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Using Performance Analysis to Increase Staff Compliance with Acquisition Programs for Children with Autism

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USING PERFORMANCE ANALYSIS TO INCREASE STAFF COMPLIANCE WITH ACQUISITION PROGRAMS FOR CHILDREN WITH AUTISM

by

Scott Traynor

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Scott Traynor
USING PERFORMANCE ANALYSIS TO INCREASE STAFF COMPLIANCE WITH ACQUISITION PROGRAMS FOR CHILDREN WITH AUTISM

Scott Traynor, M.A.
Western Michigan University, 2001

Improvement in the rate of learning on acquisition programs for individuals diagnosed with autism often depends on the quality of instruction delivered by direct-care staff. The present study evaluated the effectiveness of a performance analysis on targeting environmental variables that were maintaining less than optimal staff performance for a least-to-most prompting procedure used to teach a hand-washing task to preschool children diagnosed with autism. Direct observations of technician/child dyads were followed by informant interviews with technicians, supervisors, and other key staff members that pinpointed variables that were maintaining/hindering staff compliance with a prompting procedure designed to promote child acquisition of a hand-washing task. An intervention package, consisting of antecedents that included a job-aid and additional training on the prompting procedure, resulted in substantial increases in staff performance on teaching the hand-washing task. Indices of child performance, including percentage of steps performed independently and on-task performance during the activity, showed modest improvements.
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CHAPTER I

INTRODUCTION

Autism is a pervasive developmental disorder that is estimated to affect 1 in every 1,000 births (Bryson, Clark, & Smith, 1988). Individuals with autism may exhibit difficulty with developing relationships, display problems with acquiring a normal language repertoire (Charlop & Haymes, 1994), engage in stereotypic and/or self-injurious behavior (American Psychiatric Association, 1994), and often show a lack of responsiveness to task instruction (Schoen, 1983). These characteristics generally result in the lack of an adaptive repertoire of daily living skills, necessitating long term treatment interventions to promote independent functioning in society.

Arguably, the most promising treatment for autistic persons is behavior analysis as derived from modern learning theory (DeMyer, Hingtgen, & Jackson, 1981). Practitioners have employed behavior analytic principles and techniques to teach communication (for a review of communication interventions, see Sigafoos, 1997), to reduce aberrant behavior (Iwata, Pace, Kalsher, Cowdery, & Cataldo, 1990; Piazza, et al., 1998), and to increase educational and intellectual functioning (Lovaas, 1987).

One of the most effective interventions for the treatment of children diagnosed with autism was first reported by Lovaas (Lovaas et al., 1980). The goal of the treatment procedures was to teach not only the child diagnosed with autism but all of the significant persons in all of the child’s environments. By using this all-
encompassing approach, the mainstreaming of children diagnosed with autism into normal preschool environments has a greater chance of success. The approach places focus on very young autistic children for two reasons. First, younger children are presumed to be less likely to discriminate between environments and are therefore more likely to generalize treatment outcomes across a variety of settings. Second, it is expected that it is easier to mainstream younger children into a preschool than to mainstream older autistic children into grade school.

The primary instructional method used by Lovaas is called discrete trial training. Most interventions for treating autism prior to the development of discrete trial training employed incidental teaching methods. Whereas incidental teaching involves waiting for a training opportunity to occur naturally in the environment, discrete trial training sets up contrived situations in a variety of settings to increase the number of learning opportunities for an individual. Incidental teaching is used to encourage generalization across environments and individuals in conjunction with multiple trials to teach a skill to mastery.

In a now classic study of intensive discrete trial training, Lovaas (1987) assessed the effectiveness of 40 hours per week of one-on-one therapy for children diagnosed with autism towards the goal of mainstreaming these children to normal education classrooms. Participants were assigned to one of two groups, the experimental group (n=19) who received at least 40 hours per week of therapy, and a control group (n=19) who received 10 hours per week of therapy. Both groups were involved in the intervention for at least two years. A third group (n=21), which did not receive the
therapy, was chosen as a second control group with participants from a previous study. Therapy consisted of reducing aberrant behavior through ignoring, time-out, shaping a replacement behavior, or a thigh slap contingent on the behavior. Shaping desired behaviors was achieved by building compliance to basic verbal requests, teaching imitation, appropriate toy play, and generalization of treatment to the family. Successive years of therapy focused on teaching preliminary language skills, observational learning, interactive play with peers, and generalization of therapy into the community. For a more detailed account of the procedures, see (Lovaas et al., 1980). Results of the intervention showed that 47% of the experimental group achieved normal intellectual and educational functioning in contrast to only 2% of the control group participants.

This and other studies suggest that to some extent, behavior deficits and excesses typical of autism and other developmental disabilities can be remedied with sound behavioral interventions. However, the mere availability of effective treatments for persons with autism does not necessarily result in positive behavior change. Equally important is assuring that treatment procedures are implemented appropriately and consistently by staff who instruct these individuals. Specifically, the implementation of procedures by direct-care staff, who are the most involved with daily treatment activities, is often unsatisfactory (Whitman, Scibak, & Reid, 1983).

Staff Performance Improvement

There are three major reasons why direct-care staff members often do not implement training procedures effectively. First, the majority of personnel who
provide the daily training activities to individuals with developmental disabilities typically do not have professional training in a clinical field (Reid & Parsons, 1997). Therefore, the persons hired into these positions have not established the repertoire of skills necessary for effective treatment implementation. Second, direct-care staff members normally have multiple work responsibilities. Some of these responsibilities carry sets of contingencies that compete with the fulfillment of particular staff-to-consumer training responsibilities (Reid, Parsons, & Green, 1989). The net effect of this situation often is inconsistent program implementation, resulting in less effective treatment. Finally, given the low hourly pay offered to persons in these positions (coupled by the often difficult and challenging work conditions), the staff turnover is typically high, causing difficulty in maintaining consistent behavioral programming (Reid & Parsons, 1995). In order to remedy these and other problems related to staff performance, behavior analysts must identify existing contingencies that affect staff performance and develop interventions that result in consistent and effective implementation of treatment protocols by direct-care staff.

Early research on improving staff performance focused on teaching new skills to staff in a classroom setting. However, the results of these interventions usually showed that staff increased their knowledge of program concepts but did not apply the procedures in the work setting (Whitman et al., 1983). More recently, staff improvement methods have focused on increasing performance in the actual work setting. Performance management techniques including “hands on” skills training (e.g., Jensen, Parsons, & Reid, 1998; Schepis & Reid, 1994), goal setting and
performance feedback (e.g., Doerner, Miltenberger, & Bakken, 1989; Fleming, Oliver, & Bolton, 1989), and incentives (e.g., Azrin & Pye, 1989; Brown & Redmon, 1989) have been successfully used to increase staff performance related to client habilitation.

Although studies on performance improvement have shown positive results, most interventions fail to take a broad approach to assessment. That is, most studies do not report efforts to systematically analyze the variables in the work environment that are maintaining and/or hindering the targeted staff performance. Meinhold and Mulick (1990) refer to the complex variables that may exist in these settings by stating that "too often the interactions between government or agency regulations, the social ecology of institutional settings, and the individual needs of residents produce contingencies of reinforcement sometimes for the behavior of staff members and sometimes for the behavior of residents, that work against habilitation and personal independence of residents" (p.67). The variables that may affect behavior are often much more complex than may be realized at first glance. Dumas (1989) refers to the prevalence of events having multiple functions within behavioral ecosystems and thus, to the difficulty in determining which aspects of behavior and environment should be prioritized for observation. In fact, environmental events that may compete with client acquisition may be as obscure as cultural factors in a particular setting. Schmidmayer and Weld (1971) found that staff placed high values on statements like "to see to it that the ward was quiet and a peaceful place" (p. 2) and equivalent low values on statements such as "teaching residents to their optimal functioning" (p. 2). It is apparent that in order to improve staff performance (i.e., to improve implementation
integrity, as in the case of the current study) a plethora of potential influencing factors need to be analyzed to determine the variables controlling staff behavior.

