Using Literacy-Based Behavioral Interventions and Social Stories to Improve Work Behavior in Employees with Developmental Disabilities

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Abstract: This study was designed to examine the effects of Literacy-Based Behavioral Interventions and social stories to improve the work behavior of employees with developmental disabilities. Two experiments were conducted. In the first experiment a multiple baseline across subjects was used to examine the effects of the intervention on employees’ requests for materials and supplies, and any resulting improvements in their work engagement. The second experiment employed a multiple baseline across time periods, with an embedded ABAB design, to assess whether the intervention would increase independence and improve “on-time” return-to-work. Results showed that employees with developmental disabilities made substantial improvements in their work behavior as a result of the Literacy-Based Behavioral Intervention, and similar improvements were observed in co-workers as well.

Many people with developmental disabilities have learning and performance problems that interfere with their roles in employment and other community settings. These individuals frequently have difficulty developing fluent work routines, or generalizing the skills needed for community settings, including work settings (Brady & Rosenberg, 2002; Langone, Clees, Oxford, Malone, & Ross, 1995). These problems often affect the ability of people with disabilities to obtain and maintain meaningful employment.

There are a number of interventions available that promote learning and performance in people with developmental disabilities. For example, the literature is replete with instructional strategies based on direct instruction (Storey, 2002), strategy instruction (Fletcher & Bray, 1995), peer supports (Hughes & Carter, 2000), video and audio coaching (Lasater & Brady, 1995), self-management procedures (Lancioni & O’Reilly, 2001), and other approaches. Each set of instructional strategies has a knowledge base grounded in solid empirical work, and each has helped adults with developmental disabilities acquire and generalize a wide range of skills and behavioral routines across various community environments.

Within the last decade, another strategy has included Literacy-Based Behavioral Interventions (LBBI). LBBI incorporates the fundamental principles of behavioral self control, along with practice opportunities and prompts to respond, into text media. Although examples of LBBI include cartoon strips, reflection journals, social scripts, and multimedia stories (Ganz, Tap Scott, & Earles-Vollrath, 2006; Hagiwara & Myles, 1999; Rogers, & Myles, 2001; Thiemann, & Goldstein, 2001), the most common example of an LBBI to date involves social stories (Gray, 2000). Social stories typically have been used to teach social skills or as a behavior management technique.
Social stories are short stories which describe situations which pose behavioral challenges to individuals. The stories are used to allow an individual to examine the sequence of events leading up to a challenging situation, and then follow a strategy for resolving it (Gray, 2000). These stories were originally developed as a means for improving the social understanding of students with autism spectrum disorders when faced with challenging events (Gray & Garand, 1993), and guidelines for their development and use have been advocated. These guidelines include a typology of social story sentence structures and directions governing the ratio of sentence types.

Despite their popularity in practice, the empirical evidence to support the use of social stories is limited (Delano & Snell, 2006; Sansosti & Powell-Smith, 2004). Many claims of success have relied on anecdotal reports, and little evidence exists to support the guidelines and directions for their development. Currently, the strongest empirical support for social stories involves their use with children with autism and Asperger syndrome, and generally has been limited to behavior management outcomes (Bledsoe, Myles, & Simpson, 2003; Ivey, Hefflin, & Alberto, 2004; Kuttler, Myles, & Carlson, 1998; Swaggart et al., 1995).

Only two published reports exist that extend social stories to populations not on the autism spectrum. In the first, a case study, Moore (2004) used a social story intervention for a 4-year old boy with learning disabilities who had problems sleeping. The boy would only sleep in his parents' room with his mother, took up to two hours to fall asleep, woke several times during the night to demand milk, and woke very early each morning. If any of these demands were not met, the result was a tantrum of screaming and aggressive behavior. A social story was written to outline a new bedtime routine and explain the positive consequences (a sticker for each “good night”) for cooperation. Stickers could be traded in for a visit to the treat box. Anecdotal results indicated that the child accepted the new sleep arrangements with little difficulty. In the second report, Toplis and Hadwin (2006) expanded the use of social stories to five students not identified as having any disability. The youngsters displayed challenging behavior during lunchtime. The researchers used an ABAB design to evaluate a social story using Gray's (2000) basic sentence ratio on entering and taking a seat in school cafeteria within two minutes of being dismissed from class. This study found social stories to be effective for three out of the five children who participated in the study.

