

THE IMPACT OF A SELF-MANAGEMENT INTERVENTION ON WORK-RELATED  
BEHAVIORS IN CUSTOMIZED EMPLOYMENT FOR INDIVIDUALS WITH SEVERE  
DISABILITIES

BY

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THESIS

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## **Abstract**

The benefits of work are still not widely available to many individuals with severe disabilities. This thesis first examines challenges individuals with severe disabilities face when seeking and maintaining employment (Chapter 1). A conceptual model based on a theory of control is used to conceptually model an on-the-job, customized intervention. Chapter 2 introduces a review of the literature on interventions that have been used in employment settings primarily with adults with severe disabilities (ASD, ID, and DD) over the past 30 years. The primary intervention category that emerged from the literature review was self-management and the literature emphasized four dependent variables: (a) inappropriate behavior, (b) work performance, (c) correct responses, and (d) compliance. A methodology for a community-based, job site intervention (Chapter 3) is introduced based on the findings of the literature review and the conceptual intervention model. A human-services cooperative that provides customized employment services for individuals with disabilities was chosen for the recruitment site. Three individuals ages 22-29, with ASD and/or ID, who participate in customized employment and were looking for job promotion opportunities and/or obtaining more secure job tenure were targeted for this multiple baseline across participants single subject design. The independent variable was a self-management intervention package introduced in two phases (a) goal-setting and (b) self-monitoring and the dependent variables were on-task work behaviors and completion of job tasks - which were operationally defined for each participant. Overall, the intervention and brief functional assessment increased the on-task behavior of two participants by 31% and 23%. The third participant, who was consistently on-task at the start of the intervention, still increased his on-task behavior by 4% during intervention. Regarding task completion, this participant increased his task completion on three out of four work tasks by more than 40% and maintained 100% task

completion on the fourth task. The other two participants also increased their task completion in the majority of their job tasks. One experienced an increase of over 20% in all four of his job tasks, and the other participant experienced an increase of greater than 30% in three out of her five job tasks. Her remaining two job tasks experienced significant growth during phase two of the intervention (self-monitoring), but no growth during phase one (goal-setting). The discussion (Chapter 5) will address future implications for research and practice.

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## Chapter 1

### Introduction

The benefits of work still elude many individuals with disabilities and community employment remains difficult to obtain (Bennett, Frain, & Brady, 2009). A lack of employment has been associated with a greater risk of secondary conditions (depression, sleep problems, pain, feeling of isolation, and fatigue) for individuals with severe disabilities (Ipsen, Seekins, & Ravesloot, 2010). The definition used for severe disabilities throughout this paper is “individuals of all ages who require extensive ongoing support in more than one major life activity in order to participate in integrated community settings and to enjoy a quality of life that is available to citizens with fewer or no disabilities” (Snell & Brown, 2010). Individuals with disability labels including individuals with intellectual disability (ID), autism spectrum disorder (ASD), and developmental disability (DD) who have extensive support needs are commonly included in this category. In 1987, only 35-46% of individuals with mild intellectual disability and 57% of individuals with behavior disorders were employed. Only 10% of those same individuals with mild intellectual disability and only 20% of the same individuals with behavior disorders earned minimum wage (Warger, 1990). Those numbers have not improved significantly in over 30 years. Based on studies as recent as 2004, it is estimated that as many as 50-75% of adults with autism spectrum disorder (ASD) are unemployed (Hendricks, 2009) – to say nothing of those who are employed but do not earn minimum wage.

Researchers have demonstrated, however, that individuals with intellectual and developmental disabilities can be successful in the work world, with appropriate supports. A key dimension of participating in community employment settings is understanding and applying the behaviors that are expected (Cihak, Alberto, & Fredrick, 2007). Researchers have investigated

the effectiveness of different strategies for promoting success, including the use of self-management skills in community employment settings (Van Laarhoven, Johnson, & Van Laarhoven-Myers, 2009). One of the primary goals of self-management interventions is to assist individuals to be as self-directed as possible in performing job-related tasks so they have the means to support themselves to lead productive and self-sufficient lives – as well as being competitively and sustainably employed (Van Laarhoven et al., 2009). Researchers have suggested that opportunities to learn and practice vocational self-management skills in natural settings facilitates the acquisition of the skills needed to succeed. However, a lack of emphasis on self-management skills is a concern often associated with the education of persons with intellectual disability (Mechling & Lagone, 2000). And, the majority of individuals with severe disability do not have access to integrated job settings creating a significant barrier to learning vocational, self-management skills, creating a catch-22 (West & Patton, 2010).

Self-management interventions have been created and implemented in employment settings that support individuals with severe disabilities to develop successful, workplace skills. However, once these strategies have been taught and the intervention agent(s) fade, workplace supports need to be in place to help individuals continue achieving success. Historically, coworkers have been valued partners in employment interventions, providing feedback on the social validity of objectives, procedures, and the effectiveness of interventions provided by job coaches in supported employment (Ohtake & Chadsey, 2003). Increasingly, workplace supports are being emphasized in workplace interventions, and job coaches are taking on more of a facilitator role (Ohtake et al., 2003). Both workplace supports and self-management skills are a key part of sustained, successful vocational outcomes for people with disabilities. Many individuals with disabilities, especially severe disabilities, will benefit from both workplace

supports and direct intervention and intensive, ongoing support to achieve meaningful post-school adult outcomes (Michaels & Orentlicher, 2004).

Clearly, an array of complex issues impact the degree to which individuals with severe disability access and maintain employment in adulthood. To develop and implement an intervention that addresses all of these issues, a theoretical framework is needed. This framework must “account for the multifaceted role the environment plays in the disability experience” (Chiocchio & Frigon, 2006, p.176). Unfortunately, most intervention studies that focus on promoting employment outcomes for young adults with disabilities do not utilize a theoretical framework to guide intervention development and implementation (Webb, Sniehotta, and Michie, 2010). Webb, Sniehotta, and Michie (2010) introduced a theory of control, based upon Perceptual Control Theory (Powers, 1973), that provides a framework for modeling the role of the environment in self-regulation intervention implementation and outcomes. This theory provides an integrative framework for understanding the process of self-regulation and models the process of behavior monitoring. A unique feature of this study will be the use of this theory – in combination with the literature review described in Chapter 2 – to develop and implement the workplace self-management intervention described in Chapter. 3. The goal is to build a conceptual model that integrates existing research and can be used to design and implement future individualized interventions for people with disabilities.

Webb et al. (2010) say that control theory provides a useful integrative framework for understanding the process of self-regulation and identifying aspects of the behavior change process (Webb et al., 2010). They say that control theory “demonstrates how interventions derived from different models of behaviour change might influence the process of regulating” (Webb et al., 2010, p.1880). This theoretical framework can be used to guide the iterative

development of a customized intervention and can serve as a macro-guide to any practitioner or researcher looking for a theory of control to drive their intervention efforts (Webb et al., 2010).

As shown in Figure 1.1, control theory argues that once a goal (B – 2.) has been set “it serves as a ‘reference value’ to compare the current rate of behavior change against this point of reference” (Webb et al., 2010, p. 1880). In this model of the intervention process, the current rate of behavior change (B – 3.) is what the individual is doing now – something that is measured and changes with each new phase of the intervention. The difference between what the individual is doing now (B – 3.) and the goal (B – 2.) is the discrepancy between the goal and action (B – 4.). The target individual acts in a certain way (called consequent behavior) as a result of this discrepancy. This can lead to a disturbance (B – 5a.) in the desired impact on the environment (B – 5.), or an end to the intervention because the individual’s consequent behavior adequately changes the system, or impacts the environment as intended (B – 5.). This is the part of the loop that identifies how the environment might be impacting the individual and/or detracting from him/her reaching his/her goal. The intervening occurs during the intervention/phase introduction (C – 6.), and is often introduced in phases – especially when mastery is not instantaneous. Each iteration around the model (also called the augmented feedback loop) corresponds with a different phase in the intervention. Once each phase has been implemented, and the dependent variable (B – 3.) has been altered enough to meet the goal (B -2.) the cycling throughout the system ends.

This theory of control serves as an important guide to the development of the intervention in the thesis because “despite the potential utility of behavior change theory, interventions rarely report a theoretical framework, and when they do, it is often unclear if and how the intervention is linked to the theory” (Webb et al., 2010, p.1887). By starting with a conceptual model of the

intervention process before intervening, which (as described in Chapter 2) is rare in the disability employment intervention literature, we have a better framework for developing a successful, customized intervention. In Figure 1.1, specific components of a self-management intervention have been integrated with the model from Webb et al. (2010). Interviews/functional assessment serve as the *reference value* (A) and the goal serves as the *comparator* (B). Steps (3), (4), (5), and (5a) are taken verbatim from the Webb et al. model. Step (6), or the intervention, which will be unique to our study, is the component that follows the “readjustment” after Step (5) in the model.

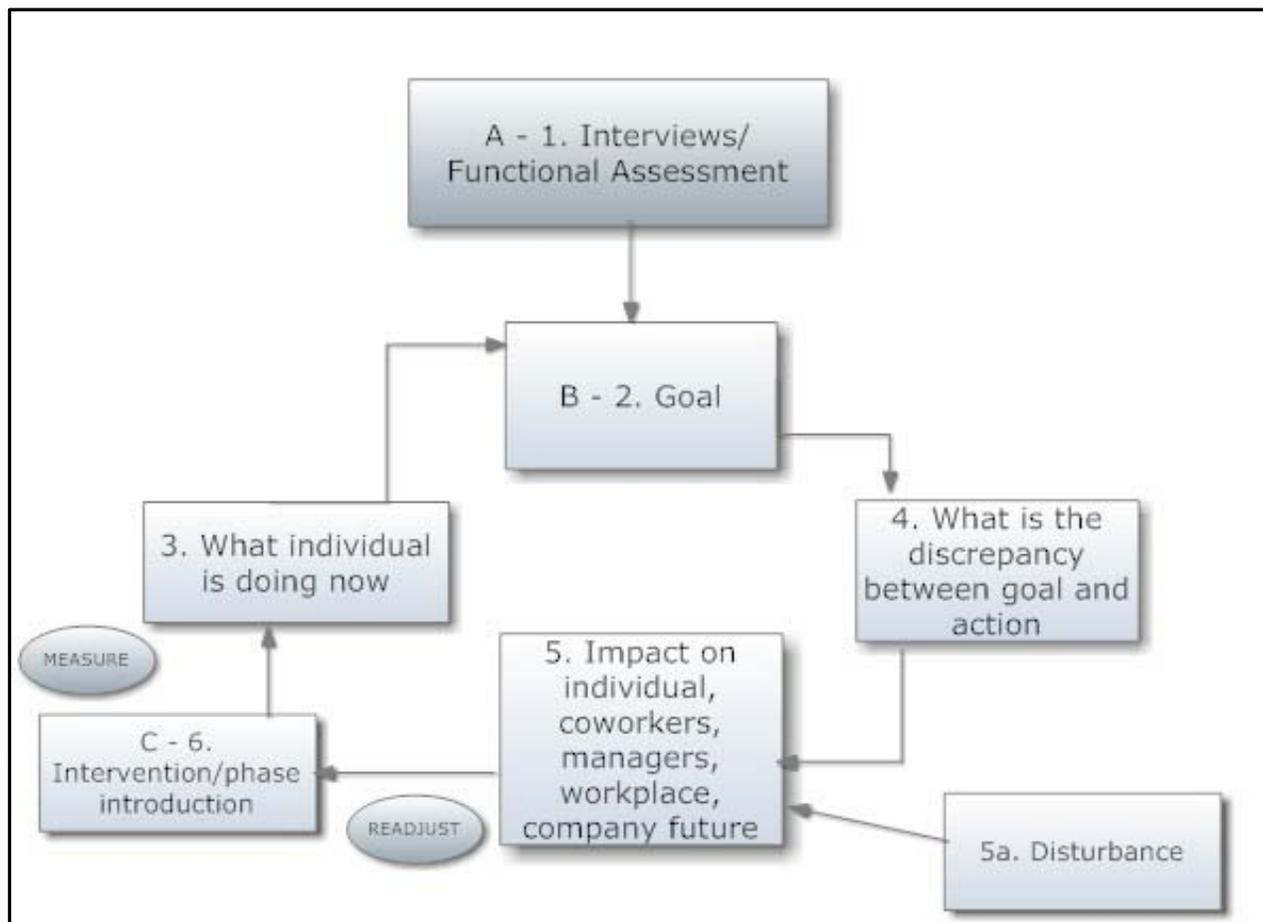


Figure 1.1, Model of intervention process based on a theory of control (Webb, Sniehotta, & Mitchie, 2010, p.1882)

In the next chapter, a systematic review of the literature will be reported. The results of the review will provide an empirical basis for the key elements that will be included in the customized employment intervention for individuals with severe disabilities evaluated in this thesis – essentially, the empirical basis for the elements described above. Dominant interventions and dependent variables will be identified.

## **Chapter 2**

### **Literature Review**

#### **Significance**

The exclusion of individuals with severe disabilities from inclusive work environments continues despite decades of research and policy suggesting that people with severe disabilities have both the capability and the right to work in community settings (West & Patton, 2010). The majority of individuals with severe disability continue to be isolated and segregated in day activity centers and sheltered workshops, or are unemployed and unserved (West et al., 2010). If students with severe disabilities are to leave school with the skills necessary to acquire and maintain community employment, they need to participate in educational programs within natural environments (Cihak, Alberto & Frederick, 2007). This means community-based instruction for job training. Acquiring and maintaining community employment is a desirable outcome for the majority of the population and should not be considered exceptional exclusively for individuals with disabilities.

#### **Historical practice**

Historically, the acceptance of persons with developmental disabilities in work settings has been contingent upon the extent which their work rates could be improved and maintained (Rae, Martin, & Brunata, 1990). Work rates for individuals with severe disabilities are often artificially restricted by a lack of effective environmental support, including low support staff/worker ratios, high contract turnover, crowded quarters, delays in reinforcement for high productivity, and the monotonous nature of many of the tasks that they are required to perform (Rae et al., 1990). It has also historically been the expectation that individuals with severe disabilities work in sheltered workshop environments because of a need for constant supervision,

leading to exclusion from work settings used by the community-at-large. This hurried, group-management perspective has been found ineffective for not only the individuals who have to work and supervise there, but also unconvincing in terms of potential advantages in the competitive market (significantly higher productivity, higher quality of goods and/or services, better general business model, etc.) (Cimera, Wehman, West, & Burgess, 2012).

### **Current research**

Research on employment practices supportive of individuals with disabilities in the last twenty years is certainly more promising, but still lacking. Schall (2010) described a study that used a positive behavior support (PBS) intervention to improve the job performance of a single individual with autism in a coffee and sandwich shop. The study implemented an intervention that used the individual's skills and strengths to select a community-based employment environment where he would succeed (Schall, 2010). A customized intervention was successfully developed to help this individual more effectively utilize his job coach and visual prompts to minimize his inappropriate behavior and increase his appropriate work behaviors. However, comprehensive interventions of this sort are the exception and not the rule. There is an increasing need for researchers to go into natural environments, assess strengths and preferences, and support individuals and families by assessing challenging situations and investigating ways to develop workplace supports that will make limited resources more effective. The mark of success for Schall (2010) was that the young man's job was more secure after the implementation of the PBS plan than prior to it.

Current research shows that although training in natural settings facilitates the acquisition of skills needed within those settings, it is not always used. Cihak et al., (2007) emphasized the difference between natural private community settings (where the general public is usually not

present – supported homes, private homes, supported workshops, detention centers) and natural public community settings (where the general public usually visits or works – grocery stores, malls/department stores, restaurants, banks, schools). All phases of their study occurred while students in the moderate to severe range of intellectual disability attended community-based vocational training (CBVT) in two natural public community settings, including two grocery stores and two department stores (Cihak et al., 2007). A brief functional analysis in the settings was conducted followed by one antecedent-based intervention and one response-based intervention using an alternating treatment design. Both interventions were “effective at decreasing target behaviors and increasing task engagement for all students” (Cihak et al., 2007, p.88). The authors suggested that future research intervene in diverse public community settings, use different tasks, provide workplace support instructors, and assess and address functions of inappropriate behavior. Cihak et al., (2007) found that brief functional analysis was effective in natural public environments, but there are not many studies that have taken more than a cursory look at its implementation.

Researchers have also suggested a collaboration between support staff and/or family and researchers is imperative to the success of interventions (West et al., 2010). West et al. (2010) conducted a study with participants who were in their 30s and had severe disabilities. Participants received services from a community-based habilitation agency 6 hours daily, Monday – Friday (West et al., 2010). The agency provided supported employment, and a customized intervention was designed for each participant after a functional behavior assessment. All interventions incorporated behavioral support plans and task analyses and measured the number of correct responses to work tasks by participants. Interventions were conducted on-site at community-based employment during allotted work time. The sites included

a community association and a community family center. Participants' work time was not paid during the course of the study. Staff training was associated with achieving positive outcomes, and much of this stemmed from the relationship and collaboration that staff had with researchers (West et al., 2010). The lead trainer in the study "consulted with staff regularly around efficiency and effectiveness of the program and all elements" and this consistent outreach for feedback made the training much more focused and relevant (West et al., 2010, p.110). Furthermore, systems change and re-engineering of the environment in the community-based sites for the four participants were additional outcomes of the intervention. All individuals showed significant increases in the number of correct responses, and underlining the intervention plan was the importance of a good relationship between the intervention design team (researchers) and the intervention implementers (support staff) so that the benefits would be maintained over time.

### **Employment outcomes**

Despite the research mentioned above, employment outcomes for individuals with severe disabilities are not promising. Even with good job training, attention to detail, a high degree of accuracy, and a dedication to work, people with severe disabilities are frequently underemployed and serially unemployed (Schall, 2010). The barriers to employment are dishearteningly extensive. "Aggressive behavior displayed by individuals with intellectual disability (ID) is a major obstacle to social integration whether it be in terms of having access to certain residential [or] occupational settings" (Crocker, et.al., 2006, p. 652). Many individuals with ASD present a divergent employment profile – they are frequently rated as excellent employees when considering the skill with which they complete their job and difficult employees when considering their 'people' skills and behavior challenges (Schall, 2010). Schall (2010) stated this variable employment profile may have led to fewer individuals with ASD achieving independent

employment in adulthood” (p. 110). Levy and Perry (2011) note a majority of individuals with ASD remain “highly dependent and socially isolated...and continue to live with their parents” (p. 1272). Furthermore, outcomes have been found to be better for higher functioning individuals and individuals with more developed communication skills (Levy et al., 2011).

The purpose of this review is to conduct an in-depth review of the employment literature to address the question: What interventions have been used effectively to measurably improve job performance for individuals with severe disabilities in employment settings? The results of this review, in combination with the theory of control described in Chapter 1, will be used to develop the employment intervention that will be evaluated in this thesis.

### **Evaluation Procedures**

A review of three databases including *PsycInfo*, *ABI-Inform*, and *ERIC* was conducted. *PsycInfo* was chosen due to its prominence and relevance to the special education field. *ABI-Inform* was chosen on consultation with a reference librarian at the University of Illinois, due to its standing as the premier employment-oriented database. Finally, *ERIC* was utilized to simultaneously tap into the sociology literature and cut across the two fields of special education and employment.

Thirty-two peer reviewed journal articles were identified in *PsycInfo* using the keywords (disab\*; employ\*; interven\*; challenging behavior\*; job\*). Six additional peer-reviewed journal articles were identified via the database *ABI/INFORM Complete* using the keywords (disability (Document title-TI); employment; intervention; challenging behavior (Document text-FT); job; intellectual disability; significant disability; work). Finally, twenty-six additional articles were identified in the *ERIC* database using keywords (disability; employment; intervention; behavior; job). Using inclusion criteria of (a) peer-reviewed journal articles, (b) intervention studies, (c)

adults with severe disabilities 18 years or older, (d) severe disabilities including ASD, ID, DD, and multiple disabilities, and (e) community-based job setting, including those that were simulated, the list was narrowed to 18 articles from *Psyc Info*, 3 articles from *ABI/INFORM*, and 15 articles from *ERIC*. The total number of articles reviewed across all three databases was 36. The 36 articles included in this review met minimum criteria for quality indicators of special education research (described below).

### **Coding Methods**

**Quality Indicators.** Each of the 36 articles was coded along several dimensions related to quality indicators of special education research by the researcher. First, the articles were coded for the type of research methodology, and then the degree to which the study met quality indicators associated with that research methodology. For each methodology, quality indicators were taken directly from the corresponding quality indicator paper published in a special issue of *Exceptional Children* (2005). Those studies that met 57% or more of the quality indicators were included in the content review, described in the next section. The score of 57% or higher was chosen based on analysis of the distribution of the quality indicator scores after all articles were coded. There was a significant break in the distribution of articles at 57%. Thus, using this number allowed the researcher to include a sufficient number of articles, while also recognizing the natural break that occurred in the distribution of quality indicator scores.

**Single Subject Studies.** Single subject research articles were coded along 10 dimensions (Horner, et.al., 2005). For the first six - (A) Description of participants and settings, (B) Dependent variable(s), (C) Interobserver agreement data, (D) Independent variable(s), (E) Fidelity of implementation, and (F) Baseline data – the researcher coded whether the article’s methods in each area were (a) replicable, (b) systematic, and (c) if data was measured over time.

For the remaining four dimensions, the researcher coded (yes/no) if the article, (A) Demonstrated experimental control at three different points in time, (B) Addressed threats to internal validity, (C) Experimental effects were replicated across participants, settings or materials (external validity), and (D) Social validity. If articles met or exceeded expectations in each of these categories they received a “Y.” If they did not meet expectations – based on the description of each category provided in the quality indicator article (Horner, et.al., 2005) – or did not include the relevant information they received a “N.” For reference, the sample coding sheet for quality indicators is included as Table A.1 in Appendix A.

**Quantitative.** Studies that used a quantitative methodology were coded for 11 quantitative quality indicators (Gersten, et.al., 2005). For the first three - (A) Describing participants’ characteristics, (B) Implementation of intervention and description, and (C) Fidelity of implementation – articles were coded based on (a) clarity, (b) description of comparison condition, and (c) comprehensiveness. For the fourth indicator – (D) Outcome measures – ratings were made based on (a) clarity, (b) description of comparison condition, and (c) presence of multiple measures. The fifth category, (E) Data analysis, was scored across different dimensions: (a) descriptive statistics included, (b) analysis linked to research questions, and (c) effect size calculations included. The final six categories were judged simply on the presence or absence of information about the following: (F) Attrition information provided, (G) Interrater reliability measures included, (H) Data collection occurred beyond immediate posttest, (I) Quality of implementation assessed, (J) Documentation of instruction provided, and (K) Clarity of results. Again, if articles met or exceeded expectations – based on the description in the quality indicator article (Gersten, et.al., 2005) – in categories they received a “Y;” if they fell short of expectations or simply did not include the information they received a “N.”

**Qualitative.** The final section on the quality indicator coding sheet was for qualitative articles (Brantlinger, Jimenez, Klingner, Pugach, & Richardson, 2005). There were three coding areas for qualitative studies: Interviews, Observations, and Data Analysis. Interview studies were coded in two areas - interview and data analysis. Observational studies were coded on observations and data analysis. Studies that included interviews and observations were coded in all three areas. In the interview area, studies were coded across the categories of: (A) Participant selection, (B) Interview questions, (C) Adequate means of recording/transcribing, and (D) Confidentiality measures. Within each category, articles were scored (Yes/No) for: (a) appropriateness, (b) clarity, and (c) sufficient information. Observation studies were coded across the same three dimensions (appropriateness, clarity, sufficient information) for the following categories: (A) Participant selection, (B) Setting selection, (C) Time spent in the field, and (D) Researcher at site. Additionally, observation studies were coded (Yes/No) in three additional categories: (A) Research has minimal impact on the setting, (B) Field notes systematically collected, and (C) Confidentiality ensured. Finally, the Data Analysis area was scored (Yes/No) across six categories: (A) Results were sorted and coded in a meaningful way, (B) Sufficient rationale was provided for what was (or was not) included, (C) Documents were sufficiently described and cited, (D) Reflection on researchers' personal positions was provided, (E) Conclusions were substantiated, and (F) Connections made with related research.

