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Effects of a self-operated auditory prompting device on the acquisition, maintenance and generalization of independent work skills of preschoolers with developmental disabilities

Ward, Marie Carmel, Ph.D.
The Ohio State University, 1994
EFFECTS OF A SELF-OPERATED AUDITORY PROMPTING DEVICE ON THE ACQUISITION, MAINTENANCE AND GENERALIZATION OF INDEPENDENT WORK SKILLS OF PRESCHOOLERS WITH DEVELOPMENTAL DISABILITIES

DISSERTATION

Presented in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy in the Graduate School of The Ohio State University

By

Marie C. Ward, B.S., M.S.

*****

The Ohio State University
1994

Dissertation Committee: Approved by
Dr. Diane M. Sainato
Dr. John O. Cooper
Dr. William L. Heward
Dr. Daryl Siedentop

Advisor
College of Education
To Mom and Dad
For your unquestionable trust in my ability to succeed
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August 29, 1965.......................... Born- Detroit, Michigan

1988 ........................................ B.S., Eastern Michigan University, Ypsilanti Michigan

1990 ........................................ M.S., Clinical Behavioral Psychology, Eastern Michigan University, Ypsilanti, Michigan

1986-1987 ............................... Parent Aide, Washtenaw County Child and Family Social Services, Ypsilanti Michigan

1987-1989 ............................... Psychiatric Assistant, Mercywood Hospital, Ann Arbor, Michigan

1989-1990 ............................... Psychology Intern, Wayne County Community Living Services, Michigan

1989-1990 ............................... Rehabilitation Specialist, New Medico, Ann Arbor Michigan

1990-1991 ............................... Program Manager, Datahr Rehabilitation Institute, Brookfield, Connecticut

1992-Present ............................ Field Coordinator, Early Childhood Special Education, The Ohio State University
PUBLICATIONS


FIELDS OF STUDY

Major Field: Education

Minor Field: Applied Behavior Analysis and Special Education
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CHAPTER I
INTRODUCTION

The twentieth century has seen political, social, economic and technological forces which have given rise to parallel but separate movements in the development of kindergarten, nursery school, and day care programs, serving typically developing children (Bricker & Cripes 1992, Peterson, 1987). In addition, advances in the fields of early education, regular education and compensatory education (e.g. Head Start, Follow-Through, and Home Start) have contributed in a significant way to the beginning of a focus upon preschoolers with at-risk or handicapping conditions (Peterson, 1987). The focus upon children with special needs began with a singular goal toward intervention. Recently, the focus has been refined toward the goal of integration.

The most powerful influence on integration has been the passage of legislature which mandates the provision of services to preschoolers with disabilities (McLean & Hanline, 1990). The passage of Public Law 99-457, Education of the Handicapped Act Amendments of 1986, assures young children with handicaps the right to receive a free and appropriate education in the least
restrictive environment. The field of special education for school age children, the early education of typically developing children and the compensatory education movement have contributed to the passage of legislation and the development of early childhood special education in the following ways:

The special education movement established the notion that handicapped children can learn and should be entitled to the opportunity for appropriate education alongside their non-handicapped peers. The early education movement brought acceptance to preschool education and day care as worthwhile (and not harmful) experiences for young children. The compensatory education movement gave reality to the notion of education intervention ...[and] demonstrated that early intervention can make a difference in children's lives and can enhance their chances for success in school. (Peterson, 1986, pp. 133-134)

Currently, one of the major goals of early childhood special education (ECSE) programs is to promote the inclusion of young children with disabilities into kindergarten classrooms with their typical peers (Carta, Sainato, & Greenwood, 1988; Conn-Powers, Ross-Allen, & Holburn, 1990; Hains, 1992; Hains, Fowler, & Chandler, 1988; Rule, Fiechtel, & Innocenti, 1990; Vincent, Salisbury, Walker, Brown, Gruenwald & Powers, 1980; Wolery, 1989). In the decade prior to 1990, Salisbury and Vincent (1990) noted that discussions in the literature frequently centered on whether to mainstream or integrate, and for whom it was appropriate. Today the question is not whether the integration or mainstreaming of children with disabilities is a good idea, but how
successful integration will be accomplished (Vincent et al., 1990, p. 79).