If social stories and other LBBIs are indeed an effective tool for individuals with other types of disabilities (including learning, emotional, cognitive, and language disabilities) in a wide variety of situations (Gray, 1995), then a research base of effective demonstrations is needed. The purpose of this study was to expand the research on the use of social stories and Literacy-Based Behavioral Interventions. Two separate studies were conducted. Experiment One addressed the following two research questions: 1) Will a social story intervention improve work behavior for employees with mental retardation or other developmental disabilities? and 2) Will a social story intervention have any impact on the participants’ co-workers in close proximity?

The research question for Experiment Two was: Will a Literacy-Based Behavioral Intervention reduce the level of prompting needed to improve the work behavior of an employee with mental retardation?

Experiment One

Method

Participants

Two women with mental retardation participated in Experiment One. These women were selected from a pool of 10 employees who were nominated by a supervisor based on having work related skill deficits. Criteria for participation included: (a) need for skill improvement in at least one critical employment behavior, (b) willingness to participate, (c) ability to discuss the content of a work-related story and demonstrate the targeted behavior, (d) written diagnosis of mental retardation, (e) employment for a minimum of five hours per day, and (f) regular work attendance.

Ruby and May were 48 and 26 years old respectively. Ruby had worked at the job site for 18 years, had a recorded IQ of 29, and...
took Depakote daily. May had two years work experience at the site, had a recorded IQ below 59, and took no medication. Neither participant could read, however, both could print their first names. Both women could recognize some letters of the alphabet.

Two co-workers in closest proximity to Ruby and May also were observed. Jay was Ruby’s nearest co-worker, and sat diagonally across the work table from her. Jay was a 48 year old woman with mental retardation and a physical impairment which impaired her ability to walk. Winnie was May’s closest co-worker, and sat directly across from May at the work table. Winnie was 46 years old and also was diagnosed with mental retardation. Both worked at the workshop for at least 11 years.

Setting

Ruby, May, Jay, and Winnie were employed 7 hours per day in a sheltered work setting. Their employment consisted of mass mailings or assembling products, and they were paid for each item they completed. Ruby and May both worked in the same large workroom, but at separate tables, with a different work supervisor assigned to each table. When the social story intervention was implemented, it was done in a separate area located approximately 200 feet from their work table. This private location allowed the story to be read and discussed without distraction.

Task Selection

The Jobs Observation and Behavior Scale (JOBS) (Rosenberg & Brady, 2000) was administered by a work supervisor to select employment skills for improvement. Ruby and May earned their lowest Quality of Performance scores on the JOBS’ Work-Related Behavior subscale. The Quality of Performance scale ranges from 1-5, where 1 indicates that the performance is not acceptable for competitive employment, and 5 indicates that the performance is superior. Four of nine items on this subscale earned ratings of two or below for Ruby, and five of May’s items earned this rating. Based on the JOBS ratings, consultation with the work supervisor, and direct observation, the skill selected for the social story intervention for Ruby and May was Requesting Additional Materials or Supplies.

Behavioral Measures

Three dependent variables were selected for each employee. Making a Request was identified as the primary dependent variable for both Ruby and May. Making a Request was defined as verbalizing a direct, specific question or statement to the table supervisor related to (a) requesting assistance (e.g., “Can you help me?”), (b) asking for more supplies or materials (e.g., “I need more boxes”), (c) asking for a break (e.g., “Can I go to the bathroom?”), or (d) when the employee gestured to the table supervisor for assistance or attention.

Data also were collected on two other behaviors: Peer Interactions and Work Engagement. Both of these behaviors were recorded to determine whether demonstrating initiative at work might affect other related behaviors. Peer Interactions were defined as any socially appropriate participant interaction with another employee. This included initiating or responding to other employees verbally or physically (e.g., tapping someone’s shoulder, handing materials to a co-worker, speaking to a co-worker). Work Engagement was defined as any independent or cooperative work on an assigned task, while actively using the materials required for the work task. This included touching and manipulating the materials necessary to complete the task.