If an article exceeded 57% in the categories scored, they were considered articles with a strong-evidence base. Twenty of the original 36 articles achieved the criteria for having a strong evidence base and were included in the next phase of coding – content – described in the next section.

**Content.** The 20 articles that met the criteria for having a strong evidence base (>57% score on quality indicators rating), were then coded for content. The 20 articles were coded across seven different categories, (a) Independent variable, (b) Dependent variable, (c) Population, (d) Setting, (e) Findings, (f) Methodology issues, and (g) Notes. After the initial coding along these seven dimensions, where the key characteristics of each category were documented verbatim for each study, common findings within each category were explored to develop specific sub-categories that were then applied to all articles in a second coding pass.

Four primary independent variables emerged, (a) PBS (including functional assessment), (b) Preference/Choicemaking, (c) Self-management, and (d) Visual supports. Each intervention category was operationally defined based on the characteristics of the included studies. Self-management interventions were described using terms like “self-directed” (Michaels & Orentlicher, 2004, Hendricks, 2009), “self-report” (Reiss & Havercamp, 1998), “self-management” (Ipsen, Seekins, & Ravesloot, 2010, Bennett, Frain, Brady, Rosenberg, & Surinak, 2009, Gear, Bobzien, Judge, & Raver, 2011), “internal motivation” (Lemaire & Mallik, 2008), and “control, freedom, and independence.” Interventions under “Preference/Choice-making” implemented procedures used to assess preference (Morgan, 2006) and/or provide choice opportunities (Wood, Fowler, Uphold, & Test, 2005). Interventions in the “PBS (including functional assessment)” category developed and implemented a positive behavior support plan (PBS) and conducted a full- or brief- functional assessment as part of developing the plan (Schall, 2010, Mesibov, Browder, & Kirkland, 2002). Interventions classified into the “Visual support” category used video (Van Laarhoven, Johnson, & Van Laarhoven-Myers, 2009), photographs (Mechling & Langone, 2000), or artwork (Bucholz & Brady, 2008) to support people with disabilities as the primary independent variable.

Four primary dependent variables emerged across the studies: (a) Inappropriate behavior (for example, loud noises and pushing of others as in Schall (2010)), (b) Correct responses (for example, independently and correctly completing a 10-step task analysis as in West et al. (2010)), (c) Performance (for example, bagging all groceries while at work as in Bennett, et.al. (2009)), and (d) Compliance (for example, responding to a specific customer request correctly and appropriately as in Cihak, et.al. (2007)).

Each study was also coded for the primary disability labels of participants, including: (a) Autism spectrum disorder (ASD), (b) Intellectual disability (ID), (c) Developmental disability (DD), (d) Multiple disabilities, (e) Severe disabilities, and (f) Other. Gender (male/female) and age in years were documented on the coding sheet. Studies were also categorized based on the primary location where the independent variable was implemented: (a) On-the-job, (b) Simulated employment in a natural setting, (c) Community-based instruction, and (d) Other. The findings, issues, and notes categories were free response areas that were used to document the key findings from the studies and to note important information about the studies used to shape the discussion section of this paper. For a sample article content coding sheet refer to Table A.2 in Appendix A.

**Intervention Agents and Intrusiveness.** In addition to the dimensions described in the content section, two additional areas that were deemed important to the implementation of employment interventions were evaluated in each article. These areas were: (a) Number of intervention agents and (b) Intrusiveness. These categories were developed to examine the practical utility of the intervention (e.g., more intervention agents may mean higher costs and increased difficulty to implement). Understanding the resource demands (e.g. staffing) is key to understanding the degree to which the intervention can be implemented in the “real world.” Further, it is best practice in special education to try interventions with the lowest level of

intrusion first, particularly when implemented in community settings. For number of intervention agents, studies were coded into one of two categories: (a) 1:1, systematic, direct instruction to teach skills or (b) less than 1:1 and/or the use of workplace supports (including peer-led instruction) to teach skills.

In terms of intrusiveness, interventions were coded as intrusive or nonintrusive. Intrusive interventions were defined as: (a) involving more than 1 hour of interviews and formal assessment measures (e.g. functional analysis, experimental analysis) or (b) requiring significant changes to the participants' environment (e.g. new mobility device, augmentative communication device, technology upgrade) that would require substantial additional resources. Interventions were scored as nonintrusive if they (a) utilized informal measures (e.g. functional assessment, file review, home observation), relatively few steps to implement (e.g. 3-5), and no especially sensitive assessment or measurement tools (e.g. functional analysis), or (b) the change to the environment was minimal and the intervention only involved minor- to moderate-additional resources (if any). This was an important category to include from a social validity perspective, as the more intrusive the intervention, the more difficult it can be for intervention agents to fade and workplace supports to take leadership roles.

### **Interobserver Agreement**

A second reviewer (a doctoral student in special education with two years of experience in transition, employment, vocational rehabilitation, and job coaching) took the operational definitions described above and conducted a review of the selection and coding of each of the articles. She had 94% total agreement with the author.

### **Results**

Fifty-seven percent of the articles reviewed (20 articles) demonstrated “strong evidence.” These articles implemented “high quality causal research linking practice with positive results, ruling out other causes of the positive results” (WWC, 2011). These 20 articles and their primary characteristics are provided in Table 2.1. Thirteen articles from *PsycInfo* (13), one article from *ABI/INFORM* (1), and six articles from *ERIC* (6) were included in this “strong evidence” category.

Article	Indep. Var.	Dep. Var.	Population	Setting
<b>PBS (functional assessment)</b>				
West, E. & Patton, H. (2010).	-PBS (functional assessment)	-Correct responses	-Severe disabilities	-Job -Community-based instruction
Schall, C. (2010).	-PBS (functional assessment)	-Inappropriate behavior	-ASD	-Job
Cihak, D., Alberto, P.A., & Frederick, L.D. (2007).	-PBS (functional assessment)	-Inappropriate behavior	-ID	-Simulated employment
Mesibov, G., Browder, D., & Kirkland, C. (2002).	-PBS (functional assessment)	-Inappropriate behavior	-ASD -Severe disabilities	-Job
<b>Preference/Choice-making</b>				
Morgan, P. (2006).	-Preference/ Choicemaking	-Inappropriate behavior -Performance	-ASD -DD -Multiple disabilities	-Simulated employment
Chiocchio, F. & Frigon, J.Y. (2006).	-Preference/ Choicemaking	-Performance -Compliance	-ID	-Job
Wood, W., Fowler, C., Uphold, N., & Test, D. (2005).	-Preference/ Choicemaking	-Correct responses	-Severe disabilities	-Community-based instruction
Ohtake, Y. & Chadsey, J. (2003).	-Preference/ Choicemaking	-Compliance	-ID	-Job
<b>Self-management</b>				
Michaels, C. & Orentlicher, M. (2004).	-Self-management	-Performance	-DD -Multiple disabilities	-Job
Reiss, S. & Havercamp, S.M. (1998).	-Self-management	-Correct responses	-ID -DD	-Community-based instruction
Hendricks, D. (2010).	-Self-management	-Performance	-ASD	-Job

Table 2.1 (continued)

Lemaire, G.S. & Mallik, K. (2008).	-Self-management	-Performance	-DD	-Job
Mactavish, J.B., MacKay, K.J., Iwasaki, Y., & Betteridge, D. (2007).	-Self-management	-Performance	-ID	-Community-based instruction
Bennett, K., Frain, M., Brady, M.P., Rosenberg, H., & Surinak, T. (2009).	-Self-management	-Performance	-ASD -DD	-Job
Warger, C.L. (1990).	-Self-management	-Compliance	-ID	-Simulated employment
Gear, S., Bobzien, J., & Judge, S. (2011).	-Self-management	-Compliance	-ID	-Simulated employment
Ipsen, C., Seekins, T., & Ravesloot, C. (2010).	-Self-management	-Compliance	-Multiple disabilities -Severe disabilities	-Job
<b>Visual supports</b>				
Mechling, L. & Langone, J. (2000).	-Visual supports	-Correct responses	-ID -Severe disabilities	-Simulated employment
Van Laarhoven, T., Johnson, J.W., & Van Laarhoven-Myers, T. (2009).	-Visual supports	-Correct responses	-Severe disabilities	-Simulated employment
Bucholz, J.L. & Brady, M.P. (2008).	-Visual supports	-Inappropriate behavior	-Severe disabilities	-Job

Table 2.1, Articles identified as having a “strong evidence” base according to the CEC criteria. These articles were also organized into categories by types of intervention.

Nine articles were qualitative studies, six utilized single subject research methods, three used group or quasi-experimental design (quantitative methods), and the final two incorporated mixed qualitative/quantitative methodology. Table 2.2 provides a summary of the methodologies of the 20 studies and Appendix A contains additional details regarding the methodology as implemented (Table A.4).

<b>Type of study</b>	<b>Number of articles</b>
Qualitative (interviews, observations, data analysis)	9
Single Subject (reversal (ABAB), multiple baseline, multi-element, withdrawal)	6

Table 2.2 (continued)

Quantitative (group or quasi-experimental)	3
Mixed Methods (quantitative & qualitative)	2
Total	20

Table 2.2, Types of studies reviewed

**Quality Indicators.** Despite many studies meeting the majority of quality indicators and being included in the “strong evidence base” for this review, there were common areas that were lacking. For example, in qualitative studies, no included studies documented any type of confidentiality measures, despite that being a quality indicator for qualitative research (Brantlinger, et.al., 2005). In terms of single subject research, only 5 studies included information on social validity. Only 6 out of 11 (55%) single subject, quantitative, and mixed methods studies included interobserver or interrater reliability data and addressed fidelity of implementation (Gersten, et.al., 2005; Horner, et.al., 2005). However, all studies included in Table 2.1 sufficiently described participant and setting characteristics, clearly described both independent and dependent variables (or in qualitative studies’ cases, clearly sorted and coded results, provided a rationale, systematically collected field notes, and/or had clear interview questions), and had strong data analysis and outcome measures. Single subject studies also included baseline data, demonstrated experimental control, addressed threats to internal validity, and demonstrated external validity (Horner, et.al., 2005). Quantitative studies linked data to research questions, provided statistics and effect size calculations, and documented trainings and implementation (Gersten, et.al., 2005). Finally, qualitative studies sufficiently described and cited documents, provided personal positions, substantiated conclusions, and made connections with related research (Brantlinger, et.al., 2005).

**Content.** Table 2.1 summarizes the main findings for the independent and dependent variables, population, and settings.

**Independent variable.** The 20 articles that demonstrated strong-evidence were coded for content. *Self-management interventions* were the most common (45%, or 9 studies). Following self-management, *preference/choice-making* and *PBS (including a functional assessment)* interventions were dominant in 20% ( $n=4$ ) of studies each. Finally, *visual supports* represented 15% of studies with 3 articles.

**Dependent variables.** Dependent variables were also coded and categorized. Inappropriate behavior and work performance were the primary dependent variable measured in 30% of studies (or 6 studies per behavior). Correct responses and compliance were the primary dependent variable measured in 25% of studies each (or 5 studies respectively). Table 2.1 highlights the distribution of dependent variables across studies.

**Participants.** Participants across the 20 included studies had diverse labels, including severe disabilities (40%, eight articles), ID (40%), ASD (20%, four articles), DD (20%), and multiple disabilities (15%, three articles). Seven studies included participants with multiple disability labels (e.g. autism and intellectual disability) (Mesibov et.al., 2002, Morgan, 2006, Michaels & Orentlicher, 2004, Reiss, et.al. 1998, Bennett et.al., 2009, Gear et.al., 2011, & Mechling et.al., 2000). Further detail on disability labels, recorded verbatim from the included studies is provided in Table A.3 in Appendix A. All participants were adults with disabilities over 18 years-of-age with only four exceptions. Cihak et al. (2007), Morgan (2006), Wood et.al. (2005), and Mechling et al. (2000) also included one or two participants under 18 years-of-age. These studies were included because they also included at least one or more individuals over the age of 18. The average age across studies was 26.83 and the range of ages across the studies was 7 to 65.

**Job site.** In terms of job sites, eleven studies were conducted at community job sites (55%), six were conducted in simulated employment environments (30%), and four were conducted in community environments via community-based instruction (20%). Only one study included multiple settings, including on-the-job community sites and community-based instruction (West et al., 2010). An on-the-job community site was defined as a workplace that is integrated in the community, and community-based instruction is when a community site is used strictly for training or practice purposes as a pathway to employment, but not an actual employment site.

### **Intervention Agent and Intrusiveness**

Table 2.3 provides the results of the analysis of the number of intervention agents and the intrusiveness of the interventions. Interestingly, 50% of all studies (10 articles) used 1:1, systematic, direct instruction to teach job skills and an equal number of studies (50%, also 10 articles) used less than 1:1 instruction and/or workplace supports (or peer-led instruction) to teach skills. Seventy-five percent of studies (15 articles) were rated as nonintrusive, while 25% were rated as intrusive. Clearly, the number of intervention agents required does not directly correspond to a study's level of intrusion. For example, interventions utilizing visual supports exclusively (100%) utilized 1:1 instruction but only 1 study (33%) was characterized as intrusive, due to the technological requirements for the intervention (Mechling & Langone, 2000).

An example of a study utilizing one-on-one, systematic, direct instruction was Mesibov et.al. (2002), where a functional assessment paired with a visual schedule was used to support individuals learning to better self-direct and transition between activities. This skill was taught via one-on-one, systematic, direct instruction, and after this instruction the one-on-one support

was faded and the individual used the visual schedule autonomously to self-direct and transition. Conversely, the goal of West et al. (2010) was to explore the impact of providing training with two consumers and one group home staff member and then workplace supports in the environment to provide ongoing support. In job settings, the goal was to withdraw the group home staff support, and have individuals rely on the job coach and peer employees (workplace supports) after the intervention. The two-on-one training was effective at teaching the skills that were then supported with workplace supports in the job environment.

Study	Disability Category	Intervention Agent		Intrusive (Y/N)
		<i>1:1, systematic, direct instruction</i>	<i>2:1 or more continued workplace support (or peer-led instruction)</i>	
<b>PBS (functional assessment)</b>				
West, E. & Patton, H. (2010).	Severe disability		X	N
Schall, C. (2010).	ASD	X		N
Cihak, D., Alberto, P.A., & Frederick, L.D. (2007).	Moderate-severe range of ID (IQ 20-55)		X	Y
Mesibov, G., Browder, D., & Kirkland, C. (2002).	ASD, Asperger syndrome, Fragile X, Severe disabilities	X		N
<b>Preference/Choice-making</b>				
Morgan, P. (2006).	ADHD, autism, moderate to severe disabilities, developmental disabilities, LD, DD, MR, Down syndrome, & Angelman's syndrome		X	N
Chiocchio, F. & Frigon, J.Y. (2006).	Mild MR (IQ b/w 50-55 to 70-75) and moderate MR (IQ b/w 35-40 to 50-55)		X	Y
Wood, W., Fowler, C., Uphold, N., & Test, D. (2005).	Severe disabilities		X	N
Ohtake, Y. & Chadsey, J. (2003).	MR	X		N
<b>Self-management</b>				
Michaels, C. & Orentlicher, M. (2004).	Athetoid dystonic cerebral palsy & Spastic quadriplegic	X		Y

Table 2.3 (continued)

	cerebral palsy			
Reiss, S. & Havercamp, S.M. (1998).	MR & DD	X		N
Hendricks, D. (2010).	ASD		X	N
Lemaire, G.S. & Mallik, K. (2008).	Mild- to moderate-DD		X	N
Mactavish, J.B., MacKay, K.J., Iwasaki, Y., & Betteridge, D. (2007).	ID		X	N
Ipsen, C., Seekins, T., & Ravesloot, C. (2010).	Physical, mobility impairment		X	Y
Bennett, K., Frain, M., Brady, M.P., Rosenberg, H., & Surinak, T. (2009).	DD, autism, & cognitive impairment	X		N
Warger, C.L. (1990).	ID	X		N
Gear, S., Bobzien, J., & Judge, S. (2011).	Moderate ID, Down syndrome		X	N
<b>Visual supports</b>				
Mechling, L. & Langone, J. (2000).	Severe ID, Down syndrome	X		Y
Van Laarhoven, T., Johnson, J.W., & Van Laarhoven-Myers, T. (2009).	1p36 Deletion Syndrome (chromosomal disorder)	X		N
Bucholz, J.L. & Brady, M.P. (2008).	Down syndrome	X		N

Table 2.3, Articles with “strong-evidence” base organized by disability category, intervention agent, and degree of intrusiveness.

## Discussion

The results of this review of the literature suggest several types of interventions can have a positive impact on the work-related behavior of people with severe disabilities. In this section, we first summarize key findings from the studies and then explore implications for practice that emerge from these findings. Next, the limitations of the review are discussed. Finally, conclusions and directions for future research are provided.

## Summary of the Findings

First, in many of the interventions, but especially PBS interventions, some sort of functional assessment procedure was performed. The literature reported that a critical factor in studying participant success in vocational activities was understanding the function of behaviors that were impeding success. Understanding the function allowed for the development of supports

for a replacement behavior that could lead to success (West et al., 2010). The reviewed literature also suggested the importance of both independence and interdependence at work (Schall, 2010). The focus in many self-management interventions was on autonomy and self-reliance. However, individuals with disabilities, especially severe disabilities, may also have a need for support from others in their environment. Recognizing the need for interdependence and workplace supports at work along with self-management can promote meaningful outcomes. Incorporating this aspect into future interventions should be a high priority and its impact on outcomes must be researched. Another common finding in the studies was the importance and desirability of re-engineering environments for more successful outcomes (West et al., 2010). The ability to think outside the box, to create customized supports that accommodate individuals with even the most significant disabilities is necessary to promote success.

### **Best Practice**

Regarding the actual implementation of the interventions in practice, collaboration with the individuals, families, and workplace supports found in the work environment appeared to be critical to long-term success of interventions. In order to align the incentives for individuals with disabilities in their work environments, the researchers consistently needed employer engagement and participation in devising supports. In some cases, employers were involved in the interventions by offering company-related incentives to help motivate individuals to use the interventions, at least initially (Schall, 2010). Additionally, with regard to the self-management interventions, in order to create self-monitoring processes that were capable of being self-implemented, researchers needed to consider the preferences and capacities of the target individuals.

### **Limitations**

Whenever doing a review of the literature, the limitations inherent to the included studies impact the degree to which conclusions can be drawn. Several limitations in the literature and therefore this review must be noted. First, the dependent variables targeted in many studies were not robust work-related variables. *Participant engagement* and/or *task engagement* is not always a meaningful measure of job productivity, particularly from an employer's perspective. Just because a worker's *on-task behavior* or *task engagement* increased, does not actually mean that he/she was being more productive with job-specific tasks: for example, he/she simply could have been perseverating on task materials, not actually completing more task steps. Future research is needed to explore effective ways to measure meaningful employment-related outcomes.

Additionally, from a social validity perspective, sustainable interventions and changes are the most important (Kennedy, 2005). Several studies included in this review indicated that high staff turnover may have had negative impacts which precluded the implementation of a sustainable intervention with fidelity (West et al., 2010). This type of turnover is a serious threat to maintenance and generalization. Future research must explore strategies to mediate the impact of turnover, particularly as sustainability is a dimension that few studies directly addressed. For example, only 5 studies of the 20 studies included in the review directly address sustainability (Gear et al., 2011; Van Laarhoven et al., 2009; Mechling et al., 2000; Cihak et al., 2007; Schall, 2010)).

Finally, confounding variables were in issue in interpreting the findings of several studies. Most of the studies that were excluded from the content analysis due to a no- to moderate- evidence base did not have results that were clearly and solely attributable to the intervention. Furthermore, if a threat to internal validity was clear, oftentimes it was left unaddressed in these studies. Very few studies mentioned internal validity (only 20%, or 4

studies: Ipsen et al. (2010), Gear et al. (2011), Mechling et al. (2000), & West et al. (2010)), much less the challenges that maturation or instrumentation effects could introduce. These oversights often led to questions about the strength of the experimental effect.

Finally, several studies asked interesting questions but did not have a design that allowed for the demonstration of experimental control. Some articles argued that they had a clear intervention effect, but the design implemented was not able to document this. For example, in one case, a withdrawal design was used (or A-B-A-B design), but the individual demonstrated learning in the first treatment phase and a reversal to baseline levels of responding was not found, leading to a lack of demonstration of an experimental effect.

## **Conclusions**

Work is arguably one of the most important endeavors in which humans engage. It is perhaps the “primary aspiration for most individuals as they enter their postsecondary years” (Hendricks, 2009, p. 125). Yet, research with individuals with ASD has largely focused on supports for toddlers and young children between the ages of three to six (Schall, 2010, p. 114). It is a priority to identify the skills and supports necessary to increase the participation of individuals with severe disabilities in employment (Schall). For individuals with DD, maintaining employment is often difficult (Lemaire et al., 2008, p. 148). A 1996-1998 study of 7,750 individuals with developmental disabilities in South Carolina “demonstrated an employment rate of only 16.9% and a job loss rate of 28% during the 2-year study period” (Lemaire et al., 2008). This is dismally low. Clearly, there is much work that needs to be done in order to improve employment outcomes for individuals with severe disabilities. Interventions conducted in natural settings that are sustainable present some of the clearest opportunities to make positive outcomes reality.

In this chapter, the literature review suggested that self-management interventions and functional assessment procedures had significant potential for impacting the work behaviors and outcomes of people with disabilities. However, no conceptual frameworks to guide the development of those interventions were reported. This is a gap that needs to be closed in order to empower researchers and practitioners to have a thoughtful model to use when developing very person-centered, customized interventions. Based on these findings and the theory of control described in Chapter 1, we chose to design and develop an individualized self-management intervention that incorporated elements of the theory of control and used functional assessment procedures to identify work-related issues experienced by the participants with disabilities. Careful consideration was given to the role of collaboration between all stakeholders, the involvement of coworkers and employers, the identification of person-centered goals by participants and their support systems, and the use of self-management and functional assessment. The intervention will be fully described in Chapter 3 and the following research questions will be examined:

1. What is the impact of a self-management intervention consisting of goal-setting and self-monitoring implemented in a community employment setting on the on- and off-task behavior of young adults with severe disabilities?
2. What is the impact of a self-management intervention consisting of goal-setting and self-monitoring implemented in a community employment setting on job task completion of young adults with severe disabilities?
3. Will the goal-setting or self-monitoring phase of the intervention be more strongly linked to changes in behavior?

4. If the self-management intervention has a positive effect, how will that effect be maintained post-intervention when researcher involvement ends and what role will workplace supports play in the maintenance of the effects?
5. How will key stakeholders perceive the social validity of the intervention?

## Chapter 3

### Methods

Based on the theory of control and the results of the literature review, the researcher designed and evaluated the impact of a self-management intervention combined with a brief functional assessment on the work behaviors of individuals with ASD and ID in community-based employment. A self-management intervention driven by a functional assessment process was chosen because it was found to be the most dominant intervention in the author's literature review (see Chapter 2). The theory of control was utilized to provide a model for implementing behavior monitoring with a focus on self-regulation (see Chapter 1). Specifically, the researchers were able to follow a cycle of implementation described by the theory of control that coincided seamlessly with the intervention elements identified in Chapter 2: self-management (specifically goal-setting and self-monitoring) and functional assessment interviews. The theory of control provided a framework to understand when and how to implement the different components, how to identify discrepancies between actions and goals, disturbances that emerged as implementation occurred, and key stakeholders to involve in the process. A collaborative approach to designing and implementing the intervention was undertaken, directly involving the individual with a disability, their family, job coach, and workplace supports. This was done through the functional assessment process, which focused on developing a deep understanding of the root cause of the work-related issues and support needs so that an appropriate goal for behavioral change could be established, confirmed by coworkers and employers, and addressed with a self-management intervention. After establishing the work-related behaviors in need of change, a customized self-management intervention was introduced in two phases (goal-setting and self-monitoring) across participants utilizing a multiple baseline design. The following

sections will describe the methods used to evaluate the five primary research questions introduced at the end of Chapter 2.