There are several reasons why conducting a thorough analysis of variables affecting staff behavior is advantageous. For example, determining factors that are related to inconsistent program implementation prior to developing an intervention may result in a more efficient and effective treatment package that addresses the most critical environmental variables affecting performance. Most of the interventions focusing on staff performance improvement consist of a treatment package of several behavioral techniques that have been proven to be effective in prior studies. However, if there is no performance analysis before interventions are developed, some components of a treatment package may be unnecessary, whereas other more effective components may be absent. This may result in an intervention with a much lower chance of long-term implementation that is costly and involves more response effort on the part of both staff and program implementers. Additionally, identifying relevant variables in the environment may allow service providers to identify which interventions will be most effective under different settings and during time periods when training activities take place. For example, suppose that it is discovered that a child diagnosed with autism is performing more independently on a daily living skill task in the morning session as compared to the afternoon session. An assessment of the training environment identifies that the morning teacher is more effective at implementing the procedure than the afternoon trainer and that more duties were required of staff members in the afternoon, resulting in a more rushed and less
effective training session. With this information, the behavior analyst may decide that the afternoon trainer needs additional staff training and that staff tasks should be more dispersed throughout the day to prevent a less effective training session in the afternoon. Such an intervention would likely result in an increase in staff performance on the procedure and a more effective learning environment for the child. In such a case, the assessment would help to identify variables that were affecting the learning of the child by analyzing the training environment and by doing so, greater gains in client independence were realized by developing the most effective treatment protocol.

Even this sort of highly informal assessment, whereas often effective, is rarely reported in the staff management literature. Several more rigorous methods of assessment are explored below.

Functional Assessment

One method that has recently been employed to systematically analyze environmental variables that are maintaining and/or hindering staff performance is organizational functional assessment. Organizational functional assessment (also known as performance analysis) is a problem solving process based in part on operant approaches to management, developed to assist managers and/or organizational consultants in assessing performance problems (Austin, 2000).

A now classic study in the area of clinical behavior analysis was conducted by Iwata, Dorsey, Slifer, Bauman, and Richman (1994/1982), that established a general model for determining the functions of aberrant behavior. Three separate contrived environmental conditions were arranged to determine the frequency of self-injurious
behavior of 9 individuals who had a history of exhibiting self-injurious behavior. It was proposed that self-injury is maintained by one or more of three functions, namely, social attention, escape from task, or automatic reinforcement. In the attention condition, a therapist ignored the participant throughout the session. However, if the participant engaged in the target behavior, the therapist delivered a verbal reprimand or statement of concern and provided physical contact to the participant (response blocking). In the demand condition, the therapist repeatedly presented instructional requests to the participant. If the participant engaged in self-injury, the requests were briefly terminated. To determine the automatic reinforcement function, the participant was placed in an alone condition with no access to reinforcing materials or interaction with the therapist. Any self-injurious behavior exhibited in this condition was maintained by automatic reinforcement. As a control, a fourth condition called free play was conducted involving free access to tangibles, absence of demands, and frequent attention delivered by the therapist. By alternating conditions in 15-minute increments, the researchers were able to determine the function of self-injurious behavior based on the frequency of the target behavior in each condition. This procedure resulted in differential or high levels of responding in particular conditions for over 90% of the participants. By systematically changing the conditions of the environment, the researchers were able to identify variables that were controlling behavior.

Functional assessment can be broken down into three levels of analysis, namely, informant assessment, descriptive assessment, and experimental analysis. Austin, Carr,
and Agnew (1999) define an informant assessment as the collection via indirect or informal means of information relating to the variables maintaining a behavior. This may consist of interviewing key managers and other staff, reviewing archived records, and/or distributing to staff rating scales and questionnaires. This method constitutes the most informal level of assessment due to the relative subjectivity of informant responses.

Descriptive assessments consist of direct observations in naturalistic settings to determine the function of targeted behaviors. For example, ABC recording (determining antecedent and consequence relations to a particular behavior) is the most common method of descriptive assessment data collection (e.g., Lerman & Iwata, 1993), but scatterplots are also used to determine temporally based behavioral patterns. A scatterplot assessment consists of recording the occurrence of target behaviors within predetermined blocks of time to determine whether there is any reliable distribution of behavior across the time period (e.g. Touchette, MacDonald, & Langer, 1985).

The most formal level of functional assessment, experimental analysis (often called functional analysis), involves the direct manipulation of relevant variables and observations of the resultant behavioral effects to determine function. Using one or more of these methods allows behavior analysts to determine the conditions maintaining sub-optimal performance. These conditions can then be targeted for change as a part of an intervention package. One way that functional assessment methods can be used to improve the quality of treatment for individuals diagnosed
with autism is through assisting practitioners in identifying the conditions in the work environment responsible for staff-to-consumer training program implementation integrity.

Numerous studies addressing staff performance in settings for individuals diagnosed with a disability review records and conduct interviews prior to developing a treatment package (for a review, see Reid & Parsons, 1997). However, it is typically the case that these fact-finding methods are used not to systematically analyze influencing variables in the environment, but only to pinpoint target behaviors for a pre-selected intervention. For example, Parsons and Reid (1993) attempted to refine a program for evaluating and improving residential treatment services during leisure periods. The authors were effective in targeting non-adaptive behaviors to be reduced during leisure times and in developing a monitoring system that ensured availability of leisure materials and interactions with clients, an intervention that proved to be related to the success of reducing aberrant behavior during these time periods. However, the authors did not conduct an assessment to determine if monitoring was the best intervention to be used based on what was maintaining the less than exemplary performance of the staff in these settings. In effect, the study analyzed the situation to find an appropriate target performance, but the authors did not assess the controlling variables to determine the best manner of intervention.

Better examples of systematically analyzing variables controlling staff performance can be found in studies using descriptive assessments. Green, Reid, Perkins, and Gardner (1991) used a structural analysis in the form of a scatterplot to pinpoint times
during the day when staff off-task behavior was most prevalent. Once this variable was identified, the authors then used the information to implement a management program that increased training activities and performance monitoring during these downtime periods. Similarly, Bodfish and Konarski (1992) used a structural analysis, showing a disproportionate frequency of resident behaviors requiring staff intervention during leisure activities. Based on the assessment, the authors implemented a management program consisting of activity and staff scheduling, staff inservice training, and staff performance monitoring and feedback during these identified time periods. Although data were not collected on staff behaviors, results showed an 83% decrease in client aberrant behavior during leisure programs.

ABC recording has been utilized, as another method of descriptive assessment, to identify the antecedents and consequences that are most highly correlated to the performance of interest. Lerman and Iwata (1993) used ABC data to determine the function of self-injurious behavior of six individuals with profound mental retardation. The authors determined staff responses to client behavior including attention delivery, reprimands, and prompts as well as environmental stimuli such as the presence of food, games, staff members, and ambient noise. Although the purpose of the study was to compare the effectiveness of a descriptive assessment to an experimental analysis and not to identify particular treatment protocols, the results showed that the descriptive assessment was useful in determining the function of certain behaviors. Still, a descriptive assessment often results in subjective interpretations of events and often
requires extensive effort to implement (Pyles & Bailey, 1990). This may be one of the reasons for its lack of prevalence in the staff performance improvement literature.

Although research studies using experimental analyses to determine the function of client behaviors have been numerous in recent years (e.g., Iwata et al., 1990; Iwata, Duncan, Zarcone, Lerman, & Shore, 1994; Vollmer, Marcus, Ringdahl, & Roane, 1995), our literature review found no studies that have employed an experimental analysis to analyze variables affecting staff or organizational performance. It seems reasonable to state that there are three reasons why facilities may be reluctant to allow the use of an experimental analysis to determine the function of staff behaviors. First, experimental analyses are typically time-consuming compared to other methods of assessment (Iwata, Duncan, Zarcone, Lerman, & Shore, 1994). Given the fact that the goal of interventions to increase staff performance in these settings is to achieve optimal programming for clients, facilities may have reservations about the amount of time that these analyses require. Second, using an experimental analysis necessitates temporarily reinforcing undesired staff behaviors to ascertain under what conditions undesired behavior is prevalent. Facilities may be reluctant to knowingly reinforce staff for inappropriate implementation of client programs because it conflicts with the primary goal of the organization. Finally, experimental analyses usually focus on identifying variables maintaining problem behaviors in order to develop decelerative interventions. Conversely, staff performance problems typically are in the form of behavioral deficits and variables of interest are those that prevent particular behaviors from occurring (rather than those that maintain undesired performance). That is, it is
conceptually incoherent to apply experimental analysis to identify variables in the environment that are causing the absence of a behavior. Until this methodological issue inherent to this level of analysis can be remedied, it is expected that there will be few studies that use an experimental analysis to determine the function of staff behaviors.

**Prompting**

Consistent training protocol implementation by staff is the key to assuring that individuals diagnosed with autism are learning at the optimal rate. However, this is often a staff performance problem in settings where such individuals are taught. One of the more prevalent techniques for teaching daily living skills to individuals with autism and other developmental disabilities is prompting. Typically, this technique consists of trainers pointing to correct responses, providing an added verbal stimulus, or using physical guidance to evoke the desired behavior within a specific activity being taught. Touchette and Howard (1984) argued that prompting consists of the substitution of an effective but inappropriate stimulus for an ineffective but appropriate one. In other words, prompts are stimuli that control the desired behavior but are not functionally related to the task. Once the prompts consistently evoke correct responding, they are systematically faded until responding occurs in the presence of naturally occurring stimuli in the situation.

