

The Effects of Covert Audio Coaching on Teaching Clerical Skills to Adolescents with Autism Spectrum Disorder

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Abstract Employment instruction for secondary students with autism spectrum disorder (ASD) has received very little attention in the professional literature. However, adults with ASD usually have difficulty maintaining employment for a variety of reasons, including problems with performing work tasks. This study used a multiple baseline design across participants to examine the effects of performance feedback on the participants' ability to independently make photocopies. Feedback was delivered privately through a two-way radio and earbud speaker. The results support the conclusion that the intervention, covert audio coaching, was effective in increasing the participants' accuracy in making photocopies. Specifically, participants demonstrated mastery of the skill within 4–5 sessions, and their improvements maintained for several weeks following intervention.

Keywords Autism spectrum disorder · Transition and secondary special education · Employment training · Performance feedback · Covert audio coaching

Introduction

Among the many areas of difficulty adults with autism spectrum disorder (ASD) experience is acquiring and maintaining employment (Gerhardt and Weiss 2011).

Some of the most common characteristics associated with ASD (e.g., difficulties with communication skills, social behaviors, and narrow interests) may substantially interfere with work and impact an individual's employment status (Hendricks 2010). Indeed, many individuals with ASD can be quite successful in a variety of employment situations given the right supports (Targett and Wehman 2009). Notwithstanding this potential for employability, the employment status of many individuals with ASD is unacceptable.

The overall unemployment rate for persons with significant disabilities is approximately 80 % (The President's Committee for People with Intellectual Disabilities 2009). Estimates of the unemployment and underemployment rate for people with ASD is also high (Holmes 2007). The many issues that unemployment brings tends to permeate throughout an individual's life, as well as having the possibility of affecting their families. Although there are multiple reasons people with disabilities are unemployed, a review of the recent literature suggests another factor that might contribute to this rate is the limited research on effective education and training in which secondary students with ASD participate, including employment skill development (Bennett and Dukes in press; Hendricks 2010; Hendricks and Wehman 2009). Hendricks and Wehman (2009) pointed out that there was limited research on instructional tactics for secondary students with ASD learning work skills, as well as others needed for success after high school. Additionally, Hendricks (2010) reported that there was insufficient research available on effective employability training provided to adults with ASD who already completed high school. Furthermore, in their review of the literature spanning the years 1995–2010, Bennett and Dukes (in press) identified only 11 studies focusing on teaching employment skills to students with

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ASD ages 14–22. Together, these reviews support the notion that there is a significant gap in the literature pertaining to employment instruction for secondary students with ASD.

Tactics based on applied behavior analysis (ABA) are among the educational strategies used to teach a variety of skills to individuals with ASD (Gerhardt and Weiss 2011). Features of ABA, such as task analysis, shaping, chaining procedures, prompting strategies, and reinforcement have typically been combined and implemented as a treatment package to develop skills among this population and others (Cooper et al. 2007). An additional tactic based on ABA, performance feedback, has also showed some initial success in helping develop employment skills among individuals with intellectual disabilities and ASD (Bennett et al. 2010).

Performance feedback consists of delivering supportive and corrective statements contingent on an individual's performance (Daniels 1989). This strategy has been frequently used in business, graduate and professional training programs, and parent skill building classes (Bennett et al. 2010). Recently, performance feedback has been used with students with disabilities with promising results. Among these studies, Barbetta et al. (1994) evaluated immediate and delayed error correction on the reading skills of students with developmental disabilities and concluded that immediate feedback led to better sight word reading. In another study, Price et al. (2002) used performance feedback to successfully ameliorate the problem behaviors of a child with ADHD. An interesting feature of the Price et al. study was that the feedback was delivered covertly through a bug-in-ear (BIE) device (a two-way radio with an earbud speaker attached). This equipment allowed the feedback to be delivered privately and immediately. In a more recent application, Bennett et al. (2010) used performance feedback, delivered covertly, to improve the work performance of supported employees. Two of the employees in that study had moderate to severe intellectual disabilities and the third participant experienced ASD. The results from this study showed that privately delivered performance feedback, or covert audio coaching (CAC), produced noteworthy improvements in the participants' job skills. Participants achieved mastery of their work tasks within a few sessions, and the results maintained for several weeks following the withdrawal of the treatment.