### **Participants**

The participants were recruited through a local human services cooperative formed in 2008 by families in a Midwestern college town. Its mission is to provide services to individuals with disabilities and their families providing them greater control and choice, as well as the ability to participate in community life as equals. The human services cooperative offers supports for individuals with disabilities and their families in the areas of (a) community living, (b) customized employment, (c) social engagement, and (d) family support. The cooperative currently supports 10 individuals in customized employment and 5 starting their own businesses. The customized employment program is based on an individualized determination of the strengths, needs, and interests of the person with a disability, and is developed through job carving, self-employment, or other job restructuring to fit the needs of the individual with a disability (Federal Register, 2002). It is designed to meet the needs of the employer and assumes that reasonable accommodations and supports will be provided (Federal Register, 2002). Consumers that receive support from the human services cooperative are employed in natural settings in the community including grocery stores, fitness gyms, fast food restaurants, and day cares. Consumers receive periodic job coaching on an as-needed basis.

Three consumers were recruited for this study in consultation with the local human services cooperative. The main criteria for participation were (a) recent transition from school to adult life (b) disability label of ID, ASD, or both (c) work-related challenges such as trouble gaining additional hours, additional job tasks, or promotion, and (d) job tenure of more than 1 year. In collaboration with the Employment Specialist at the cooperative four individuals were identified

that met the criteria listed above. A recruitment email (see Appendix B, Figure B.1) was sent to the parents of the target participants describing the purpose of the study and asking if the individual or family would be willing to consider participating. Three families and individuals agreed to participate in the study. Two participants were not their own legal guardians, and details about the study were given and consent was obtained from the guardians (parents), with assent from the participant. For one individual who was his own guardian, his parents were enthusiastic but told the researcher that she would have to ask their son if he wanted to participate separately. The researcher then scheduled a sit-down with their son, described the study and its purpose, and he agreed to participate and signed the individual consent form. The one individual and family who declined to participate, felt that their son's employment status was not secure enough for an intervention or anything that would draw attention to him at work. The author then observed each of the three participants at work to confirm they were struggling with several workplace issues, including (a) using their time on the job to effectively engage in work tasks, (b) effectively completing all of their assigned work tasks, and (c) effectively communicating with colleagues and supervisors.

Target participants were two males and one female in their 20s with labels of autism spectrum disorder (ASD) or intellectual disability (ID) or both. All were experiencing (or had experienced recently) a transition from secondary education to adult services.

**Curtis.** The first participant was a young man named Curtis, age 26, who has autism. Curtis is his own guardian, and consented to participate. For the past two years, Curtis had worked at a mid-sized, regional grocery store. He worked approximately 16 hours a week over 2 to 3 days, primarily in the evening, for example the 5-10pm shift three days a week. Curtis obtained the job with the support of an adult service provider in the local community that works to help find

employment opportunities for students with disabilities after high school. This was prior to his involvement with the human services cooperative, but at the initiation of the research project, the cooperative had been involved for approximately a year and had undertaken activities to customize the job and incorporate Curtis' strengths and preferences into his work activities. Curtis was very proficient in one of his four main job tasks (pushing and organizing carts), but he reported that he did not enjoy it much and would like to pursue other departments and job tasks within the grocery store. He performed the remaining three tasks (stocking shelves, cleaning up spills, and helping customers out with groceries) on a much more limited basis. Based on the researcher's observations, Curtis' job limited him from many of the other employees' socialization opportunities (e.g. he was outside completing a singular job while most of his coworkers worked inside in departments with significantly more interaction and interdependence). Also, the task that Curtis was consistently completing (pushing and organizing carts), secluded him the most from others. Further, challenges on the job arose for Curtis due to social situations – coworkers would often take breaks without informing Curtis which would impact his work (because their break times affected his), and he struggled to understand and communicate with management about job expectations. These issues had become rising barriers to Curtis' promotion or transfer opportunities within the store as coworkers' and supervisors' attitudes towards him were increasingly critical.

At the initiation of the study, Curtis' job site support consisted of the cooperative's Employment Specialist stopping by and speaking with Curtis' manager about his job performance approximately once every two weeks.

**Abe.** The next participant, Abe, was 22-years-old, and has autism and intellectual disability. Abe's parents are his legal guardians, and they provided consent for Abe to participate and Abe

provided assent. Abe had gone through the customized employment process at the cooperative two years ago and had obtained a job at a mid-sized electronics store. During the 2 year period, he worked 3-4 hours per week over two days. Abe and his family indicated that he was very interested in acquiring more work hours. However, based on the researcher's observation, Abe was off-task for a significant amount of his work time. A contributing factor was that Abe would experience anxiety when he was asked to do complex tasks that he did not feel comfortable with, and had trouble expressing his confusion and asking for support. This would often lead him to seek out distractions which would keep him off-task and make it difficult for him to consistently understand what he should be doing while at work. Management expressed openness to the idea of Abe acquiring more work hours, but only if he was more consistently completing work tasks. Abe's job site support consisted of the cooperative's Employment Specialist communicating with Abe's manager about once every two weeks.

**Natalie.** The final and only female participant was Natalie. Natalie was 29 years old and has an intellectual disability. Natalie's parents were her legal guardians, and they provided consent for Natalie to participate and Natalie provided assent. She went through the customized employment process with the cooperative about a year and a half prior to the study, and had since worked at an early childhood daycare center. At the start of the study she was working five days a week for 2 hours; however, only 1 of her 2 hours each day is paid (the researchers only collected data during her paid hour). She volunteered for the other hour, due to administrative cost-cutting. Discussions with Natalie's support system suggested that she struggled with completing her job tasks consistently on a day-to-day basis, but that she enjoyed working in an environment with a lot of children. Natalie's failure to complete her job tasks was presenting a major problem because the early childhood daycare center had a classroom schedule and anytime

Natalie was behind on job tasks, it usually meant that someone else would have to do them for her or other people who needed the same equipment (e.g. vacuum cleaner) were behind in their tasks. This led to Natalie developing a reputation for being inconsistent and unreliable, although staff reported liking her personally. To complicate the situation, Natalie only speaks to those she knows well and, even then, in very limited words and sentences. This meant that Natalie's support system was critical to understanding Natalie's behavior and providing support. Natalie had an extremely involved and active job coach who was able to provide insight and advice to the daycare staff and to the researcher on Natalie's preferences throughout the study. The job coach's input was used as guidance in developing the self-management intervention although options were always presented to Natalie using "yes" or "no" questions. Natalie's job coach (who is not paid by the cooperative and instead through a state Medicaid home-based waiver program) was on-site one day per week, and the cooperative's Employment Specialist would stop by and speak with Natalie's supervisor approximately once a month.

### **Dependent Variable**

Because of the individualized nature of the issues that each individual was experiencing on the job site prior to the initiation of the study each participant (a) was observed by the researcher, (b) materials used by the human services cooperative in the customized employment process (e.g., records of preference assessments conducted in the Discovery process, records of job training, employment status, and supports provided) were examined, and (c) interviews were conducted with the individual, their family, coworkers, and job coach to determine specific strengths and issues on the job site that were facilitating and impeding job success. The interviews focused on developing a further understanding of the target participant's (a) level of support need and (b) general skills, strengths, interests and preferences. Job-specific information

was also collected, including (a) vocational interests, (b) job training/preparation, (c) time spent looking for a job, (d) number of jobs held, (e) current employment, (f) how current employment was obtained, (g) number of hours worked, (h) compensation, (i) on the job paid and workplace supports, and (j) satisfaction. The interviews were open-ended and a sample list of interview questions is below, with a complete list in Appendix B, Figure B.2. These questions were used to inform the FAI (Functional Assessment Interview, described next).

- 1) What are the services and supports that you/the participant currently receive?
- 2) Which employment-related services and supports help you/the participant the most in your day-to-day life?
- 3) If you/the participant have a job, which services assisted you/the participant most in obtaining that job?
- 4) If you/the participant have a job, are there any supports and/or services that have really helped you/the participant to keep it?

**Functional Assessment Interview (FAI).** After the initial observation, material examination, and interviews, a Functional Assessment Interview was conducted. This process was used to gain a more in depth understanding of the demands of the job environment and to identify potential dependent variables. The job site observations utilized a shortened version of O'Neill's (1997) Functional Assessment Interview (Table 3.1). The purpose of this truncated assessment was to identify possible target behaviors and their function(s) – a necessary component to developing an effective intervention. The goal of the FAI was to provide “detailed description of the behaviors of concern, identify general and more immediate physical and environmental factors that predict the behaviors’ occurrence and nonoccurrence, identify the functions of behaviors in relation to the outcomes or consequences maintaining them, and

summary statements describing relationships among situations, behaviors, and their functions” (O’Neill et.al., 1997, p.10). The interviews for the functional assessment were necessary so the researcher could collaboratively design interventions that worked to target the behaviors of concern and efficiently and effectively replace them with functional alternatives.

<b>Person:</b>		<b>Age:</b>		<b>Gender:</b>	
<b>Date:</b>		<b>Interviewer:</b>			
<b>A. DESCRIBE THE BEHAVIORS</b>					
1.) Identify behaviors of concern, how they are performed (topography), frequency (per day/week/month), duration, and intensity (how damaging/destructive)					
<i>Behavior</i>	<i>How it is performed</i>	<i>Frequency</i>	<i>Duration</i>	<i>Intensity</i>	
a.					
b.					
c.					
d.					
e.					
f.					
g.					
h.					
2.) Which of the behaviors described above are likely to occur together in some way? Do they occur about the same time? In some kind of predictable sequence or “chain”? In response to the same type of situation?					
<b>C. DEFINE SPECIFIC IMMEDIATE ANTECEDENT EVENTS THAT PREDICT WHEN THE BEHAVIORS ARE LIKELY AND NOT LIKELY TO OCCUR.</b>					
1. <i>Times of Day:</i> When are the behaviors most and least likely to happen?					
Most likely:					
Least likely:					
2. <i>Job settings:</i> Where are the behaviors most and least likely to happen?					
Most likely:					
Least likely:					
3. <i>People:</i> With whom are the behaviors most and least likely to happen?					
Most likely:					
Least likely:					
4. <i>Work tasks:</i> What work tasks are most and least likely to produce the behaviors?					
Most likely:					
Least likely:					
5. Are there particular or idiosyncratic situations or events not listed above that sometimes seem to “set off” the behaviors, such as particular demands, noises, lights, clothing?					

Table 3.1 (continued)

6. What one thing could you do that would most likely make the undesirable behaviors occur?					
<b>D. IDENTIFY THE CONSEQUENCES OR OUTCOMES OF THE PROBLEM BEHAVIORS THAT MAY BE MAINTAINING THEM (I.E., THE FUNCTIONS THEY SERVE FOR THE PERSON IN PARTICULAR SIUTATIONS).</b>					
1. Think of each of the behaviors listed in Section A, and try to identify the specific consequences or outcomes the person gets when the behaviors occur in different situations.					
<i>Behavior</i>	<i>Particular situations</i>	<i>What exactly does he/she get?</i>	<i>What exactly does she/he avoid?</i>		
a.					
b.					
c.					
d.					
e.					
f.					
g.					
<b>E. CONSIDER THE OVERALL EFFICIENCY OF THE PROBLEM BEHAVIORS. EFFICIENCY IS THE COMBINED RESULT OF (A) HOW MUCH PHYSICAL EFFORT IS REQUIRED, (B) HOW OFTEN THE BEHAVIOR IS PERFORMED BEFORE IT IS REWARDED, AND (C) HOW LONG THE PERSON MUST WAIT TO GET THE REWARD.</b>					
Behavior	Low Efficiency				High Efficiency
	1	2	3	4	5
	1	2	3	4	5
	1	2	3	4	5
	1	2	3	4	5
	1	2	3	4	5
<b>F. WHAT FUNCITONAL ALTERNATIVE BEHAVIORS DOES THE PERSON ALREADY KNOW HOW TO DO?</b>					
1. What socially appropriate behaviors or skills can the person already perform that may generate the same outcomes or reinforces produced by the problem behaviors?					
<b>G. WHAT ARE THE PRIMARY WAYS THE PERSON COMMUNICATES WITH OTHER PEOPLE?</b>					
1. What are the general expressive communication strategies used by or available to the person? These might include vocal speech, signs/gestures, communication boards/books, or electronic devices. How consistently are the strategies used?					
<b>I. WHAT ARE THINGS THE PERSON LIKES AND ARE REINFORCING FOR HIM /HER?</b>					
1. <i>Food items:</i>					

Table 3.1 (continued)

<i>2. Compensation and objects:</i>			
<i>3. Activities on break or outside of work:</i>			
<i>4. Activities/outings on the job:</i>			
<i>5. Other:</i>			
<b>J. WHAT DO YOU KNOW ABOUT THE HISTORY OF THE UNDESIRABLE BEHAVIORS, THE PROGRAMS THAT HAVE BEEN ATTEMPTED TO DECREASE OR ELIMINATE THEM, AND THE EFFECTS OF THOSE PROGRAMS?</b>			
<i>Behavior</i>	<i>How long has this been a problem?</i>	<i>Programs</i>	<i>Effects</i>
a.			
b.			
c.			
d.			
e.			
f.			

Table 3.1, On-the-job, functional assessment interview (FAI) (O’Neill, 1997, p.18)

**Goal Identification.** After completion of the FAI, broad goals for each individual were identified in collaboration with the individual and their support team. Curtis’ goal centered around increasing his socialization at work which would help him feel more comfortable engaging in a variety of work tasks. Abe’s goal was to gain more work hours, which was linked to him needing to be on-task for a larger percentage of the time when he was at work. Natalie’s goal involved more opportunities to socialize and interact with the students and teachers she worked with, which was hypothesized by her support system to potentially lead to an increase in her task completion. For the broad goals that were used in the intervention with each participant, refer to Table 3.2.

<b>Individual</b>	<b>Goals created based on FAI interviews and observations</b>
<b>Curtis</b>	If I talk with customers and coworkers more often about work, I will know when they need help and I can assist them.
<b>Abe</b>	To get more hours – and, to get more hours, I have to be working a larger percentage of the time when I’m at work.

Table 3.2 (continued)

<b>Natalie</b>	To have more opportunities to socially engage with students and teachers. This will happen more often when I more quickly and consistently finish my work.
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Table 3.2, Verbatim goals used in Phase 1 of the intervention with each participant

**On- and off-task target behavior.** Once goals were agreed upon, operational definitions of the specific on- and off-task behaviors for each participant were developed by the researchers and reviewed with the participants, families, and the cooperative's Employment Specialist. For each individual, target behaviors included both reducing inappropriate, off-task behaviors (e.g. playing video games and day-dreaming during work time) and increasing appropriate, on-task behaviors (i.e., completing work specific tasks), although only on-task behavior was directly measured as on- and off-task behaviors were assumed to be mutually exclusive. The definitions of on- and off-task behavior for each individual are included in Table 3.3, and were created and vetted by the team to be sure they were clear and aligned with the support needs of the consumers.

<b>Individual</b>	<b>Off-Task Behaviors</b>	<b>On-Task Behaviors</b>
Curtis	Curtis is on his phone, aimlessly talking to customers or colleagues for more than 30 seconds about something non-work related.	Curtis is pushing carts, staying engaged with his work task. He is only handling carts, responding to colleagues if they ask for help, or helping customers. Curtis is also on-task if he is asking colleagues a question if he needs help, but for the most part working independently.
Abe	Abe is in the break room, playing on demo equipment by himself, talking to colleagues about non-work related items, aimlessly walking around	Abe is in-the-store, engaged in activities related to a work task, walking to and from activities related to a work-task, asking colleagues for instructions
Natalie	Natalie is just looking at the children, aimlessly wandering around, or randomly touching different objects	Natalie is tidying up the room, finding the vacuum cleaner, engaged with the vacuum cleaner, cleaning up after snack time, in the bathroom for 2 minutes or less, picking items up and putting them back, and checking her visual schedule

Table 3.3, Example of inappropriate behaviors and functional alternatives

**Job task completion.** In addition to on- and off-task behavior, each individual's assigned job tasks were task analyzed into operationalized steps. Researchers also documented the degree to which each individual completed each step of his/her job tasks and the number of times each job task was completed during each observation session. Each individual's job tasks and corresponding task analyses are listed in Table 3.4. These tasks were identified through on-site observations and talking to each participant and their employers during their functional assessment. The task analysis for each of the job tasks was also included at the end of each individual's data collection sheets which are included in Appendix B, Figure B.3.

<b>Individual</b>	<b>Job Tasks</b>
<b>Curtis</b>	<p>A. Putting carts back</p> <ol style="list-style-type: none"> <li>1. Physically takes carts out of the line-up and puts like sizes together</li> <li>2. Gets a group together (of typically 6) and connects them with a rope</li> <li>3. He pushes the carts towards the storage facility</li> <li>4. He pushes the carts into the storage facility</li> <li>5. He walks back out to the parking lot to start again.</li> </ol> <p>B. Cleaning up spills</p> <ol style="list-style-type: none"> <li>1. Colleague tells Curtis about a spill when he asks them if they need help</li> <li>2. He goes and gets a mop or a rag and cleaning liquid to clean it up</li> <li>3. He cleans up the spill</li> <li>4. He puts the cleaning equipment back</li> </ol> <p>C. Stocking shelves</p> <ol style="list-style-type: none"> <li>1. A colleague tells Curtis that they need help stocking shelves (typically after he asks them if they need help)</li> <li>2. Curtis goes with the colleague to the shelves that need to be stocked</li> <li>3. The colleague gives Curtis instructions and shows him what they need him to do</li> <li>4. Curtis takes one of each item and puts it on the shelf until he runs out of items</li> <li>5. The colleague checks his work and gives Curtis a positive verbal response, and Curtis stops physically touching the items</li> </ol> <p>D. Helping customers out with groceries</p> <ol style="list-style-type: none"> <li>1. Sees a customer finishing up in the grocery line who looks like he/she needs help and verbally asks them "Do you need help taking your groceries out to your car" (or some variation of that)</li> <li>2. If customer says "no," Curtis says "okay," moves on, and the task counts as being complete</li> <li>3. If customer says "yes," Curtis helps them put the grocery bags in their cart or just pushes the cart with the grocery bags in it out with them to their car</li> <li>4. Curtis physically helps them load all the groceries into the back of their car until there are no bags left and puts the cart away</li> </ol>
<b>Abe</b>	<p>A. DVD organization</p> <ol style="list-style-type: none"> <li>1. Physically touches an out-of-place DVD (crooked, fallen down, not in line</li> </ol>

Table 3.4 (continued)

	<p>with the others)</p> <ol style="list-style-type: none"> <li>2. Picks it up OR Pushes it</li> <li>3. Physically straightens it</li> <li>4. Let's go of DVD</li> </ol>
	<p>B. Finds items that are misplaced</p> <ol style="list-style-type: none"> <li>1. While organizing DVDs, finds a DVD in the wrong spot</li> <li>2. Physically touches the DVD</li> <li>3. Vocalizes the section he thinks it should go in</li> <li>4. Physically removes the DVD from the section or spot that it was in</li> </ol>
	<p>C. Puts items that are misplaced back</p> <ol style="list-style-type: none"> <li>1. After Abe finds a misplaced item, he physically walks to a different section from where he started, with the DVD in-hand, and may say something like "This was in the wrong spot" (doesn't have to be vocalized)</li> <li>2. Puts the item back in the correct place</li> <li>3. Makes sure that it's straight and organized looking</li> <li>4. Physically releases the DVD</li> </ol>
	<p>D. Assisting customers/coworkers</p> <ol style="list-style-type: none"> <li>1. Sees a customer/coworker who looks like he/she needs help and verbally asks them "Do you need help with anything" (or some variation of that)</li> <li>2. If customer/coworker says "no," Abe says "okay," moves on, and the task counts as being complete</li> <li>3. If customer/coworker says "yes," Abe asks them what they need help with and verbally responds to their request</li> <li>4. Abe then physically responds to their request ((i.e. takes them to section, begins helping coworker with task)</li> <li>5. Once Abe finishes helping customer (physically walks away from them) or finishes helping coworker (physically completes the task he's been assigned), this task is complete</li> </ol>
<b>Natalie</b>	<p>A. Vacuuming</p> <ol style="list-style-type: none"> <li>1. Natalie goes to get vacuum</li> <li>2. Brings it in classroom</li> <li>3. Plugs-in vacuum</li> <li>4. Attaches hose piece together</li> <li>5. Turns it on (in storage closet)</li> <li>6. Vacuums just around her</li> <li>7. Vacuums everywhere the vacuum reaches</li> <li>8. Turns it off (the switch is located in a storage closet outside of the classroom)</li> <li>9. Takes hose pieces apart</li> <li>10. Puts vacuum back (storage closet/corner), or gives vacuum to next person who wants it</li> </ol>
	<p>B. Cleaning tables</p> <ol style="list-style-type: none"> <li>1. Natalie picks up rag and cleaning spray (she does this simultaneously)</li> <li>2. Natalie sprays each table</li> <li>3. Natalie wipes down each table</li> <li>4. Natalie puts rag and cleaning spray away</li> </ol>
	<p>C. Cleaning sinks/mirrors</p> <ol style="list-style-type: none"> <li>1. Natalie picks up rag and cleaning spray (believe this is different spray – glass cleaner)</li> <li>2. Natalie sprays mirrors, counters, and sinks</li> <li>3. Natalie uses the rag to wipe up all of the spray</li> </ol>

Table 3.4 (continued)

	4. Natalie puts rag and cleaning spray away
	D. Sweeping <ol style="list-style-type: none"> <li>1. Natalie picks up broom and pan</li> <li>2. Natalie sweeps entire tile area underneath the snack tables</li> <li>3. Natalie sweeps all rubbish into pan (usually using a shorter broom than the main broom)</li> <li>4. Natalie throws rubbish into trashcan</li> <li>5. Natalie puts broom and pan away</li> </ol>
	E. Taking out the trash <ol style="list-style-type: none"> <li>1. Takes lid off of trashcan</li> <li>2. Takes trash bag out of trashcan</li> <li>3. Picks up a new trash bag</li> <li>4. Shakes new trash bag open</li> <li>5. Puts new trash bag in the trashcan</li> <li>6. Puts the lid back on the trashcan</li> <li>7. Ties full bag</li> <li>8. Carries used trash bag outside to the dumpster</li> </ol>

Table 3.4, Individualized job tasks

### Independent Variables

To address the dependent variables (i.e., on- and off-task behavior and job task completion) that were operationally defined through the process described above, personalized self-management interventions were developed and implemented. Self-management interventions were selected as the intervention because they were found to be the most dominant intervention component in studies with a strong evidence base in the author's literature review, described in Chapter 2, and they fit the needs of the three target participants in this study. Specific elements of effective self-management interventions were combined and evaluated in this study, as described below

**Phase 1: Goal-setting.** The first phase of the self-management intervention involved having participants *identify their goals* (step one in the Self-Determined Learning Model of Instruction) (Wehmeyer et al., 2007). The goals for behavior change that emerged from the FAI interviews and observations described above were reviewed one-on-one with the participants. During this phase, the researcher read the goals and the participants stated the goals back to the researcher, or nodded in affirmation of their goal in Natalie's case, before they started each day

of work. Refer to Table 3.2 in the Dependent Variable section for the verbatim list of goals for each participant.

**Phase 2: Self-monitoring.** After the goal-setting phase, personalized self-monitoring systems were implemented to assist participants in achieving the goals they stated in Phase 1. The systems' design is described in this section, but the methods for introducing them to the participants' environments is described in the Procedures section. The self-monitoring system was individualized for each participant based on the goal and target behavior identified through the previous steps. It was also individualized based on the job setting and the preferences of each individual participant.

