

# Coaching Teachers to Use a Simultaneous Prompting Procedure to Teach Core Content to Students With Autism

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## Abstract

The researchers in this study used a multiple baseline design across dyads to examine the effects of professional development with coaching to train general education teachers to use a simultaneous prompting procedure when teaching academic core content to students with autism and the effects of the procedure on the students' outcomes. Three teacher–student dyads participated in the study. Results showed that (a) teachers acquired the ability to use the simultaneous prompting procedure with 100% accuracy, maintained the acquired teaching behaviors over time, and generalized them in teaching new academic content to their students; and (b) students acquired the targeted academic content, maintained it over time, and generalized it across different persons and settings. In addition, the students acquired instructive feedback stimuli added to instruction and maintained these over time as well. Last, both the opinions of the teachers and students about the social validity of the study were positive. Future research is needed to support these findings.

## Keywords

professional development, simultaneous prompting, autism spectrum disorders, inclusion, general education teachers

Autism spectrum disorder (ASD) is a complex developmental disability with two core characteristics: (a) difficulty with social interactions and communication and (b) repetitive behaviors, interests, and activities (American Psychiatric Association, 2013). Over the last 3 decades, estimates of the prevalence of ASD have increased dramatically from four to five per 10,000 children to one per 68 (Christensen et al., 2016). As a parallel to this increase, inclusion of students with disabilities, including ASD, into general education settings has become a widely accepted philosophical principle and practice in the world of education. Based on prevalence data, it is not surprising that many students with ASD are being included

in general education settings. In contrast, the great body of research on teaching students with ASD is either with preschool or primary school students, with a limited number of studies available with students above 12 years of age (Wong et al., 2015). Access to the general education curriculum is one of the integral parts of inclusive education. Educational programs of children with disabilities often are not linked

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strongly enough with the general education curriculum, and, as a result, students with disabilities may not experience enough academic gains from being included (Browder & Spooner, 2003; Browder, Spooner, Wakeman, Trela, & Baker, 2006; Spooner, Dymond, Smith, & Kennedy, 2006).

The increase in the number of students with ASD in general education settings and the legislative requirements (e.g., No Child Left Behind Act Of 2001, 2006) have created a growing need for teachers to implement Evidence-Based Practices (EBP). Teachers have reported that they do not have sufficient training to use EBPs in their classrooms (Stahmer, Collings, & Palinkas, 2005), however. Although there is evidence that suggests that teachers are supportive of inclusion, they also report concerns about their ability to meet the needs of students with disabilities (Dybdahl & Ryan, 2009; Horne & Timmons, 2009). In addition to these findings, teachers who serve in K-12 settings have reported inadequate coursework in special education and little experience in inclusive settings (Barned, Knapp, & Neuharth-Pritchett, 2011; Kearney & Durand, 1992). General education teacher training programs generally have included a single introductory special education course that may cover definitions of special needs and special education, eligibility for special education, special education categories, and legal requirements. It is evident that this content is necessary; however, it fails to focus on the specific needs (e.g., academic, behavioral) of students with ASD and prepare teachers to select and implement EBPs in accordance with the needs of the students. The need for professional development (PD) of general education teachers to ensure success for all students in inclusive settings is quite clear. At the same time, the research-to-practice gap is a well-documented issue in special education (Cook & Schirmer, 2006; Jones, 2009). This gap not only affects teachers' success but also students' outcomes (Smith, Richards-Tutor, & Cook, 2010). To overcome this issue, providing PD to teachers who work with students with ASD is needed.

PD can be delivered in different forms; however, the extant literature on PD shows that the most common form of training is a one-day in-service with limited follow-up support. Klingner, Vaughn, Hughes, and Arguelles (1999) reported that, even for teachers who had been exposed to PD, implementing a new practice was difficult due to the complexity of the practice added to other classroom responsibilities. They mentioned three possible reasons for this problem: (a) not having an in-depth understanding of a practice, (b) forgetting how to use it correctly, and (c) needing a refresher. To overcome these possible problems and ensure correct implementation of the strategies that are taught during PD, teachers should receive follow-up in real classroom settings (Yoon, Duncan, Lee, Scarloss, & Shapley, 2007). Coaching, which involves an expert providing individualized support to teachers after an initial training, is an option (Kretlow & Bartholomew, 2010). During coaching, teachers are provided specific feedback on the accuracy of their implementation of new strategies. Research about coaching shows that the rate of acquisition and accuracy of using new interventions can increase (Kohler, Crilley, Shearer, & Good, 1997; Kretlow, Cooke, & Wood, 2012; Kretlow, Wood, & Cooke, 2011; Ploessl & Rock, 2014; Scheeler, McKinnon, & Stout, 2012).

The simultaneous prompting procedure is one of several response-prompting procedures that has been successful in teaching various discrete skills (Heinrich, Collins, Knight, & Spriggs, 2016; Smith, Schuster, Collins, & Kleinert, 2011; Tekin-Iftar, 2003), as well as chained tasks of varying complexity (Collins, 2012; Colozzi, Ward, & Crotty, 2008; Hudson, Hinkson-Lee, & Collins, 2013; Tekin-Iftar, 2008), to children with various types of disability. During simultaneous prompting instructional trials (Collins, 2012), the teacher delivers an individualized controlling prompt (one that is likely to result in a correct response) immediately following the presentation of the target stimuli (e.g., task direction), and students are expected to perform a correct response. Because a controlling prompt is delivered during each instructional

trial, daily probe (test) trials are needed to assess independent acquisition of the target skill. These probe trials occur prior to the instructional trials each day to measure what the students acquired and maintained from the previous instructional session. Instruction continues in this manner (i.e., probe trials followed by training trials) until criterion is met during daily probe trials. In addition to studies on the effectiveness of the simultaneous prompting procedure delivered by special education teachers, studies have shown the effectiveness and reliable implementation of the simultaneous prompting procedure when implemented by others, including peers and paraprofessionals (Britton, Collins, Ault, & Bausch, 2015; Fetko, Collins, Hager, & Spriggs, 2013; Heinrich et al., 2016; Riesen, McDonnell, Johnson, Polychronis, & Jameson, 2003; Tekin-Iftar, 2003), siblings (Tekin & Kircaali-Iftar, 2002), parents (Batu, 2008, 2014; Tekin-Iftar, 2008), and child development specialists (Vuran & Olçay Gül, 2012). There appears to be no research, however, investigating the use of the simultaneous prompting procedure by general education teachers to teach students with ASD in inclusive classrooms.

Although research has shown the simultaneous prompting procedure to be effective in directly teaching targeted skills to students with ASD (e.g., Pennington, Stehnhoff, Gibson, & Ballou, 2012; Tekin-Iftar, 2008), teaching specifically targeted skills alone may not be enough to close the gap between the skill level of students with ASD and that of their typically developing peers. Presenting nontargeted information as instructive feedback (Collins, 2012) can be one way of closing this gap and increasing the efficiency of instruction as this can increase the amount of information that a student acquires during instructional trials. Providing instructive feedback requires that the teacher deliver additional information about a topic when praising or correcting a student's response at the end of an instructional trial. The instructive feedback may be related or unrelated to the targeted skill. This increases the efficiency of instruction because research has shown that repeated

exposure to additional nontargeted information during instruction results in acquisition of at least some of that information, thus decreasing the time that would otherwise be devoted to teaching it directly. Although researchers have conducted studies on including instructive feedback with a variety of populations, including those with intellectual disability (Fetko et al., 2013; Hudson et al., 2013; Smith et al., 2011; Tekin-Iftar, Kurt, & Acar, 2008) and attention-deficit/hyperactivity disorder (ADHD) and emotional and behavior disorders (Fetko et al., 2013; Hudson et al., 2013), they only recently have begun to use this strategy with children with ASD. At present, only four studies are available that involved children with ASD as participants (Ledford, Gast, Luscre, & Ayres, 2008; Loughrey, Betz, Majdalany, & Nicholson, 2014; Reichow & Wolery, 2011; Vladescu & Kodak, 2013).