There are two major prompting sequences used by behavior analysts for teaching new repertoires to individuals diagnosed with developmental disabilities. Least-to-most prompting or the system of least prompts (SLP) (Doyle, Wolery, Ault, & Gast,
1988) allows the client a specified duration of time to respond to naturally occurring discriminative stimuli prior to initiating a sequence of least-to-most restrictive prompts to achieve the desired response (e.g., verbal, model, gestural, physical). Due to the sequential pairing of the target stimulus and the prompts, control of responding is transferred from the prompts to the target stimulus. Conversely, most-to-least prompting techniques involve initiating progressively less intrusive prompts as the learner produces closer approximations to the desired outcome (e.g., physical, gestural, model, verbal) (McConville, Hantula, & Axelrod, 1998). In other words, this procedure uses the most intrusive prompt first and then gradually reduces assistance as natural discriminative stimuli evoke the desired responses.

Research to determine which procedure is most effective at transferring stimulus control from artificial prompts to naturally occurring stimuli have shown mixed results. For example, Glendenning, Adams, and Sternberg (1983) concluded that the most-to-least prompting procedure was preferable in teaching 12 students with moderate to severe retardation a 48 step task, but conceded that age and level of retardation may be key variables that influence prompt and prompt sequences. However, McConville et al. (1998) taught three individuals with mild to moderate retardation four independent tasks, concluding that the most effective prompting procedure differed based on the activity. Perhaps the primary focus on choosing a particular prompting strategy should be based on a careful analysis of stimuli that are expected to maintain the behavior after training (Billingsley & Romer, 1983; Stokes & Baer, 1977).
In order to assure that implementing a prompting strategy results in transfer of stimulus control and eventual skill acquisition, trainers’ consistent adherence to training protocols is imperative. Touchette and Howard (1984) claim that premature removal of a prompt can initiate persistent incorrect response patterns that preclude acquisition of the target repertoire. Alternatively, extended presentations of prompts may reinforce dependence in the form of persistent selective attention to stimuli supplied by the trainer. Stokes and Baer (1977) argue that lack of transfer of stimulus control is due to insufficient exemplars, invariant stimuli, and not including aspects of the environment in the training situation. When staff fail to implement prompting procedures effectively, behavioral control may be established for only a restricted range of stimuli.

Conducting a functional assessment to determine staff behaviors and environmental variables affecting a client’s transfer of stimulus control and eventual independence on a task can increase the success of a treatment package to improve staff performance. The result may be an increased consistency of staff adherence to the most effective training protocol, coupled with subsequent improvements in client performance on the targeted acquisition tasks as transfer of stimulus control is more readily achieved.

The purpose of the present study was to: (1) demonstrate the use of an informant assessment (interviews) and direct observations of a hand washing activity to develop interventions focused on improving staff performance related to client skill acquisition; and, (2) determine the effects of the interventions on staff treatment implementation and client independence for an adaptive daily living skill.
CHAPTER II

METHOD

Participants

The participants were seven behavioral technicians enrolled in a practicum course at a large mid-western university (approximately 29,000 students enrolled), and five children diagnosed with autism who attended a preschool program that teaches communication, academic, and daily living skills to children with this diagnosis. Each technician worked with one student throughout a four-month semester. Participants were selected based on their willingness to participate and the frequency of hours worked.

The children ranged in age from 3 to 6 years. The duration of enrollment at the preschool ranged from 3 months to 2 years. All of the children were ambulatory and none possessed any severe physical disabilities. None of the children had any sensory problems that reduced the ability to respond to visual or auditory prompts.

The behavioral technicians consisted of 1 male and 6 female undergraduate psychology students. Technicians ranged in age from 19 to 22 years. Technicians in the practicum course were required to teach their child using the discrete trial training method (Lovaas et al., 1980) 5 days per week for 2 hours each day. At the beginning of the semester, the practicum supervisor assigned technicians to the 8:00 a.m. – 10:00 a.m. shift, the 10:00 a.m. – 12:00 p.m. shift, or the 12:00 p.m. – 2:00 p.m. shift for the
entire semester. Additionally, technicians met once per week for two hours in a classroom at the university to learn basic principles of teaching children diagnosed with autism. Instructors of these class sessions utilized a lecture format to teach the principles. None of the technicians had any prior experience in working with this population. All had received the normal training given to technicians in both the classroom and by the preschool.

Setting

This project was conducted in a moderate sized special school that maintains a preschool classroom for autistic children, teaching academic and social skills with the goal of mainstreaming children into a normal school environment. The classroom consisted of small cubicles used for one-on-one discrete trial training. The classroom also had a central gathering area consisting of tables for eating snacks and for teaching communication skills. After snack times and after lunch, behavioral technicians taught hand-washing skills by prompting the children to follow the component steps of the activity. Technicians were expected to use the least-to-most prompting method in teaching skills such as hand washing. Hand washing occurred at a sink approximately seven feet in length with three separate faucets. A paper towel dispenser was located at one end of the sink.

Participant Recruitment

Permission forms and a parent information sheet (see Appendix A) were sent home with children from the school, asking parents to allow participation in the study.
Assent was solicited from children in such a way that the child understood that he or she would be videotaped while washing hands and that the goal was to help him or her improve in hand-washing (see Appendix B for a copy of the assent script used by the author). Consent was also solicited from the technicians of the study. First, consent was obtained for baseline data collection and for the possibility of involvement in the informant assessment interviews. Following this baseline phase, consent was obtained from technicians for participation in the intervention phase of the study. The author read a recruitment script (see Appendix C) to technicians during the practicum course while the instructor was out of the room. Technicians were assured that their participation or non-participation would have no impact on their grades for the practicum course and that no one involved with the practicum course would have access to individual performance data.

Data Collection

The primary dependent variable was the technicians’ use of the least-to-most prompting procedure during a hand washing activity. The least-to-most prompting procedure consists of providing prompts in an increasing level of intrusiveness when the child’s response does not occur for a specified period of time. Specifically, the technicians were to follow the correct order of prompting for each task step as follows: (1) wait 3 seconds to allow an independent response on a step, (2) verbally prompt the response and wait 3 seconds, (3) provide a partial physical prompt for the response and wait 3 seconds, and 4) provide a full physical prompt for the response.
Hand washing was selected as the daily living skill activity of interest for two reasons. First, hand washing is considered to be a functional activity from both a cultural and hygienic standpoint. Second, discussions with the preschool teacher and practicum supervisor suggested that this program had a high potential for staff performance improvement.

Direct Observation

In order to construct an experimental data collection form, the extant hand-washing program at the preschool was divided into component responses (see Appendix D). The hand washing activity was videotaped using a Sony video recorder after a snack period in the morning and after a snack period in the afternoon when technicians were required to train the activity. Additionally, technicians were required to teach hand washing after a child used the restroom. Therefore, the research assistant was occasionally able to record a second hand washing session in the same day. The video camera was held by a research assistant at one end of the hand-washing sink in such a manner as to prevent disruption of the training activity. Observers later watched and scored the videotapes for the dependent variables of interest.

Technician Behavior

For each hand-washing instance, a research assistant recorded the technician's performance on the least-to-most prompting method (as described above). Each prompting step contained a series of three ordered blocks of response categories,
namely: (1) waited 3 seconds?, (2) prompt given, and (3) result of prompt. Therefore, the number of blocks per task step depended on the number of prompts required for completion of the task and the number actually given by the technician. In other words, if the technician performed the prompting procedure correctly, up to 3 blocks could occur per task analysis step depending on the level of prompt necessary for a child response on that step (e.g., wait 3 sec., verbal prompt, no response (1st block); wait 3 sec., partial physical prompt, no response (2nd block); wait 3 sec., full physical, response (3rd block)). Once a full physical prompt (i.e., hand over hand prompt) occurred, the child’s response was scored as having occurred unless the task analysis step was skipped (see below for an explanation of skipped steps). More than 3 blocks could be recorded per task analysis step if the technician erroneously provided the same prompt more than once or gave a less intrusive prompt after a more intrusive one.

The wait 3 second? category was scored by the research assistants in a binary (i.e., yes or no) fashion. That is, a yes was scored if the technician waited 3 full seconds for the child to initiate the task analysis step at the beginning of each block (i.e., at the beginning of each step and in between each prompt given). A no was scored if the technician did not wait 3 full seconds for the child to initiate the step. Research assistants used a stopwatch to determine when three seconds had elapsed.