Curtis used a mounted, laminated self-monitoring system. He used a dry-erase marker to make tallies and track his progress on his job tasks. The self-monitoring sheet was posted in the cart alleyway on the outside of the grocery store. This area was chosen because it was one Curtis frequented while on the job, but it was far enough away from customers it would not be stigmatizing. The specific activities that Curtis needed to complete while working were listed on the left side of the self-monitoring sheet and on the right side of the sheet Curtis marked when he completed the activities. The activities included: (a) Curtis makes 3 trips with carts (loading 18 carts), (b) Curtis goes inside to the registers, and asks 3 customers (or until 1 says "yes") "Can I help you out to your car with your groceries?", (c) Curtis asks 3 coworkers (or until 1 says "yes") "Can I help you stack cans?" "Are there any spills you need help cleaning up?" or "Is there anything you could use some help with?", (d) Curtis assists 1 customer (or asks 3), and (e) Curtis assists 1 colleague (or asks 3). Curtis also carried a copy of his tasks in his pocket, to facilitate ease of use (and self-recording). He also carried the dry erase marker he used to self-record in his pocket. Curtis learned that after completing each of the tasks listed, he circled back to the

beginning and started the task list over again. This enabled Curtis and the researchers to keep track of his productivity and created a permanent log for management's use. Curtis' self-monitoring system was designed to be easily photographed via Curtis' smart phone and e-mailed to the researchers after each day of work. A picture of the self-monitoring system in use while Curtis was on the job was never obtained due to his unanticipated and immediate dismissal from his job in phase two of intervention (self-monitoring), but the created versions are both included in Appendix B, Figure B.4.

Abe's system was slightly different, based on his preferences and job-related support needs. Abe felt strongly that a mounted self-monitoring system would be stigmatizing, and in a conversation with the researcher and his mom he stated that he did not know why he had to use a self-monitoring system if no one else who worked at the electronics store did. The originally designed self-monitoring sheet, which would have been mounted and visible to others in the work environment, was adapted so it could fit into Curtis' pocket and be as unobtrusive as possible. It was designed based on a task list that Abe, his mother, and the researcher agreed upon, that cycled him through the various job tasks he was assigned to complete by his supervisor and coworkers during each shift. Abe's self-monitoring system was laminated, and Velcro was affixed to it with a dry-erase marker, so Abe could tally the number of times he did each step in a work period (and reuse the sheet after each day of work). The steps on his script were developed based on his job tasks and specific components that he struggled with in each of the tasks. The tasks included (a) Organizing 2 rows of DVDs/CDs, (b) Finding 5 misplaced items and putting them back, (c) asking 1 coworker if he/she needed help with anything, (d) helping that coworker if he/she needed help, (e) asking 1 customer if he/she needed help with anything, and (f) helping that customer if he/she needed help. Following this task list was a row that

prompted Abe to start the tasks over again. There were also “Yes” and “No” columns after each task where Abe could check off when he completed each task (and how many times he completed each task). Photographs of Abe’s self-monitoring system are included in Appendix B, Figure B.5.

Natalie’s self-monitoring system was slightly different and is included in Appendix B, Figure B.6. While it was still based on a list of tasks, it was created on a magnetic dry-erase board that could be hung on the wall. Historically, Natalie had a static list of tasks to complete in her work environment each day, but when Natalie came to a task that she could not do (e.g. she could not clean the tables until the students were done with their snacks) she would simply stop and wait, rather than going on to the next task she could do. In consultation with her job coach, a more flexible approach to job task completion was developed. Specifically each task was mounted on Velcro so that the order could be changed based on changes in the environment. It was hoped that this flexibility, as well as Natalie using magnets to record when she completed each task, would support her to be more productive. On her self-monitoring system, times that each task should be completed in were also listed, as timing had been a major issue for her. For example, on a given day her self-monitoring system might list: at 3pm – Clock-in, 3:02 pm – Put purse and phone in cubby, 3:05pm – Vacuum, 3:30pm – Clean mirror and sink, 3:35pm – Take the trash out, 3:45pm – Clean-up snack and Wipe tables, Before 3:55pm – Do extra work tasks, 3:55pm – sweep floor, and 4pm – Clock-out. Visual prompts for each work task were also developed and included in a Ziploc bag with a magnet attached to it. Each visual prompt had the same, larger picture of the picture on her visual schedule work task, it was laminated, and had a written prompt (examples are included in Appendix B, Figure B.7). Either the home room teacher or her job coach could hand Natalie the visual to remind her to complete the task. Then

Natalie, the teacher, or the job coach would return the visual prompt to the self-monitoring system and Natalie could move a magnet to indicate she had completed the task. This method was chosen because Natalie would perseverate when using a marker so that filling out her self-monitoring schedule became a way to escape and delay doing additional work tasks. Magnets were faster for her and were chosen in a pink color, which aligned with Natalie's preferences. This board was mounted inside the closet in the classroom where she worked that housed all of her cleaning supplies. A picture of Natalie's self-monitoring system is included in Appendix B, Figure B.6.

***Motivation.*** The unique needs, preferences, and aspects of the work environment that were reinforcing for each individual were considered when selecting goals and developing the individualized self-monitoring systems. Each self-monitoring system was designed to link to the goals set in the previous phase and to promote the ability of each individual to self-implement the intervention consistently after initial training.

Curtis said during his initial FAI that he wanted more social interactions at work. In subsequent conversation, he said that peer colleague input and feedback would make him feel more comfortable completing his additional work tasks. Curtis' system was designed with these considerations in mind. Specifically, his self-monitoring system was set up to support him to engage in a wider variety of job tasks while at work, and to have a tool to give him more confidence and structure in interacting with colleagues. The self-monitoring tool required Curtis to verbally and physically engage with customers and colleagues which, prior to its introduction, he was rarely doing. Management verbally communicated that if Curtis exhibited proficiency in the variety of his job tasks, they would consider moving him to a different department (which

during Curtis' FAI both he and his family reported was desirable). These increased social interactions and variety in job tasks had the potential to enable him to achieve his goal.

For Abe, he wanted more work hours at the electronics store, but the only way management had indicated they would be willing to increase his hours was if his productivity increased. His self-monitoring system attempted to support Abe in the steps necessary to achieve his goals. However, Abe was hesitant to use the system because he thought it might be stigmatizing. He was, however, very interested in positive feedback in the work environment. Therefore, the researcher coordinated with the local human services cooperative to devise an award. Abe's use of the system was tracked by the researcher and after two months of using the system, Abe received a certificate which was posted in the employee breakroom, with permission from management. Because Abe was motivated by social praise, having the award posted in the breakroom was highly reinforcing for him.

Natalie's system was developed to stimulate interaction with workplace supports in the classroom as well as direct Natalie to complete necessary activities. Natalie's support system reported that she greatly enjoyed social interactions, so the primary teacher was taught to direct Natalie to the visual prompts when the teacher noticed that Natalie was off-task. Further, the system incorporated Natalie's preferences (e.g., pink materials, and pictures) and Natalie indicated enjoyment upon interacting with the system. Natalie was also told that if her performance improved she would get a certificate awarding her performance. Like Abe, her use of the system was tracked and after two months of using the system she received a certificate awarding her performance. She indicated that she would like to have it to take home with her, so it was not posted in her work environment. During the FAI the local cooperative's Employment Specialist indicated how motivated Natalie was by paystubs and any physical artifact she had

documenting her work hours. Having something tangible to reward her for her progress was highly incentivizing for her.

### **Data Collection**

The primary method of data collection was interval recording for on- and off-task behavior and event recording for each step of the job tasks. The full-length data collection sheets for each individual, in the order participants were included in the multiple-baseline, are included in Appendix B, Figure B.3. The researcher conducted observations on-site using the data collection sheets. The observation period was approximately 30 minutes, broken down into 30-second intervals for on and off-task behavior and frequency recording for each step of the task analysis. On- and off-task behavior and job task completion data were recorded simultaneously. The researcher was responsible for all data collection procedures, training, and scoring. Data collection occurred 2-3 times per week at the individuals' job sites (or as often as the individual's work schedule allowed). Every attempt was made to make the data collection method the least intrusive possible.

### **Interobserver Agreement**

Before the baseline phase began, observations of individuals on-the-job allowed the researcher and a trained doctoral student participating in data collection to learn the data collection system and calculate interobserver agreement. Baseline data collection did not begin until there were two consecutive sessions with 90% agreement (or more) on the occurrence of the dependent variables across the researcher and additional trained doctoral student. Interobserver agreement was recorded across more than 20% of all sessions (data points) per participant and if agreement dropped below 90% for any session, retraining was implemented according to best practices for single subject research described by the What Works

Clearinghouse (Kratochwill et al., 2010). For Curtis, interobserver agreement was recorded across 46% of sessions. The average agreement was 95.6% with a range of 92% to 100%. Regarding Abe, interobserver agreement was recorded across 27% of all sessions. It was more difficult to conduct interobserver agreement sessions for Abe because he was uncomfortable with having people he did not know well in his work environment. This percentage was still greater than the 20% of all sessions required by the best practices for single subject research described by the What Works Clearinghouse (Kratochwill et al., 2010), but lower than that for other participants. The average agreement for Abe was 91% across sessions with a range of 80% to 100%. For Natalie, interobserver agreement was taken for 38% of sessions, with an average of 95.6% agreement and a range of 85% to 100% overall.

### **Design**

The study used a multiple baseline across participants design. Baseline data collection was initiated concurrently across the three participants. The uncontrolled baseline phase was the A phase, followed by the B phase (component 1 of the intervention – *goal setting*), a C phase (component 2 of the intervention – *self-monitoring*), and then finally a maintenance probe phase (D) with full workplace supports in place. The individual with the most stable behavior in the baseline phase (A), Curtis, was the first to begin the first phase of the intervention (B), and the other two individuals (Abe and Natalie, respectively) were staggered into intervention subsequently. This staggered introduction of the phases of the interventions was replicated across the phases to demonstrate experimental control (Kratochwill et al., 2010).

### **Procedures**

All of the observations and activities required to define the dependent variables occurred prior to the implementation of the multiple baseline design. Observations took place 4 weeks

prior to baseline and Functional Assessment Interviews took place 2 weeks prior. After dependent variables were selected and defined, the uncontrolled baseline phase across participants was implemented (mid-May 2012).

### **Baseline**

In the uncontrolled baseline phase, nothing changed in the environment, except that 2-3 times per week the individual was observed by one or two researchers on-the-job. To reduce reactivity because of the presence of two individuals recording observations, the researchers were introduced to the environment 2 weeks prior to the initiation of the uncontrolled baseline to collect data for researcher training (described in the Interobserver Agreement section) and 4 weeks prior to the uncontrolled baseline for initial observations (described in the Dependent Variable section) to ensure that their presence did not influence behavior.

**Reactivity Issues.** During pre-baseline training and into baseline data collection, reactivity was an issue for Abe and it became an issue for Natalie during baseline. Abe initially was uncomfortable with even the primary researcher observing him at work, leading to significant issues with the first attempts at data collection. It took careful coordination of telling Abe at least a day ahead of time via text message when the researcher would be there (and whether it would be just one researcher or two), as well as scheduling lunches or snacks to debrief with Abe and address his questions about his job performance. These lunches or snacks occurred once or twice weekly, and became a stable activity, throughout the study. The mealtimes served as opportunities for Abe to constructively talk about goals, self-monitoring tools, or anything else that was on his mind. These were vitally important to ensuring his participation as it allowed the researchers to forge a friendship with Abe. Every effort was made to make these times as casual and unobtrusive as possible (e.g. having them after rather than

before data collection, including other coworkers and friends, etc.), but admittedly they likely at least in part influenced his performance on the job.

Natalie initially did not appear to be influenced by the researchers' presence in her environment. However, after about 2 weeks of observation, her job coach and researchers were all at work with her simultaneously, and her job coach prompted her to be on-task whenever researchers were around. This exerted a significant influence on Natalie's behavior, and she began showing an increase in her on-task behavior whenever researchers were present. For this reason, the researchers had to explore ways to be unobtrusive when observing Natalie. This involved the researcher observing Natalie through the door of the adjacent classroom to hers – which was typically empty. The researcher would rotate between the front door of the classroom and this adjacent door to be able to see Natalie at all times throughout the course of observation. Doing this without being noticed by Natalie was not always successful, but after about two weeks these procedures significantly reduced the impact that the researcher's presence was having on Natalie's behavior. To maintain consistency across participants, the researcher also had a lunch once a week with Natalie and her job coach to gain trust and input into intervention. After working to be as unobtrusive as possible and initiating regular contact outside of the job site, Natalie's behavior returned to initial levels. Curtis did not demonstrate any noticeable reactivity and no outside-of-work meetings were scheduled. Meetings may have been scheduled with Curtis to promote consistency across participants, but as noted in the Results section, factors external to the study led to Curtis losing his job and his participation in the study ended early in the intervention phase.

**Intervention.** After a stable level of behavior was established (e.g., at least 5 data points were collected with limited variability in the data for at least one participant), the first participant

with the most stable baseline, Curtis, was moved into phase B of the study – the first phase of intervention. That phase was systematically introduced and staggered across participants, and phase C was introduced in the same way. Phase B is described in detail in the Independent Variable section. Each participant was asked to re-state their set goals, or in Natalie’s case affirm her goals, to the researcher before work (refer to Table 3.2 for those verbatim goals). Abe and Natalie also discussed those goals at lunch and/or snack times outside of work. Phase C, however, required more explicit instruction.

In Phase C for Curtis, his self-monitoring system was described to him during a training session at work. The researcher had Curtis meet her approximately 30 minutes before his shift began to provide instruction on the self-monitoring materials. She showed Curtis the script and how and where the self-monitoring system would be mounted. She then verbally described each step of using the system, providing examples and context for its use. Curtis, who has a high reading level, was able to walk-through the script unassisted and use his self-monitoring sheet at the end of the first training session. Curtis easily began using the self-monitoring system, perhaps because of his expressed interest in learning to do his job differently and more effectively. Implementation went extremely smoothly. Curtis’ self-monitoring tools are included in Appendix B, Figure B.4.

With Abe, given his challenges with researchers in his work environment and his initial aversion to the self-monitoring tool, more training was needed on the self-monitoring tool outside of the work environment. Two weeks prior to implementing the self-monitoring system, the researcher began discussing self-monitoring with Abe. She also solicited his feedback on different formats of self-monitoring tools. When Phase C began, the researcher introduced the specific self-monitoring system developed for Abe, and modeled its use in the work

environment. This occurred over three sessions, and involved the researcher taking the first several minutes of Abe's work time to model using the self-monitoring system and then prompting Abe through using the system while he was working. Abe began to use the system independently and the researcher faded her presence by the fourth session. Abe's self-monitoring tools are included in Appendix B, Figure B.5.

Similarly for Natalie, self-monitoring was introduced during out of work meetings with the researcher. The first day that the system was introduced into the environment, the researcher described the use of the system to Natalie and modeled use of the system when completing work tasks. Natalie was using the self-monitoring board independently by the end of the first session. The researcher modeled to the teacher how the visual prompts could be used, and had her take over the prompting the next session they were both present. Refer to Appendix B, Figures B.6 and B.7 for pictures of her self-monitoring tool.

**Maintenance.** A maintenance probe phase (phase D) occurred after the end of Phase C. During the maintenance phase, active support from the researcher was removed. All materials were turned over to the job coach and Employment Specialist. A researcher went into Abe's and Natalie's work environments 4 weeks, 7 weeks, and 12 weeks after the end of intervention phase to collect data to examine the sustainability of behavior change. The goal of the maintenance phase was to establish the sustainability (Kennedy, 2005) and the social validity of the intervention. Research has indicated that job coaching staff frequently change and that interventions are not always maintained after intervention ceases, so the researchers wanted to ensure that maintenance was occurring, and if it was not, to introduce additional supports to facilitate that outcome (West, et.al., 2010). During the maintenance probes, data collection occurred the same way as it did in each of the other phases.

## **Social Validity**

Maintenance data was collected to inform the social validity of the study, specifically to determine if the intervention would be maintained after active researcher involvement ceased and if support for the intervention generalized to the workplace supports available in the work environment, and if the individual with a disability learned and internalized the skills taught through the self-management intervention. We hypothesized that because individuals with disabilities, their families, cooperative staff, and coworkers and employers were included in collaborative efforts to customize the design and implementation of the intervention with consideration to their preferences and choices, this would increase the potential of the intervention to be sustainable and socially valid for the individual. The researcher also communicated with coworkers and job coaches during the observations and FAI process to promote employer buy-in and to ensure that goals were based on a realistic understanding of the demands of the environment and what was necessary to achieve goals.

In addition to maintenance data, a brief subjective evaluation was conducted at the end of the maintenance phase to capture of the perspectives of workplace supports (co-workers, employers) and the individual and their family on the effectiveness of the intervention. The brief subjective evaluation asked participants to rank the effectiveness of the intervention on a 5-point scale (1-very small impact, 5-very large impact). It asked the same question of support providers. It also asked participants and support providers about the ease of implementation on a 5-point scale (1-very easy to implement, 5-very difficult). It provided comment areas for individuals to explain their ratings of effectiveness and implementation. The subjective evaluation also included basic demographic questions (age, gender, and occupation), and closed with open-

ended questions about improvements in the participants' quality of life at work and at home (refer to Appendix B, Figure B.8 for the actual instrument that was administered).

### **Data Analysis**

Data was hand scored by the researcher, and plotted in graphical format. The percentage of on-task behavior was calculated by dividing the number of on-task intervals by the total number of intervals in a data collection session (e.g.  $x\text{-number-of-on-task-intervals} / 60$  thirty-second intervals in a 30-minute observation session). The task completion percentages were calculated by dividing the number of operationalized segments that were checked-off by researchers during an observation session by the total number of possible operationalized segments for each task (e.g. Natalie's vacuuming task has 10 operationalized segments so this task completion percentage would be calculated by  $x\text{-number-of-checkmarks} / 10$ ).

Data points were recorded in (a) Baseline, (b) Goal-setting, (c) Self-monitoring, and (d) Maintenance phases. Participants only moved into the next phase of the design when stability was demonstrated by 5 or more data points confirming the same trend within the same phase. The Maintenance phase was a probe phase, so three data points were taken at three very distinct points in time, and this was deemed sufficient because it was less intrusive, disruptive, and still provided data on the ongoing productivity of the participants, post-intervention.

The primary means of analyzing the graphed data was the visual analysis. In order to demonstrate a functional relation, the researcher needed to demonstrate that participants' behavior changed "following intervention when compared to preintervention" (Kennedy, 2005, p.28). Additionally, because there is not withdrawal of an independent variable in a multiple baseline design, behavior should change similarly across participants with each introduction of the independent variable. This change of behavior, demonstrated at three different points in time,

is what establishes a functional relation. We were primarily interested in changes in level, trend, and variability across phases. Level is the average of the data and visually is drawn as a line with zero slope at the average percentage within a phase. Trend refers to the best-fit straight line that can be placed over the data, also within a phase. Finally, variability is the range between all the data points and that best-fit line. If an intervention is showing efficacy, researchers would see higher levels in intervention when compared to baseline, they might also see an increasing trend line in intervention, and finally, if individuals experienced significant variability in baseline they would hope to see much less variability and more limited range in the data points in intervention. Changes in these three measures across phases were given more weight than the immediacy of effect across phases because an immediate response in intervention was not the ultimate goal of intervention. In fact, it was expected it may take time for the intervention to lead to changes in the participants' behavior. Ultimately, level, trend, and decreasing variability were used to examine the data both within and across phases to look at the demonstration of a functional relation, or that "an intervention reliably produced a particular change in behavior" (Kennedy, 2005, p. 28). As generally described above, when comparing Phase A to B, ideally an increase in level would occur across each phase. The researchers also expected to see a slight increase from Phase B to C, and a maintenance of the effect in D. Further, an increase in the trend line might be expected in Phase B compared to Phase A, and perhaps an even greater increase in Phase C. In maintenance Phase D, it is expected that the level will drop slightly from intervention, but it should still remain above baseline. If there are enough data points to form a trend line in maintenance, the trend line should have either a zero or upward slope. Finally, if variability is great in Phase A, it should decrease and data points should become closer together in Phase B,

and especially by Phase C. Variability should also be significantly less in maintenance Phase D than baseline Phase A.

## Chapter 4

### Results

This chapter reports the results from a multiple baseline across participants study of the impact of a self-management intervention combined with a brief functional assessment (FA), introduced in a systematic way guided by a theory of control, on the work behaviors of individuals with ASD and ID in community-based employment. This chapter addresses the five research questions introduced in Chapters 2 and 3. Overall, the intervention and brief FA increased the on-task behavior of participants Abe and Natalie by 31% and 23%, respectively. The third participant (Curtis), who was consistently on-task at the start of the intervention, still increased his on-task behavior by 4% during intervention. With regard to task completion, Curtis increased his task completion across three of four parts of his job by more than 40% and maintained 100% task completion in the fourth. Participants Abe and Natalie also increased their task completion in the majority of their job tasks. Abe experienced an increase of over 20% in all four of his job tasks, and Natalie experienced growth of approximately 30% in three out of five job tasks. Her remaining two job tasks experienced significant growth during phase two of the intervention, but no growth during phase one. This chapter presents the data for both dependent variables throughout baseline, intervention, and maintenance data collection phases across each participant and discusses general trends. It also includes a brief discussion of social validity data. The next chapter, the Discussion, will address implications for research and practice.

### Outcomes for the Dependent Variables

The two dependent variables measured were (a) on-task behaviors (Table 3.3), and (b) task completion, or the degree to which each individual completed each step of his/her job tasks

(Table 3.4). A multiple baseline graph displaying the data for on-task behavior is in Figure 4.1, and bar graphs related to job task completion are included in Figure 4.2

### **On- and Off-Task Behavior.**

**Baseline.** As shown in Figure 4.1, Curtis was on-task for the majority of intervals during baseline. Six data points were collected for him in baseline, and his average percentage of time on-task, or level, was 94%. Also, there was a slight upward trend in his data. His range of on-task behavior during baseline was 87-100%, and was extremely consistent. Consequently, this is not the dependent variable where a significant amount of growth was demonstrated throughout the course of the study for Curtis. .

Thirteen data points were collected for Abe in baseline, and his behavior was highly inconsistent. Throughout baseline, his average percentage of time on-task was 44%, with a range of 7% to 97%. There was a slight downward trend in his on-task behavior, however, the level of variability made any interpretation of trends unpredictable.

Nineteen data points were collected for Natalie in baseline. Like Abe, Natalie's behavior was highly variable. Her average percentage of time on-task was 57%, but the range was 0-100%. Because of this level of variability, there was no consistent trend in her data.

**Intervention.** All three participants experienced an increase in their on-task behavior during intervention when compared to baseline. Curtis' percentage of time on-task during the goal-setting portion of the intervention (Phase B) was 95% with a near zero trend. During the self-monitoring portion of the intervention (Phase C), Curtis maintained 100% of intervals with on-task behavior. Despite his high levels of on-task behavior during baseline, this is still an increase of over 4% of Curtis' average time on-task during intervention when compared to baseline. While admittedly this is an incremental improvement (he went from 94% of time on-

task during baseline to 98% during intervention), during the self-monitoring portion of the intervention he was 100% on-task – which shows the efficacy of the self-monitoring tool for him. Curtis also went from a range of 13 percentage points in baseline to a range of 8 percentage points in intervention, showing increased consistency in his behavior.