For young children with disabilities, their parents, and professionals, transition from more specialized settings to kindergarten classrooms presents many challenges (Conn-Powers, et al., 1990). Children must enter settings which are very different from previous settings (Conn-Powers, et al., 1990). Once there, they must generalize previously learned skills, learn new classroom rules and routines, make new friends, function in a larger group setting with less teacher attention and function more independently (Conn-Powers, et al., 1990; Fowler, 1982; Hains et al, 1988; Vincent et al., 1980). After reviewing three studies using direct and systematic observational techniques to compare the differences between special education preschool classrooms and kindergarten or regular preschool classrooms Fowler, Schwartz & Atwater (1991) concluded that students in special education preschools spend more time in small groups or individual instruction, and receive more teacher prompting than do their typically developing peers. Furthermore, Fowler et al. (1991, p. 138) state that "these studies suggest that the ecology of special education preschool classrooms preclude opportunities for students to practice skills and foster independence". For children to be successful in the next environment educators must be effective and efficient with a focus toward normalization in the development and implementation of early intervention services. Hains (1992) suggests planning and support for the transition of
young children to integrated programs remains essential to enhancing their success in the mainstream.

Preparing the child for success in future environments is an essential component of transition (Fowler, et al., 1991). To prepare children with disabilities to meet the challenges of an educational placement with their typically developing peers the social, behavioral and academic requirements of that setting must be identified (Fowler et al., 1991). Necessary skills for success is often referred to as "survival skills". The identification of survival skills requires the direct observation of the next environment. Investigators attempting to define survival skills have concluded that for teachers, the degree of independence displayed by children is a crucial factor in the teacher-pupil relationship and in the management of the learning environment (Sainato, Strain, Lefbvre, & Rapp, 1990). Furthermore, for transition to the typical kindergarten setting to be successful children with disabilities must be able to make appropriate choices, remain actively engaged in tasks, complete tasks with less teacher attention (Hains, 1992), follow varied directions and use a variety of materials (Rule, et al., 1990).

Despite evidence that the ability to work independent of teacher direction is a critical skill for success in kindergarten, there is little evidence that preschoolers with handicaps are taught or expected to function with minimal teacher assistance (Rule et al, 1990). Furthermore, few researchers have directly
examined techniques for teaching young children to function with limited teacher attention and instruction.

**Statement of the Problem**

"There is so much to teach and the time goes so fast"


Over the past ten years several researchers have written about the transition and inclusion of young children with special needs into what is now termed the typical educational setting (Conn-Powers et al., 1990; Fowler, Chandler, Johnson & Stella, 1988; Fowler, 1982; Fowler et al., 1991; Hains, 1992; Rule, et al., 1990; Salisbury, et al., 1990; Sainato & Lyons, 1989; Turnbull & Turnbull, 1990; Vincent et al., 1980; Wolery, 1989). Sainato and Lyon (1989) summarize research findings on teachers' classroom organization, behavioral characteristics of most and least independent children in mainstreamed settings, and differences in the instructional environment between mainstream and special education preschools. Teachers interviewed during this investigation reported the behavior of children rated as the most independent was characterized by the ability to stay on task with or without teacher attention, the ability to follow a transition routine at the end of a work session, and the ability to work without disrupting peers (Sainato & Lyon, 1989). It has been suggested by many researchers that we should look to the next

Therefore, strategies that lead to increased independent child engagement through the acquisition of independent performance skills are necessary to promote the successful transition of the child with disabilities into the next, less restrictive educational environment with typical peers.

**Purpose of the Study**

Preschoolers with disabilities may be deficient in their ability to independently engage in activities. The proposed study seeks to capitalize on advances made in the development, maintenance and generalization of independent performance skills with older learners with disabilities through the use of a self-operated auditory prompting system. Recent investigations of the adaptation of a self-operated auditory prompt system proves promising (Brandt, 1992; Stemley, 1993). This investigation involved a replication and extension of the use of a self-operating auditory prompting device with preschoolers with disabilities. Preschoolers with disabilities who are expected to transition to the mainstreamed public kindergarten in the following academic year but lack necessary skills to engage in activities independently were chosen to participate in this study. The children were trained to use the auditory prompt device to assist them in completing age
and developmentally appropriate activities. Performance on the number of steps children were able to complete independently for each task as well as the amount of time they were engaged in task completion was measured. A third, important variable measured was the amount of teacher behavior directed to the child in completing the assigned activity. This study was conducted in the child's classroom during the regularly scheduled center-time activity period.