As the research has shown that persons other than special education teachers can use the simultaneous prompting procedure reliably, the need for more research is evident in extending the implementation of the simultaneous prompting procedure to general education teachers who serve students with ASD in inclusive settings. First, there is paucity of PD research that has taught teachers to implement EBPs with accuracy to teach students with ASD in inclusive settings. Second, most research on the effectiveness of PD has not focused on students' outcomes; in other words, there appears to be a need to validate the effectiveness of PD by examining students' outcomes. Third, although there is strong evidence for teaching preschool and primary school children with ASD, the need for research on teaching academic content to adolescents with ASD still exists (Wong et al., 2015). Fourth, there appears to be no research investigating access to the general education curriculum when teaching students with ASD in inclusive settings. Last, there is no study investigating the acquisition of instructive feedback by students with ASD in inclusive settings. The present study attempted to address all of these research needs across a number of research questions.

The primary purpose of this study was to investigate the effects of PD with coaching to train general education teachers to implement a simultaneous prompting procedure when teaching academic content to students with ASD as specified in Research Questions 1 to 3:

**Research Question 1:** Will PD with coaching result in accurate use of the simultaneous prompting procedure by general education teachers in teaching academic content to students with ASD in an inclusive setting?

**Research Question 2:** Will general education teachers maintain accurate use of the simultaneous prompting procedure at 1, 2, and 4 weeks following the PD?

**Research Question 3:** Will general education teachers generalize the simultaneous prompting procedure in teaching new academic content to the same students?

In addition, a secondary purpose of this study was to investigate the effect of the simultaneous prompting procedure implemented by general educators on target students with ASD and to what extent they acquire nontargeted information presented as instructive feedback stimuli as specified in Research Questions 4 to 8:

**Research Question 4:** Will students with ASD learn academic content taught by their teachers with the simultaneous prompting procedure?

**Research Question 5:** Will students with ASD maintain the content at 1, 2, and 4 weeks following instruction?

**Research Question 6:** Will students with ASD generalize the content across persons and settings?

**Research Question 7:** Will students with ASD also acquire nontargeted information presented as instructive feedback during simultaneous prompting instruction?

**Research Question 8:** Will students with ASD maintain the nontargeted information at 1, 2, and 4 weeks following instruction?

Finally, the researchers also assessed social validity as addressed in Research Question 9:

**Research Question 9:** Do the opinions of the participating general education teachers and students with ASD support the social validity of this study?

## Method

### *Participants*

Three general education teachers and three students with ASD from a suburban school district in a southern state participated in this study. The head special education teacher at the school suggested these particular general education teachers and students be included in the study, based on the students' existing placement within the selected health classes and the intent that these students would acquire core content while attending these classes. The researchers paired the participants in teacher–student dyads (i.e., Ms. Gilliam with Canon, Ms. Roberts with Keen, Mr. Howard with John). Neither the general education teachers nor the students had a history with teaching or learning with the simultaneous prompting procedure.

**Teachers.** Three Caucasian general education teachers who were certified to teach Health and Physical Education for grades K-12 volunteered to participate in this study. Ms. Gilliam was a 25-year-old female with 2 years of teaching experience and a bachelor's degree, who was teaching under a probationary certificate. Ms. Roberts was a 45-year-old female teacher with 3 years of teaching experience and a bachelor's degree. Mr. Howard was a 46-year-old male teacher with 8.5 years of teaching experience and a bachelor's degree. The only prerequisite for participation in the study was having a student with ASD included in their classrooms and not having a background or training in special education.

In addition to the three general education teachers, a special education teacher assisted in the study. Ms. Edmonds was a 26-year-old female teacher with 5 years of teaching experience and a bachelor's degree. She was certified in adapted curriculum (the state's classification for students with low incidence

disabilities). She collected baseline and instructive feedback data during the study.

**Students.** Three seventh-grade students with ASD participated in this study. Canon was a 12-year-old African American male student with ASD. His most recent test scores were as follows: (a) *Woodcock-Johnson Test of Achievement 3* (WJ III; Woodcock, McGrew, & Mather, 2001)—Basic Reading score of 80, Reading Comprehension score of 66, Math Reasoning score of 77, Written Expression score of 69, and Broad Written Language score of 67; and (b) *Childhood Autism Rating Scale*, 2nd Edition (CARS2-ST, Schopler, Reichler, & Renner, 1988)—raw score of 38.5, indicating severe symptoms of ASD. He spent 80% of his school time in a special education-adapted curriculum classroom and the rest in general education classrooms.

Keen was a 12-year-6-month-old Caucasian male student with ASD. His most recent test scores were as follows: (a) WJ III (Woodcock et al., 2001)—Letter Word Identification score of 107, Passage Comprehension score of 93, Reading Fluency score of 97, Word Attack score of 96, Reading Vocabulary score of 99, Math Calculation score of 93, Math Fluency score of 71, Applied Problems score of 89, Quantitative Concepts score of 103, Spelling score of 107, Writing Samples score of 87, and Writing Fluency score of 89; and (b) Gilliam Autism Disorders Score (GADS, Gilliam, 2001)—score of 72, indicating borderline behaviors associated with Asperger syndrome. Keen's special education and general education classroom enrollment was the same as Canon's.

John was a 13-year-old Caucasian male student with autism. He was last tested in pre-school and was scheduled for updated assessment in the following year. There were no achievement scores on file; however, he had a score of 87 on the GARS (Gilliam, 1995), indicating that he was very likely to have autism. He spent half of his school time in a special education classroom and the remainder in general education classrooms.

The prerequisite skills for the students in this study were the ability to (a) attend to

visual and/or audio stimuli for 10 minutes, (b) follow directions (4-5 words of a sentence), and (c) comprehend the content of sentences. The first researcher interviewed the special education teacher regarding these skills; then, two of the researchers observed these students in their Health Education classrooms to confirm that they had these skills prior to intervention.

**Research staff.** Two of the researchers conducted PD for the general education teachers in this study. The first researcher was a visiting international scholar who had a PhD in special education, held the rank of full professor at a university in Turkey, and had 25 years of experience as a researcher. The second researcher had an EdD in special education, was a full professor and department chair at a local university, and had more than 25 years of experience as a researcher. Two doctoral students (one in Special Education and one in Leadership) from a local university and one visiting international scholar (visiting assistant professor from a university in Turkey) collected reliability data on the PD and the performance of the participating teachers and students.

## Settings and Materials

**Professional development.** The PD sessions took place across the three classrooms of the participating general education teachers. The classrooms contained desks/tables and chairs for the students and teacher, bookshelves, and other classroom materials. Two researchers sat at a group of desks with each teacher as they went through the PD protocol during a block of time devoted to planning. The only other person in the room was a reliability data collector.

PD materials included prepared PowerPoint slides that provided a foundation for systematic instruction, an overview of the simultaneous prompting procedure, and an explanation of data collection. In addition, the teachers had access to hard copies of the PowerPoint slides, guided notes, and samples of data sheets.

*Baseline and instructional sessions.* All instructional sessions took place in the same classrooms as PD sessions during Health class. Each student sat in his usual place in the classroom, and the teacher approached him during the class block period to conduct face-to-face sessions. In addition, the special education teacher collected data for several sessions (i.e., baseline and instructive feedback probe) in the special education classroom. The first researcher also collected generalization data in the special education classroom. The special education classroom was set up in the same manner as the other classrooms, with students and paraprofessionals working at stations throughout the room. The special education teacher sat opposite the student during these sessions. During all experimental sessions, the teachers had data sheets to record student responses and a list of the target and instructive feedback stimuli to be taught in the study.

Baseline and intervention conditions consisted of two sessions per day per teacher. This was due to the use of a block schedule in the middle school that resulted in class periods (or blocks) of 90 minutes each, with classes alternating across “A days” and “B days.” This means the teachers taught the Health Education class for an extended period of time every other day (two times per week alternating with three times per week). Thus, the researchers observed the teachers for one session of instruction during the first 15 minutes and a second session of instruction during the final 15 minutes of the block, giving the teachers and students time to engage in other class activities between instructional sessions (e.g., independent seatwork, small group discussions/activities, large group lectures). They chose to conduct two sessions per day within a block to get in four to six sessions per week because they had a limited amount of time in which to conduct the study prior to the end of the school year due to the extended time it took to gather all necessary permissions. It is reasonable for teachers in a block schedule to have time to implement instructional sessions on a topic more than once within a 90-minute block of time.

## *Experimental Design*

A multiple baseline design across teacher–student dyads documented the effectiveness of PD with coaching to train the general education teachers to implement the simultaneous prompting procedure in teaching academic skills to students with ASD in inclusive settings and the effects of simultaneous prompting on students’ outcomes (Gast, Lloyd, & Ledford, 2014; Tekin-Iftar, 2012). Experimental control was established when the dependent variable increased only after the independent variable was implemented in a time-lagged manner.

## *Dependent and Independent Variables*

There were two dependent variables in the study: (a) the general education teacher’s ability to use the simultaneous prompting procedure accurately to teach academic content to a student with ASD and (b) acquisition of the academic target behaviors from Health Education class by each student with ASD. The researchers recorded the teachers’ instructional behaviors during each experimental session based on the task analyses they developed for the baseline and intervention sessions as shown in Table 1. The criterion for teachers was at least 90% accuracy in using the simultaneous prompting procedure across three consecutive instructional sessions.

The researchers worked with the general education teachers to identify three target behaviors and three nontargeted stimuli (one per each target behavior) for each student. They selected the target behaviors from the core content in Personal Consumer Health units of the Health Education and Science class that the teachers would be teaching. The researchers requested the Individualized Education Programs (IEP) of the students from the special education teachers and the essential standards and clarifying objectives of each class from the participating general education teachers. One of the IEP objectives for all students was to answer inferential questions (why, how) with accuracy after reading or being exposed to information.

**Table 1.** Teacher Behaviors Recorded During Experimental Sessions.

| Baseline, daily probe, maintenance, and generalization sessions | Daily instructional (prompting) sessions       |
|-----------------------------------------------------------------|------------------------------------------------|
| Delivering attentional cue                                      | Delivering attentional cue                     |
| Delivering task direction                                       | Delivering task direction                      |
| Waiting the 4-second response interval                          | Presenting prompt                              |
| Delivering appropriate behavioral consequences                  | Waiting the 4-second response interval         |
| Collecting data for the students' behaviors                     | Delivering appropriate behavioral consequences |
|                                                                 | Providing instructive feedback stimulus        |
|                                                                 | Collecting data for the students' behaviors    |

The researchers identified questions from the unit associated with this objective. The essential standards, clarifying objectives, and target behaviors for each student are presented in Table 2. Although all three teachers in this study taught identical units of study at the same time, the focus of instruction for each student varied according to the unit of instruction the teacher would be covering at the time that intervention occurred for each dyad. The criterion for acquisition was 100% correct responding on target behaviors during daily probe sessions.

There also were two independent variables in the study: (a) PD with coaching sessions to prepare general education teachers to use the simultaneous prompting procedure with instructive feedback and (b) the simultaneous prompting procedure with instructive feedback to teach academic content to students with ASD. The effects of the first independent variable were assessed by teachers' behaviors, and the effects of the second independent variable were assessed by students' behaviors.

*General Procedure*

*Baseline sessions.* Baseline condition consisted of two different types of sessions. The first

type was (a) baseline sessions for the teachers, and the second type was (b) baseline sessions for the students with ASD.

*Baseline sessions for teachers.* During baseline sessions for the teachers, the researchers assessed their ability to deliver instruction using the steps of the simultaneous prompting procedure (i.e., daily probe trials followed by instructional trials) to teach content to their students with ASD. A researcher provided a task direction (e.g., “Ms. Gilliam, please teach Canon facts from your unit.”). The researchers then collected the data on the behaviors presented in Table 1. There were three types of possible responses during baseline sessions: (a) correct response, (b) incorrect response, and (c) no response. They defined correct responses as performance of any of the steps of simultaneous prompting instruction and incorrect and no responses as either not performing the steps of simultaneous prompting instruction or incorrectly performing them. In both daily sessions, a researcher collected data using a plus (+) to indicate that the teacher delivered a step correctly and a minus (–) to indicate that the teacher delivered a step incorrectly or failed to perform a step. A researcher thanked the teachers at the end of each session. Then, the researchers calculated the percentage of correct responses out of the number of possible responses to plot the data on the graph. The researchers set the number of possible responses per session at nine trials per step (e.g., nine opportunities to provide an attentional cue, a task direction, a prompt, or a consequence, as shown in Table 1).

*Baseline sessions for students.* Ms. Edmonds, the special education teacher, conducted baseline sessions with the students to assess their pre-intervention performance on target behaviors and nontargeted information. Prior to these sessions, the researchers provided her with written directions on how to conduct these sessions, a list of the target behaviors for each student (including the task directions and correct responses), the nontargeted information paired with each response, and data collection forms. The researchers defined correct

**Table 2.** Target Behaviors, Expected Responses, and Instructive Feedback Stimuli for the Students.

| Students | Essential standard                                                                                                                                                      | Essential standard                                                                                                                                                                                                                                           | Essential standard                                                                                                                                                                                                                                                             |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|          | Understand wellness, disease prevention, and recognition of symptoms.<br>Clarifying Objective<br>Explain health and academic consequences of inadequate rest and sleep. | Analyze necessary steps to prevent and respond to unintentional injury.<br>Clarifying Objective<br>Demonstrate techniques for basic first aid and procedures for treating injuries and emergencies.                                                          | Analyze necessary steps to prevent and respond to unintentional injury.<br>Clarifying Objectives<br>Design plans to reduce the risk of fire-related injuries at home, in school, and in the community at large.<br>Create a plan to reduce the risk of water-related injuries. |
|          | Target behaviors                                                                                                                                                        | Expected responses                                                                                                                                                                                                                                           | Instructive feedback stimuli                                                                                                                                                                                                                                                   |
| Canon    | 1. Explains why sleeping is important.<br>2. Explains the three side effects of less sleeping.<br>3. Explains how much sleep needs an adolescent each night.            | 1. Sleep is important for good health, good mood, and safety.<br>2. Increased blood pressure, weight gain, headaches.<br>3. Most adolescents need between 8½ to 10 hours of sleep each night.                                                                | 1. Sleep enhances our attention during the daytime.<br>2. Less sleep makes us sick easily.<br>3. Children need more sleep than adults since they are growing up.                                                                                                               |
| Keen     | 1. Definition of the first aid.<br>2. Tells the ways of preventing injuries.<br>3. Explains the three symptoms of the “sunstroke.”                                      | 1. It is simple actions you can take for the victim before medical help arrives.<br>2. Wearing a seatbelt; using a helmet and other protective gear; not using alcohol or other drugs.<br>3. High body temperature; hot, red, dry skin; absence of sweating. | 1. Using first aid can reduce deaths.<br>2. Wearing a life jacket keeps a child afloat the water.<br>3. High temperature can be reduced by wrapping the child in cool, wet sheets.                                                                                             |
| John     | 1. Lists the components of fire.<br>2. Explains fire and burn hazards found in the home.<br>3. Explain causes of drowning.                                              | 1. Fuel, air, and lighter.<br>2. No smoke detector; trash stored near heating unit; locating things that can burn too close to stove and fireplace.<br>3. Diving in shallow water; going beyond the swimming ability; getting tired.                         | 1. Playing with lighters and matches can cause a fire.<br>2. We should not block the exits, otherwise in case of emergency we cannot go out easily.<br>3. Wearing a life jacket keeps a child afloat the water.                                                                |

responses during baseline sessions as answering the question correctly within 4 seconds after the task direction was presented, and they defined incorrect responses as answering the question incorrectly within 4 seconds after the task direction was presented. In addition, they defined no responses as not responding within 4 seconds after the task direction was presented. The researchers presented the target behaviors on the data collection sheet in a random order for each session and asked Ms. Edmonds to follow this order. Each baseline session consisted of nine trials (three trials per target behavior). During baseline sessions, Ms. Edmonds delivered an attentional cue (e.g., “Canon, are you ready?”); after receiving an affirmative response from the student, she delivered the task direction (e.g., “Canon, tell me why sleeping is important.”). She then waited 4 seconds for the student’s response. Correct responses resulted in verbal reinforcement (i.e., praise), and she ignored incorrect or no responses before providing the next trial following an intertrial interval of 4 seconds. Ms. Edmonds collected data using a plus (+) to indicate that the student responded correctly within 4 seconds and a minus (–) to indicate that the student responded incorrectly or failed to respond within 4 seconds. The researchers then calculated the percentage of correct responses and plotted them on the graph.