For the prompt given variable, the level of prompt provided by the technician for each separate block was recorded. The levels consisted of independent performance (I), verbal prompt (V), partial physical prompt (PF), full physical prompt (F), or (O)
other prompt (e.g., gestural prompt). An independently performed response (I) was defined as the occurrence of a task analysis step without any prompting delivered by the technician. A verbal prompt (V) was defined as the technician emitting a specific verbal instruction before the appropriate task analysis component step (e.g., “Turn on the water, Jay”). A partial physical prompt (PF) was defined as the technician providing a light touch of less than 1 second to orient the child to the appropriate step (e.g., a light touch on the wrist to bring a child’s hand toward the towel dispenser). A full physical prompt (F) was defined as any physical intervention that involves hand contact with the child for longer than 1 second (e.g., hand over hand to turn on the water). For the purposes of the study, a gestural prompt (O) was always scored as incorrect because technicians were never taught to use this prompt either in class lecture or in preschool inservice training. An error was scored if the technician gave the same prompt twice during the same task step, gave a gestural prompt, or gave a prompt in the incorrect order during the same task step (e.g., partial physical, verbal, full physical). In effect, a technician’s behavior could be scored as having one error on the level of prompt category for each block on a hand-washing step. In other words, each prompting response by the technician, whether correct or incorrect, moved the observer to the next block of recording (one block = wait 3 sec?/correct prompt delivered/?result of prompt?). Therefore, the total number of errors that could have occurred for each task step depended on the number of prompts given by the technician. There was no limit to the number of possible errors per task step.
The result of prompt category was recorded as follows: (1) The block was scored as “X” if the step was not performed by the child as a result of the prompt given for that block; (2) The block was scored as “I” if the step was (independently) performed by the child as a result of the prompt given for that block; or (3) The block was scored as “Sk” if the response was skipped. A skipped step was recorded if either the child went on to the next step in the program without performing prior required steps (i.e., the child rinsed his or her hands before covering them with soap and was not corrected by the technician) or if the step was instead performed by the technician to terminate that component. (e.g., the technician turned off the water after several prompts were given to the child).

The wait 3-sec. category and the level of prompt category were combined into a percentage of correct prompts delivered score. That is, a percentage for each hand washing session was determined by taking the total number of errors on wait 3 sec. plus the total number of errors on level of prompt divided by the sum of available opportunities for the two categories. The total number of skipped steps per session was determined and graphed separately as a frequency measure.

Child Behavior

As ancillary measures, both child independence and on-task behavior were recorded for each session. These measures were intended to evaluate the impact of improved technician prompting on the hand-washing independence of the children.

In order to determine a child independence score for each session, a number was given to each prompt based on its level of intrusiveness. That is, a number was given
for the most intrusive prompt for that step, regardless of the number of prompts given during the session. For example, if the technician gave three verbal prompts, one partial physical prompt, and one full physical prompt for the step to “get soap”, only a full physical prompt was recorded for purposes of child independence because it was the most intrusive prompt provided by the technician. More specifically, a number was given to each step as follows: (1) “3” for an independent response (no prompts given); (2) “2” for a verbal prompt; (3) “1” for a partial physical prompt; and (4) “0” for a full physical prompt. Numbers were added for all the steps, divided by 30 (total possible for independent performance on all steps), and multiplied by 100%. On-task behavior was recorded for each step of the activity. A step was recorded as being on-task if the child initiated the appropriate response for the step in less than 5 seconds after the technician provided a prompt. A step was recorded as being off-task if the child initiated the appropriate response after 5 seconds had elapsed after the technician’s prompt. If the step was recorded as skipped (see above), that step was not included for the measure of on-task. On-task steps were divided by total number of steps and multiplied by 100% to obtain a percentage of on-task behavior score for each hand washing session.

Informant Assessment

At the same time that baseline data were collected, an informant assessment was conducted with seven key staff members at the preschool (see Appendix E). Interviewees included the practicum supervisor, preschool teacher, two teacher assistants, two second semester technicians at the preschool, and a technician who
agreed to participate in the study but whose performance data were not included for reasons unrelated to the study procedures and implementation. Each interview required approximately 20 minutes to complete.

The author asked each interviewee 14 questions that were categorized into items pertaining to: (1) antecedents – facilitative stimuli occurring before the behavior of interest that may be remedied through job aids, supervisor presence, and/or goal setting, (2) knowledge and skills needed to perform specific functions, and (3) consequences – facilitative stimuli occurring after the behavior of interest that may be remedied through feedback, tangible reinforcers, and/or performance monitoring.

Interviewees were asked to provide either a yes or no response for each question. The number of “no” responses (a “no” response was indicative of some deficiency in the queried area) for each category were then added together to obtain a frequency of “no” responses across all interviewees. Additionally, interviewees provided potential solutions for categories (as stated above, the categories were antecedents, knowledge and skills, and consequences) in which there was at least one “no” response. These responses for each interviewee are presented in Appendix F and organized by category.

Interobserver Agreement

Interobserver agreement was evaluated for the percentage of correct prompts delivered, frequency of skipped steps, percentage of steps on-task, and percentage of child independence on the hand-washing program. Interobserver agreement was conducted for 33% of the sessions by having a secondary observer simultaneously but
independently score the videotaped session. Interobserver agreement was calculated on a point-by-point basis by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100%. When reliability fell below 85%, observers were retrained on response definitions.

Interobserver agreement for the *wait 3 seconds* category averaged 86.9% (range: 66.6% to 100%) for baseline and 90.6% (range: 78.5% to 100%) during intervention. Agreement on the level of *prompt* category averaged 89.0% (range: 68.8% to 100%) during baseline and 92.5% (range: 83.3% to 100%) during intervention. Interobserver agreement for the result of prompt category averaged 92.1% (range: 78.5% to 100%) during baseline and 96.4% (range: 83.3% to 100%) during intervention. Agreement for on-task performance averaged 88.9% (range: 70.0% to 100%) during baseline and 92.9% (range: 70.0% to 100%) during intervention.

**Design**

A multiple baseline design across shifts was used to evaluate the effects of the training package (determined by the informant assessment) on prompting performance, child independence, and child on-task behavior during the hand-washing program.

As stated above, at the beginning of the semester technicians were placed into one of three shifts. The 8:00 a.m.-10:00 a.m., 10:00 a.m.-12:00 p.m., and 12:00 p.m. – 2:00 p.m. were classified as shifts one, two, and three respectively. However, because the number of eligible participants in shifts one and two were fewer than in shift three, shifts one and two were combined into one group for the treatment implementation. That is, shift three was exposed to the treatment package first, followed by shifts one
and two simultaneously. Technicians 1, 2, 8, and 9 began the baseline portion of the study but either they and/or their corresponding child had poor attendance, necessitating removal of these technicians from the study.

Data points are missing for specific dyads on certain days due to the fact that either a child and/or technician was not always available when data collection took place. As stated above, during intervention some observations of hand washing sessions occurred after a child used the lavatory. As the context and timing were different than after snack periods, these sessions were considered as generalization probes.

Training took place after session 14 for the third shift technicians (n=3) and after session 18 for the first and second shifts (n=4) with the exception of technician 7 on the first shift. Technician 7 could not attend the second training session for shifts 1 and 2 and so was trained on the next day after session 19.

Intervention

The information collected from the informant assessment suggested that interviewees believed that more information and training would improve the performance of technicians on the prompting hierarchy for teaching hand washing to the children. Direct observations that occurred during baseline and prior to the informant assessment assisted in targeting the technician and child behaviors to address for the intervention. However, direct observations were not used to identify the intervention components of the study.

The researchers concluded that a job-aid would be the informational antecedent with the most potential for improving performance based on the following rationale.
Informal observation of the area revealed that there were no job aides for the technicians' behavior during hand washing procedures. Although only two out of seven interviewees responded "no" to question four (Are there job or task aids near the area where hand washing takes place?), the respondents may not have understood the question. That is, the interviewees that answered affirmatively to the presence of a job aid at the sink may have been referring to a set of picture icons that were then located above the sink that illustrated each step for the child to perform on the hand washing activity. The purpose of these icons was to help the child improve performance on hand washing. The icons did not provide information to the technicians on the correct prompting hierarchy.

A job-aid (see Appendix G for an example of the job-aid) was also included as part of the intervention package to include an additional antecedent to address the interviewees' reported deficiencies maintaining inadequate performance. Four of seven interviewees responded "no" to question seven regarding whether the technicians were adequately trained on the least-to-most prompting procedure. However, recommended solutions for six out of the seven interviewees included additional training as an effective intervention. Therefore, additional training was also included in the treatment package.