Data Collection

A partial interval recording system was used to collect data on Peer Interactions, Work Engagement, and Making a Request. A 15-minute observation session was established during which observers recorded whether or not Ruby, May, and their co-workers displayed any of the target behaviors. Participants were observed for 10 seconds, followed by an additional 10 seconds to record the observations. For the code Making a Request, observers recorded each occurrence of a request. Resulting data produced a record of the number and percent of intervals during which Peer Interactions and Work Engagement were observed, and a total frequency of all Requests. Data on Making a
Request were converted to “rate of requests” by dividing the number of requests by the total time in which the behavior was observed.

Data for the co-workers were collected in the same manner as for Ruby and May. Jay was simultaneously observed with Ruby during the observation sessions. Winnie was simultaneously observed with May during her observation sessions. Both co-workers were observed on every session.

Interobserver agreement. An investigator and a graduate student in special education served as the observers. Both observers were trained to collect data by observing workers at a university library. Observations began only when both observers reached at least 80% agreement on each behavior code. During the study, the agreement checks were conducted with both observers standing behind and to the side of the employees. This allowed the observers to hear the recorded prompts to look and record, but assured that their data collection sheets were not observable to one another.

Interobserver agreement for Work Engagement and Peer Interactions was calculated by totaling the number of intervals in which both observers recorded the target behavior, dividing that total by disagreements plus agreements, and multiplying the result by 100 (Kennedy, 2005). Interobserver agreement for Making a Request was calculated by comparing each request occurrence, dividing the agreements by the disagreements plus agreements, and multiplying the result by 100 (Kennedy). This resulted in an exact agreement score for the frequency of requests. Agreement checks were conducted for 40% of Ruby’s sessions, and 42% of May’s sessions. The mean agreement across all participants and all behavior codes was 95%. A summary of the interobserver agreement for each dependent variable is presented in Table 1.

**Experimental Procedures**

Experiment One consisted of four phases. The first phase included participant selection, pre-assessment, task selection, and creation of the data collection system. The second phase included baseline. During baseline, participants continued their daily work routines without any intervention or direction other than those which had been provided prior to
this experiment. During this phase individual social stories were prepared for each participant. The social stories for Ruby and May were written following Gray’s (2000) proscribed sentence ratio, and were within the employees’ levels of listening comprehension. Unlike the line drawing illustrations advocated by Gray, Ruby and May’s social stories included interspersed photographs depicting them and their co-workers engaged in work behavior, or requesting more work. The photographs also depicted their supervisors showing approval of their positive work behavior. Ruby’s social story consisted of six descriptive sentences, two perspective sentences and two directive sentences. May’s social story contained nine descriptive sentences, one perspective sentence, and two directive sentences. Social stories were created in a book format with one or two sentences, and one or more photographs on each page.

The third phase, delivery of the social story intervention, was implemented independently for Ruby and May. During the intervention a personalized social story was read to the employees by an investigator. After reading the story the employee and investigator discussed the story, and the employee was asked to model the target skills. Each employee then returned to their assigned work station and asked to complete their work. At this time the observer(s) began the observation session.

The fourth phase included follow-up observations to determine whether the primary target behavior, Making a Request, had been maintained once the story was no longer read to the women. The follow-up observations occurred 10 and 11 weeks after the social story intervention had been removed for Ruby, and 6, 9, 10, and 11 weeks after the social story intervention had been removed for May.

Experimental Design

A multiple baseline design across participants was used to evaluate the effects of the social story intervention on the work behavior of both employees. Baseline data for Ruby were collected until the social story intervention was implemented on session 7. On session 20 Ruby’s intervention was withdrawn and follow-up observations were made to assess potential maintenance. For May, baseline data were collected until the social story intervention was implemented on session 11. May’s intervention was withdrawn on session 24.

Results

Figure 1 depicts the rate of requests made by each employee, and shows the direct effect of the social story intervention. Figure 2, the employees’ Work Engagement and Peer Interactions, shows the extended impact of the intervention and requests on the two additional target behaviors. Comparing the information on both figures demonstrates the cumulative impact of the intervention on work engagement and productivity.

