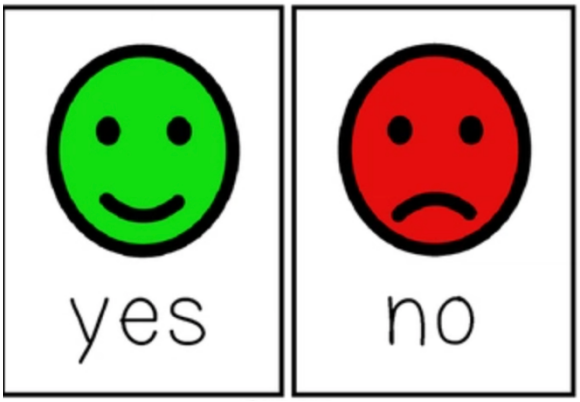
(Printed Name) (Printed Name of Child)

APPENDIX I

**Student Assent**

We need your help.

Will you help us by participating in a lesson with your teacher while the lesson is being videotaped for use by researchers at the University of North Carolina at Charlotte?




_____ _____ _____

Student's Name Student's Signature (if Applicable) DATE

Melissa Tapp **/**21

Investigator's Signature DATE

APPENDIX J

**Behavior Skills Training Guide**

Date:

Trainer:

Teacher:

| **Behavior Skills Training Script: Deliver Supported Opportunities to Respond** | |
|---|---|
| **Instructions** | Script: Today will practice delivering supported OTR.<br>Describe importance of: delivering OTR, providing communication response, delivering prompting.<br>Provide written instructions to participants and review steps via PowerPoint presentation. |
| **Modeling** | Model: I will model how to deliver supported OTR. Teacher participant acts as the student, researcher as the teacher.<br>Researcher models how to deliver supported OTR:<br>During academic instruction, deliver question, have communication mode available and ready, after 5 s provide controlling prompt. |
| **Rehearsal** | Practice/Role Play: Switch roles, teacher participant acts as the teacher, researcher as the student.<br>Teacher practices delivering supported OTR: during academic instruction, deliver question, have communication mode available and ready, after 5 s provide controlling prompt. |
| **Feedback** | Provide feedback:<br>▪ Provide praise when teacher performs skill correctly.<br>▪ Provide error correction for incorrect practice with additional models and practice. |

APPENDIX K

**Procedural Fidelity- Training and Supervisory Coaching**

Date:

Trainer:

Teacher:

Data collector:

Primary ☐ IOA ☐

| Steps for Behavior Skills Training- Supported OTR | |
|---|---|
| 1. Provide rationale for supported OTR | + - 0 |
| 2. Provide trainee with written summary of procedures | + - 0 |
| 3. Delivering OTR | + - 0 |
| a. Describe procedure | + - 0 |
| b. Model | + - 0 |
| c. Role play/practice | + - 0 |
| d. Provide feedback | + - 0 |
| e. Repeat steps if necessary | + - 0 |
| 4. Provide communication supports | + - 0 |
| a. Describe procedure | + - 0 |
| b. Model | + - 0 |
| c. Role play/practice | + - 0 |
| d. Provide feedback | + - 0 |
| e. Repeat steps if necessary | + - 0 |
| 5. Describe response prompt procedures- time delay | + - 0 |
| a. Describe procedure | + - 0 |
| b. Model | + - 0 |
| c. Role play/practice | + - 0 |
| d. Provide feedback | + - 0 |
| e. Repeat steps if necessary | + - 0 |
| 6. Provide opportunity for teacher participant to ask questions | + - 0 |
| Procedural fidelity % | / Total |

APPENDIX L

**Teacher Implementation of Supported OTR**
**Written Summary of Procedures**

Date: Teacher: Observation Period: Student:

**Behavior Definition:**
Teacher: Supported opportunity to respond (OTR) is defined as the teacher delivers OTR, the communication response tool is available (within 1 arm's reach and preset), and teacher provides prompting as needed.

***OTR:*** Teacher-delivered OTRs are operationally defined as the teacher providing the group or target individual with an OTR to a question or direction. *Examples:* This includes anytime the teacher asks a question (e.g., "what is the main idea…?"), gives a direction (e.g., "point to the main character…") to facilitate student responses (see operational definition below). To be considered an OTR, questions or directions must be related to academic content (e.g., questions about text). *Nonexamples:* OTR will not be counted if specifically targeting behaviors not related to academic content (e.g., "Sit in your seat").

***Communication:*** Providing communication support is operationally defined as ensuring that if a student needs an aided communication support (e.g., speech generating device, response options) it is placed within an arm's reach of the student and contains stimuli related to the current lesson. *Examples:* The small group lesson is a read aloud story about apples. The student's communication device is a single switch with the repeated story line preprogrammed into the device. The student is seated at the table and the switch is within one arm's reach of the student. *Nonexamples:* The small group lesson is a read aloud story about apples. The student's communication device is a single switch but is set up with the preprogramed repeated story line about bats. The student is seated at the table and the switch is in the student's backpack away from the small group area.