Consequences were not used as a component of the intervention for several reasons. First, the staff were already engaged in a multitude of scheduled and time consuming tasks during shifts and the added pressure of following a schedule of monitoring and providing feedback to technicians on performance would have proved
too time consuming. Second, the researchers wanted to use the least restrictive intervention components first to facilitate behavior change not only to show that antecedents may be effective alone but also to ensure the ease of implementation for long term effectiveness. Lastly, although 6 out of 7 interviewees stated lack of consequences in the environment as a deficiency, consequences were not as clearly indicated as were the antecedents and training components (see Figure 1).

Training consisted of a one-hour session in a small classroom at the university where the technicians attended the weekly lecture (see Appendix H for a script of the training session). Shift three received the training first, followed by shifts one and two simultaneously. The training was identical for all shifts. During training sessions, technicians were instructed on the least-to-most prompting hierarchy to be used during the hand washing activity. Based on the data collected during baseline, the training session instructor emphasized that the technicians should wait three seconds between each prompt they delivered and that they be sure that each child completes the necessary steps of the program (i.e., avoiding skipped steps). For the remainder of the training session, each technician role-played the prompting activity with the instructor taking the role of the child, until mastery was achieved (defined as no technician errors for the entire hand-washing program).

Two identical 8 ½” x 11” job-aids were placed approximately 18 inches above each end of the sink. During the first intervention, the sheets were removed at the end of shift three to prevent shifts one and two from seeing the job-aids before the intervention for that group had begun.
Human Subjects Institutional Review Board Approval

All of the procedures of this research were brought before and approved by the Human Subjects Institutional Review Board at Western Michigan University. Approval was sought and granted first for the baseline and informant assessment phases of the study and then for the intervention phase.
CHAPTER III

RESULTS

The number of “no” responses by category for the informant assessment for each of the interviewees are presented in Figure 1.

**Number of "No" Responses by Category**

![Figure 1](image)

*Figure 1. Interviewee Responses by Category During the Informant Assessment*

The performance of the technicians and the children are presented in numeric form in Table 1. The performance of the technicians on correct prompts delivered and the number of skipped steps are presented as a percentage and frequency measure, respectively, in Figure 2. Participants were grouped together on figures based on the child with whom they worked. That is, (1) technicians 4 and 7 conducted hand washing sessions for child 3, (2) technicians 5 and 10 conducted hand washing sessions for child 4, (3) technician 3 conducted hand washing sessions for child 2, (4)
Table I

Technician and Child Independence Data

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<tr>
<th>Tech</th>
<th>Child</th>
<th>Ind.- Snack Baseline</th>
<th>Ind.- Snack Int.</th>
<th>Toilet Baseline</th>
<th>Toilet Int.</th>
<th>On-Task Snack Baseline</th>
<th>On-Task Snack Int.</th>
<th>On-Task Toilet Baseline</th>
<th>On-Task Toilet Int.</th>
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<td>62.2%</td>
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<td>77.2%</td>
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Table I

Child independence and On task Data

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<th>Ind. Toilet</th>
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<th>On-Task Toilet</th>
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<td>87.5%</td>
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<td>70.0%</td>
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<td>95.3%</td>
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<td>7</td>
<td>3</td>
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<td>83.8%</td>
<td>1.4</td>
<td>90.0%</td>
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</table>

<table>
<thead>
<tr>
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<th>Child</th>
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<th>% - Snack</th>
<th>Skip Toilet</th>
<th>% - Toilet</th>
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<tr>
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<tr>
<td>11</td>
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<td>0.4</td>
<td>90.0%</td>
</tr>
</tbody>
</table>

technician 6 conducted hand washing sessions for child 5, and (5) technician 11 conducted hand washing sessions for child 6.

Technician 3 performed at a mean baseline percentage of correct prompts delivered of 70.9% and an intervention mean percentage of 96.5%. Generalization probes for technician 3 during intervention averaged 95.6%. The number of skipped steps committed by technician 3 decreased from a mean baseline frequency of 0.6 to an intervention mean of 0 with generalization probes also averaging 0. Technician 4 performed at a mean baseline percentage of correct prompts delivered of 72.7% and
Figure 2. Percentage of Correct Prompting Procedures and Frequency of Skipped Steps of Technicians

S=Handwashing Program after Snack
T=Handwashing Program after Toileting
Independence and On Task Behavior - Child 3

Independence and On Task Behavior - Child 2

Independence and On Task Behavior - Child 4

Independence and On Task Behavior - Child 5

Independence and On Task Behavior - Child 6

Figure 3. Percentage of Independence and On-Task Performance of Children
an intervention mean percentage of 83.0%. Generalization probes for technician 4 during intervention averaged 79.0%. The number of skipped steps committed by Technician 4 decreased from a mean baseline frequency of 1.0 to an intervention mean of 0.4 with generalization probes averaging 0. Technician 5 performed at a mean baseline percentage of correct prompts delivered of 52.0% and an intervention mean percentage of 86.0%. Generalization probes for technician 5 during intervention averaged 87.5%. The number of skipped steps committed by technician 5 decreased from a mean baseline frequency of 0.3 to an intervention mean of 0 with generalization probes averaging 0. Technician 6 performed at a mean baseline percentage of correct prompts delivered of 70.0% and an intervention mean percentage of 95.1%. Generalization probes for technician 6 during intervention averaged 95.3%. The number of skipped steps committed by technician 6 decreased from a mean baseline frequency of 0.5 to an intervention mean of 0 with generalization probes averaging 0. Technician 7 performed at a mean baseline percentage of correct prompts delivered of 63.8% and an intervention mean percentage of 80.3%. Generalization probes for technician 7 during intervention averaged 84.5%. The number of skipped steps committed by technician 7 decreased from a mean baseline frequency of 1.5 to an intervention mean of 0 with generalization probes averaging 0. Technician 10 performed at a mean baseline percentage of correct prompts delivered of 42.5% and an intervention mean percentage of 81.5%. Generalization probes for technician 10 during intervention averaged 88.0%. The number of skipped steps committed by technician 10 decreased from a mean baseline frequency of 0.3 to an intervention mean
of 0 with generalization probes averaging 0. Technician 11 performed at a mean baseline percentage of correct prompts delivered of 78.7% and an intervention mean percentage of 83.8%. Generalization probes for technician 11 during intervention averaged 90.0%. The number of skipped steps committed by technician 11 decreased from a mean baseline frequency of 1.4 to an intervention mean of 0.4 with generalization probes averaging 0.

The performances of the children on both percentage of independence on the hand washing program and percentage of on-task behavior during the hand-washing program are presented in Figure 3. Child 2, during technician 3’s hand-washing

| Table II |
| A Comparison of Prompts By Category Given to Children During Baseline and Treatment Phases |

| Child 2 | Tech 3   | 18 | 12 | 5 | 35 | 15 | 7 | 3 | 25 |
| Child 3 | Tech 4   | 15 | 14 | 12 | 41 | 18 | 15 | 10 | 43 |
| Child 4 | Tech 7   | 19 | 16 | 10 | 45 | 17 | 17 | 7 | 41 |
| Child 5 | Tech 5   | 14 | 12 | 12 | 38 | 17 | 10 | 9 | 36 |
| Child 6 | Tech 10  | 15 | 11 | 13 | 39 | 16 | 12 | 7 | 35 |
| Child 7 | Tech 11  | 18 | 12 | 7 | 37 | 17 | 14 | 6 | 37 |
| Child 8 | Tech 12  | 17 | 8 | 6 | 31 | 20 | 7 | 8 | 35 |
from a mean baseline percentage of 71.4% to an intervention mean of 90.8%. Generalization probes for independence averaged 92.3%. On-task performance decreased from a baseline percentage mean of 92.8% to an intervention mean of 77.5% with generalization probes averaging 80.0%. Child 3, during technician 4’s hand washing sessions, decreased independence on the hand washing activity from a mean baseline percentage of 68.5% to an intervention mean of 62.2%. Generalization probes for independence averaged 60.3%. On-task performance increased from a baseline percentage mean of 77.0% to an intervention mean of 79.0%, but with generalization probes averaging only 73.3%. Child 3, during technician 7’s hand washing sessions, increased independence on the hand washing activity from a mean baseline percentage of 63.5% to an intervention mean of 71.0%. Generalization probes for independence averaged 65.0%. On-task performance generally remained stable from a baseline percentage mean of 76.8% to an intervention mean of 76.7%, however generalization probes averaged 85.0%. Child 4, during technician 5’s hand washing sessions, increased independence on the hand washing activity from a mean baseline percentage of 46.4% to an intervention mean of 62.3%. Generalization probes for independence averaged 50.0%. On-task performance decreased from a baseline percentage mean of 82.7% to an intervention mean of 71.0% with generalization probes averaging 70.0%. Child 4, during technician 10’s hand washing sessions, increased independence on the hand washing activity from a mean baseline percentage of 43.8% to an intervention mean of 58.5%. Generalization probes for independence averaged 57.7%. On-task
performance increased from a baseline percentage mean of 86.9% to an intervention mean of 94.8% with generalization probes averaging 93.3%. Child 5, during technician 6’s hand washing sessions, decreased independence on the hand washing activity from a mean baseline percentage of 61.5% to an intervention mean of 55.5%. Generalization probes for independence averaged 61.0%. However, on-task performance increased from a baseline percentage mean of 65.1% to an intervention mean of 77.5% with generalization probes averaging 70.0%. Child 6, during technician 11’s hand washing sessions, decreased independence on the hand washing activity from a mean baseline percentage of 65.0% to an intervention mean of 60.0%. Generalization probes for independence averaged 63.0%. However, on-task performance increased from a baseline percentage mean of 77.2% to an intervention mean of 90.8% with generalization probes averaging 100%.