It is the goal of this study to develop a strategy that will promote the development of independent work and play skills that will generalize to untrained activities. Furthermore, the generalization of skills necessary for children to engage independently in activities will help to ensure successful transition of these children into their next educational environment with their typically developing peers.

Research Questions

The following research questions will be addressed in this study.

1. Can preschool children with disabilities be trained to use a self-operated auditory prompt device to complete age and developmentally appropriate tasks?

2. What is the effect of the use of a self-operated auditory prompt device on independent choice and completion of
table time activities for preschool children with disabilities within the classroom?

3. What is the effect of the self-operated auditory prompt device on children’s active engagement in task completion?

4. What is the effect of the self-operated auditory prompt device on the percentage of teacher prompts during table time activities?

5. To what extent does independent task completion using the self-operated auditory prompt device maintain following training?

6. What is the effect of the removal of the self-operated auditory prompt device on maintenance of children’s independent task performance?

7. To what extent does independent task completion generalized to untrained tasks?

8. What are teachers opinions on the use of the self operated auditory prompt device?

9. What are children's opinions of the use of the self operated auditory prompt device?
Glossary of Key Terms

The following list of terms will be used throughout this investigation.

Activity center- an area within the preschool classroom which has been labeled and is designated for the completion of a particular set of activities which are typically found in preschool classrooms. For example the Block center is where the wood blocks and other appropriate toys used in block building such as toy cars, animals and people, are located; the Art center is where glue, paper, paint, scissors and other art supplies are located. Other centers include Dramatic Play, Housekeeping and the Table-time center which will be used for this study.

Idea Bunny- "Idea Bunny" is an age and developmentally appropriate plush animal, which is used to encase a miniature cassette recorder with voice actuation, to play scripted task tapes for the completion of activities.

Auditory prompt device- The combination of the Bunny, miniature cassette recorder with voice actuation, on/off remote pedal and task tapes which is used to prompt steps necessary for the completion of various activities.

Developmental disability- refers to conditions originating during the developmental years (before age 18) that may impede an individuals ongoing developmental progress (Peterson, 1987, p.150).
Engagement- The total duration of time a child spends in developmentally and contextually appropriate behavior (i.e. task completion).

Graduated Guidance- Bailey and Wolery's (1992, p.171) definition is used. The teacher begins each trial with the type and amount of prompt necessary, and as the child begins to perform the task the prompts are removed immediately. If the child stops or begins to perform incorrectly, the type and amount of prompts needed are immediately applied and withdrawn as appropriate. Reinforcement is provided if the child completed a minimal amount of the task correctly; reinforcement is not provided if the child resists at the end of the task.

Integration- refers to the extent the child with disabilities is included with his non disabled peers in school and in the community.

Independent Completion- The completion of either a step of a task or the completion of an entire task in the absence of experimenter prompts.

Least to Most Prompting- Bailey and Wolery's (1992, p.170) definition is used. The teacher uses a hierarchy of prompts ordered from least to most intrusive. On each trial, the teacher presents the target stimulus alone, and provides an opportunity for a response. If no response or an error results, the least intrusive prompt is presented as is an opportunity to respond. Again, if no response is forthcoming or an error occurs, the next most intrusive prompt is presented with an opportunity to respond. This process
continues until the child responds correctly. Reinforcement is provided, and the trial is terminated when the child responds correctly to any level of the hierarchy.
CHAPTER II
REVIEW OF THE LITERATURE

Independent engagement is a critical skill for both typically developing children and children with special needs. According to Lovitt (1973) "one of the expressed goals of the educational system is to create individuals who are self-reliant and independent" (p.139). Despite their importance, the systematic instruction of independent work skills is rarely a part of the curriculum. For children with special needs, the amount of time spent in table top activities tends to be a predictor of future success in kindergarten (McGee, Daly, Izeman, Mann, & Risley, 1991). Therefore, instruction to teach children with disabilities to choose, and complete activities in an independent fashion is educationally justifiable.