**Figure 1: Request rates.** The top graph in Figure 1 shows the rate of requests for Ruby, the first employee to receive the social story intervention. During baseline, Ruby seldom requested work or materials (.13 requests per minute to no requests at all). When the intervention was introduced, Ruby’s request rate increased immediately. Throughout the intervention, her requests were variable but substantially increased; on 12 of 13 days of intervention, Ruby’s request rate was consistently at .4 per minute or higher. On the two observations after the intervention was removed, Ruby’s rate of requests again varied from .93 on the first follow-up day to .13 on the second day.

May’s request rate (bottom graph in Figure 1) during baseline ranged from a high of .27 requests per minute to a low of zero. When the social story intervention was applied, May’s requests increased immediately. On 6 of 13 days May made at least .48 requests per minute, and on the remaining days her request rate equaled her highest rates during baseline. During the follow-up observations after the intervention was removed, May’s rate of requests ranged from 0 to .67.

**Figure 2: Work engagement and peer interactions.** To understand the effect of the social story intervention more fully it is necessary to examine two other variables: Work Engagement and Peer Interactions. The top graph in Figure 2 shows the Work Engagement and Peer Interactions for Ruby. During baseline, Ruby’s work engagement was uniformly low (zero work on three of the six days). When the intervention was provided, Ruby’s work engagement in-
creased steadily and dramatically, and remained high during the follow-up observations (96% and 100% engagement). The social story intervention had an opposite effect on her peer interactions. During baseline, Ruby’s interactions with co-workers was quite variable (2% to 38%), but remained at or above 27% on three of the six baseline days. When the intervention was introduced, Ruby’s peer interactions gradually and steadily dropped, and remained at or below 13% on 10 of the 13 days. Her interaction level remained low during the follow-up observation (7% and 2%).
May’s work engagement (bottom graph in Figure 2) showed substantial variability during baseline (0 to 73%). On five out of 10 baseline days, May’s work engagement was below 25%, and on 8 days her work engagement was below 50%. After the social story intervention was
introduced, May’s work engagement remained at 78% or higher for all but one day, and on 8 of the 13 days she was engaged in work at least 90% of the time. This increased work engagement maintained during the follow-up observations (at or above 93% on all four days). Like Ruby, the intervention had an opposite effect on May’s interactions with peers. Although her baseline interactions were variable (0 to 73%), her interaction reached or exceeded 16% on five of 10 baseline. When the intervention was provided, May’s interactions reduced substantially, with interactions at or below 4% on 10 of the 13. During the follow-up sessions May interacted with her co-workers between 0 and 20% of the time.

Taken together, results shown in Figure 1 and Figure 2 indicate that when the social story intervention was introduced each employee showed a marked improvement in their work behavior. As each employee’s requests for work, assistance, or materials increased, the percentage of Work Engagement also increased. Furthermore, as the Work Engagement and Requests increased, the Peer Interactions reduced substantially.

Impact co-workers. Although the social story interventions did not include Ruby and May’s co-workers, nor did the co-workers receive any part of the intervention, their Work Engagement and Peer Interactions were observed to assess any potential extended effects from the changes in Ruby and May. Results of the observations of the co-workers are found in Table 2.

During Ruby’s baseline, her closest co-worker, Jay, engaged in work just over 25% of the time. Jay increased her work to more than 55% when the intervention was implemented with Ruby, and yielded 100% engagement during Ruby’s follow-up session. Ruby’s intervention had an opposite effect on Jay’s interactions with co-workers. During Ruby’s baseline, Jay interacted with her co-workers an average of 3% each day. This level of interaction decreased to near zero when the intervention was implemented for Ruby. She did not interact with co-workers at all during Ruby’s follow-up.

A similar pattern was seen with Winnie, May’s co-worker. During May’s baseline, Winnie’s average work engagement was 56.3%. When the intervention was implemented with May, Winnie increased her Work Engagement to 95.3%, and averaged 100% during May’s follow-up.