In order to further show the effects of the intervention on child independence on the hand-washing program, a comparison of the types of prompts given by technicians to achieve a correct response on a component step during the last 5 sessions of baseline and the first 5 sessions of intervention are presented in Table 2.
CHAPTER IV

DISCUSSION

The results of the study demonstrated that using an informant assessment to target an intervention package resulted in improved staff performance on training a daily living skills task for children diagnosed with autism. All of the technicians in the study improved their performance to varying degrees on the targeted measures, more accurately implementing the least-to-most prompting hierarchy (3-second errors, skipped steps, and prompting procedures) during the hand-washing procedure. The improvements in the behavior of the children were marginal. Four out of the seven children measured increased independence on the hand-washing program and four out of seven children measured increased on-task behavior during the activity. The average gains for all children in independence and on-task behavior were 4.74% and 3.34%, respectively. Surprisingly, the data for 5 of the 6 children suggested that as independence on the hand-washing program increased, on-task behavior decreased (see Table 1). This may have been due to the response definitions that were chosen for these measures.

In the present study, I identified the components of the treatment package by interviewing technicians, employees, and teachers about the deficiencies present in the training environment that were causing the sub-optimal performance of the technicians. This procedure allowed me to choose specific intervention components
that would address these deficiencies. In doing so, an intervention package was
developed in an efficient and user friendly manner that resulted in substantial
improvements in staff performance during the hand washing procedure.

Prior to the intervention, technicians were performing the prompting hierarchy at a
sub-optimal level. There were possibly several factors as to why technicians were not
performing the hand-washing task on a more consistent basis during baseline. First,
technicians were not trained specifically on the prompting hierarchy during classroom
instruction and preschool inservice prior to the intervention. Due to the fact that none
of the technicians had prior experience in working with this population, technicians did
not have the behavioral repertoire needed to implement the hierarchy procedure
effectively. Therefore, inconsistent performance across technicians during baseline
may have been based on self-generated rule statements of each technician according to
their corresponding reinforcement histories.

Another reason why technician performance may have been at a sub-optimal level
during baseline was that the technicians may have delivered more intrusive prompts
and/or not prompted skipped task component steps during baseline to complete the
hand washing session more quickly. The hand washing procedure as compared to
other training programs at the preschool was significantly more demanding for both
the technician and the child from a procedural perspective. For data collection
purposes, technicians were required to remember each component step, present
several prompts in a short period of time, and remember each prompt delivered.
Children were required to complete a chain of different responses in order and did not
receive reinforcement for each correct response, as in other training programs, but only received end of session reinforcement. Technician behavior may have been negatively reinforced because immediately delivering physical prompts and/or not prompting skipped component steps by the child resulted in quicker completion of each hand washing step, fewer total prompts delivered, and a quicker overall training session.

One factor that may have been creating sub-optimal performance is that technicians may have seen other programs (discrete trial training, other daily living skills tasks, etc.) as more important than the hand-washing activity. Therefore, technicians may have been immediately delivering more intrusive prompts and/or not prompting skipped component steps by the child in order to return to other required duties of the position that were more closely monitored by supervision (discrete trial training, other daily living skills tasks, etc.). In effect, these other required activities may have been competing contingencies with appropriate prompting. In fact, monitoring of discrete trial training by a shift supervisor took place at least twice a week during the study. These monitoring sessions were included as a part of technicians' practicum grade. Thus, technicians may have focused more attention towards activities that were being monitored and were to affect technicians' final practicum grade, resulting in sub-optimal performance during baseline measures of the hand washing activity.

The informant assessment that was used in the study can be seen as advantageous from one standpoint. The ease with which the informant assessment was conducted,
using interviews of key staff members at the preschool required considerably less time than would a descriptive assessment or experimental analysis. However, data gathered from the informant assessment were subjective and required some interpretation when selecting the best intervention package. The use of a descriptive assessment or experimental analysis, albeit difficult to implement when analyzing staff behavior (as discussed above), would have been scientifically more objective and may have identified factors maintaining staff performance that the informant assessment did not.

Still, more research on functional assessments of staff performance is needed to determine the most effective assessment procedures, taking into account concerns of both objectivity and timeliness of the procedure.

The components of the intervention package may have addressed each of the possible factors maintaining sub-optimal performance of the technicians mentioned above in the following ways. First, one or more of the intervention components may have supported improvement in staff implementation of the prompting hierarchy simply by practicing running the hand-washing program with knowledge of the correct protocol for the least-to-most prompting procedure. In fact, visual inspection of the graphs including the percentage of correct prompting procedures for technicians 3, 5, and 6 suggest an increasing trend during baseline resembling maturation effects. Therefore, the mean lines indicating the technician’s average performance during baseline and intervention may have erroneously shown a stronger effect. Still, further inspection suggests that the increasing trend in performance is much more pronounced after the intervention phase began (see graphs for technicians 5 and 10).
well be the case that small improvements in technician performance occurred as a result of the intervention components, but were difficult to detect given the lack of experimental control inherent in an AB design.

Another explanation for the intervention's effect on technician performance is that one or more of the technicians may have discussed the intervention components to a participant that had not yet received the training or seen the job aid. For example, the data point for the graph "Performance on Prompting Procedures" for the last session before intervention for technician 7 shows marked improvement on the prompting procedure and suggests that discussions with other technicians who received the training may have occurred. The technicians in the study attended seminar once per week that included students from different shifts. However, due to the schedule of the autism practicum course, this problem was not correctable during the study.

Another explanation for the intervention's effect on technician performance is that the training component may have resulted in the technicians developing new covert rule statements regarding the hand washing program that resulted in better performance on the prompting procedure. For example, a previous rule of, "If I give a physical prompt on each step, my child will learn hand washing faster" may have been replaced with, "If I follow this hierarchy, it will encourage my child to need fewer prompts and he/she will become more independent in hand washing". In similar fashion, the training component coupled with the fact that the technicians were being monitored during the study (data collection of hand washing sessions via videotape), may have resulted in the technicians developing new covert rule statements and
placing higher priority on their performance during the hand washing activity than they had previously. A factor related to this analysis is the phenomenon known as “top management support” (Agnew, 1998). The training component of the intervention may have caused the technicians to feel that the supervisors and the teachers were placing more emphasis on technician performance during the hand-washing program. This would, in effect, act as an establishing operation, increasing the reinforcing value of improved child performance during the program and evoking the behaviors that exemplified correct technician procedures (waiting 3 seconds between prompts, implementing the correct prompting hierarchy, etc.).

Due to the improvements in staff performance with only antecedent (job aid) and training components, the current study demonstrates that consequences may not be initially necessary to bring about performance improvement in habilitation settings. Therefore, one strength of the current study was the fact that the intervention was user friendly and inexpensive due to the absence of the consequence component. The amount of time that would have been required by the teachers and supervisors in monitoring, delivering feedback, and providing incentives may have, in effect, compromised the consistent implementation of such a procedure given competing supervisory duties. This would have meant that the intervention may have been less likely to be maintained over time due to the response effort associated with the inclusion of a consequence component. Further, the treatment package required only 1 hour of training per shift that did not occur during the technicians’ hours of employment at the preschool. Therefore, this type of training procedure does not
require direct care staff to be absent from their training duties for an extended period of time, resulting in greater cost effectiveness for the organization and less client schedule disruption.

Another potential strength of the current study is that an “antecedent only” intervention may also encourage long term implementation of the treatment package. In effect, “antecedent only” interventions may be implemented for a longer period of time because they link into some natural or existing programmed consequences in the environment that then maintain the behavior (Sulzer-Azaroff & Mayer, 1991).

The ancillary measures used during the study, namely percentage of child independence and on-task performance during the hand-washing program, showed that child performance improvements were more modest than technician performance gains. The manner in which the on-task performance of the children was measured during the study may have affected the results of this component. During baseline, the data suggested that technicians delivered prompts more quickly than during intervention, as evidenced by their frequency of 3 second errors. Thus, the increased duration between prompts during the intervention phase may have allowed for more off-task behavior to be observed during the session (recorded as the child spending more than 5 seconds on a hand-washing step between prompts by the technician). In other words, as a technician’s performance improved on the delayed prompting procedure, more time was available during the hand washing activity for the child to be off-task. This proved to be a limitation of the measure of on-task performance. An alternative definition of on-task behavior other than a time component was considered
but would have proven difficult to record accurately given the number of response definitions required for the various types of off-task behavior observed during the study (e.g. playing in the water, running away, drinking the water).

There were several additional weaknesses in the present study. First, given that the semester for the practicum course was ending, only five days of intervention were possible for the first shift of technicians. It is unclear if the performance of the technicians would have been maintained over time without feedback, monitoring, or other programmed consequence components. Follow-up measures on the dependent variables in the study would have been helpful to determine if the performance of the technicians and children were maintained. Further, a longer intervention phase may have showed greater child independence gains as the delayed prompting procedure began to reduce the level of intrusiveness of prompts necessary to evoke a response for some children. Finally, the “skipped step” category for technician performance would have provided more information if the data included which task steps were being skipped by technicians. Due to the fact that the measure only stated the frequency of skipped steps per hand-washing session, the data is nominal.

The methodology of the study left some empirical questions unanswered. The present study showed only that increases in technician and child performance can be realized by using an informant assessment to pinpoint factors maintaining sub-optimal performance and implementing treatment components based on those pinpoints. It is unclear whether other interventions chosen that were not related to the assessment results would have produced similarly positive gains in performance. In order to
address this issue, future research could test alternative hypotheses recommended by the assessment. Further, it was not apparent if either training or the job aid alone would have resulted in similar increases as the treatment package. If time permitted, a component analysis could have determined which components of the treatment package were necessary to produce behavior change.

Due to the duration of the practicum semester, coupled with the availability of participants for the study, only two groups could be established for the multiple baseline design. Three groups (three shifts of technicians) would have proven a more convincing design and would have established better experimental control to draw conclusions based on the data. Further, a multiple baseline could only be used for technicians 4, 5, 7, and 10 because these participants had another technician training their child on the hand-washing program during another shift. Therefore, the data for technicians 3, 6, and 11 were essentially an AB design. This made it difficult to determine experimental control for these individuals and so compromised the apparent effects of the study.

Another weakness of the current study was that social validity data was not sought. The results of the study suggested small improvements in technician performance and child performance (given possible maturation effects). It would have been beneficial to include social validity measures to determine if such improvements are deemed worthy by professionals in these settings and if the time and money involved with this type of research are warranted.
The main focus of the study was to demonstrate the utility of the informant assessment in identifying interventions effective in improving technician performance. Therefore, an analysis of the most effective prompting procedures to encourage child independence on the hand washing activity was not conducted. However, an individual assessment of the behavior of each child as to whether a combined prompting (a.k.a. simultaneous prompting procedure) or delayed prompting procedure would have been more effective may have resulted in greater gains in child independence on the hand washing activity. For example, Doyle, Wolery, Ault, and Gast (1988), in their review, determined that the mixed results of least-to-most prompt procedures compared to most-to-least prompt procedures suggest that a subject variable may be controlling which procedure is more efficient.

More research studies in a variety of habilitation settings are needed to determine the utility of informant assessments in identifying maximally effective interventions. Research directed at comparing the usefulness of an informant assessment to that of a descriptive assessment in identifying factors maintaining sub-optimal performance of staff would tell us which assessment tool was more effective. Further, research along these lines would suggest if additional time needs to be spent on a descriptive assessment or if an informant assessment reveals the same maintaining factors. A direct replication of the present study with a longer intervention period and component analysis may help to assess the likelihood of maintenance of the performance improvement of both technicians and children. It may also help to determine which components of the intervention package result in the greatest desired
behavioral change, and if programmed consequences are indeed necessary for maintenance. Finally, including a section in the informant assessment that identifies competing contingencies in the environment that may be affecting staff performance would provide more information towards developing an effective treatment package.

The prevalence of staff turnover and education level of direct-care staff in facilities serving individuals diagnosed with a disability (Reid & Parsons, 1995) exemplifies the importance of developing a cost efficient and effective program to develop lasting performance improvement. Given the magnitude of complex variables that may be maintaining sub-optimal performance in these settings, it is imperative to determine the most effective means of pinpointing these factors to identify interventions that promote positive behavior change. By maintaining optimal performance of staff in these environments, greater independence of individuals served in these settings can be realized.
REFERENCES


Appendix A

Parent Information Sheet
Appendix A

Parent Information Sheet

We are affiliated with Western Michigan University - Dr. Austin is a faculty member and Scott Traynor is a graduate student in the Psychology Department, conducting research for his Master's thesis.

We are currently planning a research study at the Croyden Avenue Preschool that may result in improving your child's independence with hand washing. If your child participates, he/she will be videotaped during the activity so that we can determine ways to improve on the excellent teaching methods that Croyden provides. We will then implement those changes to the teaching methods that may result in your child learning hand washing more quickly. You may withdraw your child from the study at any time and for any reason without penalty.

The information collected for the study may be used for publication and/or conference presentations.

In order for your child to participate in this project, the enclosed permission form must be signed and returned to the school. For more details of the study, please read through the consent form before signing and/or call Dr. Austin at 387-4495 (email: john.austin@wmich.edu) or call the school.

THANKS!
Appendix B

Script for Child Assent
Appendix B

Script for Child Consent

1. Make direct eye contact with child and smile.

2. Prompt the child to look directly at you and listen.

3. Say, “We would like to work with you for the next couple of weeks. We want to help you to wash your hands better. We would like to videotape you with a camera (show camera) when you wash your hands so that we can get better at helping you wash your hands. Would you like to work with us?”

The teacher will help the researchers define assent behaviors for the child and will be present to determine if the child assents to participate in the research study.

Potential Indicators of Assent:

1. Saying “yes,” “uh-huh,” or a phrase that the teacher indicates as affirmative.

2. Smiling, nodding, touching the experimenter, or other physical actions that indicate interest in the interaction.
Appendix C

Technician Recruitment Script
Appendix C

Technician Recruitment Script

My name is Scott Traynor and I am a graduate student at Western Michigan University in the Psychology Department. I would like to invite you to participate in a research study at Croyden School entitled, “Using Performance Analysis of Staff Behaviors to Increase Child Engagement during Acquisition Programs.” This study is a Master’s thesis that partially satisfies the requirements for a Master’s degree in Industrial/Organizational Psychology. We are interested in observing the technician/student interactions during the hand washing program at the preschool to determine if there are changes that can be made to improve teaching methods that may result in children acquiring the skill more quickly. If you agree to participate in the study, you will be videotaped while working with your student during the hand washing task.

Participation in the study is completely voluntary. If you choose not to participate, your performance reviews or practicum grade will be unaffected. If you decide to participate, you may withdraw from the study at any time and for any reason. Additionally, the data collected will not be used to evaluate individual technicians and the preschool teacher, teaching assistants, practicum supervisor, and practicum director will not have access to individual data.