It is the goal of this study to directly teach children to independently perform tasks, through the use of a self-operated auditory prompt system. The extent to which this intervention is effective is dependent upon the maintenance and generalization of treatment effects to untrained tasks. Three dependent variables will be measured; engaged time, correct performance on
task completion, and teacher behavior. Accordingly, this chapter will review the following literature: (a) the relationship between time on task and achievement; (b) strategies that promote independent engagement and (c) the generalization of behavior change.

**Time On-Task and Achievement**

"Students learn by doing"


Relationships between time and achievement have been a primary focus of research in education for the past four decades (Brophy & Good, 1986; Fisher & Berliner, 1985; Shulman, 1986). For the purpose of this review two sources of research on children's use of time will be discussed. First are studies related to academic learning time (Fisher, Berliner, Marliave, Cahen & Dinshaw, 1980; Rosenshine, 1977). This line of inquiry has investigated achievement in reading and math with general education school-age children. The second source investigates the relationship between environmental dimensions of classrooms and engagement levels of preschoolers (Bailey & Wolery, 1992; Carta, Atwater, Schwartz & Miller, 1990; McWilliam, 1991; McWilliam, Trivette, & Dunst, 1985).

**Academic Learning Time**

Most inquiry on teaching effectiveness in the 1970's focused on the identification of correlates between teacher behaviors
(process) and student achievement gains (products) in math and reading. This paradigm is commonly referred to as the process-product paradigm (Dunkin & Biddle, 1974). Process-product research correlated instructional procedures directly with student achievement test scores (Smyth, 1985). One criticism of this paradigm is that it largely ignored the learning process itself (Shulman, 1986).

Shulman (1986) suggested that many researchers were dissatisfied with the delayed measures of process-product research, which were dependent upon end of year achievement tests. This dissatisfaction produced the mediating process-product paradigm which sought a mediating and explanatory variable to explain the link between process and product variables. The search began with the Beginning Teacher Evaluation Study (BTES) (Fisher, et al., 1980) which was conducted throughout the mid to late seventies. Results of the BTES lead researchers (Fisher, et al., 1980) to conceptualize a group of variables they labeled Academic Learning Time (ALT).

Academic learning time is a "time on task" variable that includes three elements: task relevance to criterion outcomes, engaged time, and success rate. Task relevance to criterion outcomes refers to the alignment between content and the goals of the instruction. The second element, engaged time is the amount of time with which the student is actively engaged with the lesson content. Engaged time does not include transition time, distractions, or interruptions which decrease the total time
available for instruction in a lesson (commonly called allocated time). The final element, success rate, represents the levels of success experienced by students. This element provides a simple indicator of the appropriateness and difficulty of the instructional material for the student. Academic learning time has been used to describe how teachers and students spend their time in classrooms and refers to that portion of the lesson when the pupil is involved with criterion materials at a success rate of generally 80% or more (Fisher, 1980). The BTES produced moderate correlation's between ALT and student achievement (Fisher, et al., 1980, Smyth, 1985). The results of the BTES study suggest that a student who spends more time actively engaged with a task at a high rate of success will learn more of the content of an instructional activity. The conclusions of the BTES researchers regarding the ALT variable and achievement closely support the earlier work of Carroll (1963) and Bloom (1976).

Environment and Engagement

For preschoolers with disabilities the focus of education is intervention. One of the goals of early intervention "should be to promote the child's engagement, independence and mastery" (Bailey & Wolery, 1992, p.33). Within the early childhood special education literature engagement has been defined as "the amount of time a child spends in developmentally and contextually appropriate behavior (McWilliam, 1991, p. 42). In an attempt to add a qualitative component to the definition of engagement, Bailey and Wolery (1992), propose a reconceptualization of engagement as the
amount of time children spend interacting with the environment at different levels of competence. Five levels are proposed: (a) non-engagement, (b) transient engagement, (c) undifferentiated engagement, (d) elaborative engagement and (e) sustained engagement.

The literature on the relationship between engagement and achievement gains for young children with disabilities is small but growing. Research thus far, has primarily focused on the assessment of future educational environments through the use of surveys or questionnaires (Allen, 1980, Fowler, 1982; Vincent et al., 1980). The results of surveys and questionnaires suggest that children's ability to engage in activities independent of teacher direction was identified by teachers as critical to success in the mainstreamed kindergarten classroom (Carta et. al., 1988; Fowler, 1982; Hains et. al., 1988).