### *Instructional Sessions*

**PD sessions.** After baseline condition, two researchers provided PD on the simultaneous prompting procedure for the three general education teachers individually in a time-lagged manner. PD consisted of providing background on systematic instruction, providing a description of the simultaneous prompting procedure, modeling (video and live), providing guided practice, and providing feedback. The researchers presented this information through a PowerPoint presentation, explaining the basic instructional concepts of systematic instruction (i.e., foundation in Applied Behavior Analysis for presenting stimulus, response, and consequence), the

simultaneous prompting procedure (i.e., presentation and fading of prompt likely to result in correct response), delivery of instructive feedback (i.e., nontargeted information presented in consequence to increase learning), and data collection (i.e., recording of daily probe data to determine when criterion is reached). They then showed video samples (i.e., teacher-made instructional sessions of simultaneous prompting procedure being used to teach object identification to student with disabilities) of how to conduct probe and training trials. The researchers talked about the steps of the simultaneous prompting procedure (i.e., attentional cue, task direction, probe trials, prompting trials, consequences) as the teachers watched the videos. The researchers then modeled how to deliver probe and training trials on the content (i.e., health facts) to be taught in the study. One of the researchers role-played as a teacher and the other as a student. The researchers talked about the teaching behaviors that they modeled, and then asked the teachers to deliver the simultaneous prompting procedure with instructive feedback, taking into consideration the information provided to them earlier. One of the researchers acted as a student for each teacher. The researchers provided feedback to the teachers on their performance until they reached 100% accuracy in implementing the simultaneous prompting procedure. Each PD session lasted between 45 to 50 minutes across teachers.

**Simultaneous prompting sessions.** Following PD, the general education teachers implemented the simultaneous prompting procedure with the included students with ASD during a 90-minute class block for two instructional sessions per block 2 or 3 days per week, based on the schedule of A and B days. During each instructional session using the simultaneous prompting procedure, the teacher first delivered nine probe trials and then nine training trials (three trials for each target behavior). The teachers only conducted training trials (no probe trials) on the session of the first day of intervention; they conducted probe trials prior to training trials during all

subsequent sessions. The teachers used verbal models as the controlling prompts for all students throughout intervention based on teachers' opinions and researchers' observations that all students were imitative and capable of verbal expressive responses.

The teachers conducted daily probe sessions to assess acquisition of the target behaviors as follows. The teacher first secured the student's attention (e.g., "Canon, today I will ask some questions. If you know the answer, please tell me. Are you ready?") and verbally reinforced his affirmative response (e.g., "Great, let's start"). The teacher then delivered the task direction (e.g., "Why is sleep so important?"). The teacher waited 4 seconds for a response; correct responses resulted in verbal reinforcement (e.g., "Great, you did it"), and the teacher thanked the student for trying or attending following incorrect responses or no responses. The teachers collected data on the student's responses, and the researchers plotted the student's data on the graphs. The criterion was 100% correct responses for all students for at least three consecutive probe sessions. In addition to collecting student response data, a researcher also collected data on the teacher behaviors, using the same data collection procedure as used during baseline sessions for the teachers (see left column in Table 1).

After probe trials, the teacher conducted simultaneous prompting training trials to teach the target behaviors to the students. The teacher secured the student's attention (e.g., "Canon, today I will ask some questions. This time, I will tell the answer. I want you to repeat my answer. Are you ready?") and verbally reinforced his affirmative response (e.g., "Great, let's start.") before delivering the task direction (e.g., "Why is sleep so important?") and immediately stating the controlling prompt (e.g., "Sleep is important for good health, good mood, and safety."). The teacher then waited 4 seconds for a response. A correct response resulted in verbal reinforcement and presentation of the corresponding nontargeted information as instructive feedback (e.g., "Great, you did it! Sleep also enhances our attention during the daytime."); following

an incorrect or no response, the teacher thanked the student and provided instructive feedback (e.g., "Thank you! Sleep enhances our attention during the daytime."). The teachers collected data on the student's behaviors during these sessions as well, although prompted responses during training trials did not count toward criterion and were not graphed. They used the same data collection procedure as in the daily probe trials. During training trials, the researcher also collected data on the teacher behaviors (see right column in Table 1). She used the same data collection procedure as during baseline sessions for the teachers. Criterion was at least 90% correct responses across three consecutive sessions for all teachers. At the end of two daily probe and simultaneous prompting training sessions each day, the researcher provided coaching to the teachers (e.g., "You conducted the sessions perfectly. It would be much better, however, to secure the student's attention by saying his name at the beginning of each trial.").

### *Instructive Feedback Probe Sessions*

Ms. Edmonds assessed the acquisition of nontargeted information presented as instructive feedback in a pretest–posttest manner prior to and following intervention. She conducted these sessions in the same manner as baseline sessions. There were nine trials (three trials per nontargeted response) in a session. The teacher secured the student's attention (e.g., "Canon, today, I will ask some questions. If you know the answers, please tell me. Are you ready?"), verbally reinforced his affirmative response (e.g., "Great, let's start."), and delivered the task direction (e.g., "How does sleep help us during the daytime?"). The teacher waited 4 seconds for the response; a correct response resulted in verbal reinforcement (e.g., "Great, you did it!"), and the teacher thanked the student following incorrect or no responses.

### *Maintenance*

*Maintenance sessions for the teachers.* For Ms. Gilliam and Mr. Howard, maintenance sessions

occurred at 1, 2, and 4 weeks following intervention and, for Ms. Roberts, at 1 and 2 weeks. Due to the end of school year, there was no time left to conduct the third maintenance sessions with Ms. Roberts. Teachers conducted maintenance sessions in the same manner as simultaneous prompting instruction with the exception that they only conducted only one daily probe and one simultaneous prompting training session. This allowed the researchers to determine maintenance of the teachers' ability to conduct both probe and training trials in the simultaneous prompting procedure.

*Maintenance sessions for the students.* The researchers collected maintenance data on the target behaviors for the students when they were conducting maintenance probe sessions for the general education teachers. Ms. Edmonds also assessed maintenance of the instructive feedback stimuli acquired in the study. She conducted these sessions 1, 2, and 4 weeks after the intervention.

### **Generalization Sessions**

*Generalization sessions for the teachers.* The researchers assessed the ability of the teachers in this study to generalize the simultaneous prompting procedure across content in a pretest–posttest manner. A researcher asked the general education teachers to select three target behaviors from a different unit and conduct one daily probe and one simultaneous prompting training session. There were nine trials in these sessions as well. Table 3 displays the target behaviors and instructive feedback stimuli that the teachers developed for generalization.

*Generalization sessions for the students.* The researchers also assessed the ability of the target students in this study to generalize the core content taught in this study across persons and settings. The first author conducted one generalization session with each student in the special education classroom in a pretest–posttest manner. There were nine trials in these sessions. She conducted these sessions just like baseline sessions, using the same target information taught to them in the study.

### **Interobserver Agreement and Treatment Integrity**

Three reliability observers collected reliability data for at least 33% of each experimental condition with the teachers and students. The researchers taught the observers how to collect reliability data during a practice session in which they provided instruction on and role-played the simultaneous prompting procedure and explained and modeled data collection. This session continued until the reliability observers and the researchers reached 90% agreement. The researchers calculated interobserver agreement (IOA) data using a point-by-point method (i.e., number of correct responses/number of correct plus incorrect responses  $\times$  100). IOA analyses for the teachers and students are presented in Table 4.

Treatment integrity for the simultaneous prompting procedure was the dependent variable for the general education teachers in this study. An observer collected reliability data during 67% of PD sessions, and treatment integrity for conducting the PD was 100% across the teachers based on the following formula: observed teacher behaviors/planned teacher behaviors  $\times$  100 (Billingsley, White, & Munson, 1980). The special education teacher conducted baseline sessions. The researchers collected reliability data for at least 50% of these sessions. The special education teacher conducted these sessions with 100% treatment integrity across the students.

### **Social Validity**

One of the researchers (first author) interviewed the teachers and students with ASD about the social validity of the goals, procedures, and outcomes of the study. She asked a total of six and seven questions, respectively, of each participating teacher and student. The teacher interview included questions about whether they liked providing simultaneous prompting instruction, how they viewed the quality and content of the PD provided to them, what the three most-liked and least-liked parts of the study were, and whether they would use simultaneous prompting instruction

**Table 3.** Teachers Developed Target Behaviors and Instructive Feedback Stimuli for Generalization.

| Students | Target behaviors developed for generalization                                                                                                                                                                                                                                                                                                                                                                                  | Instructive feedback stimuli developed for generalization                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Canon    | <ol style="list-style-type: none"><li>1. Define peer pressure (PP)</li><li>2. Give the three examples for peer pressure.</li><li>3. Tell negative and positive examples of PP.</li></ol> <ol style="list-style-type: none"><li>1. What is the difference between over-the-counter and prescription medicine?</li><li>2. What are the stages of addiction?</li><li>3. What are the risks associated with drug misuse?</li></ol> | <ol style="list-style-type: none"><li>1. PP can be negative or positive.</li><li>2. PP may have both positive and negative effects.</li><li>3. If you feel yourself under PP, it is wise to talk to your teacher.</li></ol> <ol style="list-style-type: none"><li>1. It is always a good idea to keep prescription drugs in clearly marked bottles so you can know what you are taking.</li><li>2. You can never get addicted to a drug if you never try it the first time.</li><li>3. Taking drugs that have not been prescribed can be harmful.</li></ol> |
| John     | <ol style="list-style-type: none"><li>1. What is a prescription drug?</li><li>2. Name three types of drugs.</li><li>3. Name the four stages of Dependency.</li></ol>                                                                                                                                                                                                                                                           | <ol style="list-style-type: none"><li>1. More teens are abusing prescription drugs today than ever before.</li><li>2. Marijuana is considered a depressant and a hallucinogen.</li><li>3. Narcotics Anonymous is a place for people to go for help when addicted.</li></ol>                                                                                                                                                                                                                                                                                 |

**Table 4.** Reliability Data for Teachers and Students.

| Teachers    | BL       | DP       | Ins.     | Main.   | Gen.     | Students | BL     | DP     | Ins.   | IF P.  | Main. | Gen.  |
|-------------|----------|----------|----------|---------|----------|----------|--------|--------|--------|--------|-------|-------|
| Ms. Gilliam | 100%     | 99.5%    | 98.5%    | 100%    | 100%     | Canon    | 100%   | 100%   | 100%   | 100%   | 100%  | 100%  |
|             | 100%     | 98%-100% | 96%-100% | 100%    | 100%     |          | 100%   | 100%   | 100%   | 100%   | 100%  | 100%  |
|             | (100%)   | (67%)    | (67%)    | (33%)   | (50%)    |          | (100%) | (67%)  | (67%)  | (100%) | (33%) | (50%) |
| Ms. Roberts | 97%      | 98%      | 95.4%    | 94%     | 98%      | Keen     | 100%   | 100%   | 100%   | 100%   | 100%  | 100%  |
|             | 91%-100% | 93%-100% | 91%-100% | 86%-98% | 96%-100% |          | 100%   | 100%   | 100%   | 100%   | 100%  | 100%  |
|             | (50%)    | (71%)    | (71%)    | (100%)  | (50%)    |          | (50%)  | (71%)  | (67%)  | (67%)  | (67%) | (50%) |
| Mr. Howard  | 93%      | 94.5%    | 99%      | 100%    | 100%     | John     | 100%   | 100%   | 100%   | 100%   | 100%  | 100%  |
|             | 87%-100% | 89%-100% | 98%-100% | 100%    | 100%     |          | 100%   | 100%   | 100%   | 100%   | 100%  | 100%  |
|             | (38%)    | (50%)    | (50%)    | (33%)   | (50%)    |          | (67%)  | (100%) | (100%) | (67%)  | (33%) | (33%) |

Note. Each cell includes mean IOA (first row), Range of IOA (second row), and Percentage of Sessions Data Collected (shown in parentheses in third row) across teachers and students. BL = baseline; DP = daily probe; Ins = instruction; Main. = maintenance; Gen. = generalization; IF P. = instructive feedback probe; IOA = interobserver agreement.

in the future with their students. The student interview included questions about whether they liked the way their teachers taught them, what they thought about their target behaviors, whether they would use the information that they got from the study in their daily life, whether they enjoyed the study, whether they would like to learn new facts this way, and the three most-liked and least-liked parts of the study. (Due to space constraints, the social validity questions are not listed here but are available from the authors on request.) The researcher took notes while they were answering the questions. She then descriptively analyzed the social validity data.

## Results

### *Effectiveness Findings*

*Effectiveness of PD on general education teachers' use of the simultaneous prompting procedure.* In evaluating the effectiveness of PD to prepare general education teachers to use the simultaneous prompting procedure, the researchers plotted the treatment integrity data as the dependent variable. Figure 1 displays the accurate use of the simultaneous prompting procedure during baseline, intervention, maintenance, and generalization sessions across the participating teachers (i.e., Tiers 1, 3, and 5 show general education teacher data) and the percentage of correct responses during baseline, intervention, maintenance, and generalization sessions across the participating students (i.e., Tiers 2, 4, and 6 show student data).

Ms. Gilliam used the steps of the simultaneous prompting procedure during baseline condition with a mean of 9.6% accuracy (range = 2%-27%). Following PD, she reached criterion on using the simultaneous prompting procedure in three sessions and maintained with 100% accuracy. She did not perform any correct responses during the generalization pretest and demonstrated 100% accuracy during the posttest.

Ms. Roberts used the steps of the simultaneous prompting procedure during baseline condition with a mean of 7.3% accuracy

(range = 0%-13%). Following PD, she reached criterion on using the simultaneous prompting procedure in five sessions and maintained with a mean of 96.5% accuracy (range = 93%-100%). She did not perform any correct responses during the generalization pretest and demonstrated 100% accuracy during the posttest.

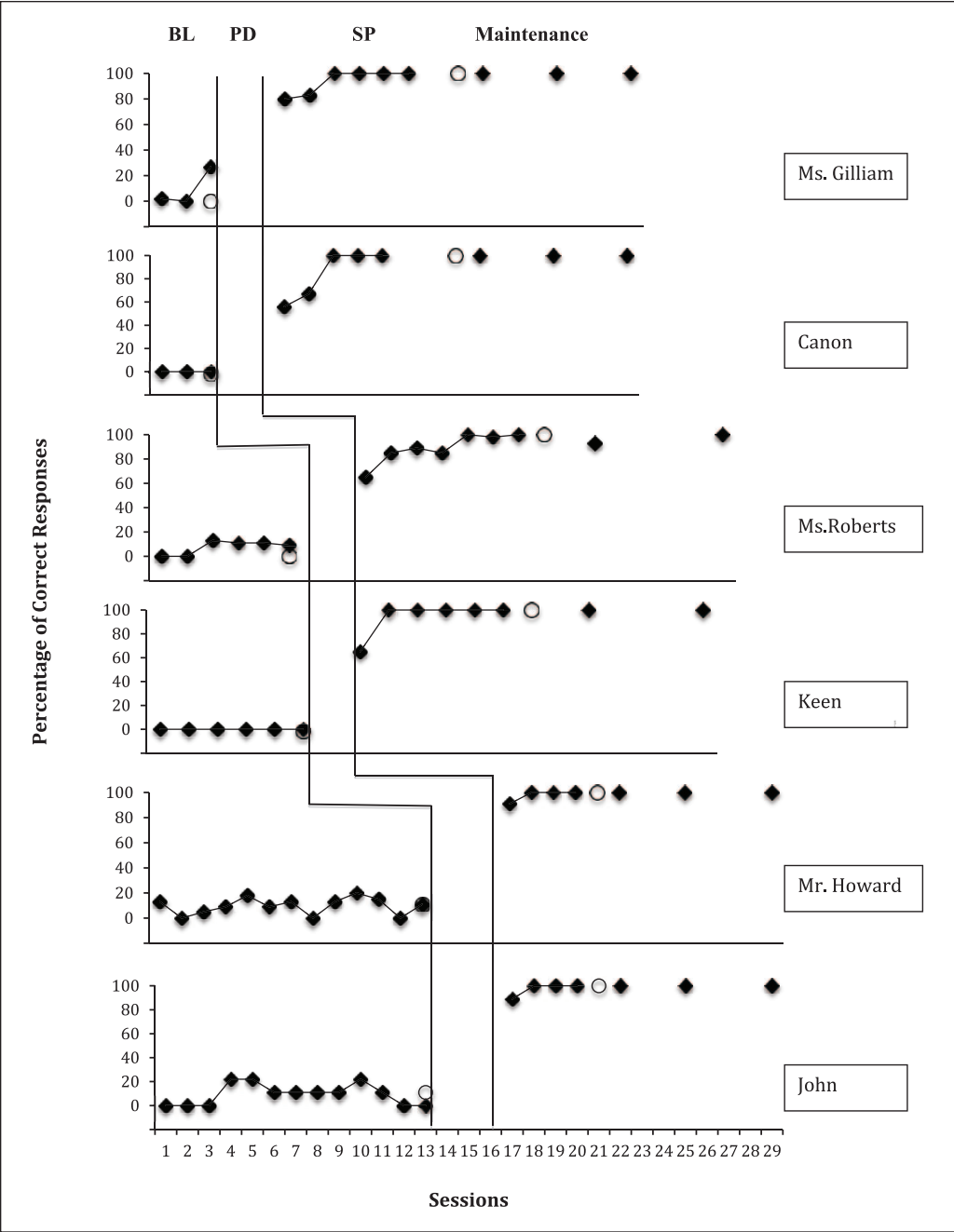
Mr. Howard used the steps of the simultaneous prompting procedure during baseline condition with a mean of 9.7% accuracy (range = 0%-20%). Following PD, he reached criterion in two sessions and maintained with 100% accuracy. He did not perform any correct responses during the generalization pretest session and demonstrated 100% accuracy during the posttest.

*Effectiveness of the simultaneous prompting procedure on students' target behaviors.* In evaluating the effectiveness of the simultaneous prompting procedure on the students' acquisition of their target behaviors, the researchers plotted the percentages of correct responses in daily probe sessions during the simultaneous prompting instruction condition.

As can be seen in Figure 1, Canon did not make any correct responses during baseline sessions. The trend and level of his data changed immediately after he was exposed to simultaneous prompting instruction. He reached criterion in three sessions and maintained his target behaviors with 100% accuracy. He did not perform any correct responses during the generalization pretest across persons and settings but had 100% accuracy during the posttest.

Keen demonstrated his target responses during baseline condition with a mean of 3.7% accuracy (range = 0%-22%). The trend and level of his data changed immediately after he was exposed to simultaneous prompting instruction. He reached criterion in two sessions and maintained with 100% accuracy. He did not perform any correct responses during the generalization pretest across persons and settings but had 100% accuracy during the posttest.

John demonstrated his target responses during baseline sessions with a mean of 9.3%



**Figure 1.** The percentage of correct responses of teachers and students during baseline, intervention, and maintenance sessions.

accuracy (range = 0%-22%). The trend and level of his data had changed immediately after he was exposed to simultaneous prompting instruction. He reached criterion in two sessions

and maintained with 100% accuracy. He did not perform any correct responses during the generalization pretest across persons and settings but had 100% accuracy during the posttest.

### ***Instructive Feedback Findings***

The researchers analyzed acquisition and maintenance of instructive feedback stimuli by calculating the percentage of correct responses during pretest–posttest instructive feedback probe sessions and maintenance sessions. Canon did not perform any correct responses during the pretest session and performed 67% correct responses during the posttest session. He had 89%, 67%, and 100% ( $M = 85.3\%$ ) accuracy across the three maintenance probe sessions, respectively. Keen and John also did not perform any correct responses during the pretest probe sessions. They both performed with 100% accuracy during posttest sessions and maintenance condition.

### ***Social Validity Findings***

**Teachers' opinions.** All three general education teachers reported that they liked teaching their students with ASD with the simultaneous prompting procedure. They stated that the professional development was helpful, informative, and useful. One teacher, Ms. Gilliam, indicated that the role-playing part of the professional development was the most useful, stating, "If we would not have role-playing, I would not use it correctly to teach my student." They stated that the three most liked parts of the study were (a) having the PD and coaching during the study on a one-on-one basis, (b) gaining more experience with the simultaneous prompting procedure and the nature of the simultaneous prompting procedure (probing the student first and then prompting), and (c) narrowing the subject questions (i.e., focusing only on the target student during trials). Ms. Gilliam and Mr. Howard explained what they most disliked about the study was "taking away the student from the rest of the classroom," and Ms. Roberts reported "having to leave the class." (See the following discussion for an explanation of this result.) Regarding the intervention, they reported that simultaneous prompting procedure is easy to use and providing prompting during instruction is effective and a positive

way to build a quality interaction with the students. All three teachers stated that they definitely would use the simultaneous prompting procedure to teach other students in the future.

**Students' opinions.** All three students reported that they liked the way their teachers taught them, they liked the facts their teachers taught them during the study, and these facts were important to learn. They also stated that they would use the information they learned during the study in their daily lives. All students expressed that learning this way was fun, and they enjoyed it. They indicated that they would like to learn new things this way. When they were asked about the three most liked parts of the study, Canon stated that, "I learned quickly and she works with me more," Keen expressed "praise and prompting," and John said, "I like one-on-one thing, I like how he read it and I repeat it, being probed first." All students explained that there was nothing that they did not like during the study.

## **Discussion**

The researchers designed this study to investigate the effectiveness of (a) PD with coaching to prepare general education teachers to implement the simultaneous prompting procedure in teaching academic skills from the general education curriculum to middle school students with ASD and (b) the simultaneous prompting procedure in teaching the academic skills to students with ASD. They also examined maintenance and generalization of both instruction and acquisition of instructive feedback stimuli by the students with ASD. Last, they assessed social validity of both interventions (PD and the simultaneous prompting procedure) in the study. The PD with coaching was effective in preparing general education teachers to use the simultaneous prompting procedure accurately, and the students acquired the targeted academic behaviors from their Health Education class. Moreover, both the teachers and students maintained their acquired skills over time. The teachers also generalized the use of the simultaneous prompting procedure in teaching new objectives to their students, and the students

generalized the acquired academic skills across persons. The students also acquired at least 85% of the instructive feedback stimuli. Finally, social validity findings of the study were encouraging because the general education teachers planned to use the simultaneous prompting procedure in the future with all students in the class as it was effective. Because exposure to the simultaneous prompting procedure during PD was effective and resulted in maintenance and generalization, this provides the groundwork for preparing general education teachers who currently serve students with ASD to use other EBPs.

There are several points worth discussing regarding the PD with coaching process used in the study. First, the teachers only needed limited coaching during implementation. The majority of the feedback was about the need to deliver an attentional cue to the students at the beginning of each trial. In addition, they needed reminders about delivering instructive feedback stimuli (e.g., "Please do not forget delivering instructive feedback after your student response."). One of the researchers delivered coaching at the end of every two sessions (i.e., once per day). This researcher delivered feedback once on the attention cue to Ms. Gilliam and Mr. Howard and twice to Ms. Roberts. Ms. Roberts also needed feedback about delivering instructive feedback stimuli once as well. In addition to these occurrences of feedback, the researcher always provided positive feedback about how well the teachers implemented the procedure at the end of every two sessions. Considering the fact that the teachers were able to implement the simultaneous prompting procedure with a high degree of accuracy in their classrooms after having only 45 minutes of training, these findings show that providing PD on an ongoing basis to general education teachers is a valuable option for achieving quality teaching in inclusive settings. It is possible that the special education teacher could be the one to deliver PD to other teachers in the school. The social validity component of the study also validated these findings because all of the general education teachers found the PD process to be informative and useful.

Some of the teacher comments reported from the social validity survey, however, can be misleading. During this study, the teachers did not literally take "the student from the rest of the classroom" or have "to leave the class" with the target student, as suggested in their comments. Instead, the teachers chose to take a break in the large class lecture for the few minutes that it took to walk to the target student's desk within the same classroom and deliver direct explicit instruction (i.e., prompting trials in which the teacher stated core content while the student listened and then repeated it). Thus, "leaving the class" meant walking across the room to the target student seated at a separate table within a few feet of classmates. This was a choice that each of the teachers made although the researchers suggested that each teacher seat the target student within the group and embed individual instructional (i.e., prompting) trials within the context of the lesson they were teaching. Encouraging teachers to embed instruction in this manner is more inclusive and should be the focus of future studies.

Another discussion point is the teachers' delivery format of probe and training trials in the inclusive classroom. During PD, the researchers suggested that they deliver massed trials (three trials in a row) in a distributed format (three distributions of three trials in a session). They indicated that chunking trials like this would be much easier and appropriate in their classrooms as they circulated around the room working with all students. Each of the general education teachers, however, chose to present all trials in a massed trial format (i.e., nine consecutive trials) throughout the study. In addition, they reported in the social validity questions that they did not feel comfortable working with the students separately within the classroom. The reason that teachers may want to deliver instruction in a massed trial format rather than a distributed format is that it is easier and more convenient to deliver all trials at one time. Using a distributed format, however, is a more inclusive model of instruction. The fact that the researchers provided a model of massed trial format during modeling (both in video and role-playing) might have

caused the teachers to use massed trials even though the researchers explained how to use a distributed format during the PD and recommended the application of a distributed trial format. Future researchers may consider providing modeling for the strategies in a real classroom using both massed and distributed formats or using technology to show how to deliver different trial formats.

The simultaneous prompting procedure delivered by general education teachers was effective in teaching academic skills to children with ASD. These results are consistent with previous studies (e.g., Pennington, Stehnhoff, Gibson, & Ballou, 2012; Tekin-Iftar, 2008) and add to the current literature. The majority of previous studies, however, were conducted with either preschool or primary school students with ASD. The findings of this study contribute to the literature because there is a scarcity of research on using the simultaneous prompting procedure with middle and high school students with ASD. The students not only acquired their academic skills but also maintained them over time and generalized them across persons and settings.

It also is important to note that, although not systematically, the investigators evaluated the comprehension of the acquired target behaviors by asking several questions of the students after the study ended. For example, one of the researchers asked, "Please tell me—if you get sunstroke, what would you do?" and the student response was, "I would get a wet, cold blanket and put it over me." This indicates that the student did not simply memorize the response but also comprehended the meaning.

In addition to acquiring their target behaviors, the students also acquired the majority of their instructive feedback stimuli. When the gap between the students with ASD and their typically developing peers are considered, these findings have special importance as adding additional information during instruction began to close the gap between the students and their peers. Previous studies investigating the effects of providing instructive feedback to students with ASD have had promising outcomes, but all of the participants in these stud-

ies were between 5 and 8 years old (Ledford et al., 2008; Loughrey et al., 2014; Reichow & Wolery, 2011; Vladescu & Kodak, 2013), and instructive feedback was presented in segregated settings. The findings of this study provide information about the impact of providing instructive feedback to middle school-age students in inclusive settings. To the knowledge of authors, this is the only study with this age group with ASD; therefore, researchers may consider designing studies to replicate these effects.

There are some points worthy of discussion about the students' outcomes. Teaching students with ASD is one of the most challenging practices in inclusive classrooms, as was observed in this study. After providing the PD, Ms. Gilliam started to deliver the simultaneous prompting procedure immediately while baseline data collection was in progress with the remaining teachers. The other teachers started to provide instruction on the target behaviors of the participating students to their entire classes although they had not had the PD. In spite of this, the baseline data showed that the participating students still did not learn or make any correct responses on their target behaviors during baseline sessions, even though they had been exposed to classroom instruction on their target behaviors. As soon as the teachers started to deliver instruction with the simultaneous prompting procedure, there was an immediate improvement in the students' target behaviors, and they met criteria in a minimal number of sessions. In the second teacher–student dyad, Keen learned his target behaviors before his teacher, Ms. Roberts, achieved criterion on using the procedure (see third and fourth tiers in Figure 1). These findings are encouraging and confirm the importance of professional development in the school and providing instruction with the simultaneous prompting procedure. Thus, the researchers recommend that future studies be conducted to use professional development to teach other response-prompting procedures to general education teachers who have students with ASD, or other types of disabilities, included in their classrooms.

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## References

- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: American Psychiatric Publishing.
- Barned, N. E., Knapp, N. F., & Neuharth-Pritchett, S. (2011). Knowledge and attitudes of early childhood preservice teachers regarding the inclusion of children with autism spectrum disorders. *Journal of Early Childhood Teacher Education*, 32, 302-321. doi:10.1080/10901027.2011.622235
- Batu, S. (2008). Care-giver provided home-based instruction using simultaneous prompting for teaching home skills to individuals with developmental disabilities. *Education and Training in Developmental Disabilities*, 43, 541-555.
- Batu, S. (2014). Effects of teaching simultaneous prompting through visual supports to parents of children with developmental disabilities. *Education and Training in Autism and Developmental Disabilities*, 49, 505-516.
- Billingsley, F., White, O. R., & Munson, R. (1980). Procedural reliability: A rationale and an example. *Behavioral Assessment*, 2, 229-241.
- Britton, N. S., Collins, B. C., Ault, M. J., & Bausch, M. E. (2015). Using time delay procedure to teach support personnel to use a simultaneous prompting procedure. *Focus on Autism and Other Developmental Disabilities*. Advance online publication, 1-12. doi:10.1177/1088357615587505
- Browder, D. M., & Spooner, F. (2003). Understanding the purpose and process of alternate assessment. In D. Ryndak, & S. Alper (Eds.), *Curriculum and instruction for students with significant disabilities in inclusive settings* (2nd ed., pp. 51-72). Boston, MA: Allyn & Bacon.
- Browder, D. M., Spooner, F., Wakeman, S., Trela, K., & Baker, J. N. (2006). Aligning instruction with academic content standards: Finding the link. *Research and Practice for Persons with Severe Disabilities*, 31, 309-321.
- Christensen, D. L., Baio, J., Braun, K. V., Bilder, D., Charles, J., Costantino, J. N., & Yeargin-Allsopp, M. (2016). Prevalence and characteristics of autism spectrum disorder among children aged 8 years—Autism and developmental disabilities monitoring network, 11 sites, United States, 2012. *MMWR Surveillance Summaries*, 65(3), 1-23. doi:10.15585/mmwr.ss6503a1
- Collins, B. C. (2012). *Systematic instruction for students with moderate and severe disabilities*. Baltimore, MD: Brookes.
- Colozzi, G. A., Ward, L. W., & Crotty, K. E. (2008). Comparison of simultaneous prompting procedure in 1:1 and small group instruction to teach play skills to preschool students with pervasive developmental disabilities. *Education and Training in Developmental Disabilities*, 43, 226-248.
- Cook, B. G., & Schirmer, B. R. (Eds.). (2006). *What is special about special education: The role of evidence-based practices*. Austin, TX: Pro-Ed.
- Dybdahl, C. S., & Ryan, S. (2009). Inclusion for students with fetal alcohol syndrome: Classroom teachers talk about practice. *Preventing School Failure*, 53, 185-195. doi:10.3200/PSFL.53.3.185-196
- Fetko, E. E., Collins, B. C., Hager, K. D., & Spriggs, A. D. (2013). Embedding science facts in leisure skill instruction conducted by peer tutors. *Education and Training in Autism and Developmental Disabilities*, 48, 400-411.
- Gast, D. L., Lloyd, B. P., & Ledford, J. (2014). Multiple baseline and multiple probe designs. In D. L. Gast, & J. R. Ledford (Eds.), *Single case research methodology: Applications in special education and behavioral sciences* (2nd ed., pp. 251-296). New York, NY: Routledge.
- Gilliam, J. E. (1995). *Gilliam Autism Rating Scale*. Austin, TX: Pro-Ed.