I will be handing out consent forms for your consideration. If you are interested in participating, you can either complete the consent form and return it at his time or you may take it with you and return it at the end of the week in Dr. Austin's mailbox, in the Psychology Department. Thank you for your time.
Appendix D

Data Sheet
### Appendix D

<table>
<thead>
<tr>
<th>Session Number:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Water on</td>
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<tr>
<td>2. Hands wet</td>
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</tr>
<tr>
<td>3. Get soap</td>
<td></td>
</tr>
<tr>
<td>4. Scrub</td>
<td></td>
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<tr>
<td>5. Rinse</td>
<td></td>
</tr>
<tr>
<td>6. Water Off</td>
<td></td>
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<tr>
<td>7. Get Towel</td>
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<tr>
<td>8. Dry Hands</td>
<td></td>
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<tr>
<td>9. Dry Arms</td>
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</tr>
<tr>
<td>10. Throw towel</td>
<td></td>
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</tbody>
</table>

**Key**

- **V** = Verbal Prompt
- **X** = response not performed
- **PF** = Partial Physical Prompt
- **I** = response performed
- **F** = Full Physical Prompt
- **N** = No Prompt
- **Oth.** = Other Prompt

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### Session Data

<table>
<thead>
<tr>
<th></th>
<th>Prompt Result</th>
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<th>Prompt Result</th>
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<th>Prompt Result</th>
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<th>Prompt Result</th>
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<th>Prompt Result</th>
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<tbody>
<tr>
<td>1.</td>
<td>Water on</td>
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<td>2.</td>
<td>Hands wet</td>
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<td>3.</td>
<td>Get soap</td>
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<td>4.</td>
<td>Scrub</td>
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<td>5.</td>
<td>Rinse</td>
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<tr>
<td>6.</td>
<td>Water Off</td>
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<td>7.</td>
<td>Get Towel</td>
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<td>8.</td>
<td>Dry Hands</td>
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<td>9.</td>
<td>Dry Arms</td>
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<tr>
<td>10.</td>
<td>Throw towel</td>
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</table>
Appendix E

Informant Assessment Questions
Appendix E

Informant Assessment Questions

Position: __________________

Experience: ________________

Script

I appreciate you taking a few minutes to meet with me. I am conducting a study in the preschool at Croyden to satisfy the requirements necessary to get a Masters Degree in Psychology. I am going to be asking you questions regarding the prompting procedures that the technicians use during the hand washing program. These questions may help us develop better and more consistent teaching methods that may result in improved tech performance and improved child independence on hand washing.

Antecedents and Information

Yes  No

☐  ☐ Are there written instructions in the tech manual regarding prompting procedures during ADL activities?

☐  ☐ If yes, are they clear and easily understandable?

☐  ☐ Do you feel that the technicians receive adequate instruction regarding the importance of following the correct prompting procedures during hand washing? (not training - explicit instructions like “I want you to do this, this, and this before we leave today…”)

☐  ☐ Are there job or task aids near the area where hand washing takes place? Visible while completing the task in question? Reminders to prompt the task at the correct time?

☐  ☐ Is the teacher or teacher’s aide present during the hand washing activity?
Are there frequently updated, challenging, and attainable goals set for the correct implementation of procedures that technicians are comfortable with/feel are fair?

Are the equipment & environment optimally arranged in a physical sense?

What do you think could be done that would remedy these types of problems?

1.
2.
3.

**Knowledge and Skills**

**Yes**  **No**

Are the technicians adequately trained in general prompting procedures, the least-to-most prompting hierarchy, and data recording procedures?

What do you think could be done that would remedy this problem?

1.
2.
3.

**Consequences**

**Yes**  **No**

Are there consequences delivered based on adherence to the correct prompting procedures?

- How frequent?
- How immediate?
- How consistent?
- Are they positive or negative?
Do technicians see the effects of their performance? (How? Natural / arranged)

Do the teacher or teacher assistants deliver feedback to the technicians on how well the prompting procedures are performed?

In what form? ________________________________

Is there performance monitoring?

If yes, who monitors and how?

Is there a response effort associated with the technician performing the activity correctly? (carrying clipboard?, ambient noise?)

Are there other behaviors that the technician needs to accomplish on his/her shift that competes with performing the prompting procedures correctly?

What do you think could be done that would remedy these types of problems?
Appendix F

Interview Responses of Technicians
## Appendix F
### Interview Responses of Technicians

<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Antecedents and Information</th>
<th>Knowledge and Skills</th>
<th>Consequences</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>None noted</td>
<td>Training on specific prompting procedures</td>
<td>Make sure that technicians are doing the procedure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- More training on data recording</td>
<td>correctly before monitoring stops</td>
</tr>
<tr>
<td>2</td>
<td>Fewer kids washing their hands at one time</td>
<td>None noted</td>
<td>More monitoring by the teacher assistants</td>
</tr>
<tr>
<td>3</td>
<td>Ensure hierarchy of prompts is in the technician manual</td>
<td>More training on hierarchy of prompts</td>
<td>None noted</td>
</tr>
<tr>
<td></td>
<td>Make sure that techs are wearing their reinforcer belts and reinforcing kids</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>None noted</td>
<td>Train prompting hierarchy with examples and non-examples (possibly video)</td>
<td>Monitor technicians more frequently</td>
</tr>
<tr>
<td>5</td>
<td>Clear job-aids on the prompting procedure</td>
<td>Training both on and off site</td>
<td>Ongoing monitoring</td>
</tr>
<tr>
<td>Interviewee</td>
<td>Antecedents and Information</td>
<td>Knowledge and Skills</td>
<td>Consequences</td>
</tr>
<tr>
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</tr>
<tr>
<td>6</td>
<td>Lower soap dispenser - left side of sink</td>
<td>One-on-one training</td>
<td>Have students record data after task is complete (not during)</td>
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<tr>
<td></td>
<td></td>
<td>like techs receive for booth procedures</td>
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<td></td>
<td></td>
<td>(discrete trial training)</td>
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<td></td>
<td>Immediate feedback and monitoring</td>
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<td>Distinct category for ADL on grade sheet for practicum</td>
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<td></td>
<td>Incentives (rewards, bonus points) for correct implementation of program</td>
</tr>
<tr>
<td>7</td>
<td>None noted</td>
<td>More instruction in seminar with modeling</td>
<td>Loss of points for not meeting prompting performance criteria</td>
</tr>
</tbody>
</table>
Appendix G

Technician Job Aid for Performing the Hand-washing Program
Appendix G

Tech Job-Aid for Performing the Hand Washing Program

* If your child scrubs under the water, you must prompt him/her to scrub with hands out of the water following the hierarchy.

* If a child goes through the hierarchy and does not respond, perform a hand over hand full physical prompt. Never perform the step for the child.
Appendix H

Script of Technician Training Session
Appendix H

Script of Training Session for Technicians

I. Introduction
A. Explanation of why technicians present were chosen - not based on performance compared to other technicians.
   1. Based on consent of both technician and child
   2. Based on frequency of hand washing sessions for the tech/child dyad.
B. Summary of Baseline Findings
   1. 3 major areas of technician errors
      a. No 3 second delay to allow child to respond
      b. Not following least-to-most prompting hierarchy
      c. Technicians allowing child to skip steps with no prompts given
C. How was training determined to be the intervention of choice?
   1. Interviews with other technicians and key staff members – frequency of responses on various categories.
   2. Informal collection of information on current training procedures suggested need for additional training.

II. Training - Hand out Job-Aid sheet explaining hierarchy
A. 3 second errors – wait 3 seconds to allow child to respond:
   1. At the end of one step and beginning of the next
   2. In between each prompt given
   3. After saying “Wash your hands” at the beginning of the session.
B. Prompting Hierarchy
   1. Least-to-Most Prompting
      a. Verbal – Partial Physical – Full Physical
      b. Response Definitions of Each
   2. Never perform step for the child - use full physical
   3. Always stand right behind child while hand washing is taking place
   4. Avoid unnecessary prompts- touching counts as partial physical
C. Skipped steps by child unprompted by technician
   1. Scrubbing should take place out of the water
   2. High frequency during baseline of skipped “Dry Arms” step
D. Summary of Lecture
   - Each step . . . Wait 3 seconds – Verbal Prompt - Wait 3 seconds –
     Partial Physical Prompt - Wait 3 seconds – Full Physical Prompt

III. Role Playing of Hand washing session
1. Trainer plays role of child, exhibiting typical responses by the specific child of the technician.
2. Each participant practices hierarchy for the entire program.

IV. Closing
A. A Job-Aid will be posted above the sink to help technicians to remember hand washing procedure.
B. Please don’t discuss training with other shifts.
C. Thanks for your time.
Appendix I

Human Subjects and Institutional Review Board Consent Letter
Date: 20 November 2000

To: John Austin, Principal Investigator
Scott Traynor, Student Investigator for thesis

From: Michael Pritchard, Interim Chair

Re: HSIRB Project Number: 00-11-18

This letter will serve as confirmation that your research project entitled "Using Performance Analysis of Staff Behaviors to Increase Child Engagement During Acquisition Programs" has been approved under the expedited category of review by the Human Subjects Institutional Review Board. The conditions and duration of this approval are specified in the Policies of Western Michigan University. You may now begin to implement the research as described in the application.

Please note that you may only conduct this research exactly in the form it was approved. You must seek specific board approval for any changes in this project. You must also seek reapproval if the project extends beyond the termination date noted below. In addition if there are any unanticipated adverse reactions or unanticipated events associated with the conduct of this research, you should immediately suspend the project and contact the Chair of the HSIRB for consultation.

The Board wishes you success in the pursuit of your research goals.

Approval Termination: 20 November 2001