### TABLE 2

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>Intervention</th>
<th>Follow-Up</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Jay (Ruby’s co-worker)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peer Interactions</td>
<td>Mean</td>
<td>3%</td>
<td>0.2%</td>
</tr>
<tr>
<td></td>
<td>Range</td>
<td>0–7%</td>
<td>0–2%</td>
</tr>
<tr>
<td>Work Engagement</td>
<td>Mean</td>
<td>25.5%</td>
<td>55.6%</td>
</tr>
<tr>
<td></td>
<td>Range</td>
<td>0–98%</td>
<td>0–100%</td>
</tr>
<tr>
<td><strong>Winnie (May’s co-worker)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peer Interactions</td>
<td>Mean</td>
<td>1.6%</td>
<td>0.4%</td>
</tr>
<tr>
<td></td>
<td>Range</td>
<td>0–13%</td>
<td>0–5%</td>
</tr>
<tr>
<td>Work Engagement</td>
<td>Mean</td>
<td>56.6%</td>
<td>95.3%</td>
</tr>
<tr>
<td></td>
<td>Range</td>
<td>11–100%</td>
<td>64–100%</td>
</tr>
</tbody>
</table>

Like Jay, Winnie also decreased her interactions with co-workers from 1.6% to 0.4% corresponding to May’s baseline and social story interventions. Her interactions with co-workers increased, however, during May’s follow-up observations (4.5%).

### Summary: Experiment One

The specific goal of Experiment One was to determine whether the Literacy-Based Behavioral Intervention, specifically a social story would increase Ruby and May’s requests for work, and if so, whether there would be any further impact on their actual work engagement, or reduction in their interactions with co-workers. Additionally Experiment One explored the potential impact of the intervention and the increases in Ruby and May’s work behavior, on co-workers in close proximity. Results showed that Ruby and May’s requests for work, and their actual work behavior, increased significantly. Results also showed that their interactions with co-workers, a variable reported by their supervisors as interfering with their work, reduced as their work engagement increased. Both women had been nominated for this study by their work supervisors because when they were not actively engaged in work, they would wander off, distract other employees, daydream, and at times became argumentative. Increasing their work engagement reduced helped to reduce these prob-
lems with co-workers. Finally, the LBBI also had an impact on the work engagement and peer interactions of Ruby and May’s co-workers in closest proximity. As Ruby and May increased their work productivity and decreased their interaction with co-workers, the co-workers also increased their productivity.

Although the results of Experiment One were quite positive, they also led to new questions. While both employees had significant cognitive disabilities, both were able to communicate fluently with co-workers and supervisors, and were familiar with written language (although neither could actually read). To extend the intervention to people with more significant disabilities, it seemed apparent that significant alterations in the design of the intervention would be needed to respond to more complex language and cognitive characteristics. Therefore, Experiment Two was implemented to extend the intervention to another employee with more complex disabilities, and with other employment challenges including a high need for prompts. In addition, in Experiment Two, the ratio and design of the literacy-based intervention were modified substantially from the formula and guidelines advocated by Gray (2000).

Experiment Two

Method

Participant

Lou, a 57 year old man with Down syndrome, was selected to participate in Experiment Two. Lou had worked at the job site for 4 years, and had a recorded IQ of 30. He did not take any regular medication. Lou was able to recognize his first name in print, print his first name and last initial, identify 12 letters of the alphabet, and name 9 different numerals. Lou communicated in one, two, and three word utterances, many of them short phrases he used repeatedly for different situations. Lou was selected from a pool of four employees who were nominated by a work supervisor as most in need of support for their employability challenges. Criteria for participation included: (a) need for skill improvement in at least one critical employment behavior, (b) willingness to participate, (c) ability to respond to the content of a work-related story and demonstrate the targeted behavior, (d) written diagnosis of severe mental retardation, (e) employment for a minimum of five hours per day, and (f) regular work attendance.

Setting

Lou worked in a sheltered work setting with vocational training programs in culinary production, mailroom skills, custodial management, and computer data entry. Lou worked in a mailroom training area with two supervisors. The LBBI was provided to Lou in a private location in the cafeteria near the mailroom. In addition, Lou took his morning break in that cafeteria, and ate lunch in a separate break room. On some days Lou would take his morning break and lunch outside at a picnic table. All of these locations were within 300 yard of the mailroom.

Task Selection

As in Experiment One, a work supervisor administered JOBS to select employment skills for improvement. Lou scored low in all the JOBS’ subscales categories, with Quality of Performance scores of 2 or below on 8 of 13 Work-Required Daily Living Activities items, 9 of 9 Work-Required Job Duties items, and 2 of 8 Work-Required Behavior items. Based on the JOBS’ results, workroom supervisor recommendation, and through observation, Returning to Work at a more independent level after morning and lunch breaks was identified as the target work behavior for Lou.