- Gilliam, J. E. (2001). *Gilliam Asperger's Disorder Scale Manual*. Austin, TX: Pro-Ed.
- Heinrich, S., Collins, B. C., Knight, V., & Spriggs, D. A. (2016). Embedded simultaneous prompting procedure to teach STEM content to high school students with moderate disabilities in an inclusive setting. *Education and Training in Autism and Developmental Disabilities, 51*, 41-54.
- Horne, P. E., & Timmons, V. (2009). Making it work: Teachers' perspectives on inclusion. *International Journal of Inclusive Education, 13*, 273-286. doi:10.1080/13603110701433964
- Hudson, M. T., Hinkson-Lee, K., & Collins, B. C. (2013). Teaching paragraph composition to students with emotional/behavioral disorders using the simultaneous prompting procedure. *Journal of Behavioral Education, 22*, 139-156. doi:10.1007/s10864-012-9167-8
- Jones, M. L. (2009). A study of novice special educators' views of evidence-based practices. *Teacher Education and Special Education, 32*, 101-120. doi:10.1177/0888406409333777
- Kearney, C. A., & Durand, V. M. (1992). How prepared are our teachers for mainstreamed classroom settings? A survey of post-secondary schools of education in New York State. *Exceptional Children, 59*, 6-11.
- Klingner, J. K., Vaughn, S., Hughes, M. T., & Arguelles, M. E. (1999). Sustaining research based practices in reading: A 3-year follow-up. *Remedial and Special Education, 20*, 263-274.
- Kohler, F. W., Crilley, K. M., Shearer, D. D., & Good, G. (1997). Effects of peer coaching on teacher and student outcomes. *The Journal of Educational Research, 90*, 240-250.
- Kretlow, A. G., & Bartholomew, C. C. (2010). Using coaching to improve fidelity of evidence-based practices: A review of the literature. *Teacher Education and Special Education, 33*, 279-299. doi:10.1177/0888406410371643
- Kretlow, A. G., Cooke, N. L., & Wood, C. L. (2012). Using inservice and coaching to increase the accurate use of research-based strategies. *Remedial and Special Education, 33*, 348-361. doi:10.1177/0741932510395397
- Kretlow, A. G., Wood, C. L., & Cooke, N. L. (2011). Using in-service and coaching to increase kindergarten teachers' accurate delivery of group instructional units. *The Journal of Special Education, 44*, 234-246. doi:10.1177/0022466909341333
- Ledford, J. R., Gast, D. L., Luscere, D., & Ayres, K. M. (2008). Observational and incidental learning by children with autism during small group instruction. *Journal of Autism and Developmental Disorders, 38*, 86-103. doi:10.1007/s10803-007-0363-7
- Loughrey, T. O., Betz, A. M., Majdalany, L. M., & Nicholson, K. (2014). Using instructive feedback to teach category names to children with autism. *Journal of Applied Behavior Analysis, 47*, 425-430. doi:10.1002/jaba.123
- No Child Left Behind Act of 2001, 20 U.S.C. § 6301 et seq. (2006).
- Pennington, R. C., Stehnhoff, D. M., Gibson, J., & Ballou, K. (2012). Using simultaneous prompting to teach computer-based story writing to a student with autism. *Education and Treatment of Children, 35*, 389-406. doi:10.1353/etc.2012.0022
- Ploessl, D. M., & Rock, M. L. (2014). eCoaching: The effects on co-teachers' planning and instruction. *Teacher Education and Special Education, 37*, 191-215. doi:10.1177/0888406414525049
- Reichow, B., & Wolery, M. (2011). Comparison of progressive prompt delay with and without instructive feedback. *Journal of Applied Behavior Analysis, 44*, 327-340. doi:10.1901/jaba.2011.44-327
- Riesen, T., McDonnell, J., Johnson, J. W., Polychronis, S., & Jameson, M. (2003). A comparison of constant time delay and simultaneous prompting within embedded instruction in general education classes with students with moderate to severe disabilities. *Journal of Behavioral Education, 12*, 241-259. doi:10.1023/A:1026076406656
- Scheeler, M. C., McKinnon, K., & Stout, J. (2012). Effects of immediate feedback delivered via webcam and bug-in-ear technology on preservice teacher performance. *Teacher Education and Special Education, 35*, 77-90. doi:10.1177/0888406411401919
- Schopler, E., Reichler, R., & Renner, B. (1988). *The Childhood Autism Rating Scale (CARS)*. Los Angeles, CA: Western Psychological.
- Smith, B. R., Schuster, J. W., Collins, B. C., & Kleinert, H. (2011). Using simultaneous prompting to teach restaurant words and classifications as non-target information to secondary students with moderate to severe disabilities. *Education and Training in Autism and Developmental Disabilities, 46*, 251-266.
- Smith, G. J., Richards-Tutor, C., & Cook, B. G. (2010). Using teacher narratives in the dissemination of research-based practices. *Intervention in School and Clinic, 46*, 67-70. doi:10.1177/1053451210375301

- Spooner, F., Dymond, S. K., Smith, A., & Kennedy, C. H. (2006). What we know about accessing the general curriculum for students with significant cognitive disabilities. *Research and Practice for Persons with Severe Disabilities*, 31, 277-283.
- Stahmer, A. C., Collings, N. M., & Palinkas, L. A. (2005). Early intervention practices for children with autism: Descriptions from community providers. *Focus on Autism and Developmental Disabilities*, 20, 66-79.
- Tekin, E., & Kircaali-Iftar, G. (2002). Comparison of the effectiveness and efficiency of two response prompting procedures delivered by sibling tutors. *Education and Training in Mental Retardation and Developmental Disabilities*, 37, 283-299.
- Tekin-Iftar, E. (2003). Effectiveness of peer delivered simultaneous prompting on teaching community signs to students with developmental disabilities. *Education and Training in Developmental Disabilities*, 38, 77-94.
- Tekin-Iftar, E. (2008). Parent-delivered community-based instruction with simultaneous prompting for teaching community skills to children with developmental disabilities. *Education and Training in Developmental Disabilities*, 43, 249-265.
- Tekin-Iftar, E. (2012). Çoklu başlama düzeyi modelleri [Multiple baseline designs]. In E. Tekin-Iftar (Ed.), *Eğitim ve davranış bilimlerinde tek-denekli araştırmalar* [Single subject research in educational and behavioral sciences] (pp. 181-216). Ankara: Türk Psikologlar Derneği [Turkish Psychological Association].
- Tekin-Iftar, E., Kurt, O., & Acar, G. (2008). Enhancing instructional efficiency through generalization and instructive feedback. *International Journal of Special Education*, 23, 147-158.
- Vladescu, J. C., & Kodak, T. M. (2013). Increasing instructional efficiency by presenting additional stimuli in learning trials for children with autism spectrum disorders. *Journal of Applied Behavior Analysis*, 46, 805-816. doi:10.1002/jaba.70
- Vuran, S., & Olçay Gül, S. (2012). On-the-job training of special education staff: Teaching the simultaneous prompting strategies. *Educational Sciences: Theory & Practice*, 12, 2101-2110.
- Wong, C., Odom, S. L., Hume, K., Cox, A. W., Fetting, A., Kucharzyk, S., . . . Schultz, T. R. (2015). Evidence-based practices for children, youth, and young adults with autism spectrum disorder: A comprehensive review. *Journal of Autism and Developmental Disorders*, 45, 1951-1966. doi:10.1007/s10803-014-2351-z
- Woodcock, R. W., McGrew, K., & Mather, N. (2001). *The Woodcock-Johnson Tests of Achievement* (3rd ed.). Itasca, IL: Riverside.
- Yoon, K. S., Duncan, T., Lee, S. W. Y., Scarloss, B., & Shapley, K. (2007). *Reviewing the evidence on how teacher professional development affects student achievement* (REL 2007-No. 033). Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory Southwest. Retrieved from [http://ies.ed.gov/ncee/edlabs/regions/southwest/pdf/rel\\_2007033.pdf](http://ies.ed.gov/ncee/edlabs/regions/southwest/pdf/rel_2007033.pdf)

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