During the goal-setting phase (Phase B) of the intervention, Abe's percentage of time on-task decreased slightly from baseline, 44%, to 41% (-3 points). Although there was a slight upward trend in his data during the latter data points collected in the goal-setting phase, his level in goal-setting was still below that in baseline. However, in the self-monitoring phase of the intervention, that average percentage of his time on-task jumped to 86%, a much higher level than baseline. In addition, his on-task behavior was trending upward, and showed much more limited variability than baseline. Abe's data was highly variable in both baseline and goal-setting, but this variability was significantly reduced during self-monitoring (Phase C). Although it appeared there was an immediate effect of behavior based on the first data point in Phase B (goal-setting), this diminished quickly, and all of Abe's remaining data points in the goal-setting phase (Phase B) overlapped with data points in baseline. During self-monitoring (Phase C), there was not the same immediate effect in the first data point, but instead a stable upward trend over the course of the phase. Only two data points overlapped with the goal-setting phase and there was much more limited variability during self-monitoring than during the baseline phase.

During the goal-setting phase (Phase B) of the intervention, Natalie's percent of time on-task increased a negligible amount to an average of 58% time on task (+1 point over baseline). However, during the self-monitoring portion of the intervention (Phase C), Natalie experienced a significant jump from baseline to 92% on-task, an average increase of 35 percentage points over baseline. There was also a reduction in the variability of Natalie's behavior; she demonstrated a

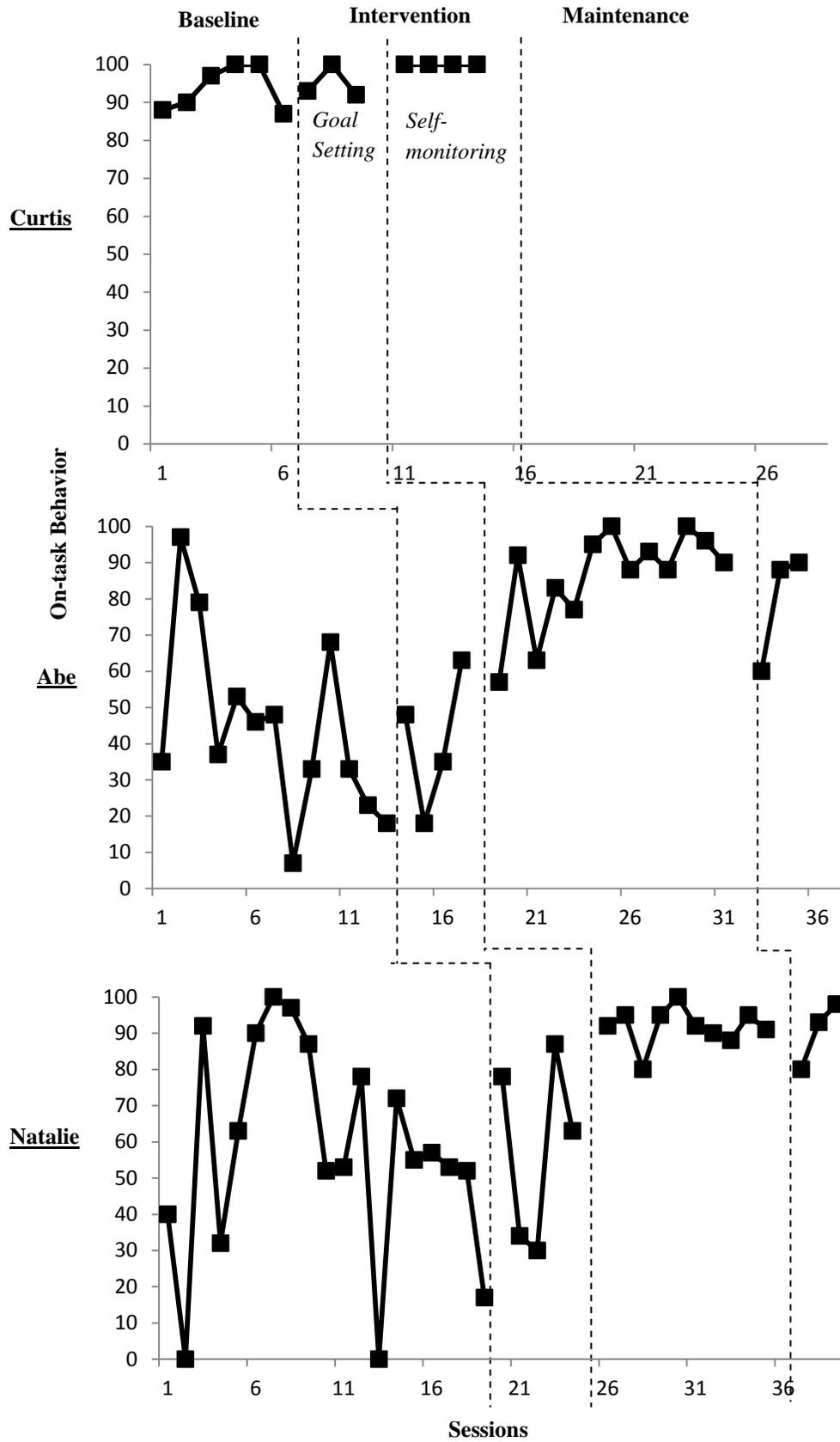
range of 100 percentage points during baseline to 70 percentage points during intervention. During the self-monitoring phase, the variability was lowest. Natalie demonstrated an immediate effect when she transitioned to the self-monitoring phase, with a large immediate increase in her behavior over baseline and goal-setting.

***Maintenance.*** Unfortunately, Curtis unexpectedly lost his job during the latter part of the intervention phase of the research study due to factors that were previously unknown to the researchers and the staff at the local cooperative. Curtis had been consistently coming to work 2 minutes late, and occasionally using far more than his allotted 15-minutes of break time, and every infraction added half of a point to a “disciplinary score” tracked by his employer. The operating policy of the company, given its size and level of turnover, was to immediately dismiss anyone when they accumulated 12 points. Furthermore, that individual would not be able to regain employment at that company or any of its stores in the future. Unknown to the researcher, Curtis had 11 points at the start of the study – and every infraction earned him half of a point (so he was two infractions shy of immediate dismissal). Management did not share these issues with Curtis’ Employment Specialist at the cooperative or the researcher, even though his job was in jeopardy. When Curtis accumulated 12 points, the company’s policy dictated that he be fired within two weeks and Curtis was dismissed on the spot after the fourth intervention session. Regrettably, that means there are no maintenance results to report for Curtis.

Abe’s average level of on-task behavior during maintenance sessions 4, 7, and 12 weeks after intervention was 79%. This is remarkably consistent with his on-task behavior during intervention and even shows a slight increase (+3 percentage points over intervention). Abe’s average on-task behavior during the maintenance phase was 44 percentage points higher than his average performance during baseline.

Natalie's average level of on-task behavior during maintenance sessions 4, 7, and 12 weeks post-intervention was 90%. This is 10 percentage points higher than her level of on-task behavior during the intervention phases of the study, and substantially higher than her average baseline performance.

Figure 4.1, Multiple baseline graph of on-task behavior



*Experimental control across participants.* Abe's and Natalie's data demonstrate a similar pattern of change. Low to average levels of on-task behavior during baseline with extreme variability, limited change during goal-setting (Phase B), and substantial positive change during self-monitoring (Phase C) that was maintained after the intervention was withdrawn. Curtis, however, was already demonstrated very high levels of on-task behavior during baseline, leading to a ceiling effect and less ability to detect an impact of the intervention. However, during self-monitoring Curtis did demonstrate an increase in his on-task behavior to 100%, suggesting a potential impact of the intervention. This consistent pattern of positive change during the self-monitoring intervention phase across participants, suggests the efficacy of the self-monitoring interventions, although more work is needed to determine participant characteristics that influence efficacy.

### **Job Task Completion.**

*Baseline.* All three participants experienced low percentages of job task completion in baseline (refer to Figure 4.2). Curtis was inconsistent in his completion of three of four job tasks during baseline. He was only completing one of his job tasks (pushing carts) with 100% accuracy. Two job tasks he was not doing at all, 0% (cleaning spills and stocking shelves), and his final job task (assisting customers with groceries) he was only completing 29% of the steps in the task, on average.

Regarding Abe's job task completion, he was also performing at low levels during baseline. For three of his job tasks, (DVD organization, replacing misplaced items, and finding items) he was, on average, only completing 12%, 15%, and 19% of task steps, respectively. His fourth and final job task, assisting customers and coworkers, was higher, but still only 54% of steps in the task were being completed.

Natalie was attempting to complete each of her five job tasks throughout baseline, but completed all of the steps at low levels. She was completing three of her job tasks (cleaning tables, cleaning sinks/mirrors, and sweeping) at less than 50% accuracy (39%, 41%, and 47%, respectively) during baseline. She was slightly more consistent at vacuuming and taking the trash out, but those percentages of steps completed, on average, were still only 55% each. And, it is important to note that despite these average percentages of task steps completed, there was significant variability in her performance from observation to observation during baseline. As mentioned previously, Natalie's job coach prompted Natalie to work hard whenever the researchers were present which led to reactivity in Natalie's behavior for several observation sessions. For these two tasks in particular, which were identified as non-preferred by her job coach, there seemed to be a significant impact on her performance.

***Intervention.*** All three participants exhibited growth in the majority of their job tasks in intervention, although the majority of this growth occurred during the self-monitoring phase (Phase C), not the goal-setting phase (Phase B). Curtis, Abe, and Natalie all had levels of task completion above 80% in every single job task by the self-monitoring portion of the intervention (Phase C).

During goal-setting, Curtis began to complete some of the steps of the cleaning up spills task (8%), and when it came to assisting customers with their groceries, his task completion increased to 67% (an increase of 38 percentage points over baseline). He continued to complete the pushing carts task with high accuracy, but still did not engage in stocking shelves. In the self-monitoring phase, his task completion for cleaning up spills continued to increase (81% of steps completed on average), as did his completion of assisting customers with groceries (94% of steps completed on average, a 65 percentage point increase over baseline). He began stocking shelves

and performed this task with high accuracy (85%), and continued to push carts with high accuracy (100%). It is notable that Curtis was not performing two of those job tasks at all during baseline (stocking shelves and cleaning up spills) and that he maintained his high completion of pushing carts (100%) across both goal-setting and self-monitoring.

Abe also showed meaningful growth in all four of his job tasks during the goal-setting and self-monitoring portion of the intervention. First, with regard to the goal-setting phase, Abe showed increases in his task completion ranging from 6 to 38 points: replacing misplaced items – 25% during goal-setting (+10 percentage points over baseline), finding items – 30% (+11 points), and assisting customers/coworkers – 60% (+6 points). His accuracy in completing his fourth job task of DVD organization improved to 50% (+38 percentage points over baseline) in goal-setting. In the self-monitoring phase the growth was even more pronounced. For replacing misplaced items his job task completion increased to 77% (+52 percentage points over baseline), finding items improved to 85% (+55 points), assisting customers/coworkers jumped to 92% (+32 points), and organizing DVD's increased to 98% (+48 points).

Natalie also experienced overall growth in her completion of tasks during the intervention phase, although the majority of her growth occurred during self-monitoring. During the goal-setting phase, Natalie actually experienced decreases in her accuracy of completion of two job tasks, sweeping and taking out the trash. During baseline, Natalie intermittently completed these tasks which she reportedly did not enjoy completing (mainly after prompting by the job coach to preform them when researchers were present) with low levels of accuracy (47% and 55% respectively), but she did not complete them at all during goal-setting. It is possible that the issues with reactivity during baseline described above were resolved by the goal-setting phase and influenced Natalie's performance of these tasks. However, during the self-monitoring phase

she began to complete these tasks with much higher levels of accuracy, completing 83% and 100% of the task steps, on average. In her other three job tasks, Natalie experienced significant growth from baseline to self-monitoring. By the self-monitoring phase, she was completing, on average, 83% of the steps in the vacuuming task (a 28 percentage point increase over baseline), 100% of the steps of the cleaning tables task and the cleaning sinks and mirrors task (+61 and +53 points over baseline, respectively).

***Maintenance.*** Both Abe and Natalie continued to show consistent, accurate performance in each of their job tasks during maintenance data probes, which occurred 4, 7, and 12 weeks after the end of the intervention phase. Unfortunately, as mentioned previously, Curtis lost his job, so maintenance data was not available. As shown in Figure 4.2, Abe's job task completion during maintenance sessions was 100% across all four of his job tasks, which was even higher than his levels of performance during intervention phases. Natalie's job task completion during maintenance sessions was also 100% across all five of her job tasks. When comparing this to both participants' baseline levels of performance, the data suggest that the positive change in job task completion which occurred during the intervention phases was maintained after researcher support was withdrawn.

Figure 4.2, Each Participant's Average Job Task Completion

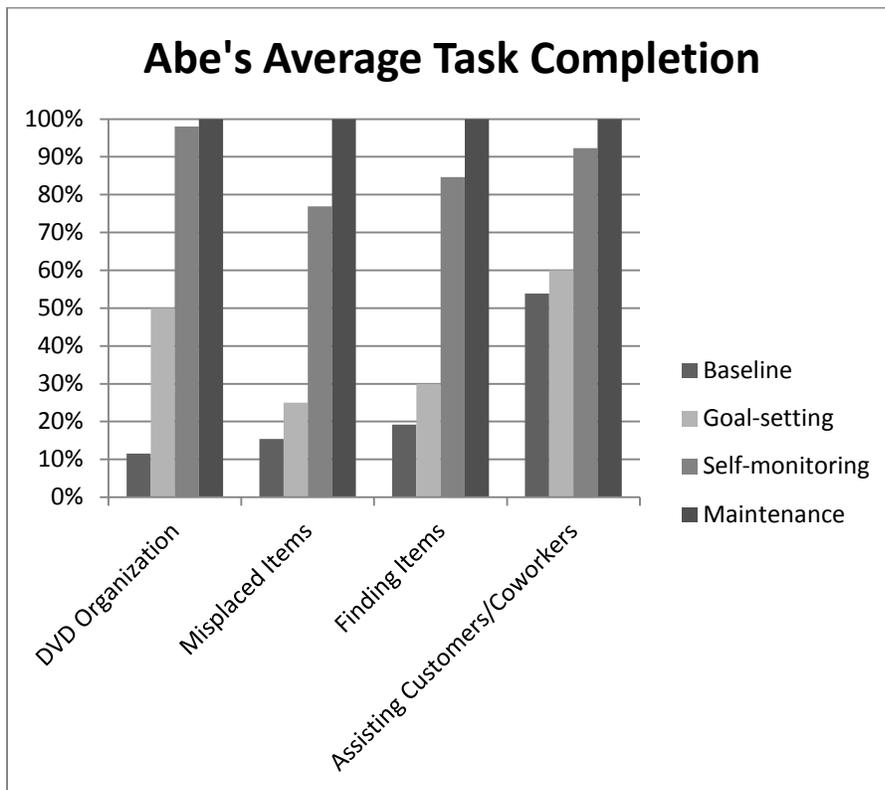
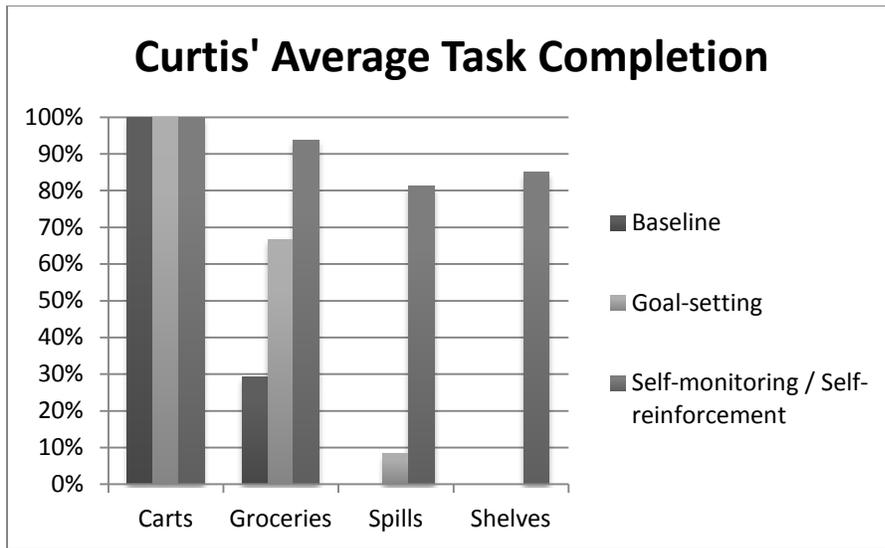
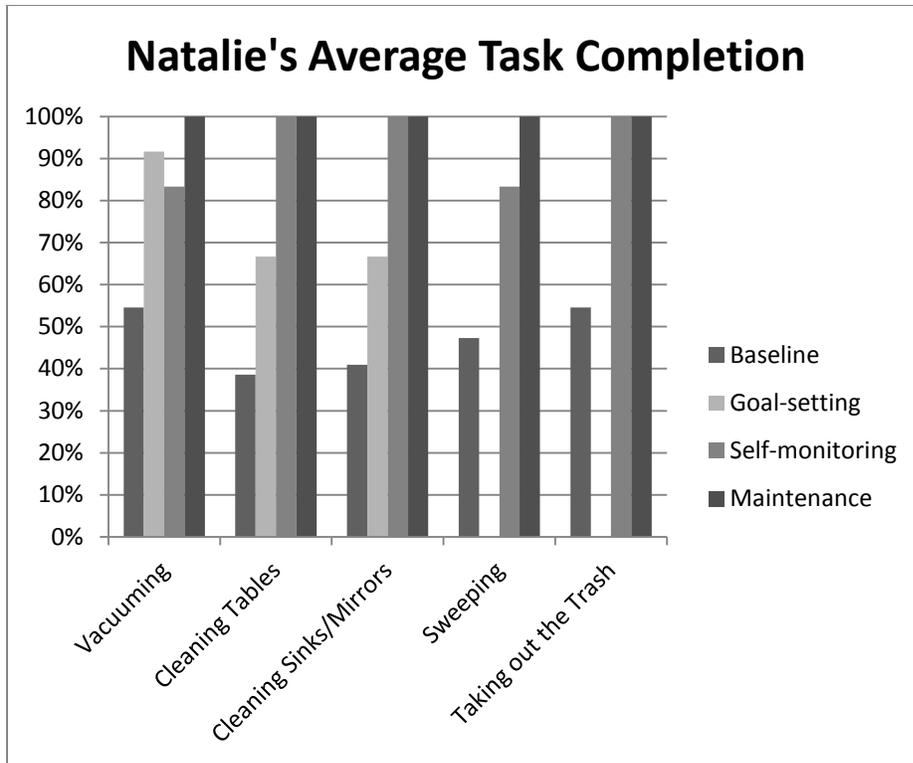


Figure 4.2 (continued)



### Treatment Fidelity

The same researcher implemented each component of the intervention. The researcher followed a series of steps on a checklist, informed by each individual's self-monitoring system, and checked-off all steps as they were completed throughout the course of the intervention. For 50% of observed sessions with Curtis, 33% with Natalie, and 25% of observed sessions with Abe, a second observer recorded the implementation of the intervention independently from the researcher to ensure fidelity of implementation. For example, during the goal-setting phase (Phase B) a second observer coded whether the goals were reviewed and repeated and affirmed with each participant prior to the work session. During the self-monitoring portion of the intervention (Phase C), a second observer recorded whether the participant had access to the self-monitoring system and was following the steps on the checklist to use the system. For Abe, only 25% of observed sessions were accompanied by a second observer because as described previously Abe was uncomfortable with a second researcher in his workplace. Minimum fidelity

to the intervention was required to be 80%, and any time fidelity fell below that minimum, the primary researcher would talk to the second observer about the inconsistency in implementation procedures. This occurred once with Natalie and twice with Abe; the inconsistencies occurred because the primary researcher, who was also the intervention agent, was inadvertently changing the way she recorded the completion of steps on the checklist based on her close work with the participants (e.g., skipping a step because she knew the participant did not need to review that step). When this occurred, the primary researcher went back to the original intervention script and task sheet with the detailed descriptions of on- and off- task behaviors for each participant, and reviewed the proper, operationalized, data collection definitions and intervention protocol. Ultimately, procedural fidelity was 96.5% for Curtis, 86% for Abe, and 94% for Natalie.

### **Social Validity**

Abe's and Natalie's levels of on-task behavior and work task completion remained at or above their intervention phase levels of performance, demonstrating high levels of maintenance of behavioral change. It was predicted that there may actually be a slight drop off in behavior when supports were withdrawn, but this did not occur, and instead Abe and Natalie's behavior continued to improve. By the end of the maintenance phase, both Abe and Natalie were actually more on-task and accurate in their completion of job tasks than during baseline or intervention phases. Also by the end of the maintenance phase, Natalie had acquired three additional paid hours per day raising her to close to 20 hours a week of paid employment. Her job tasks were expanded and she began working in more classrooms. Abe had a new job supervisor who expanded his job tasks during the maintenance phase. And, at the time of this writing, he was in discussions with his employer to obtain more hours. Overall, the benefits of the intervention

were maintained for Abe and Natalie and appeared to be leading to significant, positive changes in their employment statuses.

It is also noteworthy that during the maintenance phase, workplace supports began to play a larger and larger role in Natalie and Abe's work environment, likely contributing to their ongoing success. The Employment Specialist at the local cooperative was aware of the self-monitoring systems Abe and Natalie were using, and the researcher provided detailed information after she finished intervention to give the Employment Specialist the opportunity to continue to support the two individuals to use their systems. However, the Employment Specialist could not be on sight as frequently as the researcher had been. She worked with Abe to use technology to continue his use of the self-monitoring system. At the end of each shift, Abe began to take a picture of his self-monitoring tool on his smart phone, and e-mail it to the cooperative's Employment Specialist. Abe actually preferred using his smart phone to a laminated self-monitoring sheet, so he and his Employment Specialist adapted the sheet into a text message on his phone that he saved as a draft and re-sent each day to the Employment Specialist. This helped accommodate Abe's preferences, as well as reduced the stigma that Abe felt the laminated system introduced. Further, because of the awareness of Abe's discomfort with his checklist, his job coaches and coworkers began to talk about and carry around checklists that they used. They shared with Abe how they use checklists and other organizational tools, further increasing Abe's comfort with using his self-monitoring system.

For Natalie, after the intervention phase, the teacher in the home room where Natalie worked took her self-monitoring tool out of the closet where the researcher had originally mounted it and displayed it in the classroom next to the shelf where Natalie kept her drink and other personal items. This area was known to be Natalie's "home-base" in the classroom. The

teacher reported that this helped reinforce everything that Natalie was doing and made it easier to access. She said that “this way Natalie didn’t forget any of her job tasks.”

Key stakeholders were also asked to complete the social validity instrument described in the Methods section (see Figure B.8 in Appendix B) during the last maintenance observation session. Both Abe’s and Natalie’s supervisors scored the intervention at a “5” when it came to improving their individual job performance (5 = completely improved). They also both felt that the intervention was “5” or easy to implement. In their written comments, both supervisors indicated that they noticed positive changes in both Abe’s and Natalie’s performance on-the-job from mid-May (the start of the research study) to mid-August (the end of the study). Abe’s supervisor wrote “he is one of the hardest workers we have and takes direction well.” Natalie’s supervisor (homeroom teacher) commented that she was more on task and more dependable as the summer months wore on. Natalie’s job coach also affirmed that she had seen very positive changes in Natalie’s behavior on-the-job, particularly toward the end of the study, which was one of the reasons she was able to make the case to Natalie’s supervisor to acquire more work hours (and succeeded). Abe’s family thought that he was more excited about work and talked more about new and different job tasks than prior to the study.