***Prompt:*** A prompt will be defined as the delivery of a vocal, gestural, model, or physical prompt that results in the target student's accurate response. The prompt must occur following the teacher-delivered OTR and be followed by the student emitting the targeted response. *Example:* The teacher asks a question about the story, "Who is the main character?," waits 5 s, uses physical prompting to select the correct answer. *Nonexample:* The teacher asks a question about the story, "Who is the main character?," and immediately delivers physical prompt or does not deliver prompt within predetermined amount of time (e.g., 5 s).

***Student:*** Active student response is defined as the prompted or unprompted student response to teacher-delivered OTRs.
*Unprompted student responses:* any independent response to teacher OTR including vocal (i.e., speech), gestural, written, or SGD/AAC device supported responses.
*Prompted student responses:* response to teacher OTR including vocal (i.e., speech), gestural, written, or SGD/AAC device supported response supported by teacher-delivered response prompt.

APPENDIX M

## Teacher Implementation of Supported OTR

Date: Teacher: Observation Period:

Student:

**Behavior Definition:**

Teacher: Supported opportunity to respond (OTR) is defined as the teacher delivers OTR, the environment is set up with communication response tools (within 1 arm's reach and preset), and teacher provides prompting as needed.

OTR:

Communication:

Prompt:

Student: Active student response is defined as the prompted or unprompted student response to teacher-delivered OTR.

*Unprompted student responses:* any independent response to teacher-delivered OTR including vocal (i.e., speech), gestural, written, or SGD/AAC device supported responses.

*Prompted student responses:* response to teacher OTR including vocal (i.e., speech), gestural, written, or SGD/AAC device supported response supported by teacher-delivered response prompt.

| | Trial 1 | Trial 2 | Trial 3 | Trial 4 | Trial 5 | Trial 6 | Trial 7 | Trial 8 | Trial 9 | Trial 10 | Totals: |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Teacher: | | | | | | | | | | | |
| OTR | | | | | | | | | | | |
| Comm? | | | | | | | | | | | |
| Prompt | | | | | | | | | | | |
| Supported OTR | | | | | | | | | | | |
| Student Response: | | | | | | | | | | | |
| Prompted | | | | | | | | | | | |
| Unprompted | | | | | | | | | | | |
| No response | | | | | | | | | | | |

| | Trial 1 | Trial 2 | Trial 3 | Trial 4 | Trial 5 | Trial 6 | Trial 7 | Trial 8 | Trial 9 | Trial 10 | Totals: |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Teacher: | | | | | | | | | | | |
| OTR | | | | | | | | | | | |
| Comm? | | | | | | | | | | | |
| Prompt | | | | | | | | | | | |
| Supported OTR | | | | | | | | | | | |
| Student Response: | | | | | | | | | | | |
| Prompted | | | | | | | | | | | |
| Unprompted | | | | | | | | | | | |
| No response | | | | | | | | | | | |

APPENDIX N

## Teacher Information Form

Please respond to the following items about yourself:

**Name:** **Date:**

**School:**

1. **Current Role:**

☐ **General education teacher**
☐ **Special education teacher (i.e., general curriculum)**
☐ **Special education teacher (i.e., adapted curriculum)**
☐ **Teaching assistant (i.e., paraprofessional, classroom aide)**
☐ **Other:**

2. **Years in role:**

3. **Previous teaching experiences:**

4. **Gender:**

☐ **Female**
☐ **Male**
☐ **Prefer not to disclose**

5. **Age:**

6. **Education:**

☐ **No high school degree or GED**
☐ **High school degree or GED**
☐ **Some college**
☐ **Associate degree (2 years)**
☐ **Bachelor of Art/Bachelor of Science degree (4 years)**
☐ **Graduate work or degree**
☐ **Other:**

7. **Please describe the type of teaching license and endorsement(s)/certification(s), if any, you currently hold in the state of North Carolina:**

8. **Please describe any training or coaching you've previously received on delivering evidence-based practices?**

APPENDIX O

**Parent Recruitment Information**

# Research Study Interest Form

Thank you for your interest in the research study:
Effects of a Coaching Package on Teacher Delivery of Supported Opportunities to Respond

Please indicate and provide your email address on the next page and the research teamwill contact you with further information!

* Required

1. Are you interested in participating in this study? *

*Mark only one oval.*

- ◯ Yes
- ◯ No
- ◯ Maybe
- ◯ Other

2. Please provide your name.

_____

3. Please provide your child's name.

_____

4. Please provide your child's teacher's name.

_____

5. Please provide your email address to receive further information.

Untitled Title

Thank you so much for your interest! You will receive additional information regarding this research study from Melissa Tapp. Be on the lookout for an email from mcook42@uncc.edu. I look forward to working with you!