Behavioral Measures

Returning to Work was defined as Lou leaving the break or lunch area, walking to his mailroom, and entering the room. The length of time in minutes to return to work from the break area also was recorded. Third, the prompt level necessary to get Lou to return to work was recorded. The following prompt hierarchy was established to determine Lou’s level of independence when returning to work: (a) Independent Return to Work, (b) Social Return to Work, (c) Verbal Prompt, (d) Physical Prompt, and (e) Escorted Return. An Independent
Return to Work was defined as Lou cleaning up from his break, leaving the break room, and returning to his work table in the mailroom without a co-worker or supervisor providing him with any type of prompt to do so. Social Return to Work was defined as Lou returning to work along with one or more co-workers or supervisor in a social context, but without prompts to do so. A Social Return could include verbal interactions or walking along with co-workers or supervisors, in a social context, but without any direct or indirect prompts to return to work. Verbal Prompts were defined as any direct statement by a co-worker or supervisor to Lou telling him to return to work (e.g., “Lou, break is over, get back to work” or “Lou, it is time to go back to work”). Physical Prompts were defined as a co-worker or supervisor physically touching or directing Lou for an intermittent period of time to assist him to return to work. This included pulling his arm or hand, pushing his shoulder, or tugging on his shirt. Escorted Return was defined as Lou being taken back to work continuously by a supervisor or co-worker. Escorted returns frequently included verbal, and at times physical prompts.

Data Collection

Lou was required to return to work from break at 10:30 am and from lunch at 12:00 pm. Observations started three minutes prior to, and 15 minutes after Lou was scheduled to be back at work. Two data collection systems were employed. First, the frequency of each type of prompt given to Lou was recorded. Second, a latency system was used to record the number of seconds Lou returned late from his breaks. A digital watch which displayed the time with seconds was used to record the time Lou entered his mailroom following the end of break or lunch. If the time exceeded 15 minutes past the required time, the observation was stopped, and the observer recorded the time as 15/17 minutes.

Interobserver agreement. Agreement checks were conducted for Lou on 38% of the observation sessions. An investigator and a second employee with mild mental retardation at the work site collected all data. This individual worked as part of the environmental staff at the site, and at a local science museum as a guide for children who visited the museum. Observer training and practice was conducted prior to the study until observers reached 90% agreement or better on the codes. During the study, the two observers stood or sat several feet away from Lou during each break period to allow them to hear any comments made by co-workers or supervisors with respect to returning to work. Observers maintained a relatively close proximity, but were positioned so the individual data collection sheets were not observable to one another.

Agreement on the level of prompts was calculated by totaling the number of sessions in which both observers recorded a target behavior, dividing the total by disagreements plus agreements, and multiplying the result by 100. Agreement on time late to work was calculated by dividing the smaller amount of time by the larger amount of time, and multiplying by 100 (Kennedy, 2005). Overall agreement on combined codes was 90 %. Interobserver agreement results for specific codes are summarized in Table 3.

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<thead>
<tr>
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<th>Baseline</th>
<th>Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morning Break</td>
<td></td>
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</tr>
<tr>
<td>Social Return</td>
<td>Mean NA</td>
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<td></td>
<td>Range</td>
<td>(0–100%)</td>
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<tr>
<td>Verbal Prompt</td>
<td>Mean 94%</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>Range (83–100%)</td>
<td></td>
</tr>
<tr>
<td>Physical Prompt</td>
<td>Mean 100%</td>
<td>NA</td>
</tr>
<tr>
<td>Escorted Return</td>
<td>Mean 100%</td>
<td>NA</td>
</tr>
<tr>
<td>Lunch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social Return</td>
<td>Mean NA</td>
<td>100%</td>
</tr>
<tr>
<td>Verbal Prompt</td>
<td>Mean 90%</td>
<td>88%</td>
</tr>
<tr>
<td></td>
<td>Range (80–100%)</td>
<td>(75–100%)</td>
</tr>
<tr>
<td>Physical Prompt</td>
<td>Mean 50%</td>
<td>NA</td>
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<tr>
<td>Escorted Return</td>
<td>Mean 100%</td>
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</tr>
</tbody>
</table>
Experimental Procedure

Experiment Two consisted of five phases. The first phase included participant selection, pre-assessment, task selection, and creation of the data collection system. The second phase included baseline. During baseline, data were collected while Lou continued his daily break routines with his typical levels of prompting from supervisors or co-workers; no intervention was in place. An individual story for the behavior Return to Work was written, but not delivered, during this time. Lou’s story varied substantially from Gray’s (2000) guidelines in several ways. First, his story included second and third person directive sentences. In addition, the ratio of sentence types differed from Gray’s guidelines (7 directive sentences, 5 descriptive sentences, and one perspective sentence). Third, his story was created in a book format with one to three sentences and a photograph on each page. Finally, the story was written to provide Lou with practice opportunities where he acted out the process of cleaning up from break and returning to the mailroom in a timely manner.

The third phase of Experiment Two included delivery of the LBBI intervention. During the intervention, experimental procedures were implemented independently for each break period. Each day Lou was accompanied to the cafeteria where his personalized story was read to him prior to the break period. Lou then proceeded to his break. Three minutes prior to the end of the break period the observations began as described previously. During the fourth phase, the intervention was withdrawn for two days. Lou was not read his story, and he proceeded to each break period as he had during the first baseline phase. During the final phase, Lou’s story intervention was re-introduced. Lou was again accompanied to the break room to hear his story.

Experimental Design

A multiple baseline design across break periods (Morning and Lunch Breaks) was used to evaluate the effects of the intervention on Lou’s return to work, and the level of prompting necessary for him to return. In addition to the multiple baseline, a simultaneous withdrawal of the intervention was applied to evaluate whether removing the story intervention would result in (a) a decrease in Lou’s independence (i.e., an increase in prompt level), or (b) an increase in the lateness of his return to work. Finally, a re-introduction of the story intervention was applied to replicate the effects of the intervention.

Results

Prompt levels. The top graph in Figure 3 represents level of prompts needed by Lou to return from the Morning Break period. During the first baseline, Lou did not return to work within the 15 minute time period on one day, and required an escort to return on the other three days. When the story intervention was introduced, Lou required only verbal prompts to return to work from the Morning Break. When the intervention was withdrawn on sessions 14 and 15, Lou required an escort on both days to return to work. Finally, when the intervention was re-introduced on session 16, Lou required prompts on two of four days, and made a social return to the mailroom with his co-workers on two other days.

The bottom graph in Figure 3 represents the level of prompts Lou needed to return from his Lunch breaks. During baseline, Lou required an escort to return to work on four days. On four other days, Lou did not return to work from lunch within the 15 minute time period. When the story intervention was introduced, Lou returned to work with only verbal prompts on four days, and independently returned on one day. During the two-day withdrawal, Lou did not return to work within the 15 minute time period. Finally, when the story intervention was re-introduced, Lou returned to work from lunch with verbal prompts on two days. On the remaining days, he returned with peers or independently.

Timely returns. Figure 4 represents the number of minutes that Lou was late in returning to work. The top graph shows Lou’s returns from his Morning Break. During baseline, Lou always returned late, although there was wide variability, and a high level of prompting (including returning with an escort). When the intervention was provided, Lou’s lateness to work showed a substantial decline. On the last two days of this intervention, Lou
was less than one minute late returning to work from his Morning Break. When the intervention was withdrawn, Lou was over nine minutes late, and required an escort to return.
Figure 4. Minutes late returning to work following break.
on both days. Finally, when the intervention was re-introduced, Lou’s tardy return again decreased substantially.

The bottom graph included in Figure 4 represents Lou’s late returning to work from his Lunch break. During baseline Lou was not late on one occasion, and on that day he was escorted back to work; on four days Lou failed to return to work from his lunch break within the 15 minute time period. When the intervention was provided, Lou’s lateness declined, substantially. During the withdrawal, Lou failed to return to work from Lunch on both days. When the story intervention was re-introduced, Lou was only late on one day, and was actually early on the final two days of the study.

Summary: Experiment Two

The specific goal of Experiment Two was to determine whether a LBBI would reduce Lou’s needs for prompts to return to the mail-room from his break periods. It also evaluated whether or not the intervention would have an impact on how late Lou was in returning to work after his morning and lunch break periods. Unlike the previous work in the area, the intervention differed substantially from the structure and format for social stories advocated by Gray (2002). Results showed that an LBBI, structured to accommodate an employee’s significant cognitive and language impairments, can be useful in reducing prompt dependence and increasing a timely return to work.

Discussion

The purpose of this study was to examine the effects of LBBIIs on the work behavior of employees with developmental disabilities. LBBIIs were effective in changing the work behavior of the three employees with moderate to severe mental retardation. For the two employees where follow-up data were collected, maintenance of the behavior changes was observed.

For Ruby and May, the participants in the first experiment, an increase in their rate of making requests were seen with the introduction of the intervention. Ruby’s rate of requests reached a high of 1.2 per minute on one day of the intervention and was at an overall high of .4 per minute on 12 out of the 13 intervention days. May’s rate of requests increased to a high of .67 per minute on one day of the intervention and was at .48 per minute on almost half (6 out of 13) of the intervention days. These results have greater impact when examined in conjunction with the two other variables: work engagement and peer interactions. Ruby’s level of work engagement and peer interactions varied during the baseline phase. The introduction of the social story intervention resulted in a steady and dramatic increase in work engagement to a level of 100% on four of the 13 intervention days. Ruby’s rate of peer interactions decreased with the introduction of the intervention. May’s level of work engagement increased and her rate of peer interactions decreased when the social story intervention was in place. On eight out of the 13 days in which the intervention was in place, May’s work engagement was at or above 90%. May’s peer interactions were at or below 4% on 10 of the 13 intervention days.

Prior to the intervention, the supervisors for Ruby and May indicated that their interactions with co-workers were often a result of not being engaged in their assigned work task. The intervention taught these two women to be pro-active at their jobs by requesting more work materials when necessary, therefore reducing their need to interact with co-workers as a way to keep busy.

The social story intervention also affected the co-workers who worked in closest proximity to Ruby and May. When the intervention was implemented with Ruby and May, the level of work engagement increased for both Jay and Winnie while the level of peer interaction decreased for both women.

A more directive LBBI was effective in decreasing the level of prompts needed for Lou to return to work after break on time. When the intervention was in place, the highest level of prompt required by Lou to return to work following either break was a verbal prompt. Furthermore, on five occasions Lou returned to work either independently or socially with a co-worker. The directive LBBI also reduced the number of minutes that Lou was late in returning to work, with Lou returning to work
from his lunch break early on the final two days of Experiment Two.

This study was conducted in part to expand the research on social stories and LBBIs to other populations of people with disabilities, specifically adults with developmental disabilities. This study expands upon previous reports by demonstrating the efficacy of the interventions with adults, including those with serious cognitive disabilities. The current study also used LBBIs to increase participants’ work behavior (punctuality, making requests), outcomes not explored previously in the social story literature.

An additional outcome of this study includes the extended effects of the social story intervention on the participants’ closest co-workers. There have been numerous reports that have implemented social stories in school settings (Gray & Garand, 1993; Hagiwara & Myles, 1999; Norris & Datillo, 1999) where spread effects to peers might have produced very positive outcomes. For example, numerous students could benefit from learning morning classroom routines (Gray & Garand), increasing on-task behavior (Hagiwara & Myles), or replacing inappropriate verbalizations with positive peer interactions (Norris & Datillo). To date, however, none of the social story investigations have examined the impact of these interventions on classmates or peers. In the current study (Experiment One), the participants’ co-workers (Jay and Winnie) increased their work engagement by at least 30% when the social story intervention was in place for Ruby and May. Decreases in their co-worker interactions were seen at the same time. This outcome is an important extension of this body of literature, and suggests new directions for future studies as well.

The present study investigated whether LBBIs including social stories would improve the work behavior of adult employees with developmental disabilities, and whether any positive effects might spread to co-workers in close proximity. The results are quite encouraging, and provide empirical support for LBBIs for individuals with a range of learning and performance problems in employment settings. Additional applications, modified for different populations including non-readers and individuals with severe disabilities, indicate that LBBIs are an important contribution in the search for positive, effective, empirically-based instructional strategies.

References


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