## Chapter 5

### Discussion

#### Overview of Findings.

This study was designed to explore the impact of a self-management intervention on the job performance of individuals with severe disabilities in employment settings. Overall, the results indicate that self-management interventions can be effective in supporting individuals in community-based, employment settings to increase their on-task performance and completion of job tasks, and that these increases can be maintained over time and, perhaps, contribute to changes in employment status. Furthermore, the results suggest that utilizing a theory of control to guide a systematic and strategic process for implementation of the intervention can positively affect the implementation process by identifying the discrepancies between goals and actions, disturbances that emerge in implementation, and key stakeholders. It also appears that self-monitoring in combination with setting goals is more robust than simply stating goals in terms of promoting behavior change. The findings add to the literature reviewed in Chapter 2, suggesting specific participant and intervention characteristics that might influence the impact of interventions as well as demonstrating the impact of thinking systematically by using a conceptual model of implementation to identify key stakeholders and address disturbances, such as participant reactivity and sensitivities to researcher presence in the job setting

***Impact on on-task behavior and work task completion.*** As shown in Figure 4.1, on-task behavior was significantly impacted by the intervention, particularly the self-monitoring phase of the intervention for two of the three participants. For Curtis, because he was already demonstrating high levels of on-task behavior, there was not as substantial of an impact as for Abe and Natalie. It is important to note, and to consider in future research and practice, that

while establishing goals was a critical part of the study and was completed collaboratively with employment support specialists, families, and the individuals, simply having the individuals state their goals did not have a large impact on behavior. It was not until individuals began self-monitoring to the degree where they were taking steps to achieve these goals that changes in behavior were seen. Having goals in place was fundamental to knowing what should be self-monitored, but teasing out the best ways to set goals, review goals, and implement self-monitoring is an important direction for future research. It is also important to note that despite Curtis' high levels of on-task behavior he was not completing the majority of his job tasks on an ongoing basis. This suggests that on-task performance may also not be the best indicator of work productivity, and that multiple measures of employment success are needed.

For all three participants in terms of work task completion, self-monitoring was also more effective than only stating goals in leading to an increase in accuracy of completion of work tasks. Reviewing goals did not seem to provide the participants with concrete steps to take in completing work activities, and instead may have led to frustration as previously described for Abe. Instead, increases in task completion were strongly linked to the self-monitoring portion of the intervention, as were increases in on-task behavior. The self-monitoring involved a concrete tool individuals could use to help them do a better job while at work. The self-monitoring component provided a mechanism for individuals to record and understand how to complete their goals and to track their progress.

West et al. (2010) discussed the importance of reengineering environments to help give rise to more successful outcomes, and the self-monitoring system seemed to serve this function. Some of the participants did not seem to be clear on the steps they were supposed to be taking to complete tasks, or even the tasks to complete, in the work environment. By adding a level of

organization in the form of the self-monitoring system to each individual's job environment, it assists employers by listing what their expectations are from the employee and the specific steps needed to meet these expectations became much clearer. Every participant learned that they needed to accomplish all of the tasks on their self-monitoring system at least once each time they were at work. They also became aware that completing all of their job tasks was important, and related to success in the job environment. As mentioned previously, when Abe did not want to be stigmatized by having a self-monitoring system that no one else in his work environment had to use, his job coaches and coworkers started to carry around checklists. They talked about how much they used organization in their lives and relied on checklists on their phones. This helped make something that was previously perceived as socially stigmatizing to Abe, to be something of a social norm. Reengineering the environment, as well as incorporating participants' preferences into the design of their self-monitoring systems made the systems more useful and more likely to be used with and without researcher support. Interestingly, employers were very supportive of whatever tools enabled the individuals to be successful in completing their job tasks; none of the employers expressed strong preferences or reservations on how the job tasks were completed or what supports were provided when asked. Instead they simply wanted the task to be completed, dependably and consistently, in a reasonable amount of time. Future research is needed that examines how designing self-monitoring systems around individuals' preferred activities impacts the likelihood that the systems are used. In addition, future research should try to identify additional ways to restructure the environment to promote success, defined by completing activities, dependably and consistently.

Previous research has generally discussed the benefits of training provided on-the-job, but Gear, Bobzien, Judge, and Raver (2011) also suggest that direct training in the workplace

combined with training in an adult education vocational program assisted workers with autism or intellectual disability to be more successful in supported employment. In this study, supports outside of the work environment were important to the efficacy of the self-monitoring systems on-the-job, particularly for Abe and Natalie. While there was no supplementary adult education vocational program, the education and supports provided by the researchers during lunch meetings with Abe and Natalie were critical to teaching the individuals to use the self-monitoring system and supporting them to use it on an ongoing basis. Furthermore, Gear and colleagues (2011) suggested that workers displayed more rapid acquisition of job skills when work skills were practiced both at the real workplace and in another environment. Perhaps, reviewing the self-monitoring tools during the lunch meetings served this function, despite the informal nature of the lunch meetings. Future research is needed to explore the best ways to provide training on strategies, like self-monitoring tools, that effectively support their use with minimal disruptions to the work environment.

Additionally, Gear et al. (2011) discussed the importance of prosocial behaviors and social relationships to success in employment settings. Although not a direct focus of this intervention, it quickly became clear that social interactions were fundamental to participants' success in their respective work environments. Each individual had elements of their work tasks that required social skills, and anecdotally, the self-monitoring system seemed to improve social interactions around these specific activities. Further research is needed on ways to support individuals to learn to self-direct their use of social skills and build social relationships that promote job performance, workforce integration, and promotional opportunities

### **Implications.**

**Employment Outcomes.** Despite the overall positive findings and outcomes, particularly for Abe and Natalie, this study also suggests that employment can be tenuous for individuals with disabilities - even when there is a strong focus on collaboration across disability support providers and employers. As mentioned in Chapter 4, Curtis lost his job after the fourth intervention data collection session. This came as a complete surprise to the researchers, the Employment Specialist at the cooperative, and Curtis and his family. Curtis' job supervisor consistently told cooperative staff during bi-weekly conversations (as recently as 2 weeks prior to his dismissal) that he was one of the hardest workers at the store and a great employee. In the researcher's conversations with Curtis' supervisor, the issues that led to his dismissal were never brought up. Therefore, there was a lack of awareness of the issues with tardiness and excessive break times within Curtis' support team. And, Curtis seemed to have no awareness of these issues, nor was he reliably informed by his supervisor about the issues prior to his dismissal. (He was shown the number of points he had accumulated on a computer monitor some weeks prior.) So, proactively targeting these issues was not considered by the cooperative, family, or researcher. While these issues were likely covered in different employment manuals and trainings, given the range of company-specific policies future research is needed that explores ways that disability support providers can interact with work supervisors and collect meaningful data on the diverse issues and idiosyncratic company policies that impact success in the work environment. Data collection tools that identify questions and domains to be assessed to ensure that all parties are communicating about key issues will be important.

**Collaboration.** Additionally, the researcher was never successful in getting any supervisor or manager, across participants, to respond to her e-mails or return her phone calls. On-site communication before or after work observations of the participants was the only way

that the researcher was able to communicate with employers. Future research is needed on the most effective communication strategy or tool that can facilitate these discussions. Frank and candid conversations about an employee's work performance are vital to the success of an intervention study (and the provision of employment supports by disability service providers), and it can be difficult to build the level of rapport needed for honest communication with infrequent and quick communication. The complexity of business structures and functions must be considered in devising these strategies. For example, what if the direct supervisor for a participant is never on-site when the participant is working (for example, always in a different department, as with Abe and Curtis) – how does the researcher (or a job coach) go about identifying a chain of command without interfering with or disrupting the individual's work environment? Collaboration is identified a best practice in the literature, but future research is needed that focuses on strategies for building supports and creating sustainable change, while also not creating disruptions or stigmatizing work conditions.

Schall (2010) discussed the importance of involving workplace supports on the job site, and the importance of not limiting employer involvement exclusively to supervisors and managers, as they are typically not involved in the participants' day-to-day job tasks, not always working when the participants are, and not consistently the best at communicating the root issues the individual may be experiencing at work. In fact, two different supervisors (one for Abe and one for Natalie) were replaced over the short course of the study. Identifying co-workers and involving them in developing interventions and understanding work place culture appear to be critical to communication and the success of interventions.

Ultimately, enhancing communication and building relationship among all stakeholders is critical to successful community employment for people with severe disabilities. The functional

assessment process used in this study provided a framework for building this collaboration among the diverse stakeholders vested in the success of people with disabilities. As described in the Methods section, interviews were set-up with participants and families prior to baseline data collection as part of the Functional Assessment. In one family, the researcher met only with the participant and his mother. With a second family, it was the researcher, participant, participant's mother, and job coach. In a third family, the researcher met with the participant, the participant's brother, and the participant's mother and father. How the collaboration was structured was decided by the participant and each family, but multiple stakeholders were involved for each participant. Prior to these meetings, the researcher had extensive discussions about each participant with the local cooperative's Employment Specialist. The researcher also observed each individual on-the-job and had discussions with each individual's employer prior to these meetings. The Functional Assessment process was crucial to defining the dependent variables. Without observing the participants at work, talking to employers about the participants' areas of strength and support needs, and talking to the cooperative's Employment Specialist about those same issues, the researcher would have had no tangible context for the dependent variables that were the most meaningful. Scheduling meetings with the families and participants after these other steps had been taken was strategic. The researcher wanted to be able to bring information to the meetings that families typically lacked. No parent or family member had a completely accurate picture as to what their son or daughter did while at work. It was important that the researcher could help clarify this, as well as shed light on what both employers and the cooperative's Employment Specialist felt were the main areas of the strength and weakness. In one very specific case during these family meetings, the participant described job tasks that he hoped to do in the future as part of his current repertoire. Without the researcher having been to

his work environment and having discussions with his employer, she could have mistakenly identified erroneous components of the dependent variables to focus on and measure in the study.

Another function of the family meetings was to create an opportunity for a group dialogue around goal-setting, building buy-in and support across the home and work context. Participants had the opportunity to voice what they wanted out of their work environment that they were currently not receiving. (Refer to Table 3.2 in the Methods section for those goals.) Families were generally in complete support of these goals, and participants heard their families agree and support their goals. Having a team that was completely focused on creating supports helped everyone get on the same page regarding current and future initiatives at work. It was vitally important for all participants to have family support and encouragement at home for participation in all aspects of the study. Further research is needed that focuses on building supports at home for work-related interventions, and promoting active involvement of families in identifying and supporting the achievement of work-related goals.

***Behavioral Change.*** In addition to the sudden and unfortunate loss of Curtis' job, Abe and Natalie experienced inconsistencies in their on-task behavior and job task completion throughout the study. For example, Abe's on-task behavior decreased in the goal-setting portion of the intervention which was counter to the predicted pattern of change. It seemed that for Abe, simply stating goals aloud was not enough to lead to behavioral change. Prompting, modeling, and supports to implement self-monitoring seemed to be necessary to change behavior. However, the decrease in the goal-setting phase is a finding that deserves further exploration. Even though the goals set prior to the start of the study and reviewed with Abe during the goal-setting phase helped clarify certain expectations from management, Abe appeared to need specific strategies to

make changes in his behavior. Further, he had, in the past, become resistant to members of his support team telling him what to do to change his behavior at work. It may have been that restating the goals with the researcher actually led to Abe becoming frustrated and resulted in a negative performance because he did not have the tools to make changes. However, providing these tools, for all three participants, seemed to lead to significant changes in task completion that promoted greater independence and a greater ability to understand and act on expectations for performance and behavior.

***Reactivity.*** As discussed in the Results section, Natalie experienced significant reactivity to having researchers present in her environment during baseline that seemed to decrease during intervention. This may have been due to Natalie's increasing comfort with the researcher and her recognition that despite her job coach telling her to be on-task when the researchers were in the environment during baseline, Natalie did not receive any attention or consequences from the researchers based on her on- or off-task behavior. This reactivity, however, can be observed throughout the data displayed in Figure 4.1 and may have influence Natalie's intermittent performance of two job tasks during baseline, but her failure to complete these tasks during the goal-setting phase (Phase B). The researcher hypothesizes that, similar to Abe, only affirming goals was not enough to change Natalie's behavior. Actual supports in the form of a self-monitoring system proved much more effective for her than more conceptual goal-setting. Further research is needed, however, to address issues of reactivity, the level of involvement of the researcher, the need for relationship development for successful implementation of interventions in real world settings, and the relationship between setting goals and building self-monitoring systems.

## **Considerations**

There were several limitations inherent in this study. First, the initial participant, Curtis, lost his job in the middle of the intervention phase. This limits the potential of the design to demonstrate experimental control. The ability to demonstrate an experimental effect at three different points in time (or across three participants) in a multiple baseline study is central to internal validity (Horner et al., 2005). And, not being able to include complete data for Curtis during the intervention or maintenance phase limits the conclusions that can be drawn. However, given the clear changes for Natalie and Abe, and for Curtis in work task completion, the data suggest that the intervention had some impact, but future research is needed to confirm these findings.

There were also differences in the degree to which the participants' families were involved in the intervention. Two families were very involved, and were continuously interested in updates and progress reports as the study went along. Another family participated in the functional assessment process but then relied on the job coach to work with the researchers to develop and implement the intervention. Further research is needed on the role of families in supporting young adults in work settings, the impact this involvement has on intervention efficacy, and ways to promote involvement that is meaningful and comfortable for all parties.

In addition, because the interventions were implemented in community environments, there were specific challenges with data collection. The researcher had to attempt to blend into community environments as video-recording or recording in another manner was not possible. However, it was nearly impossible to watch someone complete job tasks in a public environment for several hours without some recognition from the environment. For example, individuals approached the researchers at different points to ask if what they were doing, at times becoming defensive if they thought the researcher was collecting data on them. Not disclosing the purpose

of the research and protecting the confidentiality of the research subjects was important, but led to an inability to provide specific feedback when questioned that angered some individuals. Overall, the researchers were able to collect the needed data, but it was a struggle to limit the impact data collection had on the work environment, coworkers, and the community at large. While every effort was made to limit the impact on data collection, it is likely that there were unknown influences on the data that cannot be fully understood. More research is needed on data collection strategies, particularly the exploration of the use of emerging technologies, to collect data in “real-world” environments. Relatedly, it was critical to ensure that the researcher’s presence was not stigmatizing for the individual. Ohtake and Chadsey (2003) suggest that job coaches (or in this case researchers) may sometimes become a barrier to social interactions between workers with disabilities and their coworkers without disabilities. Every effort was made to reduce this possibility in the present study, but it is possible there were unknown impacts of the researcher’s presence. Methods to empower the participants in this process and clearly communicate the strengths of these individuals to employers and coworkers to overcome this problem of perception would also be helpful directions for future research.

In addition, the use of the same observers to record data over extended periods of time or an instrumentation effect was a threat to internal validity. In this study, two observers were used to promote consistency and reliability, and interobserver reliability data was strong, but the data collection on the dependent variables was inherently impacted by the perceptions of the observers and by “observer drift” – when the definitions an observer uses implicitly change over time (Kennedy, 2005).

Vacations and time-off were also not adequately anticipated at the start of the study. During the data collection period, the participants had family vacations that interrupted the

intervention and the participants also took certain days off for personal activities. Because of the researcher's connections with the participants through the cooperative, she would often learn of these absences; however, there was not a clear communication protocol. This added time to the study and created gaps in data collection that must be considered in interpreting the results.

Another limitation was the nature of the goal-setting phase of the intervention. Arguably, goal-setting began with the initiation of the functional assessment process and was much more involved than what occurred in the intervention phase, which was simply having the individual repeatedly state their goal. Further research is needed to capture the impact of collaboratively developing goals, and to tease out the impact of this process alone and in combination with self-monitoring on behavior.

Finally, although three participants were included, each of who was in a unique community-based employment setting, the external validity of the study is narrow. Future research is needed in diverse settings with individuals with diverse personal and familial characteristics.

### **Implications for Future Research**

In the present study, coworkers and other employees who worked directly with the participants were vital sources of information and creativity when developing the intervention approach and self-monitoring systems. In many cases, coworkers were able to provide more information than direct supervisors, suggesting their importance in developing supports. Future research is needed that focuses on how to include more peripheral stakeholders in collaborative efforts to enable success in the workplace. Perhaps, coworkers could be included in future intervention phases or even as the primary intervention agent. This could be extremely timely if a participant is undergoing training in the workplace anyway – which seemed to happen fairly

regularly with this study's participants. Of course, efforts should also be made to not change the power structure of the relationship (between participant and coworker), but perhaps utilizing coworkers who are slightly more senior could be a good way to address that issue. Further, the supports that are developed for people with disabilities may also have more universal applicability, and developing systems of support that benefit all employees could make interventions more inclusive and less focused on the person with a disability in particular.

Further research is also needed on best practices in reengineering environments to support productivity, and to engage workers with and without disabilities. Many possibilities exist for reengineering environments, challenging stigmas, and creating a culture of support for all individuals, including people with disabilities. Emerging technologies have potential to support these efforts, and further research is needed. And, even when technology is not available, identifying ways to use workplace supports more effectively is an important direction for future research.

Developing and examining tools to collaborate effectively with employers is also needed in future research. As shown for Curtis in the study, miscommunications and misperceptions can lead to negative outcomes. Future research should explore the best ways to build relationships with limited time, people, and resources. Additionally, research is needed to facilitate family collaboration when designing work-based supports. Exploration of issues of independence, family involvement, and work expectations are needed. Future research should also investigate better and more creative ways to conduct research in natural, community-based settings. Best practices and strategies to avoid would be extremely helpful for future researchers whose primary work is done in largely uncontrolled, community-based environments. Involving the

participant (employee) in these discussions as a self-advocate should be investigated as a strategy to lead to improved communication between the employee and coworkers and supervisors.

Finally, ways to eliminate the stigma of researchers' and job coaches' presence is vital when considering the direction of future research. Since community-based employment is a valued adult outcome for individuals with disabilities, ways to train, intervene, and conduct research in those types of environments are increasingly important. Taking advantage of more mainstream opportunities like "shadowing" or "interning" with participants may be a way for researchers to blend into work environments in a way that empowers the individuals they are working with. Researcher involvement should not have to diminish participants' social power in their employment environments – it should enhance it.

### **Implications for Future Practice**

This research suggests that it is critically important to involve participants in the development of their self-management interventions. Because self-management involves learning the skills to manage one's own behavior, involving the individual in identifying the best ways to teach and support these skills is critical. This promotes social validity and sustainability. Collaboration with the job coaches and employment specialists is also needed. Because external, onsite job support is limited for consumers who have successfully held a job for 2 years, due to restrictions in vocational rehabilitation and limited additional resources, it was exceptionally important that the interventions be self-directed and that necessary support was largely provided by workplace supports like coworkers. When it comes to involving participants in their self-management interventions, several best practices are important: (a) Know what participants' preferences are – especially when those preferences are different in their work environment than elsewhere, (b) Have participants self-identify their strengths and support needs – if they are

aware of why and where they need to improve, they will be more willing to try and change their behavior with supports, and (c) Give them a choice when it comes to how they self-monitor and what their self-management interventions look like. The more involved they are in the creation of it, the more likely they are to want to actually use it.

Also, the integration of goal-setting with the development of the self-monitoring system should be emphasized. While repeating goals may not lead to direct and significant behavior change alone, developing goals and developing awareness of those goals is fundamentally linked to developing and internalizing self-monitoring strategies. Finding a way to develop strong, overarching goals which will seamlessly thread throughout the intervention should be something that participants continuously come (or are brought) back to. A best practice for identifying such comprehensive goals is using natural systems of support (e.g. families, friend groups, valued community members, etc.) to assist with goal development in a collaborative process.

Finally, education and support on the job has been found by other research, and this study, to be one of the fastest, most successful ways to lead to intervention integration and success. These are two skills that should certainly be emphasized in future practice. The more training and practice can be interwoven while individuals are on the job, the faster the intervention will be implemented and the more effective its implementation.

## **Conclusion**

Despite the limitations in this study, the findings, outcomes, and implications confirm and extend our understanding of the efficacy of self-management interventions – especially in community-based employment settings. Goal-setting and self-monitoring components of self-management interventions were explored and while both are unequivocally necessary, it seems as though the self-monitoring component led to more definitive changes in behavior with this

study's participants. Additionally, the importance of utilizing an overarching theory of control to help organize intervention elements and guide implementation cannot be underestimated – especially in a type of research where this is unfortunately not the trend. Adopting a theory of control in future research may allow researchers to have a shared framework to understand and address the multifaceted considerations impacting the design and implementation of an employment intervention in a community setting. The development of specific strategies and tools for collaboration with very specific stakeholders (e.g. supervisors, job coaches, parents, etc.), the connection between strong social skills and desired work outcomes, and understanding the demands placed on researchers in community-based environments and minimizing their impact are all important areas for future research. In practice, engaging in authentic conversations with employers, coworkers, and families, involving participants in the development of their self-management interventions, integrating goal-setting and self-monitoring, and providing direct training are all important considerations. Ultimately, community-based employment offers opportunities for longer job-tenure and a more flexible work environment that is vital to the success and support of individuals with autism and intellectual disability. Building supports that promote community-based employment should be the focus of future employment efforts for adults with disabilities as it stands the greatest chance of improving historically low and/or decreasing rates of employment among this population.