APPENDIX P

**Social Validity Questionnaire**

Please rate your response for each of the following questions using the Likert scale from strongly disagree to strongly agree.

| | *Strongly Disagree* | *Disagree* | *Neutral* | *Agree* | *Strongly Agree* |
|---|---|---|---|---|---|
| This was an acceptable intervention for my students. | ☐ | ☐ | ☐ | ☐ | ☐ |
| This intervention was effective in meeting the purpose. | ☐ | ☐ | ☐ | ☐ | ☐ |
| I would suggest the use of this intervention to other teachers. | ☐ | ☐ | ☐ | ☐ | ☐ |
| This intervention was easy to implement. | ☐ | ☐ | ☐ | ☐ | ☐ |
| This intervention required minimal time and resources. | ☐ | ☐ | ☐ | ☐ | ☐ |
| Coaching meetings were effective. | ☐ | ☐ | ☐ | ☐ | ☐ |
| Setting a goal impacted my progress. | ☐ | ☐ | ☐ | ☐ | ☐ |
| Having a choice for goal setting impacted my progress. | ☐ | ☐ | ☐ | ☐ | ☐ |
| The opportunity for a cancelled meeting impacted my progress. | ☐ | ☐ | ☐ | ☐ | ☐ |
| Seeing the graphed data impacted my progress. | ☐ | ☐ | ☐ | ☐ | ☐ |
| Overall, this intervention was beneficial for my students who follow the adapted curriculum. | ☐ | ☐ | ☐ | ☐ | ☐ |

What suggestions do you have for improving the supported OTR?

What suggestions do you have for improving the supervisory coaching meetings?

Any additional feedback regarding the study overall that you would like to provide:

APPENDIX Q
**Student Screening**

Teacher:

Student:

Date of observation:

Communication form primarily used during observation:
☐Vocal speech
☐Unaided AAC (e.g., sign, gestural, eye gaze)
☐Real objects/tangible symbols
☐Communication board or book
☐PECS
☐Simple speech generating device
☐Speech generating device with levels
☐Speech generating device with icon sequencing
☐Speech generating device with dynamic display
☐Text based device with speech synthesis
Specific form used:

During the observation, the student:

| | None | Some | Often |
|---|---|---|---|
| AAC system available | ☐ | ☐ | ☐ |
| AAC system provided for use | ☐ | ☐ | ☐ |
| AAC system set up for instruction | ☐ | ☐ | ☐ |
| Interacts with AAC system independently | ☐ | ☐ | ☐ |
| Interacts with AAC system with teacher prompting | ☐ | ☐ | ☐ |
| Actively participates during instructional activity | ☐ | ☐ | ☐ |
| Uses AAC successfully during academic instruction | ☐ | ☐ | ☐ |

Prompting provided during observation (select all that apply):
☐Verbal
☐Gestural
☐Model
☐Partial Physical
☐Full physical
☐No prompts provided

Additional information:

**Student Screening Determination for Participation (**complete after observation):
Student meets criteria:
☐Yes
☐No

Communication form to use during study:

Controlling prompt to use during study:

Additional information:

APPENDIX R

**Coaching Meeting Schedule and Agenda**

Teacher:

Meeting Schedule:

Dates: Time:

Current goal:

**Coaching Meetings Agenda**

| Time | Agenda | Completed? |
|---|---|---|
| | 1. Present teacher with graphed data (i.e., frequency of supported OTRs) | ☐ |
| | 2. Did the teacher meet current goal? Yes ☐ No☐ | ☐ |
| | 3. If goal was met, teacher choice:<br>• Set a new goal? Yes ☐ No ☐<br>o New goal:<br>• Continue current goal? Yes ☐ No ☐<br>• Move to maintenance? Yes ☐ No ☐ | ☐<br>☐<br>☐<br>☐<br>☐ |
| | 4. If goal was NOT met:<br>• Behavior skills Training:<br>o Researcher presents a video of sessions and reviews missed steps and opportunities with the teacher.<br>o Train: Researcher reviews all components of supported OTR (focusing on missed steps; i.e., OTR, communication support, prompt).<br>o Model: Researcher models delivering supported OTR (focusing on missed steps)<br>o Role play: Teacher practices delivery supported OTR (focusing on missed steps)<br>o Feedback: Researcher provides feedback during role play. | ☐<br>☐<br>☐<br>☐<br>☐ |
| | 5. Teacher Q & A | ☐ |
| | 6. Review goal | ☐ |
| | Procedural Fidelity for Coaching Session | / |

☐**Goal: I will increase supported OTR delivery to times per session.**

☐**Goal: I will continue current goal of delivering support OTRs per session.**

☐**Goal: I will maintain current goal of delivering support OTRs per session.**

If teacher meets goal for at least 3 consecutive sessions, the coaching meeting will be cancelled.

☐**Teacher met goal for consecutive sessions. This meeting was cancelled.**

APPENDIX S

**Teacher Screening**

Teacher:

Date of observation:

Time of observation/instructional routine:

Academic lesson: yes ☐ no ☐

Describe lesson components:

Good for OTR: yes ☐ no ☐

Frequency of OTR:

Anecdotal notes: