Simultaneous Prompting: A Review of the Literature

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Abstract: Published literature pertaining to the simultaneous prompting teaching procedure is reviewed. Purposes of this review are to (a) present an initial analysis of effectiveness of this emerging response prompting procedure, (b) discuss work that has been conducted to date, and (c) provide directions for future research. Data from all published investigations (18 articles) in which effectiveness of this procedure was reported are included in this review. Demographic, procedural, and outcome variables are summarized and examined. Simultaneous prompting was reported to be an effective teaching procedure in each investigation. Individuals with and without disabilities have been taught discrete and chained tasks with the procedure. Participants in investigations have included preschool, elementary, middle school, and high school students, as well as adults. High rates of procedural and dependent variable reliability data were reported across investigations. Additionally, positive measures of maintenance and generalization were reported in most investigations.

Wolery, Ault, and Doyle (1992) noted that teachers are responsible for producing learning and, therefore, need to be experts at presenting instruction. In particular, teachers need to know how to get students to acquire behaviors, meaning how to perform the basic requirements of a behavior or skill. Accordingly, Wolery et al. remarked that three basic issues must be addressed when a student is taught how to acquire a behavior. The student (a) must attend to the relevant stimulus, (b) be provided with information about how to perform the target behavior, and (c) receive feedback about the correctness of the response.

Teachers can use a number of procedures to provide students with information about how to perform a new behavior, including verbally directing a student’s performance, using direct physical contact and guidance, and prompting (Westling & Fox, 2000; Wolery et al., 1992). Noteworthy among the prompting procedures are response prompting procedures, such as constant time delay, the system of least prompts, progressive time delay, and most to least prompting. Numerous investigators have reported that these procedures were effective when they have been used to teach discrete and chained tasks to students who have disabilities (Doyle, Wolery, Ault, & Gast, 1988; Schuster et al., 1998; Wolery et al.).

Response prompting procedures involve the provision of extra teacher assistance, or prompts, to students, followed by the removal, or fading, of that assistance as instruction progresses. Since the prompts are presented before a student responds, errors during instruction are often minimized. These errorless learning procedures have been used to teach students with disabilities how to acquire a number of skills and are preferable for several reasons, including the fact that errorless learning procedures (a) provide more opportunity for reinforcement, (b) decrease the likelihood of problem behaviors resulting from too many errors, (c) provide a potentially positive teaching and learning situation for the teacher and student, and (d) increase the time available for instruction (Cooper, 1987).

Simultaneous prompting is a relatively new errorless learning response prompting teaching procedure that has been reported to be effective in teaching students with and without disabilities how to acquire both discrete (e.g., Fickel, Schuster, & Collins, 1998) and chained
tasks (e.g., Maciag, Schuster, Collins, & Cooper, 2000). Gibson and Schuster (1992) reported that this procedure emerged when data and investigators’ personal experiences revealed that students were acquiring target skills during the zero second, or simultaneous prompted, trials that are conducted first when time delay teaching procedures are used.

Yet, since simultaneous prompting may eliminate some potential problems associated with the time delay procedures, such as the need to distinguish between, and differentially respond to, correct and incorrect responses before and after the controlling prompt, it may be perceived by some teachers to be a more efficient teaching procedure. Simultaneous prompting simply involves the presentation of the task direction followed immediately by the presentation of a controlling prompt (i.e., a prompt that ensures a correct response). For instance, when teaching a student how to read a grocery word the instructor would present the word and simultaneously model the reading of the word (i.e., provide the controlling prompt). The student would then respond by reading the word. Since students are never given an opportunity to respond independently during the instructional sessions when this teaching procedure is used, test trials (also referred to as daily probes) are conducted prior to instructional sessions to assess the transfer of stimulus control. The simultaneous prompting teaching procedure is characterized by the provision of test trials that always occur immediately prior to instructional sessions (Schuster, Griffen, & Wolery, 1992). That is, once an initial simultaneous prompting instructional session is conducted, daily probe sessions are conducted immediately prior to instructional sessions on subsequent days so that the instructor can determine when stimulus control, or acquisition of the target skill, has occurred.

Consequently, given the (a) need to provide teachers with information concerning how to teach students to acquire behaviors; (b) proven effectiveness of numerous response prompting strategies to teach skill acquisition; (c) advantages of errorless learning procedures; and (d) recent emergence of simultaneous prompting as an effective, response prompting teaching procedure, this review of the published literature pertaining to simultaneous prompting was conducted. Data from all published investigations (18 articles) in which effectiveness of this procedure was examined are included in this review, the purpose of which is to present an initial analysis of the effectiveness of this emerging response prompting procedure. Additionally, the significance of its reported and potential uses is discussed, as are directions for future research.

Method
An electronic search of the ERIC and PsycINFO databases was conducted using “simultaneous prompting” as a keyword. Next, the references section of each article that was obtained was checked to locate additional articles. An article was included in this review (a) if it reported results of an investigation in which simultaneous prompting was used as an instructional strategy to teach skill acquisition and (b) was published in a peer reviewed journal.

Results
Eighteen articles were located and reviewed. Each investigation is presented in Tables 1 and 2.

Participants
Overall, 74 individuals participated in the investigations: 36 females and 38 males. Five investigations (e.g., Gibson & Schuster, 1992) included preschool-age (birth–5) participants. However, two participants included in these counts from the Dogan and Tekin-Iftar (2002) investigation would probably be considered elementary school students since they were 6 years old. Seventeen individuals participated in these investigations: nine females and eight males. Fifteen were reported to have various disabling conditions while two were reported to have no disabilities.

Six investigations (e.g., Griffen, Schuster, & Morse, 1998) included elementary school-age (6-11) participants. However, one participant included in these counts from the Schuster and Griffen (1993) investigation would probably be considered a middle school student since he was 12 years, 3 months old. Twenty-
<table>
<thead>
<tr>
<th>Authors</th>
<th>Participants</th>
<th>Setting (Pupil: Teacher Ratio)</th>
<th>Dependent Variable</th>
<th>Independent Variable (Controlling Prompt)</th>
<th>Error Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dogan &amp; Tekin-Iftar</td>
<td>2 with moderate and 1 with mild mental retardation; 4–6 years old</td>
<td>One-to-one instruction classroom at the university housing the participants’ special education classroom (1:1)</td>
<td>Receptively identify 5 occupations presented on picture cards</td>
<td>Simultaneous prompting (Gesture plus verbal model)</td>
<td>Instruction = 0.13%; Probes = 18%</td>
</tr>
<tr>
<td>Gibson &amp; Schuster</td>
<td>2 developmentally delayed, 2 non-disabled; 57–61 months old</td>
<td>Preschool classroom in a rehabilitation hospital (1:1)</td>
<td>15 nouns from classroom storybooks</td>
<td>Simultaneous prompting (Verbal model)</td>
<td>Instruction = 1.3%; Probes = 32.7%</td>
</tr>
<tr>
<td>MacFarland-Smith et al. (1993)</td>
<td>3 with developmental delays; 21–37 months old</td>
<td>Room in a hospital-based early intervention program (1:1)</td>
<td>Expressive object identification: 8 food items</td>
<td>Simultaneous prompting (Verbal model)</td>
<td>Instruction = 0%; Probes = 4%</td>
</tr>
<tr>
<td>Sewell et al. (1998)</td>
<td>2 with developmental delays; 25 and 28 months old</td>
<td>Two classrooms, children’s bathroom, and a playground in a comprehensive care center (1:1)</td>
<td>Dressing skills</td>
<td>Simultaneous prompting (Physical guidance with verbal directions)</td>
<td>Instruction = 2.22%; Probes = 37.9%</td>
</tr>
<tr>
<td>Wolery et al. (1993)</td>
<td>5 with developmental delays; 36–42 months old</td>
<td>Children’s classroom (2:1 and 1:1)</td>
<td>Receptive identification of rebus symbols</td>
<td>Simultaneous prompting (Pointing to the correct stimulus)</td>
<td>Instruction = Not reported; Probes = Not reported</td>
</tr>
<tr>
<td>Griffen et al. (1998)</td>
<td>5 with moderate intellectual disabilities; 6–11 years old</td>
<td>Student’s special education classroom (1:1)</td>
<td>Expressive identification of environmental words</td>
<td>Simultaneous prompting (Verbal model)</td>
<td>Instruction = 0%; Probes = 18%</td>
</tr>
<tr>
<td>Parrott et al. (2000)</td>
<td>5 with moderate to severe mental retardation; 6–8 years old</td>
<td>Restroom connected to the student’s classroom (1:1)</td>
<td>Hand washing</td>
<td>Simultaneous prompting (Full physical)</td>
<td>Instruction = Not reported due to use of a full physical prompt; Probes = 10%</td>
</tr>
</tbody>
</table>

**TABLE 1**

Summary of Demographic and Procedural Variables
<table>
<thead>
<tr>
<th>Study</th>
<th>Participants</th>
<th>Setting</th>
<th>Task</th>
<th>Instruction/Probes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schuster &amp; Griffen (1993)</td>
<td>4 with moderate mental retardation; 9–12 years old</td>
<td>Kitchen in the students’ classroom (1:1)</td>
<td>Making juice from a frozen concentrate</td>
<td>Simultaneous prompting (Model with a verbal description of the step)</td>
</tr>
<tr>
<td>Schuster et al. (1992)</td>
<td>4 with moderate mental retardation; 10–11 years old</td>
<td>Table in students’ classroom (1:1)</td>
<td>Grocery words</td>
<td>Simultaneous prompting and Constant time delay (Verbal model)</td>
</tr>
<tr>
<td>Singleton et al. (1995)</td>
<td>2 with moderate intellectual disabilities; 7 and 11 years old</td>
<td>Students’ self-contained classroom (2:1)</td>
<td>Expressive identification of community signs</td>
<td>Simultaneous prompting (Verbal model)</td>
</tr>
<tr>
<td>Tekin &amp; Kircaali-Iftar (2002)</td>
<td>2 with mild, 1 with moderate mental retardation; 7–10 years old</td>
<td>Table in a room at each participant’s house (1:1)</td>
<td>Receptively identifying animals</td>
<td>Simultaneous prompting and Constant time delay (Not identified)</td>
</tr>
<tr>
<td>Schuster &amp; Griffen (1993)</td>
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<tr>
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<tr>
<td>Singleton et al. (1995)</td>
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</tr>
<tr>
<td>Tekin &amp; Kircaali-Iftar (2002)</td>
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</tr>
</tbody>
</table>

Middle School

| Fickel et al. (1998)           | 3 with mild-moderate mental retardation, 1 non-disabled; 13–15 years old    | Room off of students’ self-contained classroom (4:1)                  | Expressively identify 12 outlines of states, 24 national flags; State sums of six addition facts; Manual signs for six communication picture symbols | Simultaneous prompting (Verbal model for 3 students; Model of manual sign and verbal label of it for 1 student) |

High School

| Fetko et al. (1999)            | 4 with severe mental retardation; 17–19 years old                           | High school hallway locker (1:1)                                      | Opening a keyed lock                                                 | Simultaneous prompting (Instructor modeling and a verbal model, switched to full physical and a verbal model) |
| Johnson et al. (1996)          | 3 with learning disabilities, 2 with mild mental disabilities; 16–17 years old | Students’ science classroom (11:1)                                    | Science vocabulary words from biology text                           | Simultaneous prompting (Verbal model)                                             |

|                                    | Instruction = 2.9%; Probes = 10.4%                                          | Instruction = 0.1%; Probes = 21.9%                                    | Instruction = 0%; Probes = 43–54%                                   | Instruction = 5%; Probes = Not reported                                            |
### TABLE 1—(Continued)

<table>
<thead>
<tr>
<th>Authors</th>
<th>Participants</th>
<th>Setting (Pupil: Teacher Ratio)</th>
<th>Dependent Variable</th>
<th>Independent Variable (Controlling Prompt)</th>
<th>Error Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parker &amp; Schuster</td>
<td>1 with moderate and 1 with mild intellectual disabilities, 2 non-disabled; 15–19 years old</td>
<td>Table in the cafeteria (4:1)</td>
<td>Read 9 grocery aisle headers and 12 occupational words; Define 15 prefixes; Identify 12 elements from the Periodic Table of Elements</td>
<td>Simultaneous prompting (Verbal model)</td>
<td>Instruction = Not reported; Probes = 23%</td>
</tr>
<tr>
<td>Singleton et al.</td>
<td>4 with moderate intellectual disabilities; 15–19 years old</td>
<td>Students’ self-contained classroom (1:1)</td>
<td>Grocery shopping words</td>
<td>Simultaneous prompting and Antecedent prompt and test; (Verbal model)</td>
<td>Instruction = 0%; Probes = 24%</td>
</tr>
<tr>
<td>Maciag et al. (2000)</td>
<td>10 with moderate and severe mental retardation; 29–57 years old</td>
<td>Vocational training center (2:1)</td>
<td>Construction of shipping boxes</td>
<td>Simultaneous prompting (Instructor modeling and verbal directions)</td>
<td>Instruction = 1.3%; Probes = 33.1%</td>
</tr>
<tr>
<td>Palmer et al. (1999)</td>
<td>5 with mild mental retardation; 29–49 years old</td>
<td>Investigator’s office at an adult day habilitation workshop (3:1)</td>
<td>Verbal identification of six manual signs</td>
<td>Simultaneous prompting (Verbal model)</td>
<td>Instruction = 0%; Probes = Not reported</td>
</tr>
<tr>
<td>Authors</td>
<td>Design</td>
<td>Results</td>
<td>Maintenance</td>
<td>Generalization</td>
<td>Social Validity</td>
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</tr>
<tr>
<td>Dogan &amp; Tekin-Iftar (2002)</td>
<td>Multiple probe</td>
<td>All participants acquired the targeted skills</td>
<td>7, 21, and 28 days after the final full probe condition</td>
<td>Across materials</td>
<td>Survey of students’ mothers</td>
</tr>
<tr>
<td>Gibson &amp; Schuster (1992)</td>
<td>Multiple probe</td>
<td>3 of 4 participants reached criterion</td>
<td>9 days, 3 and 6 weeks following training and 3 weeks after completion of all training</td>
<td>Across materials</td>
<td>Classroom curriculum</td>
</tr>
<tr>
<td>MacFarland-Smith et al. (1993)</td>
<td>Multiple probe</td>
<td>All participants acquired the targeted skills</td>
<td>1 week after reaching criterion, then bi-monthly on acquired skills</td>
<td>Across people and materials</td>
<td>Students’ IFSPs</td>
</tr>
<tr>
<td>Sewell et al. (1998)</td>
<td>Multiple probe</td>
<td>All participants acquired the targeted skills</td>
<td>1, 3, and 6 weeks after reaching criterion, then bi-monthly on acquired skills</td>
<td>Across materials and settings</td>
<td>Students’ IFSPs</td>
</tr>
<tr>
<td>Wolery et al. (1993)</td>
<td>Multiple probe</td>
<td>3 of 5 participants acquired the targeted skills; 2 improved baseline performance before study was terminated</td>
<td>None</td>
<td>Across materials</td>
<td>Recommendations of children’s intervention teams</td>
</tr>
<tr>
<td>Griffen et al. (1998)</td>
<td>Adapted alternating treatments design</td>
<td>All participants acquired the targeted skills</td>
<td>7, 14, and 28 days after achieving criterion</td>
<td>No formal measure</td>
<td>Students’ IEPs, cross referenced with preferences of non-disabled, same-age peers</td>
</tr>
<tr>
<td>Parrott et al. (2000)</td>
<td>Multiple probe</td>
<td>3 of 5 participants acquired the targeted skills; 2 improved baseline performance before the study was terminated due to the end of the school year</td>
<td>1, 3, and 6 weeks after training, then every 2 weeks until the end of the school year</td>
<td>Across people</td>
<td>None for targeted skills</td>
</tr>
<tr>
<td>Schuster &amp; Griffen (1993)</td>
<td>Multiple probe</td>
<td>All participants acquired the targeted skills</td>
<td>7, 14, 30, and 60 days after achieving criterion</td>
<td>Across materials and settings</td>
<td>Students’ IEPs</td>
</tr>
<tr>
<td>Study</td>
<td>Design</td>
<td>Participants</td>
<td>Time</td>
<td>Materials</td>
<td>Additional Information</td>
</tr>
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</tr>
<tr>
<td>Schuster et al. (1992)</td>
<td>Parallel treatments design</td>
<td>All acquired targeted skills</td>
<td>2, 4, and 8 weeks</td>
<td>No formal measure</td>
<td>Rationale provided</td>
</tr>
<tr>
<td>Singleton et al. (1995)</td>
<td>Multiple probe</td>
<td>All acquired targeted skills</td>
<td>7 and 14 days</td>
<td>Across materials</td>
<td>Parental survey</td>
</tr>
<tr>
<td>Tekin &amp; Kircaali-Iftar (2002)</td>
<td>Parallel treatments design</td>
<td>All acquired targeted skills</td>
<td>1, 4, and 5 weeks</td>
<td>Across materials</td>
<td>Parental and sibling questionnaire</td>
</tr>
<tr>
<td>Fickel et al. (1998)</td>
<td>Multiple probe</td>
<td>All acquired targeted skills</td>
<td>21 and 35 days</td>
<td>Across settings</td>
<td>Students’ IEPs, regular education curriculum, participant and parental preferences</td>
</tr>
<tr>
<td>Fetko et al. (1999)</td>
<td>Multiple probe</td>
<td>3 of 4 acquired targeted skills</td>
<td>7, 14, 30, and 60 days</td>
<td>Across materials</td>
<td>Survey of locker use at local workplaces</td>
</tr>
<tr>
<td>Johnson et al. (1996)</td>
<td>Adapted alternating treatments design</td>
<td>All acquired targeted skills</td>
<td>1, 3, 6, and 12 weeks</td>
<td>Across materials</td>
<td>Classroom curriculum</td>
</tr>
<tr>
<td>Parker &amp; Schuster (2002)</td>
<td>Multiple probe</td>
<td>All acquired targeted skills</td>
<td>11 days after achieving criterion</td>
<td>Across materials and settings</td>
<td>Students’ IEPs or consultation with non-disabled students and general education teachers</td>
</tr>
<tr>
<td>Singleton et al. (1999)</td>
<td>Adapted alternating treatments design</td>
<td>All acquired targeted skills</td>
<td>1 day and 1, 4, 10, and 16 weeks after achieving criterion</td>
<td>Across materials and settings</td>
<td>Students’ IEPs and parental preferences</td>
</tr>
<tr>
<td>Maciag et al. (2000)</td>
<td>Multiple probe</td>
<td>4 of 5 dyads acquired targeted skills</td>
<td>1, 3, 6, 10, and 15 weeks</td>
<td>No formal measure</td>
<td>Rationale provided</td>
</tr>
<tr>
<td>Palmer et al. (1999)</td>
<td>Multiple probe</td>
<td>All acquired targeted skills</td>
<td>1, 4, and 8 weeks</td>
<td>Across people and settings</td>
<td>Survey of service professionals</td>
</tr>
</tbody>
</table>
three individuals participated in these investigations: 10 females and 13 males. All were reported to have mild, moderate, or severe intellectual disabilities.

One investigation (Fickel et al., 1998) included middle school-age (12-14) participants. However, one participant would probably be considered a high school student since he was 15 years old. Four individuals participated in this investigation: three females and one male. Three participants were reported to have mental retardation while one did not have a disability.

Four investigations (e.g., Fetko, Schuster, Harley, & Collins, 1999) included high school-age (15-19) participants. Seventeen individuals participated in these investigations: nine females and eight males. Nine were reported to have moderate or severe mental retardation, three mild mental disabilities, three specific learning disabilities, and two had average functioning abilities.

Two investigations (e.g., Palmer, Collins, & Schuster, 1999) included adult (20 or older) participants. Thirteen individuals participated in these investigations: five females and eight males. All were reported to have mental retardation: 10 with moderate or severe mental retardation and three with mild mental retardation.

Setting

Two investigations involving preschoolers were conducted exclusively in the participants’ classrooms (e.g., Wolery, Holcombe, Werts, & Cipolloni, 1993), while one was conducted in the participants’ two classrooms and two other locations at the participants’ child care center (see Sewell, Collins, Hemmeter, & Schuster, 1998). Dogan and Tekin-Iftar (2002) conducted their investigation in a one-on-one classroom at the university where participants’ special education classroom was located, and MacFarland-Smith, Schuster, and Stevens (1993) conducted their investigation in a room at the hospital where the participants’ early intervention program was located.

Among investigations involving school-age participants, six were conducted in the participants’ classrooms (e.g., Johnson, Schuster, & Bell, 1996) while four were conducted in the participants’ schools though not in their classrooms (e.g., Parker & Schuster, 2002). The Tekin and Kircaali-Iftar (2002) investigation was conducted in a room at each participant’s house.

The two investigations with adults were conducted in the adults’ employment settings (e.g., Maciag et al., 2000). These were employment settings for adults with disabilities.

Instructional Arrangement

The instructional arrangement (i.e., pupil: teacher ratio) that was used during the instructional sessions in each investigation was examined. Twelve investigations reported using a 1:1 instructional arrangement (e.g., MacFarland-Smith et al., 1993). Seven investigations (e.g., Fickel et al., 1998) reported using a small group instructional arrangement, which was defined as a pupil: teacher ratio of 2:1-7:1, inclusive.

The most frequently used small group instructional arrangement consisted of a 2:1 pupil: teacher ratio (e.g., Maciag et al., 2000), followed by a 4:1 (e.g., Parker & Schuster, 2002) and 3:1 pupil: teacher ratio (Palmer et al., 1999). Note that Wolery et al. (1993) used a 2:1 instructional arrangement with four participants and a 1:1 instructional arrangement with one participant.

Only one investigation reported using a large group instructional arrangement, which was defined as a pupil: teacher ratio of 8:1 or higher, inclusive. Johnson et al. (1996) reported using an 11:1 instructional arrangement.

Dependent Variable

Both discrete and chained tasks were reported to be target behaviors in the investigations that were reviewed. Specifically, 13 investigations reported examining acquisition of discrete tasks whereas five investigations reported examining acquisition of chained tasks.

Regarding discrete tasks, six investigations targeted teaching of word reading (e.g., Singleton, Schuster, Morse, & Collins, 1999), two investigations targeted basic academic skills (e.g., Fickel et al., 1998), three investigations targeted communication skills (e.g., Wolery et al., 1993), two investigations targeted expres-
sively identifying functional objects (e.g., Singleton, Schuster, & Ault, 1995), one investigation taught their participants to receptively identify occupations presented on picture cards (Dogan & Tekin-Iftar, 2002), and one investigation taught the participants to receptively identify animals (Tekin & Kircaali-Iftar, 2002). Note that some investigations (e.g., Fickel et al.) targeted more than one of the skills identified above.

Five investigations targeted the teaching of chained tasks. Three investigations targeted domestic living, self-help skills (e.g., Parrott, Schuster, Collins, & Gassaway, 2000) and two investigations targeted vocational tasks (e.g., Maciag et al., 2000).

High rates of dependent variable reliability data were reported, indicating the reported dependent variables were, in fact, the focus of each investigation. Overall mean percentage of agreement on student responding during instructional sessions ranged from 96%-100% in 17 investigations that reported dependent variable reliability data. Overall mean percentage of agreement on student responding during daily probe sessions in these investigations ranged from 93.5%-100%. Only Johnson et al. (1996) did not report these data.

Independent Variable

Simultaneous prompting was the sole independent variable in 15 investigations. Two independent variables, one of which was simultaneous prompting, were investigated concurrently in the other three investigations (e.g., Schuster et al., 1992). Every investigation except one (Tekin & Kircaali-Iftar, 2002) reported the controlling prompt that was used.

Each investigation reported collecting procedural reliability data during instructional and daily probe sessions. Procedural reliability ranged from 96.7%-100% across the instructional sessions in all 18 investigations. Procedural reliability ranged from 98%-100% across the daily probe sessions in 17 while the other investigation (Fetko et al., 1999) reported a mean accuracy of 85% for procedural reliability during the daily probe sessions.

Error Rates

Six investigations reported that no participant errors occurred during any instructional session (e.g., MacFarland-Smith et al., 1993) while another eight investigations reported that participant error rates during instructional sessions ranged from 0.1%-5% (e.g., Schuster & Griffen, 1993). Four investigations did not report any instructional session error rate data (e.g., Wolery et al., 1993).

Much higher participant error rates were reported with respect to the daily probe sessions. Across 15 investigations that reported the percentage of daily probe trials during which participants made errors, daily probe error rates ranged from 4% (MacFarland-Smith et al., 1993) to 54% (Singleton et al., 1995). Three investigations (e.g., Palmer et al., 1999) did not report these data.

Research Designs

Single-subject research designs were used in each investigation. Thirteen used a multiple probe design (e.g., Sewell et al., 1998), three used an adapted alternating treatments design (e.g., Griffen et al., 1998), and two used a parallel treatments design (e.g., Tekin & Kircaali-Iftar, 2002).

Task Acquisition

Overall, 66 of the 74 participants achieved criterion for the target skill. Seven of the remaining eight were reported to have improved their ability to perform the target skill from baseline performance levels after instruction involving simultaneous prompting was implemented. Some of these participant’s investigations were terminated before criterion was reached due to the end of the school year (e.g., Parrott et al., 2000). Only Gibson and Schuster (1992) reported that simultaneous prompting was completely ineffective with a participant.

Maintenance

Maintenance data were reported in 17 investigations (e.g., Singleton et al., 1999). Only Wolery et al. (1993) did not report maintenance data.
Overall maintenance data were favorable. The majority of participants scored 50% or higher on maintenance assessments. Only one participant (see Parrott et al., 2000) needed to receive additional instruction during maintenance phase of the investigation due to exceptionally low maintenance probe scores (i.e., 6% accuracy). Additionally, (a) some participants did not complete all planned maintenance probe sessions due to the end of the school year and (b) maintenance data for some participants were included within the research design that was used (e.g., a multiple probe single-subject research design).

Generalization

Generalization was assessed in 15 investigations (e.g., Singleton et al., 1995), and included measures across people, settings, materials, and conditions. One investigation (Sewell et al., 1998) reported how generalization was facilitated within the study through the use of different materials and instructional settings, but did not report a formal measure of generalization. Two additional investigations (e.g., Griffen et al., 1998) did not report any measure of generalization.

In investigations that assessed generalization, the majority of participants scored 50% or higher on generalization assessments. Some participants reportedly did not complete all planned generalization probes due to the end of the school year.

Social Validity

Fifteen investigations specifically cited evidence of social validity data for their target skills. For instance, some investigations (e.g., Fetko et al., 1999) conducted formal surveys to collect social validity data to support the need to teach the target skill, whereas the target skill in other investigations (e.g., Schuster & Griffen, 1993) was addressed in the participant’s IEPs. In addition, in two investigations (e.g., Maciag et al., 2000) sound, socially valid reasons for selecting the target behaviors were presented in lieu of formal measures of social validity. One (Parrott et al., 2000) did not present social validity data pertaining to the target behavior but did cite social validity data for instructive feedback that was measured.

Discussion

Investigations involving simultaneous prompting that have been published have established that it is an effective, errorless learning procedure. Since only 74 participants were included in the investigations reviewed, more research needs to be conducted. However, these initial investigations provide adequate data for purposes of (a) reporting utility of the procedure, and (b) discussing work that has been conducted to date and establishing a future research agenda.

Utility of the Procedure

Data indicate that simultaneous prompting is an effective response prompting procedure (89% of the participants achieved criterion) that can be used to teach individuals with and without disabilities, ages preschool to adult, how to perform discrete and chained tasks. Presently the procedure has been examined mostly in school-based settings. Among the 16 investigations in which preschoolers or school-age individuals were participants, 15 were conducted in the participants’ classrooms or in locations at the participants’ schools outside of the classroom (e.g., a playground). On the other hand, both investigations in which adults were participants were conducted in sheltered workshops.

Simultaneous prompting’s utility has been proven predominantly in one-on-one or small group instructional arrangements (17 of 18 investigations). High rates of procedural fidelity (> 96%) indicate it is an easy procedure to use, while low participant error rates (< 5%) indicate it promotes errorless learning. Favorable maintenance and generalization data that were reported in the investigations that included these measures indicate that the procedure’s effectiveness extends beyond task acquisition.

Existing Data and Future Research

Existing data provide guidance for how simultaneous prompting can be used by practitioners as well as directions for future research.
Table 3 presents a summary of future research needs involving simultaneous prompting.

Participants. While a fairly equal number of preschool, elementary school, high school, and adult participants were included in the investigations that were reviewed, only one study with middle school participants (n = 4) has been conducted. Hence, more investigations involving middle school participants are warranted.

Regarding simultaneous prompting’s effectiveness with individuals with varying degrees of disability, additional research needs to be conducted with individuals who have profound intellectual disabilities. Data pertaining to the disability classification status of the 57 elementary, middle school, high school, and adult participants revealed that all but three had a disability. The majority of the participants with disabilities had moderate or severe intellectual disabilities (n = 41), whereas the others were reported to have mild mental disabilities (n = 9), mental retardation (n = 1), and specific learning disabilities (n = 3). These data are noteworthy because response prompting procedures have been designed for use with individuals who have moderate, severe, or profound intellectual disabilities (Wolery et al., 1992). Thus, the existing data offer some validation that simultaneous prompting is another effective response prompting strategy available for use with individuals who have moderate or more significant intellectual disabilities. However, these data need to be augmented with data from investigations that include individuals with profound intellectual disabilities. This research should also include participants who have specifically identifiable developmental disabilities (e.g., autism) that are often associated with moderate or more significant levels of intellectual disability since these individuals have not participated in investigations that have been conducted.

Future investigations should continue to explore use of simultaneous prompting with individuals who do not have disabilities. The limited research (see Fickel et al., 1998; Parker & Schuster, 2002) in which the procedure has been used in heterogeneous groups is remarkable and needs to be extended since the Individuals with Disabilities Education Act (IDEA, 1997) emphasizes (a) educating students with disabilities in general education classrooms and the general education curriculum, (b) allowing special educators to work simultaneously with special and regular education students, and (c) using research-proven instructional strategies.

Settings. Since every investigation but one was conducted in either a school-based setting or sheltered workshop, future research needs to be conducted in community settings where the target behaviors are performed by, and the settings are frequented by, peers who do not have disabilities, or where the target behavior is performed in an isolated, yet natural, setting (see Tekin & Kircaali-Iftar, 2002).

A setting-related variable that is worthy of further exploration is the instructional arrangement, or pupil: teacher ratio that is used. Since, historically, students who have moderate or more significant disabilities have received instruction in either 1:1 or small group instructional arrangements (Collins, Gast, Ault, & Wolery, 1991; Kamps et al., 1991;...
it is not surprising to have discovered that these arrangements were used in all but one investigation. Of particular note is the fact that, when the investigations in which 1:1 and 2:1 instructional arrangements were used are combined, the data indicated that only two additional small group arrangements were used: a 4:1 arrangement (e.g., Fickel et al., 1999) and a 3:1 arrangement (Palmer et al., 1999).

Three reasons can be put forth regarding why more investigations need to be conducted in which simultaneous prompting is used with small group instructional arrangements that have relatively high pupil: teacher ratios (e.g., 4:1-7:1). First, other response prompting investigations in which a 3:1, or higher, pupil: teacher ratio has been used have demonstrated that students with moderate or more significant disabilities can learn to perform a chained task by performing part of it and observing other group members perform parts of it (e.g., Stonecipher, Schuster, Collins, & Grisham-Brown, 1999). Second, preliminary data indicate that instructional efficiency can be increased when simultaneous prompting is used to teach a group of students. Students in group arrangements have been shown to be capable of acquiring not only their target behaviors but also non-target behaviors they learned through observational and incidental learning (e.g., Wolery et al., 1993). Third, some investigations (e.g., Fetko et al., 1999) demonstrated that the procedure can be effective when used to teach a heterogeneous group that includes both students with and without disabilities.

**Dependent variables.** The fact that simultaneous prompting was effective when it was used to teach both discrete and chained tasks is significant since an appropriate curriculum for students with disabilities, particularly students who have moderate or more significant disabilities, is comprised of both types of tasks (Schuster & Griffen, 1993). While acquisition of discrete tasks is the focus of many preschool and elementary school curricula for students with moderate or more significant disabilities, as these students enter middle and high school their curricula focus more on the acquisition of chained tasks.

Hence, effectiveness of simultaneous prompting across a wider range of chained tasks besides just the vocational and domestic living, self-help skills that were the focus of the studies that were reviewed must be investigated. Future investigations should examine using simultaneous prompting to teach participants how to perform recreation/leisure (e.g., playing a video game) and community use skills (e.g., purchasing stamps at a post office).

**Independent variables.** Procedural reliability data indicate acceptable levels of procedural fidelity (Wolery, Bailey, & Sugai, 1988) and add support to the other reported data (e.g., daily probes being conducted immediately prior to instructional sessions) that indicated that the simultaneous prompting procedure was used in each investigation as it has been formally defined. Of particular note is the fact that many investigators cited the procedural reliability data they obtained as support for their belief that simultaneous prompting is an inherently easy teaching procedure to use, and called for investigations in which non-certified instructors, such as paraeducators and peer tutors, use the procedure. Tekin and Kircaali-Iftar (2002) conducted one such investigation and did, in fact, report high levels of procedural reliability data for their peer tutors. Similar investigations are warranted since non-certified instructors routinely present instruction to students who have moderate or more significant disabilities.

More investigations in which effectiveness and efficiency of simultaneous prompting is compared to more established response prompting procedures, such as constant time delay, the system of least prompts, and most to least prompting, also need to be carried out. To date, three comparison studies have been conducted and have only juxtaposed simultaneous prompting to two other procedures: constant time delay and antecedent prompt and test. Comparison studies are valuable because even findings of no differences, such as those reported in the existing comparison studies (e.g., Schuster et al., 1992), can assist teachers who are deciding between two procedures. These data can justify an instructor’s decision to use a procedure based solely on her preference.

**Instructional session error rates.** Data indicate that the participants’ error rates during in-
structional sessions (<5%) justify referring to simultaneous prompting as an errorless learning procedure. Worth mentioning, however, is the fact that four investigations did not report any instructional session error rate data. Since simultaneous prompting is referred to as an errorless learning procedure it is important to collect data that either supports or refutes this contention. To date the data seem to support this contention. However, future investigators need to be sure to report both individual and aggregate instructional session error rate data.

A related issue worth reporting is how controlling prompts were selected and their effectiveness monitored. Investigators and practitioners should take steps before beginning an intervention to ensure that the prompt used will, by definition, be a controlling prompt. Perhaps the best way to do this is to determine the types of prompts that are effective in teaching other similar target behaviors to the participants. Another procedure might be to match the characteristics of the prompt to the characteristics of the target behavior. A review of the controlling prompts that were used in the investigations revealed that, in most instances, these prompts served as explicit models of the target behaviors. For example, when word reading was taught the instructor’s controlling prompt was a verbal model (e.g., see Gibson & Schuster, 1992), and when the construction of shipping boxes was taught the instructor’s controlling prompt was modeling the performance of the target behavior on a second set of similar materials (see Maciag et al., 2000). Given reported success of these controlling prompts, practitioners and researchers should review what is known about effective models (Bandura, 1975) to assist with the selection of an appropriate controlling prompt. This information may enable practitioners and investigators to avoid having to modify the controlling prompt after beginning an intervention, as did Fetko et al. (1999). Yet, Fetko et al.’s study highlights the need to monitor effectiveness of a controlling prompt to be sure that it is, in fact, directing an individual’s behavior as desired.

Several investigations reported using more intrusive controlling prompts, including physical guidance (e.g., Parrott et al., 2000). While practitioners need to be sure to use a prompt that will serve as a controlling prompt, they should be encouraged to use the least intrusive prompt possible for a couple of reasons. First, any prompt that is used must ultimately be faded, and the more intrusive the prompt, the more difficult it may be to fade. Second, intrusive prompts may place an unwanted restriction upon the participant’s freedom. This discussion highlights the fact that prompt selection is an issue worthy of exploration (Billingsley & Romer, 1983; Riley, 1995; Wolery & Gast, 1984).

Probe session error rates. Relatively high error rates (4-54%) were reported for the test trials that were conducted during daily probe sessions. Consequently, future investigations should explore ways in which these error rates can be reduced. These investigations could focus on ways to do this while maintaining procedural fidelity, as well as ways to do this by perhaps redefining the simultaneous prompting procedure. In fact, Wolery and Schuster (1997) called for investigations in which modifications to the various response prompting procedures are examined.

Investigations which explore the possibility of reducing probe session error rates while maintaining procedural fidelity might incorporate the following elements: (a) use error correction procedures during instructional and daily probe sessions; (b) present more trials per instructional session; (c) increase the intensity of instruction by using attentional cues and requiring attentional responses during every instructional trial, and presenting specific rather than general feedback after every response; and (d) teach meaningful target behaviors to enhance each participant’s motivation to learn.

Investigations that explore the possibility of reducing probe session error rates and modifying how simultaneous prompting is defined might explore two modifications. First, more instructional sessions could be implemented before the first probe session is conducted. Currently the first probe session is conducted before the second instructional session, which means only one instructional session is conducted before test trials are presented. With the constant time delay response prompting procedure (from which simultaneous prompting emerged) two or more instructional sessions in which a 0-second delay is used are presented before error rate data are collected.
Hence, simultaneous prompting could be modified so that, at a minimum, two instructional sessions are implemented before any probe sessions are conducted. Second, simultaneous prompting could be modified so that probe sessions are conducted only before every other, every third, or every fourth instructional session. The drawback to this approach is that time may be spent teaching skills that the probe trials, had they been conducted daily, would have indicated had been mastered. After all, determining when the transfer of stimulus control occurs is the reason for conducting probe sessions. Nonetheless, an investigation that begins by conducting daily probe sessions every other day may reveal that probe error rate data is reduced relative to the data reported to date and, therefore, that manipulation of this feature of simultaneous prompting is worthy of further exploration.

_Maintenance, generalization, and social validity_. While the stated focus of each investigation was to examine effectiveness of simultaneous prompting to teach acquisition of target behaviors, the vast majority of investigations that were reviewed reported favorable measures of maintenance and generalization. Future investigations should collect both types of data since maintenance and generalization of acquired target behaviors are the ultimate goals of instruction.

Also important is the fact that almost every investigator provided support for their selection of the dependent variables that were the focus of their investigation, and other available data support their selections of these dependent variables as well. Worth mentioning is the fact that 15 investigations reported that they conducted some measure of social validity (e.g., a parental preference survey) to collect data to support their selection of the dependent variable that was the focus of their investigation. Future investigations should do the same since these data enable researchers to argue on behalf of the significance of their investigation (Wolfe, 1978). Furthermore, for students with disabilities curriculum decisions are paramount given the difficulties these individuals experience acquiring new skills in the relatively limited amount of instructional time that is available to them (Polloway, Patton, Epstein, & Smith, 1989; Wolery et al., 1992).

Across the investigations that were reviewed simultaneous prompting proved to be an effective instructional procedure when it has been used to teach discrete and chained tasks. Both individuals with and without disabilities have learned to perform new target behaviors with the procedure, and have maintained and generalized them. Additionally, several investigations that were reviewed reported instances of observational and incidental learning when the procedure was used, indicating that it can be a relatively efficient instructional procedure. These data are significant to special and regular education teachers who are looking to use research-proven teaching procedures in accordance with the IDEA (1997). Investigators can use the data and information presented here to further the field’s understanding of the utility of this procedure. Data presented to date are encouraging and provide evidence in support of effectiveness of the simultaneous prompting procedure, but these data also provide guidance for additional work that needs to be done.

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