Although the use of CAC with people with disabilities has had initial success, it is a budding tactic with this population that has received little attention in the literature. Price et al. (2002) provided an example of the utility of CAC in a school setting, and Bennett et al. (2010) demonstrated a successful application of CAC with employees with disabilities in the community. Although there was one adult with ASD in the Bennett et al. study, it is still

unknown how this strategy will work among people with ASD, including those at the secondary level of education learning employment skills. Thus, the purpose of this research was to examine the effects of CAC on the employment skill development of secondary students with ASD. Two research questions were posed, including:

1. Will CAC be effective in improving the employment skills of secondary students with ASD?
2. If the CAC strategy is effective, will the results maintain once the intervention is removed?

Method

Participants and Setting

Three high school students with ASD participated in this study. The participants attended a school exclusively designed for secondary students with ASD. Each participant was working toward a special diploma and instruction in daily living and employment skills comprised a substantial portion of their curriculum. Pseudonyms are used in place of their real names to protect their identity. Jason was 13-years old. He could communicate his wants and needs, answer simple questions, and follow multi-step directions. Shaun was 22-years old. He was able to communicate his wants and needs, participate in simple conversations, as well as follow multi-step directions. David was 16-years old. He also was able to request items and activities, participate in simple conversations, and follow multi-step directions. All participants' behaviors were responsive to verbal prompting and feedback. No other information was available in the participants' school records.

The school's teachers were informed of the purpose of the study and they nominated individuals to be included. Participants had to meet the following criteria to be selected for the study.

1. The participant was willing to wear an earbud speaker attached to a two-way radio;
2. The participant could follow verbal directions and his or her behavior was amenable to verbal coaching statements; and
3. The participant had experience with the employment task selected for this investigation, but did not master it.

The first three individuals that met the inclusion criteria were selected regardless of race, gender, religion, or socio-economic status. Participation was voluntary and written consent or assent was obtained. In the case where the participant provided assent, parental consent was also

obtained. Written agreement was also secured from the school where the study was conducted. This study was approved by the Institutional Review Boards of the authors' universities.

The study was conducted in the school's faculty workroom. There were computers, tables, chairs, laminating equipment, faculty and staff mailboxes, and a copy machine in the workroom. This room was routinely accessible to students practicing vocational skills.

Task and Behavioral Measures

The employment skill selected for each participant was making photocopies. The dependent variable was the percentage of task steps completed correctly. A task analysis of the skill was conducted and consisted of 10 steps (see Table 1). This task analysis included additional steps to train the participants in a system that would allow independent completion of a copy job. The ten step task analysis repeated for each copy job that was available for that session, ranging from 3 to 6 jobs per session. A range of copy jobs was used for two reasons. First, a varied amount of jobs would simulate actual work practices. Second, the school's resources were being utilized and efforts were made to reduce their cost. Although this created different opportunities to respond across sessions, Ayers and Gast (2010) stated that percentage data permits the comparison of unequal numbers of opportunities to respond across sessions for data analysis. Additionally, a minimum of three copy jobs (30 steps) was selected so that subtle changes in the correct: incorrect ratio would not produce large changes in the resultant percentage data (Cooper et al. 2007; Ayers and Gast 2010).

The independent variable was performance feedback delivered through CAC. Performance feedback consisted

of support statements, antecedent prompts, and correction statements. An example of a support statement was, "good work making copies", and an example of an antecedent prompt and correction statement was, "put the finished copies in the folder."

Data Collection

Data were collected among three observers. These included (a) the first author, an assistant professor of special education; (b) the second author, a professor of special education; and (c) a graduate student in counseling with an emphasis in ABA. Practice coding on each variable was conducted prior to baseline and continued until at least 85 % agreement was obtained.

For the dependent variable, an observer recorded the correct and incorrect steps of the task analysis. These data were then converted to percentage of steps correct by dividing the number correct by the number correct plus the number incorrect and then multiplying by 100. Data were also collected on the independent variable by recording each instance a coaching statement was given. A "S" was recorded for support statements, an "AP" was recorded for antecedent prompts, and a "C" was recorded for correction statements.

Materials

A photocopy machine was used during this study. Next to the copy machine was a table with two bins labeled "original" and "finished." Copy jobs were placed in file folders. Each folder contained the original document to be copied and a note with the number of copies needed to be made for that job. The number of copies to be made was also written on the data collection forms so the data collectors would know the correct amount of copies to be made. For this study, the number of copies per job was limited to single digit copies (i.e., 1–5 copies). The above materials were present during each condition of the study. Additionally, a pair of two-way radios and one earbud speaker headset were used only during the intervention condition.

Procedure

During baseline sessions, participants were instructed, "make some photocopies." No coaching statements of any type were provided. Additionally, no prompts were given to the participants. If the participants asked for help, they were told, "do your best." If participants completed a copy job, they were instructed to continue with the next job until all the jobs had been completed/attempted for that session. Participants were permitted to err on a step and continue to

Table 1 Task analysis of photocopying system

Task analysis steps
1. Open folder
2. Take the original from the folder
3. Place the original in the copy feeder
4. Press the reset button
5. Enter the number of copies to be made
6. Press the start button
7. Take the originals from the machine and place them in the folder
8. Take the copies from the machine and place them in the folder
9. Press the reset button
10. Put the folder of the completed job in the finished basket (done for each job)

The task analysis repeated for each copy job presented during a session

the next step when possible (e.g., placed the document to be copied upside down in the feeder, hit the wrong number of copies to be made, did not clear the previous copy job by hitting the reset button). In addition, they were permitted to complete steps out of order when possible (e.g., enter the number of copies to be made and then put the original document in the feeder). If a participant made continuous mistakes for 10-s on a critical step in the task analysis, a researcher stopped that copy job and instructed the participant to start with the next copy job. A critical step was one that must be completed before the next step can be performed (e.g., enter the number to be copied on the keypad vs. the LCD panel, placing the document to be copied in the feeder vs. on top of the feeder, pressing the start button vs. pressing the reset button).

During 1–2 baseline sessions, the two-way radio and earbud speaker was placed on the participants to probe any reactivity they might have had in response to the equipment. For Jason and Shaun, this was session five, and they were not reactive to the equipment. For David, two probes were conducted at sessions five and six because the first probe session demonstrated a slight increase in accurate responding. The second probe session, however, showed a decrease in accurate responding suggesting variability was not a result of the radio equipment.

Baseline sessions were conducted until stability was achieved. For this study, stability was defined as 80 % of the data occurring within 20 % of the median for at least five sessions (Gast and Spriggs 2010). The intervention was applied to the first participant whose data stabilized.

Once baseline measures were completed, each participant was instructed on how to wear the two-way radio and earbud speaker. A researcher explained to the participants that loud volume could injure their ears, and because of this, participants were instructed to tell a researcher if the volume was ever too loud for them or was uncomfortable. In addition, a researcher conducted volume checks with the participants before each session to determine if the volume was comfortable and that the coaching statements could be heard through the earbud speaker. All coaching statements were spoken at a low volume.

Intervention sessions consisted of delivering one of three statements including support, antecedent prompts, and corrections. Support statements were delivered at the end of each copy job regardless of participants' accuracy. Antecedent prompts were concise and specific statements given once the participant made two consecutive errors on the same task analysis step. Specifically, antecedent prompts were given immediately before the third opportunity to emit that step. Correction statements also consisted of concise and specific statements delivered as a consequence each time an error occurred. No other statements were made during this condition. While delivering

the coaching statements, the coach and data collectors stood approximately 23 feet away from the participant. This was done so that the coaching statement could only be heard through the ear bud speaker. In addition, the distance allowed the coach and data collectors to see the key pad and discriminate the keys pushed. The intervention continued until the data were stable and the participants achieved 90 % or better accuracy for at least five consecutive sessions.

Follow-up conditions were conducted identically to baseline. Sessions were conducted each week for 3 weeks (Jason and Shaun). David's data showed a descending trend in accuracy during the first two weekly follow-up sessions. Therefore, the intervention was reintroduced. Following David's data stabilizing at or above 90 %, the intervention was withdrawn and follow-up sessions were conducted weekly for 3 weeks.

Experimental Design

A multiple baseline design across participants was used. There were three conditions for two of the participants, including baseline, intervention, and follow-up (three weekly probes following the removal of the independent variable). For the remaining participant, an additional intervention condition was added since his performance during the first two follow-up probes showed performance degradation. Following this participant's data stabilizing in the second intervention condition, three weekly follow-up probes were conducted.

Interobserver Agreement

Independent observers recorded data on the dependent variable for 44.7 % of the sessions. These data were collected across all conditions and participants. Point-by-point agreement was used to determine reliability (Kazdin 1982). Both observers had to score the same code on the same step for an agreement to be scored. Agreement was calculated by dividing the number of agreements by the number of agreements and disagreements and then multiplying by 100. The mean agreement on the dependent variable was 98.4 %, with a range of 80–100 %.

Results

Intervention Fidelity

Data on procedural fidelity provides evidence that the independent variable was delivered as intended (Gast 2010). Fidelity data were collected simultaneously with interobserver agreement (IOA) data. Independent observers

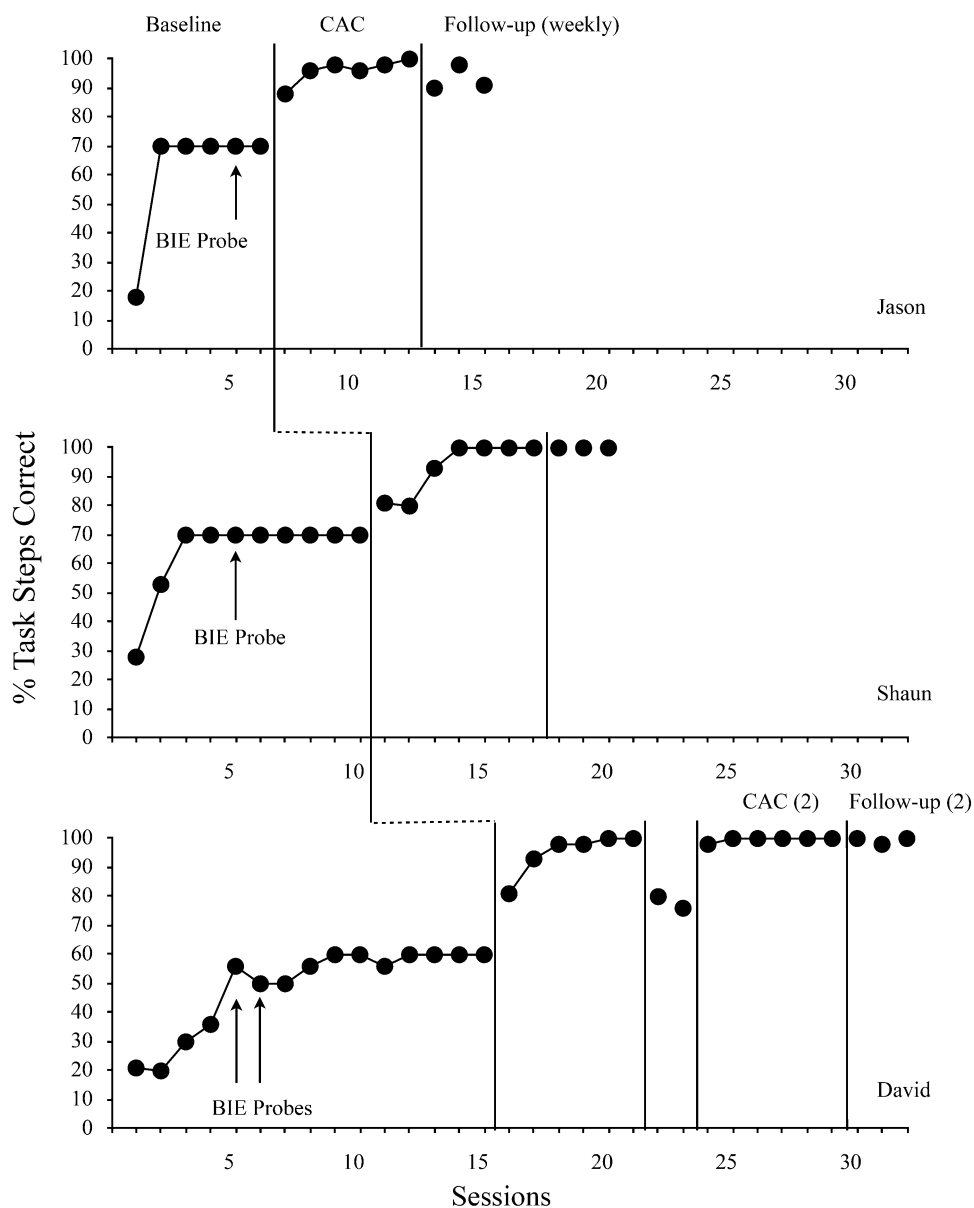
recorded data on the coach’s delivery of the independent variable (support statements, antecedent prompts, and correction statements) for 44.7 % of the sessions. Fidelity was calculated by dividing the number of observed behaviors of the coach by the number of planned behaviors and multiplied by 100 (Gast 2010). There was 100 % agreement that coaching statements were not delivered during baseline and follow-up sessions. During the intervention condition, the overall agreement on all coaching statements was 97.4 %, ranging from 0 to 100 %. Note that during the fidelity checks there were only two opportunities to observe antecedent prompt statements delivered. One of these was recorded by the independent observer as occurring after the participant’s behavior (as a correction) instead of occurring before it (as an antecedent prompt).

When photocopying, it is important to note that the temporal sequence of recording an antecedent or consequence can occur in less than 2-s for some steps; this was the case during this fidelity check. The only other procedural error was an antecedent prompt being delivered when it should not have been. That is, it was delivered when the participant had not made two consecutive mistakes on the same step.

The effectiveness of CAC on the students’ accuracy of making photocopies is displayed in Fig. 1. During the first several sessions, ascending trends were evident for each participant. However, these data stabilized before CAC was introduced.

The first graph of Fig. 1 displays Jason’s data. His baseline data revealed a stable performance from sessions

Fig. 1 Percentage of task analysis steps completed correctly (photocopying)



two through six achieving only 70 % accuracy. Once CAC was introduced, his accuracy level immediately increased and stabilized between 98 and 100 % for five consecutive sessions. The weekly follow-up probes indicated that his performance maintained above 90 % for 3 weeks following intervention.

The second graph of Fig. 1 shows Shaun's performance. His baseline also stabilized for eight sessions after the initial ascending trend. Shaun also achieved no better than 70 % accuracy during baseline. However, when CAC was introduced, there was an immediate level shift and his accuracy steadily improved over several sessions. For the final four sessions, he performed at 100 %. Furthermore, his skills maintained at 100 % during the weekly follow-up probes.

David's data is depicted in the third graph of Fig. 1. After the initial increasing trend during baseline, the last 11 sessions demonstrated stable responding. David performed no better than 60 % accurate during this condition. The introduction of CAC produced an immediate improvement in his task performance. He scored above 90 % within two sessions and maintained at 98–100 % accuracy the following four sessions. Once CAC was removed, David's performance decreased during the two weekly probes showing difficulties with maintenance. When CAC was reintroduced, his accuracy increased and maintained at 100 % for five consecutive sessions. The second attempt to withdraw the treatment was successful as he maintained his accurate responding between 98 and 100 % for 3 weeks.

Finally, percentage of non-overlapping data (PND) among baseline and intervention sessions was calculated for each participant. Gast and Spriggs (2010) reported that higher PND suggests that the independent variable (i.e., CAC) has a greater affect on the dependent variable (i.e., accurate photocopying). For this study, PND equaled 100 %.

Discussion

The purpose of this investigation was to explore the effects of CAC on the development of employment skills for secondary students with ASD. The results support the conclusion that CAC was effective in helping students with ASD develop photocopying skills. The results also showed the participants maintained their skills for several weeks following the intervention, with the exception of David who required additional training before his skills maintained at a level of mastery.

One important feature of the data that must be discussed is the ascending trends observed during baseline. Each participant showed initial improvement with the data stabilizing thereafter. All participants had previous experience

learning to operate a copy machine with support and prompts from their teachers. The selection of students with past experience with the skill was deemed necessary as our purpose was to explore skill enhancement, not initial acquisition. It is possible that participants were adjusting to using the copy machine without any teacher support, as they were given materials and asked to make photocopies without any other assistance. It is also possible that the participants were reactive to the researchers during these initial sessions.

Another possibility involves an examination of how chains of behavior operate. Cooper et al. (2007) describe a behavior chain as, "... a specific sequence of discrete responses, each associated with a particular stimulus condition" (p. 435). Since a chain is comprised of stimuli that both evoke behavior and reinforce it, it is possible that the participants were exposed to a type of trial and error learning opportunity absent of adult instruction. That is, features of the chain began to set the occasion for and select the correct behaviors. For example, David placed the original document to be copied upside down and a blank copy was produced. On the next trial, and each one thereafter, David placed the original document right side up with a completed photocopy being produced, potentially functioning as reinforcement. Furthermore, certain steps in this chain had to occur in sequence while others did not.

For instance, a participant must enter the number to be copied before pressing the start button. However, a student can put the original document in the file folder before or after the copied documents and the outcome of the job would not be affected. Considering the features of behavior chains, it is possible that the students learned to emit some steps on their own, especially those steps that were required to be carried out in order and where immediate results were produced and natural consequences might have been experienced. Notwithstanding the initial baseline data, each participants' performance stabilized and showed they could only reach a certain level of accuracy, and the proficiency level achieved without additional intervention would not have been acceptable in authentic places of employment.

Once CAC was introduced, each participant made immediate improvements with mastery occurring within several sessions. Jason's accuracy had an initial increase of 18 %. He scored above 90 % during the second session and maintained that level of performance for the remainder of the intervention sessions. His performance during the follow-up sessions maintained at or above 90 % (the criteria for mastery for this study) for three consecutive weeks. Shaun's accuracy showed a more modest initial increase of 11 %. However, he quickly achieved 100 % and maintained that level during the weekly follow-up probes. David's initial increase in accuracy was 21 %. Similar to the other participants, he achieved mastery and maintained

that level throughout the intervention condition. However, his skills deteriorated quickly once the intervention was withdrawn going well below the 90 % mastery level. Thus, CAC was reintroduced and his performance immediately improved to 98–100 %. Importantly, only one correction statement was given during this condition. The second attempt to remove the intervention was successful with his skill set maintaining well above the 90 % criterion level. These results were similar to that of Bennett et al. (2010). In that study, the participants' performance on work tasks improved immediately and demonstrated maintenance during several weeks of follow-up sessions. Similar findings have been reported by others implementing performance feedback delivered covertly with varying populations (Korner and Brown 1952; Baum and Lane 1976; Goodman et al. 2008). More germane to the point is that the current investigation, along with Bennett et al. (2010) and Price et al. (2002), provides an additional example of CAC being successfully implemented with people with disabilities, especially those learning work tasks via coaching.

Traditional Coaching and CAC

Traditional, side-by-side, coaching and CAC share similar features. First, both methods require the arrangement of the participant's work environment (e.g., preparation of materials, task analysis of skills, etc.). Second, both methods require another person (e.g., job coach, teacher, co-worker, or supervisor) to observe the participant perform their job duties. Third, they both require systematic delivery of coaching tactics (e.g., prompts, support statements, correction statements, etc.). Next, both methods require the coach to monitor and adjust their coaching tactics as the participant's performance changes (e.g., improves or declines). Finally, both methods require the coach to implement a prompt fading strategy to ensure independence.

Despite these similarities, there are two noteworthy differences. First, CAC only uses verbal coaching statements including prompts, support statements, and correction statements. Clearly, this difference will limit the use of CAC to those individuals who have a receptive language repertoire developed enough to benefit from verbal coaching. Second, CAC must be delivered from a distance so that the person can only hear coaching statements through the ear bud speaker. Considering that job coaches struggle to fade their support from employees with disabilities without specific training to do so (Parsons et al. 1999), this feature in particular may offer a distinct advantage to traditional coaching in that it forces the coach to provide feedback from a distance, and thus, fade their proximity.

Another important aspect of CAC is that the coaching appears to fade automatically. That is, as participants become more proficient at their task, the coach provides fewer correction and antecedent prompt statements. This can also be said of traditional coaching. However, this feature combined with the inherent distance between the participant and the coach seems to facilitate the fading of the performance feedback leading to greater independence. This is of particular importance for students with ASD as many of these individuals tend to over rely on prompts when not faded correctly (MacDuff et al. 2001).

An additional advantage is that the equipment used to deliver CAC, as well as the tactics, seem to match naturalistic work site conditions. Indeed, some large retail stores, and other businesses, require their employees to wear two-way radios with ear bud speakers presumably to improve communication and work productivity. Moreover, the support offered to secondary students participating in community-based instruction (CBI) may, at some point, be less dense than that offered once they are employed and receiving services from an adult agency. The supports offered by school or agency personnel should transfer to features of the natural environment, such as coworkers (Rogan et al. 2007). Thus, it seems prudent to prepare some students to use similar communication equipment, become accustomed to receiving verbal feedback, and to be able to perform their job duties with less support from others.

It is now well known that this population has difficulty obtaining and maintaining employment (The President's Committee for People with Intellectual Disabilities 2009; Holmes 2007), requires service beyond what is given in school (Cimera and Cowen 2009), and struggles with independence while at work (Parsons et al. 1999). As a matter of policy, the Individuals with Disabilities Education Improvement Act (2004) mandates educational services to prepare students with disabilities for post school life, including employment. Furthermore, the No Child Left Behind Act mandates that educators implement evidence-based practices when teaching students (Odom et al. 2005). Although it cannot be claimed to be an evidenced-based practice at this point, the developing research on the application of CAC with people with disabilities suggests that it might be a viable tool for teachers and job coaches to use to build skills while fading assistance and proximity. Clearly, additional research will determine its merit as an evidenced-based practice.

As a practical matter, traditional coaching and CAC may not be mutually exclusive and incompatible. Perhaps side-by-side coaching is a first step that transitions to CAC to facilitate independence. It is also conceivable that a participant vacillates between both types of coaching. That is, if there are difficulties evoking the correct responses

through CAC, perhaps the coach can temporarily revert to a side-by-side model until the problem is resolved. Thus, it seems that CAC has the potential to be part of an overall intervention package for students and employees with disabilities learning employment skills.

Parameters of CAC

Several aspects of delivering the coaching statements warrant further examination. First, support statements were delivered following the completion of each copy job. That is, one praise statement was delivered after 10-steps regardless of how successful the participant was at the copy job. This differed from other studies where support statements were delivered contingent on accurate responding as well as on more dense intermittent schedules (e.g., Bennett et al. 2010; Mechling et al. 2009). One factor that necessitated this feature of the current study was that some behaviors in the photocopying chain occurred within very close proximity to each other. Indeed, several steps (e.g., put the document in the feeder, press reset, enter the number to be copied, and press start) can occur within just a few seconds. Delivering support statements at that rate could be cumbersome for the coach and potentially confusing for the participant. Furthermore, the support statements were general statements and did not specify the exact behavior in the chain receiving support. Participants were simply told, “good work making copies”, or “you are doing good work.” Additionally, these statements were made at the end of each copy job irrespective of the participants’ accuracy with completing that job.

Considering that participants quickly mastered the skill, one must question the role support statements may or may not have played while coaching this chain of behaviors with these participants. It is possible that correction and antecedent prompt statements combined with the features of how behavior chains develop are more responsible for the behavior change. This is not to say that support statements should be limited. Certainly, students should receive encouraging statements as they are learning skills. Rather, this becomes a question of how best to use support statements and is particularly important when attempting to make coaching as efficient as possible to reduce the task loading of the coach and any potential over stimulation of the participants.

Limitations and Future Research

There are several limitations to this study. As with any single subject design, the issue of external validity must be considered until enough studies have replicated the effects (Horner et al. 2005; Kratochwill et al. 2010). First, only

three individuals were included in the study making it difficult to know if similar results would be seen among other participants. Perhaps individuals with ASD who have a limited receptive language repertoire might have difficulty achieving similar gains. Second, only one work task was investigated. It is possible that some tasks may be more or less amenable to CAC, a consideration that was also noted by Bennett et al. (2010). Another limitation was that the follow-up sessions only covered a period of 3 weeks post-intervention. It is not known if the participants’ skills would have maintained or degraded after a span of months, or longer. As a corollary, this limitation restricts any prediction to which other individuals would maintain the skill for periods exceeding 3 weeks following the withdrawal of the intervention. An additional limitation was that during baseline sessions, a copy job was stopped after 10-s if a participant made repeated mistakes on a critical step. Although participants were permitted to complete the task steps out of order as well as continue with the chain if a previous step was performed incorrectly, it is possible that limiting the emission of critical mistakes to 10-s was premature and additional task steps could have been performed during baseline. An important consideration, however, is that sessions were not stopped after 10-s. Rather, the participants were instructed to start the next copy job if one was available. Thus, participants were given several opportunities during each session.

Additional studies are needed to replicate these findings with other individuals with ASD, with this particular clerical skill, and with other employment skills potentially amendable to CAC. Future research should also examine maintenance for more extensive periods allowing an analysis of the long-term durability of skills coached using this tactic. Future investigations might also seek to explore this tactic with students participating in community-based instruction. Such research could allow an examination of the parameters of using CAC with secondary students with ASD in a community setting. Subsequent studies might also examine the combined use of traditional, side-by-side, coaching with CAC. Such inquiries might be useful among individuals who are struggling with independence using the traditional model. Lastly, other researchers should investigate the parameters of coaching and feedback. Specifically, the function of support statements should be examined. It may be that dense levels of support statements are needed under certain circumstances, while leaner levels of support may be sufficient under other situations. Information learned from such investigations will help determine the utility of CAC as well as further define the parameters with which it is best used.

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