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## Appendix A

Table A.1, Quality Indicators Checklist

<b>A. Quality Indicators for Single Subject</b>			
	<b>Replicable</b>	<b>Systematic</b>	<b>Measured over time</b>
1. Description of participants and settings	Y/N	Y/N	
2. Dependent variable	Y/N	Y/N	Y/N
3. Interobserver agreement data	Y/N	Y/N	Y/N
4. Independent variable	Y/N	Y/N	Y/N
5. Fidelity of implementation	Y/N	Y/N	Y/N
6. Baseline data	Y/N	Y/N	Y/N
	<b>Yes</b>	<b>No</b>	
7. Demonstrated experimental control at three different points in time			
8. Addressed threats to internal validity			
9. Experimental effects are replicated across participants, settings or materials (external validity)			
10. Social validity			
<b>B. Quality Indicators for Group Experimental and Quasi-Experimental</b>			
	<b>Clear</b>	<b>Comparison condition described</b>	<b>Comprehensive</b>
1. Describing participants' characteristics	Y/N	Y/N	Y/N
2. Implementation of intervention & description of comparison condition	Y/N	Y/N	Y/N
3. Fidelity of implementation	Y/N	Y/N	Y/N
	<b>“”</b>	<b>“”</b>	<b>Multiple</b>
4. Outcome measures	Y/N	Y/N	Y/N
	<b>Statistics</b>	<b>Linked to research questions</b>	<b>Effect size calculations</b>
5. Data analysis	Y/N	Y/N	Y/N
	<b>Yes</b>	<b>No</b>	
6. Attrition information provided			
7. Interrater reliability measures included			

Table A.1 (continued)

8. Data collection beyond immediate posttest?			
9. Quality of implementation assessed?			
10. Documentation of instruction?			
11. Clarity of results			
<b>C. Quality Indicators for Qualitative</b>			
	<b>Appropriate</b>	<b>Clear</b>	<b>Sufficient</b>
<i>Interviews</i>			
1. Participant selection	Y/N	Y/N	Y/N
2. Interview questions	Y/N	Y/N	Y/N
3. Adequate means of recording/transcribing	Y/N	Y/N	Y/N
4. Confidentiality measures	Y/N	Y/N	Y/N
<i>Observation studies</i>			
1. Participant selection	Y/N	Y/N	Y/N
2. Setting selection	Y/N	Y/N	Y/N
3. Time spent in the field	Y/N	Y/N	Y/N
4. Researcher at site	Y/N	Y/N	Y/N
	<b>Yes</b>	<b>No</b>	
5. Research has minimal impact			
6. Field notes systematically collected			
7. Confidentiality ensured			
<i>Data Analysis</i>			
1. Results are sorted and coded in meaningful way			
2. Sufficient rationale is provided for what was (or was not) included			
3. Documents are sufficiently described and cited			
4. Reflection on researchers' personal positions are provided			
5. Conclusions are substantiated			
6. Connections made with related research			

A. (Horner, et.al., 2005, p.174), B. (Gersten, et.al., 2005, p.152), & C. (Brantlinger, et.al., 2005, p.202).

**Table A.2, Article content coding sheet**

<b>Article</b>	
Author & Year:	
<b>Independent Variable</b>	
	PBS (functional assessment)
	Preference/ Choicemaking
	Self-management
	Visual supports
	Other:
<b>Dependent Variable</b>	
	Inappropriate behavior
	Correct responses
	Performance
	Compliance
	Other:
<b>Population</b>	
	ASD
	ID
	DD
	Multiple disabilities
	Severe disabilities
	Other:
<b>Setting</b>	
	Job
	Simulated employment
	Community-based instruction
	Other:
<b>Findings</b>	
Free response:	
<b>Issues</b>	
Free response:	
<b>Notes</b>	
Free response:	

Table A.3, Extended literature review tables

Study	Indep. Var.	Depend. Var.	Participants	Findings
PBS (functional assessment)				
West, E. & Patton, H. 2010	Functional behavior assessment, motivation assessment, informal measures, behavioral support plan, task analysis	Independent responses, correct responses, and incorrect responses across four participants	4 participants, 34-41 years, group home residents, and communication ability (speech, sign language, gestures, or picture communication symbols)	Understanding function of problem behavior was critical (109) staff training associated with achieving positive outcomes, change within the organization and reengineering of environment, collaboration between researchers and staff.
Schall, C. 2010	PBS – functional behavior assessment, multicomponent interventions (customized), use of multiple perspectives, methodological practices, lifespan perspective, improved QOL, collaboration b/w stakeholders, prevention of problem behavior (111)	DJ's loud noises and pushing of others (frequency)	25-year-old man with autism.	DJ's noises, pushing others, and additional problem behaviors <b>was an attempt to avoid correction.</b> DJ became most noisy and pushed others when he made a mistake and required verbal correction and redirection. The true success of the plan was that DJ's job was more secure after than prior to the implementation of PBS.
Cihak, D., Alberto, P.A., & Frederick, L.D. (2007).	One customized antecedent-based intervention (SOAP – self-operated auditory prompts (81)) and one response-based intervention (DRA – differential reinforcement of alternative behaviors (81)) in a public community setting. Interventions presented daily and alternated.	(1) Inappropriate behaviors: outbursts (Haley), inappropriate touching (Anne), loud vocalizations (Gail), leaving the work area (Kyle); (2) Task engagement (alternative behavior): directing eyes toward the work activity, performing a step of the task, manipulating task materials, and refraining from engaging in the	4 high school students, 15-21 years of age, cognitive functioning w/in moderate-severe range of ID (IQ 20-55), participation in community-based vocational training, performance of inappropriate behavior while in community, ability to complete all steps of job task independently	The antecedent-based intervention (SOAP) was more effective for Gail and Kyle, and both interventions were equally effective for Haley and Anne. All four teachers indicated a stronger social acceptance for SOAP than for DRA. Teachers used “escape” as inclusion criteria so that same intervention could be evaluated across students (82). Also, brief-FA procedures accurately identify the

Table A.3 (continued)

		target inappropriate behavior		function of students' inappropriate behavior in vocational setting.
Mesibov, G., Browder, D., & Kirkland, C. (2002).	Individualized/personalized schedules as a component of PBS	Problem behavior	Children through adults with mental retardation, ASD, Asperger syndrome, Fragile X, and severe disabilities.	Before introducing a visual schedule as a predictor strategy, it is important to decide whether the schedule will function to reduce confusion during transitions or encourage choice during free or flexible time. Some schedules are designed to do both (78).
<b>Preference/Choice-making</b>				
Morgan, P. (2006).	Preference and choice-making - also, emphasis on a preference assessment. 2 studies evaluated preference, 4 studies evaluated choice-making, 9 studies directly compared choice-making to preference (178).	Academic performance and behavior - also, emphasis on improved task engagement.	K-Grade 12	Both preference and choice-making have worked in classrooms (185)...Practitioners who employ preference assessments when using choice-making are more likely to improve a student's task engagement than those relying on choice-making alone (185). "For practitioners...they are likely to see significant effects on students' behavior and academic performance when they use preference, but only modest effects when they employ choice-making (185)."
Chiocchio, F. & Frigon, J.Y. (2006).	Directors of public service centers and agencies offering supported employment designed and delivered an onsite training. Training consisted of familiarization with the manual, the forms, and the rating scale. Case examples were discussed; continuous support was offered in the form of a hot line manned by a research coordinator and subject matter expert. Goal of training (and going	Employee satisfaction (ES) is the result of his or her needs being met by the environment. Work satisfaction (WS), or satisfactoriness, is the result of its requirements being met by the employee (177). WS was measured by:	CMR (candidates with mental retardation), 31 men (58.5%) and 22 women (41.5%) participated. Women were slightly older than men. A total of 44 (84.6%) candidates were people with a mild mental retardation (e.g., IQ between	ES (employee satisfaction) is a mediator while flexibility of the work environment is not. ES and WS (satisfaction in the work environment) together contribute to predict tenure (the length of time individual keeps his/her job). Assessment drawn from a broader

Table A.3 (continued)

	<p>into interviews with candidates and family members, business owners, employees, etc.) was to determine skills necessary for the job. Staff could assess as many candidates and work environments as they wanted (178).</p>	<p>punctuality, autonomy, performance, interest for work, respect of rules and procedures, and interactions with colleagues (182). Tenure was operationalized by total number of weeks spent in the job (182). Pay and positive feedback on performance (177).</p>	<p>50–55 to 70–75) and the remainder were people with moderate mental retardation (e.g., IQ between 35–40 to 50–55). Half of the work environments were family operated businesses or were managed by a single owner. A total of 52.9% were service businesses, 17.6% were in manufacturing, 13.7% were retailers, 7.8% were in food transformation (e.g., packaging, preparation), 2% were in agriculture, and 5.9% classified themselves in other. Work environments were in downtown areas (38.3%), commercial sectors (36.2%), industrial park (19.1%), rural areas (4.3%) or other (2.1%).</p>	<p>socioecological context may reveal that the individual is not the only or best target of rehabilitation efforts. The environment may also be a focus of intervention. As expected, correspondence was higher for successful job placements than unsuccessful ones. Flexibility of the work environment does not seem to mediate the relationship between functional correspondence and WS. This can mean that the extent to which organizations are open to CMR integration does not affect the relationship that exists between functional correspondence and WS. If so, this is interesting for people with mental retardation since they are usually employed in organizations that showed a strong commitment to providing support, thus limiting the pool of potential employers.</p>
<p>Wood, W., Fowler, C., Uphold, N., &amp; Test, D. (2005).</p>	<p>Choice making: systematic instructional procedures (141), systematic prompting procedures, direct instruction strategies. Self-determination components were also taught and measured including: self management (self-instruction, self-monitoring, self-reinforcement).</p>	<p>Most common self-determination component measured as a dependent variable was choice making (n=10). All studies that taught choice making used systematic instruction. 5 of the 21 articles measured self management as a</p>	<p>Articles were included that (a) were published in a peer-reviewed journal, (b) reported results of interventions, (c) included at least one participant with severe disabilities, (d) included participants ages preschool through adulthood, and (e)</p>	<p><b>There are quite a few self-determination components that have not yet been adequately measured</b> as dependent variables in intervention research with individuals with severe disabilities. <b>These include decision making, goal setting and attainment, self-</b></p>

Table A.3 (continued)

		self-determination component.	measured one or more component of self-determination as a dependent variable.	<b>awareness, self-advocacy, and self-efficacy (141).</b> Natural follow-up to research on these components would be to focus on generalizing applications of these skills to multiple uses and settings. For example, if individuals were taught to self-monitor work productivity in a job setting, how can this skill be efficiently transferred to other areas?
Ohtake, Y. & Chadsey, J. (2003).	Each job coach who agreed to participate was sent 10 questionnaires and stamped, self-addressed envelope to be distributed to coworkers. 23 problem items were subdivided into 4 problem categories (a) Production, (b) Work-Related Interactions, (c) Non-Work-Related Interactions, and (d) Challenging Behaviors. These 4 categories emerged from a review of the literature on job termination and social integration studies. <b>Identified independent variables were: type and frequency of problems (216)</b>	Facilitation strategies provided, facilitation strategies perceived as being needed, and discrepancies between support provided and support perceived as being needed (216).	Job coaches - the majority were females, Euro-American, and had either bachelor's degrees or some college experience. They provided support for persons with mental retardation who worked in food service, manufacturing, retail, and service industries across 31 states. A total of 73 job coaches were sent a sample of the instrument & the Job Coach Support Questionnaire (JCSQ). 36 coworkers across 14 states completed and returned the JCSQ to the authors (215). A 2nd recruitment phase recruited an additional 16 job coaches, which resulted in a total of 58 coworker	Autonomous support by coworkers, suggested support from job coaches to coworkers, managed support of coworkers by job coaches, instructional support by coworkers, direct training by job coaches with consultation from coworkers, direct training by job coaches (217). Furthermore, when the frequency of work problems was low the majority of the problems resulted in the need for and provision of less intensive facilitation strategies. Coworkers perceived they needed either low or a mixed level of support, not a high level of support, even when the frequency of work problems was high, except when the problems were related to challenging behaviors such as self-injury and property destruction. The most

Table A.3 (continued)

			questionnaires across 13 states.	intriguing finding was that job coaches generally used the level of facilitation strategies that matched coworker needs.
<b>Self-management</b>				
Michaels, C. & Orentlicher, M. (2004).	Person-centered planning with the use of self-directed occupational therapy and post-school goal setting.	Performance skills, performance patterns, client factors, activity demands, and contexts	Qual study: Anna, 21-year-old woman diagnosed with athetoid dystonic cerebral palsy. She uses a manual wheelchair, which must be pushed by others. She is fed through a gastronomy tube. -Brian, 21-year-old man diagnosed with spastic quadriplegic cerebral palsy.	(1) More service systems are demanding that person-centered planning be conducted on a large scale; (2) the small band of original developers of person-centered planning methods who were so steeped in the values of inclusion, self-determination, choice, and collaboration are no longer the people responsible for implementing most of the person-centered planning conducted today; (3) there is a growing interest in re-shaping service systems to provide people with disabilities with effective control of their allocated public money to choose and pay for the services they want and use; (4) interest in person centered planning is beginning to grow and expand outside the fields of special education and adult services (224).
Reiss, S. & Havercamp, S.M. (1998).	Comprehensive assessment of the strength of a person's fundamental end goals and motivational sensitivities. One instrument was a self-report inventory for adolescents and adults in general, and the other was an informant-rating scale for adolescents and adults	Identifying people's fundamental motives as end goals and also those which were means to other end goals.	Study 1: 401 adolescents and adults sampled from six sources (three universities, a high school, a seminar for MR/DD professionals, and a church group) in	Findings: 15 factors, Power, Social Conflict, Food, Physical Activity, Order, Pain, Anxiety, Frustration, Sex, Rejection, Social Contact, Vengeance, Curiosity,

Table A.3 (continued)

	with mental retardation and development disabilities.		Ohio and Pennsylvania (98).	Independence, and Nurturance.
Hendricks, D. (2010).	<p>On-the-job support services and an appropriate job match for the individual are crucial. Additionally, a supportive environment as provided by the employer(s) and coworkers can be necessary, too.</p> <p>-Self-directed on-the-job support matched to person-identified interests.</p> <p>-Research supports the use of strategies derived from the principles of applied behavior analysis and include modeling, structured reward systems, video modeling, errorless learning, graduated guidance, and systems of prompts. These strategies are not new, but are essential to teach individuals with a variety of disabilities in the workplace.</p>	Benefits of employment, state of employment, obstacles to employment, current service options, and in depth review of supports for success (126).	Adults with ASD	The vast majority is unemployed and for those who do have gainful employment, underemployment is common. The increased prevalence of ASD coupled with unique social, communication, and behavioral characteristics translate into the need for services to achieve employment success. Consideration of individual characteristics including strengths, weaknesses, as well as specific interests can lead to an appropriate job placement.
Lemaire, G.S. & Mallik, K. (2008).	<p>Natural supports in the work setting within this program may have contributed to job tenure for some employees (153). The use of a conceptual model in supported employment settings can provide a basis for identifying and developing appropriate interventions for challenging behaviors. For example, using such a model to identify and categorize job problems relative to either deficient work skills (e.g., the employee attempts the task but does not succeed) or problems with internal motivation (e.g., the employee does not attempt the task) to guide treatment plans and individualized intervention.</p>	Poor attendance, inadequate work quality, or interpersonal problems (responsible for 20.8% of involuntary employment terminations).	112 adults with mild to moderate DD.	Meaningful employment is important to life quality and a challenge for persons with DD.
Mactavish, J.B., MacKay, K.J.,	The role of vacations - personal health and basic	Personal health and basic need	Focus groups of family caregivers	Financial resources have the capacity to

Table A.3 (continued)

Iwasaki, Y., & Betteridge, D. (2007).	need fulfillment. Also, QOL (quality of life) being a much broader and encompassing concept that integrates meaningful and enriching social connections with friends and family, and perceived control, freedom and independence. Financial resources, quality respite, and health and impairment concerns.	fulfillment. Financial resources, quality respite, and health concerns were additional foci.	(biological and adoptive parents, and adult siblings)	facilitate or constrain life quality. Respite and health impairment issues demonstrate how caregivers' personal perspectives about QOL often meld with concerns affecting other family members – blurring distinctions between family and individual quality of life.
Ipsen, C., Seekins, T., & Ravesloot, C. (2010).	Health promotion programs within the vocational rehabilitation (VR) system based on self-management strategies.	Reduce health risk and increase health protective behaviors (i.e. weight management, smoking cessation, stress management, fitness, and nutrition programs	Individuals whose primary disability was a physical or mobility impairment, (b) they were between the ages of 21 and 65, (c) they had been accepted to receive VR services, and (d) they were within 6 months of entering the VR system (69).	VR clients reported significant declines in health promoting lifestyle behaviors over 18 months, which contrasts with the pre- to post-intervention health behavior improvements of the <i>Living Well</i> sample. Group comparisons for days of limitation showed that the VR sample experienced significantly higher days of limitation from pain, anxiety, and sleep problems and might have a greater need for health promotion activities or treatments.
Bennett, K., Frain, M., Brady, M.P., Rosenberg, H., & Surinak, T. (2009).	Role playing and self-management strategies to promote social skills. Social behaviors taught include: a) establishing and maintaining eye contact with adults during conversation, (b) waiting to speak until adults finished speaking, and (c) giving appropriate verbal responses to directions, feedback, or criticism.	Work performance	Young woman with Down syndrome	Moderate-to-large increases in target behaviors during intervention, with these changes maintained for three months following training. The training protocol was effective in teaching prosocial behaviors which improved work performance.
Warger, C.L. (1990).				
Gear, S., Bobzien, J., & Judge, S. (2011).				
Visual supports				
Mechling, L. &	Introduction of computer-	Number of	Two persons, one	A substantial increase

Table A.3 (continued)

Langone, J. (2000).	based video program: computer-based video anchors to increase the success of photographs prompting augmentative communication (5).	unprompted correct photographs selected (5).	male and one female, ages 11 and 24 years, with severe intellectual disabilities participated in the study. The two persons were selected based on their intellectual disability, need to acquire photograph recognition, and their use of augmentative communication devices.	was made in the number of photographs correctly selected with the computer program, with results generalizing to selection of photographs on each participant's augmentative communication device. Eve required continually fewer attempts to learn the photographs across the three sets, while Mike also became more efficient in his learning as the study progressed. This finding bears further study and can have a significant impact on the quantity of community-based instruction required to teach functional skills.
Van Laarhoven, T., Johnson, J.W., & Van Laarhoven-Myers, T. (2009).	Video iPod as a prompting device for teaching three job-related tasks	Percentage of independent correct responses, percentage of error correction prompts with video feedback alone, percentage of error correction prompts with video feedback plus controlling prompt, and percentage of prompts to use technology.	17-year-old young man who attended a large suburban high school where his educational goals were met. He had recently been diagnosed with a chromosomal disorder known as 1p36 Deletion Syndrome (124).	Introduction of the video iPod was associated with immediate and substantial gains in independent correct responding with an associated decrease in the number of prompts given from a job coach. In addition, the participant used the video iPod independently.
Bucholz, J.L. & Brady, M.P. (2008).	LBBI (literacy-based behavioral interventions) – i.e. social stories	Inappropriate behavior (others identified were increasing work productivity or accuracy)	57-year-old man with Down syndrome who works in a sheltered mailroom training area with approximately 20 co-workers and two supervisors (53). Second, 48-	LBBI's have strong potential as a successful intervention when educators consider the cognitive level, language ability, age, interests, and support needs of the person for whom they are writing the LBBI.

Table A.3 (continued)

			year-old woman who assembled various products at a community worksite (54).	Depending on the needs of the individual who will use the LBB, directive or coaching messages can outline the specific steps of a task to reduce the ambiguity.
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Table A.3 extended, Articles identified as having a “strong evidence” base according to the WWC criteria. These articles were also organized into categories by types of intervention.

**Table A.4 extended, Studies and types of designs**

<b>Article</b>	<b>Design</b>
<i>Qualitative</i>	
Morgan, P. (2006).	Qualitative: literature review of effective pref./ choicemaking interventions
Wood, W., Fowler, C., Uphold, N., & Test, D. (2005).	Qualitative: literature review of effective self-management interventions with adults
Michaels, C. & Orentlicher, M. (2004).	Qualitative: anecdotal interviews
Ohtake, Y. & Chadsey, J. (2003).	Qualitative: descriptive interviews
Mesibov, G., Browder, D., & Kirkland, C. (2002).	Qualitative: description of effective intervention and based on research
Hendricks, D. (2010).	Qualitative: descriptive interviews
Mactavish, J.B., MacKay, K.J., Iwasaki, Y., & Betteridge, D. (2007).	Qualitative: interviews of effective intervention
Bucholz, J.L. & Brady, M.P. (2008).	Qualitative: brief observations of intervention practice
Warger, C.L. (1990).	Qualitative: brief literature review of effective interventions
<i>Single Subject</i>	
West, E. & Patton, H. (2010).	Single subject: withdrawal
Schall, C. (2010).	Single subject: reversal
Cihak, D., Alberto, P.A., & Frederick, L.D. (2007).	Single subject: multi-element
Mechling, L. & Langone, J. (2000).	Single subject: multiple probe
Van Laarhoven, T., Johnson, J.W., & Van Laarhoven-Myers, T. (2009).	Single subject: multiple probe across behaviors
Gear, S., Bobzien, J., & Judge, S. (2011).	Single subject: alternating treatment
<i>Quantitative</i>	
Chiocchio, F. & Frigon, J.Y. (2006).	Quantitative: quasi-experimental
Reiss, S. & Havercamp, S.M. (1998).	Quantitative: quasi-experimental (instrument testing)
Ipsen, C., Seekins, T., & Ravesloot, C. (2010).	Quantitative: group/quasi-experimental
<i>Mixed Methods</i>	
Lemaire, G.S. & Mallik, K. (2008).	Mixed methods: quantitative assessments & qualitative descriptions
Bennett, K., Frain, M., Brady, M.P., Rosenberg, H., & Surinak, T. (2009).	Mixed methods: qualitative instrument for data collection & quantitative analysis

### **Excerpt A.1, Exclusion criteria for database keyword searches**

A review of three databases including *Psyc Info*, *ABI-Inform*, and *ERIC* was conducted. *Psyc Info* was chosen due to its prominence and relevancy in the special education field. *ABI-Inform* was chosen on consultation with UIUC's reference librarian, due to its standing as the premier employment-oriented database. Finally, *ERIC* was utilized to simultaneously tap into the sociology literature and cut across the two fields of special education and employment.

Thirty-two peer reviewed journal articles were assessed in *Psyc Info* using the keywords (disab\*; employ\*; interven\*; challenging behavior\*; job\*). Articles that related to *staff* (including keywords "disability support staff," "staff working with persons with disability," "care providers," "staff-client interaction," "staff behaviour," "burnout and quality of support," "staff morale," "direct care workers," "day-treatment services," "direct care staff," "staff working with people with intellectual disabilities," "support staff," "group home quality," "staff scheduling system," and "personnel" ), strictly *classroom-based interventions* (including keywords "classroom-based interventions," "relationships between teachers and secondary students," "school-based intervention," and "schoolbased practice") only *children* (including keywords "children" and "youth" ), non-developmental disabilities (including keyword "schizophrenia") and theoretical ideas (including keywords "exploratory analysis in psychological research," "Utopian vision," "useful distinction in behavior," "psychology students' training," and "psychology research opportunities") were excluded due to their lack of bearing on the research question. Ultimately, 15 articles were selected for review from the initial *Psyc Info* search, in addition to 3 others that were suggested by *EBSCO* during the search that specifically related to "employment and adults with ASD."

Six peer-reviewed journal articles were identified via the database *ABI/INFORM Complete* using the keywords (disability (Document title-TI); employment; intervention;

challenging behavior (Document text-FT); job; intellectual disability; significant disability; work). Articles were excluded if they addressed *substance abuse* (including keywords “substance use, abuse, and dependence”), addressed *legislation* (including keywords “hearing on the no child left behind act”), or only related to *school environments* (including keywords “academic advising”), again due to irrelevancy to the research question. 3 articles were selected for inclusion in the review after the initial search.

Finally, twenty-six articles were identified in the *ERIC* database using keywords (disability; employment; intervention; behavior; job). Articles were excluded that focused on *children* (including keywords “children” and “youth”), *health service providers* (including keywords “health promotion services within the vocational rehabilitation system”), *legislation* (including keywords “implementation of the individuals with disabilities act,” ), *non-developmental disabilities* (including keywords “traumatic brain injury”), *benefits* (including keywords “work and cash benefits”), and *research* (including keywords “annotated bibliography”). The initial search was whittled down to 15 articles for review. The total number of articles reviewed across all three databases came to 36 total articles (*Psyc Info* (18), *ABI/INFORM* (3), *ERIC* (15)).

## Appendix B

### Figure B.1, Recruitment E-mail

Dear Community Choices clients and families:

My name is Christy Nittrouer and I am on a research team in the Department of Special Education at the University of Illinois led by Dr. Karrie Shogren. I have been involved in different aspects of Community Choices for the last year (social events in the spring, job coaching and mentoring in the summer, and Community Choices' pilot social skills curriculum and class in the fall).

Our research team is looking for individuals and families who would be willing to participate in a research study we are conducting examining customized employment and community living supports and services. Most of this participation simply involves being observed throughout different portions of the customized employment process and during onsite job tours and onsite employment activities. Some additional participation activities might also involve short interviews with researchers and descriptions of your experience(s) at Community Choices.

Participation does involve inherent risks like possible identification of being involved, but the research team has taken many steps to protect the privacy of our participants (which we would be happy to describe in detail to those who are interested). Additionally, participation does involve inherent benefits, including the opportunity to describe the services you are receiving to help identify practices that are effective and may help you and other families in the future.

Participation in these activities is completely voluntary and anyone may stop taking part at any time. Participation will not affect your current or future relationship with Community Choices or your child's status or service there. The anticipated length of the study is 1 year.

If you are interested in being involved and would like to hear more about the study, please respond to this e-mail.

Thank you so much for your time.  
Christy

Christy Nittrouer (Carr)  
clcarr2@illinois.edu  
512.217.9245

**Figure B.2, Sample Interview Questions**

- 1.) What are the services and supports that you currently receive?
- 2.) Which employment-related services and supports help you the most in your day-to-day life?
- 3.) If you have a job, which services assisted you most in obtaining that job?
- 4.) If you have a job, are there any supports and/or services that have really helped you to keep it?
- 5.) If you are currently looking for a job, which services and supports have you found to be the most helpful and rewarding throughout that process?
- 6.) Which community-living services and supports help you the most in your day-to-day life?
- 7.) Are there certain services that you enjoy and use more often than others?
- 8.) Are there any services or supports that you haven't liked or haven't used?

**Figure B.3, Data Collection Sheets**

**CURTIS Data Collection Sheet**

**Duration:** 30 min segments, 2-3 times per week (Participant B (Curtis): 5:00-10pm, 3 days/week)

**Date:** \_\_\_\_\_ **Name of Data Collector:** \_\_\_\_\_

(circle) Participant A | B | C

(circle) M | T | W | R | F

Write START-time: _____		Write END-time: _____			
On-task – every 30 seconds: Curtis is pushing carts, staying engaged with his work task. He is only handling carts, responding to colleagues if they ask for help, or helping customers. Curtis is also on-task if he is asking colleagues a question if he needs help, but for the most part working independently. <i>*Include short observation notes here next to the checkmark in the appropriate column</i>	Off-task – every 30 seconds: Curtis is on his phone, aimlessly talking to customers or colleagues for more than 30 seconds about something non-work related. <i>*Include short observation notes here next to the checkmark in the appropriate column</i>		On	Off	
<b>:30</b>			<b>2:00</b>		
<b>1:00</b>			<b>2:30</b>		
<b>1:30</b>			<b>3:00</b>		

Figure B.3 (continued)

<b>3:30</b>	(On)	(Off)	<b>11:30</b>	(On)	(Off)
<b>4:00</b>			<b>12:00</b>		
<b>4:30</b>			<b>12:30</b>		
<b>5:00</b>			<b>13:00</b>		
<b>5:30</b>			<b>13:30</b>		
<b>6:00</b>			<b>14:00</b>		
<b>6:30</b>			<b>14:30</b>		
<b>7:00</b>			<b>15:00</b>		
<b>7:30</b>			<b>15:30</b>		
<b>8:00</b>			<b>16:00</b>		
<b>8:30</b>			<b>16:30</b>		
<b>9:00</b>			<b>17:00</b>		
<b>9:30</b>			<b>17:30</b>		
<b>10:00</b>			<b>18:00</b>		
<b>10:30</b>			<b>18:30</b>		
<b>11:00</b>			<b>19:00</b>		

Figure B.3 (continued)

<b>19:30</b>	(On)	(Off)	<b>25:00</b>	(On)	(Off)
<b>20:00</b>			<b>25:30</b>		
<b>20:30</b>			<b>26:00</b>		
<b>21:00</b>			<b>26:30</b>		
<b>21:30</b>			<b>27:00</b>		
<b>22:00</b>			<b>27:30</b>		
<b>22:30</b>			<b>28:00</b>		
<b>23:00</b>			<b>28:30</b>		
<b>23:30</b>			<b>29:00</b>		
<b>24:00</b>			<b>29:30</b>		
<b>24:30</b>			<b>30:00</b>	Total number: _____	Total number: _____
<b>Notes:</b>					

Figure B.3 (continued)

<b>A. Putting carts back</b> (Tally the number of times these steps occur)				
1. Physically takes carts out of the line-up, and puts like sizes together	2. Gets a group together (of typically 6) and connects them with a rope	3. He pushes the carts towards the storage facility	4. He pushes the carts into the storage facility	5. He walks back out to the parking lot to start again.
<b>B. Cleaning up spills</b> (Tally the number of times these steps occur)				
1. Colleague tells Curtis about a spill when he asks them if they need help.	2. He goes and gets a mop or a rag and cleaning liquid to clean it up	3. He cleans up the spill.	4. He puts the cleaning equipment back.	
<b>C. Stocking shelves</b> (Tally the number of times these steps occur)				
1. A colleague tells Curtis that they need help stocking shelves (typically after he asks them if they need help).	2. Curtis goes with the colleague to the shelves that need to be stocked.	3. The colleague gives Curtis instructions and shows him what they need him to do	4. Curtis takes one of each item and puts it on the shelf until he runs out of items	5. The colleague checks his work and gives Curtis a positive verbal response, and Curtis stops physically touching the items.

Figure B.3 (continued)

<b>D. Helping customers out with groceries</b>				
1) Sees a customer finishing up in the grocery line who looks like he/she needs help and verbally asks them "Do you need help taking your groceries out to your car" (or some variation of that)	2) If customer says "no," Curtis says "okay," moves on, and the task counts as being complete	3) If customer says "yes," Curtis helps them put the grocery bags in their cart or just pushes the cart with the grocery bags in it out with them to their car	4) Curtis physically helps them load all the groceries into the back of their car until there are no bags left and puts the cart away.	

Figure B.3 (continued)

**ABE Data Collection Sheet**

**Duration:** 30 min segments, 2-3 times per week (Participant B (Abe): 12:30-2:30pm)

**Date:** \_\_\_\_\_ **Name of Data Collector:** \_\_\_\_\_

(circle) Participant A | B | C

(circle) M | T | W | R | F

Write START-time: _____		Write END-time: _____			
<b>On-task – every 30 seconds:</b> Abe is in-the-store, engaged in activities related to a work task, walking to and from activities related to a work-task, asking colleagues for instructions <i>*Include short observation notes here next to the checkmark in the appropriate column</i>		<b>Off-task – every 30 seconds:</b> Abe is in the break room, playing on demo equipment by himself, talking to colleagues about non-work related items, aimlessly walking around <i>*Include short observation notes here next to the checkmark in the appropriate column</i>		<b>On</b>	<b>Off</b>
<b>:30</b>			<b>3:30</b>		
<b>1:00</b>			<b>4:00</b>		
<b>1:30</b>			<b>4:30</b>		
<b>2:00</b>			<b>5:00</b>		
<b>2:30</b>			<b>5:30</b>		
<b>3:00</b>			<b>6:00</b>		

Figure B.3 (continued)

<b>6:30</b>	(On)	(Off)	<b>15:00</b>	(On)	(Off)
<b>7:00</b>			<b>15:30</b>		
<b>7:30</b>			<b>16:00</b>		
<b>8:00</b>			<b>16:30</b>		
<b>8:30</b>			<b>17:00</b>		
<b>9:00</b>			<b>17:30</b>		
<b>9:30</b>			<b>18:00</b>		
<b>10:00</b>			<b>18:30</b>		
<b>10:30</b>			<b>19:00</b>		
<b>11:00</b>			<b>19:30</b>		
<b>11:30</b>			<b>20:00</b>		
<b>12:00</b>			<b>20:30</b>		
<b>12:30</b>			<b>21:00</b>		
<b>13:00</b>			<b>21:30</b>		
<b>13:30</b>			<b>22:00</b>		
<b>14:00</b>			<b>22:30</b>		

Figure B.3 (continued)

<b>14:30</b>	(On)	(Off)	<b>23:00</b>	(On)	(Off)
<b>23:30</b>			<b>27:00</b>		
<b>24:00</b>			<b>27:30</b>		
<b>24:30</b>			<b>28:00</b>		
<b>25:00</b>			<b>28:30</b>		
<b>25:30</b>			<b>29:00</b>		
<b>26:00</b>			<b>29:30</b>		
<b>26:30</b>			<b>30:00</b>	Total number: _____	Total number: _____
Notes:					

Figure B.3 (continued)

<b>A. DVD organization</b>						
1) Physically touches an out-of-place DVD (cockeyed, crooked, fallen down, not in line with the others) Picks it up OR Pushes it	2) Picks it up OR Pushes it	3) Physically straightens it	4) Let's go of DVD			
<b>B. Finds items that are misplaced</b>						
1) While organizing DVDs, finds a DVD in the wrong spot	2) Physically touches the DVD	3) Vocalizes the section he thinks it should go in	4) Physically removes the DVD from the section or spot that it was in			

Figure B.3 (continued)

<b>C. Puts items that are misplaced back</b>				
1) After Abe finds a misplaced item, he physically walks to a different section from where he started, with the DVD in-hand, and may say something like “This was in the wrong spot” (doesn’t have to be vocalized)	2) Puts the item back in the correct place	3) Makes sure that it’s straight and organized looking	4) Physically releases the DVD	
<b>D. Assisting customers/coworkers</b>				
1) Sees a customer/coworker who looks like he/she needs help and verbally asks them “Do you need help with anything” (or some variation of that)	2) If customer/coworker says “no,” Abe says “okay,” moves on, and the task counts as being complete	3) If customer/coworker says “yes,” Abe asks them what they need help with and verbally responds to their request	4) Abe then physically responds to their request ((i.e. takes them to section, begins helping coworker with task)	5) Once Abe finishes helping customer (physically walks away from them) or finishes helping coworker (physically completes the task he’s been assigned), this task is complete

Figure B.3 (continued)

**NATALIE Data Collection Sheet**

**Duration:** 30 min segments, 2-3 times per week (Participant A (Natalie): 3-5pm)

**Date:** \_\_\_\_\_ **Name of Data Collector:** \_\_\_\_\_

(circle) Participant A | B | C

(circle) M | T | W | R | F

Write START-time: _____ Write END-time: _____					
	<b>On-task – every 30 seconds:</b> Natalie is tidying up the room, finding the vacuum cleaner, engaged with the vacuum cleaner, cleaning up after snack time, in the bathroom for about 2 minutes, picking items up and putting them back, and checking her visual schedule  <i>*Include short observation notes here next to the checkmark in the appropriate column</i>	<b>Off-task – every 30 seconds:</b> Natalie is just watching the children, aimlessly wandering around, or randomly touching different objects  <i>*Include short observation notes here next to the checkmark in the appropriate column</i>		<b>(On)</b>	<b>(Off)</b>
			<b>2:30</b>		
<b>:30</b>			<b>3:00</b>		
<b>1:00</b>			<b>3:30</b>		
<b>1:30</b>			<b>4:00</b>		
<b>2:00</b>			<b>4:30</b>		

Figure B.3 (continued)

<b>5:00</b>	<b>(On)</b>	<b>(Off)</b>	<b>13:30</b>	<b>(On)</b>	<b>(Off)</b>
<b>5:30</b>			<b>14:00</b>		
<b>6:00</b>			<b>14:30</b>		
<b>6:30</b>			<b>15:00</b>		
<b>7:00</b>			<b>15:30</b>		
<b>7:30</b>			<b>16:00</b>		
<b>8:00</b>			<b>16:30</b>		
<b>8:30</b>			<b>17:00</b>		
<b>9:00</b>			<b>17:30</b>		
<b>9:30</b>			<b>18:00</b>		
<b>10:00</b>			<b>18:30</b>		
<b>10:30</b>			<b>19:00</b>		
<b>11:00</b>			<b>19:30</b>		
<b>11:30</b>			<b>20:00</b>		
<b>12:00</b>			<b>20:30</b>		
<b>12:30</b>			<b>21:00</b>		
<b>13:00</b>			<b>21:30</b>		

Figure B.3 (continued)

<b>22:00</b>	(On)	(Off)	<b>26:30</b>	(On)	(Off)
<b>22:30</b>			<b>27:00</b>		
<b>23:00</b>			<b>27:30</b>		
<b>23:30</b>			<b>28:00</b>		
<b>24:00</b>			<b>28:30</b>		
<b>24:30</b>			<b>29:00</b>		
<b>25:00</b>			<b>29:30</b>		
<b>25:30</b>			<b>30:00</b>		
<b>26:00</b>					
				Total number: _____	Total number: _____
Notes:					

Figure B.3 (continued)

<b>Task Analyses: (1) Vacuuming, (2) Cleaning tables, (3) Cleaning sinks/mirrors, (4) Sweeping, &amp; (5) Taking out the trash</b>							
<b>(1) Vacuuming</b>							
<b>Natalie goes to get vacuum</b>	<b>Brings it in classroom</b>	<b>Plugs-in vacuum</b>	<b>Attaches hose piece together</b>	<b>Turns it on (in storage closet)</b>	<b>Vacuums just around her</b>	<b>Vacuums everywhere the vacuum reaches</b>	<b>Turns it off (in storage closet)</b>
<b>Takes hose pieces apart</b>	<b>Puts vacuum back (storage closet/corner), or gives vacuum to next person who wants it</b>						
<b>(2) Cleaning tables</b>							
<b>Natalie picks up rag and cleaning spray (she does this simultaneously)</b>	<b>Natalie sprays each table</b>	<b>Natalie wipes down each table</b>	<b>Natalie puts rag and cleaning spray away</b>				

Figure B.3 (continued)

<b>(3) Cleaning sinks/mirrors</b>							
<b>Natalie picks up rag and cleaning spray (believe this is different spray – glass cleaner)</b>	<b>Natalie sprays mirrors, counters, and sinks</b>	<b>Natalie uses the rag to wipe up all of the spray</b>	<b>Natalie puts rag and cleaning spray away</b>				
<b>(4) Sweeping</b>							
<b>Natalie picks up broom and pan</b>	<b>Natalie sweeps entire tile area underneath the snack tables</b>	<b>Natalie sweeps all rubbish into pan (usually using a shorter broom than the main broom)</b>	<b>Natalie throws rubbish into trashcan</b>	<b>Natalie puts broom and pan away</b>			
<b>(5) Taking out the trash</b>							
<b>Takes lid off of trashcan</b>	<b>Takes trash bag out of trashcan</b>	<b>Picks up a new trash bag</b>	<b>Shakes new trashbag open</b>	<b>Puts new trash bag in the trashcan</b>	<b>Puts the lid back on the trashcan</b>	<b>Ties full bag</b>	<b>Carries used trash bag outside to the dumpster</b>

Figure B.3 (continued)

<b>Social Interactions:</b>					
<b>With child:</b>	<b>With teacher/adult:</b>				

Figure B.3 (continued)

**Figure B.4, Curtis' Self-Monitoring System**

<b>Task:</b>	<b>Yes</b>	<b>No</b>
Curtis make 3 trips (loading 18 carts)		
Curtis goes inside to registers, and asks 3 customers (or until 1 says "yes") "Can I help you out to your car with your groceries?"		
Curtis asks 3 coworkers (or until 1 says "yes") "Can I help you stack cans?" "Are there any spills you need help cleaning up?" "Is there anything you could use some help with?"		
Curtis assists 1 customer (or asks 3)		
Curtis assists 1 colleague (or asks 3)		
<i>(Script starts over)</i>		

The script that Curtis kept in his pocket and was trained using

Figure B.4 (continued)

## **3 TRIPS WITH CARTS:**

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**Helped 1 customer (or talked to 3),  
Helped 1 colleague (or talked to 3)**

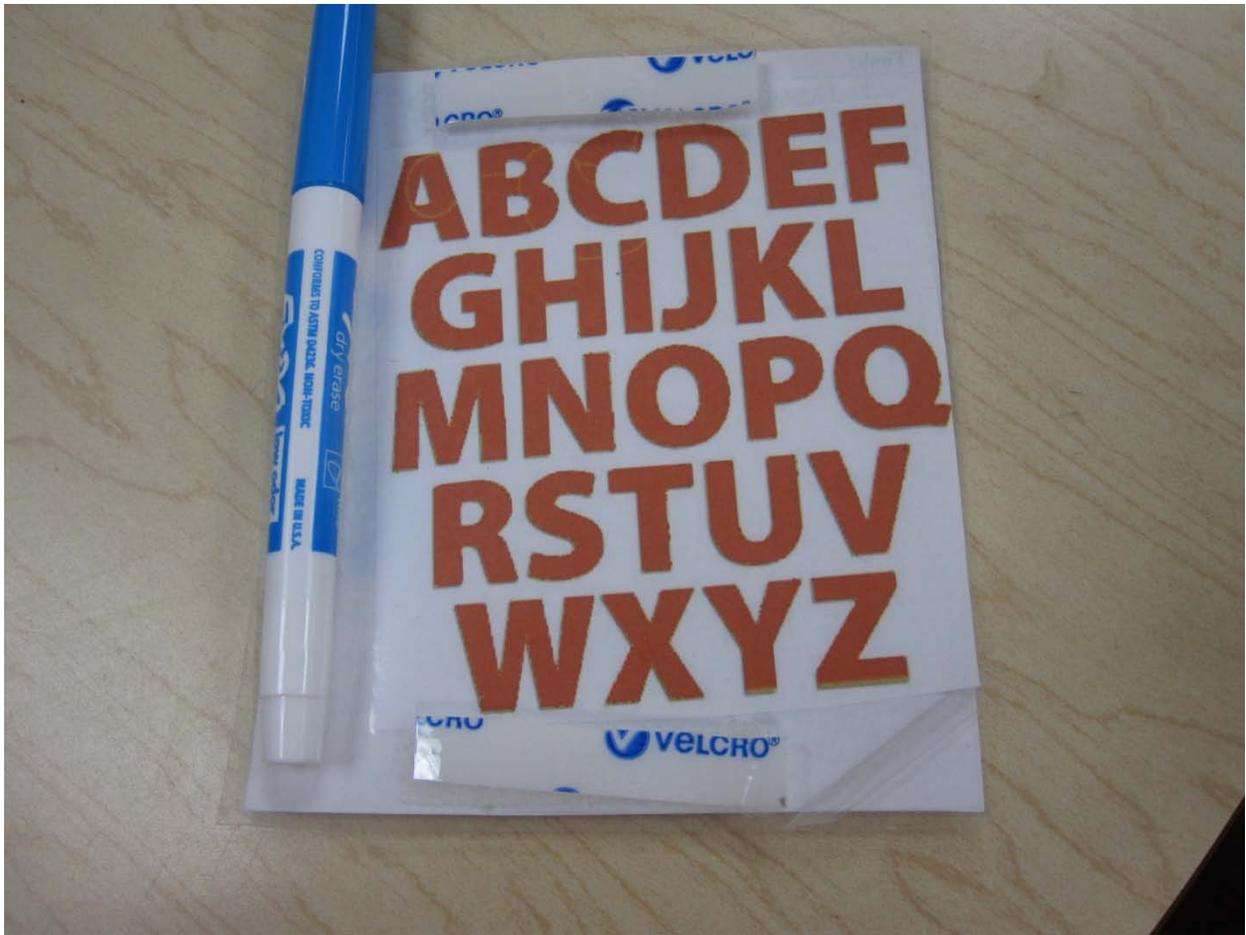
Curtis' laminated visual that was posted for him in the cart facility

**Figure B.5, Abe's Self-Monitoring System**

<b>Task:</b>	<b>Yes</b>	<b>No</b>
1. Organize 2 rows of DVDs/CDs		
2. Find 5 misplaced items and put them back		
3. As 1 coworker if he/she needs help with anything		
4. Help that coworker		
5. Ask 1 customer if he/she needs help with anything		
6. Help that customer		
<b>START OVER</b>		

Abe's script that was laminated and pocket-sized, to be as unobtrusive as possible.

Figure B.5 (continued)



The back of Abe's script, which was customized to accommodate a dry-erase marker and an alphabet, to help him with the alphabetization of the DVD's which he was occasionally asked to do.

Figure B.6, Natalie's Visual Prompts

	<p>Natalie, please start/keep vacuuming</p>
	<p>Natalie, please clean the sink and the mirrors</p>
	<p>Natalie, please take the trash out</p>

Figure B.6 (continued)

	<p>Natalie, please wipe down the tables</p>
	<p>Natalie, please sweep the floor</p>
	<p>Natalie, please stack the chairs</p>

Figure B.6 (continued)



Natalie, could you help organize the books?

Natalie, please

---

Natalie, please

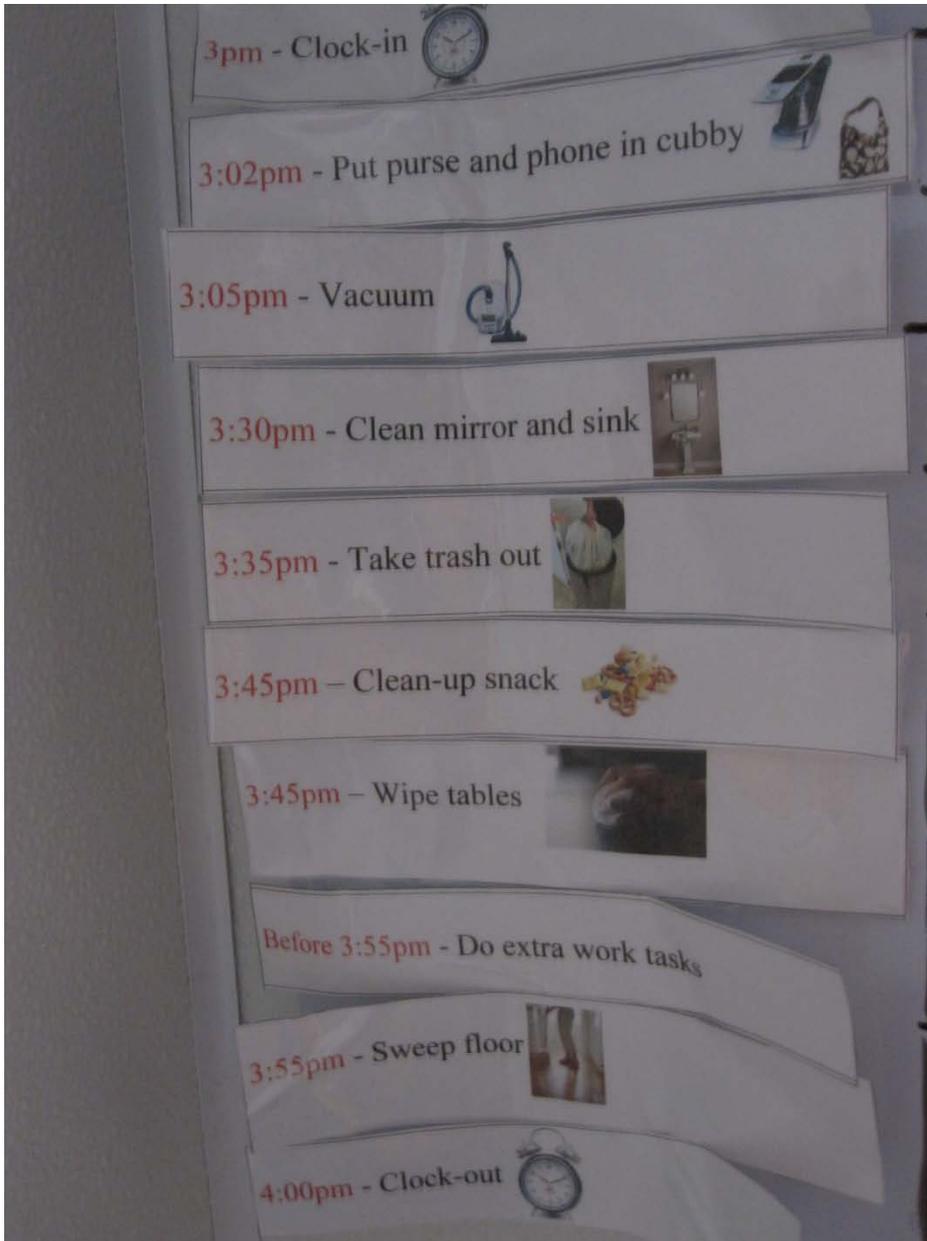
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**Figure B.7, Natalie's Self-Monitoring System**



Natalie's self-monitoring, magnetic, white board removable tasks visual schedule

Figure B.7 (continued)



Natalie's tasks: A closer look at the actual removable tasks on her self-monitoring tool

**Figure B.8, Social Validity Instrument**

Name:	Date:	Curtis / Abe / Natalie		
1. Did you feel that the intervention improved the individual's job performance? (1-not at all, 2-somewhat, 3-neutral, 4-a little bit, 5-completely)				
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Please explain why you picked the number you did for Question 1:				
2. How easy did you find the intervention was to implement once researchers left? (1-hard, 2-somewhat difficult, 3-neutral, 4-not that difficult, 5-easy)				
<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Please explain why you picked the number you did for Question 2:				
3. From mid-May (the start of researcher involvement) to mid-August (the end of researcher involvement) did you notice any changes in the individual's job performance? (Circle one)				
-YES		-NO		
In what way? (In response to Question 3)				
4. FOR EMPLOYERS: Did you notice any other improvements at work from this individual over those three months? (For example, was this individual easier to work with, more engaged in work, better at social interactions, etc.)				
4. FOR FAMILIES: Did you notice any other improvements at home from this individual over those three months? (For example, was this individual more motivated to work, more excited about work, talking more about the future, etc.)				
Thank you so much for your participation and on-going support throughout this whole process!				