Descriptive analyses comparing special education preschool settings and regular education kindergarten settings have supported the independent engagement as a critical skill for success in kindergarten. Several researchers have concluded that children in the regular education setting are expected to perform tasks with little teacher attention (Carta, et al., 1988; Carta, et al., 1990; McConnell & Palley, 1987; Rosenkoetter, 1990, Sainato & Lyon, 1989).

Researchers have recently begun to move from the identification of variables related to school success to the investigation of interventions to prepare children with disabilities
for success in the mainstreamed kindergarten setting (Carta, et. al., 1990; Hains, 1992; Rule, Fiechtl & Innocenti, 1990). Research programs have focused on teaching preschool children with disabilities survival skills that were identified through previous research (Hains et al., 1988; Hains et al., 1989; Vincent et al., 1980). Rule et al. (1990) developed a Skills for School Success curriculum to teach generalized skills through nine specific activities. One of these activities involved instruction (i.e. prompts and praise) for children to completed the skill components for the completion of sequenced individual tasks. The components taught included: (a) check posted pictorial list of tasks, (b) go to the work area within 1 minute, (c) select the correct materials, (d) return to your seat, (e) complete the task, (f) return the materials to the appropriate place and, (g) go on to the next task or return to your seat. Of the 18 four and five year old children, across three research sites who participated in this study, 16 mastered the skill components for sequenced individual tasks. Follow-up data suggest that children transferred their independent work skills to their kindergarten classrooms.

Carta et al. (1990) conducted a comparative analysis of special preschool and kindergarten environments using the Ecobehavioral System for the Complex Assessment of Preschool Environments (i.e. ESCAPE). In general, an ecobehavioral analysis is used to answer two questions (a) what student behaviors are most likely related to developmental gains and, (b) which ecological variables set the occasion for children to engage in behaviors that
result in developmental gains? The results of the analysis lead to the development of a program focused on teaching three specific skills: (a) completing within-class transitions, (b) participation in large group instruction and (c) working independent of teacher prompts. Results of this program indicate that the children increased their group participation and increased engagement in task completion with lower rates of teacher prompts.

One common variable shared by research investigating preschool and kindergarten environments is the importance of independent work and play skills. A strong case has been made for an emphasis on the preparation of children with disabilities to engage in tasks independent of teacher attention. Independent work/play skills will not only prepare children for success in kindergarten but will also assist in preparing them for continued success in later grades and in life. McWilliam (1991, p. 43) summarized the advantages of programming for high levels of engagement.

engagement promotes learning, since both children's time spent in simple interactions with the environment and the natural teaching that should enhance these interactions provide optimal opportunity for response differentiation. Second, engagement prevents or reduces behavior problems and provides opportunities for more effective, less aversive contingencies. Third, a focus on engagement addresses our humanitarian obligation to promote a high quality of life through interesting and appropriate environments.
In short, increased levels of engagement will result in increased opportunities for children to make responses. The preschool years provide a limited period of time in which to teach the fundamental skills to prepare children with disabilities for success in kindergarten and throughout life. The development and use of methods which foster independent child engagement are a necessity if transition to less restrictive environments is the goal.

Thus two disparate literature's (a) the mediating process-product paradigm and (b) research seeking a relationship between classroom environment and engagement levels of preschool children, provide convincing evidence in favor of increasing the opportunity to respond by either by increasing academic learning time and/or by changing the environmental stimuli.

**Self-Monitoring Strategies**

One skill necessary for children's successful functioning in school, and ultimately in society is the ability to perform certain tasks in an independent fashion (Sainato, et al., 1990, p. 540). An effective tactic fostering independent child engagement involves the development of self-monitoring skills. Self-monitoring including, self-assessment, self-monitoring, and self-evaluation, has been the most widely used and studied self-management strategy (Cooper, Heron, & Heward, 1987).

Self-monitoring was originally used as a data collection technique in which the client collected data on target behaviors that only he could observe. The self-monitoring process requires the individual to observe his own behavior, discriminate between
the occurrence and non-occurrence of the target behavior and then record the frequency and/or extent to which the target behavior occurred. The result of collecting data on oneself often produces a reactive effect in which the behavior is changed in the desired direction. This has resulted in the use of self-monitoring as an intervention strategy for behavior change.

A variety of self-monitoring strategies have proven effective with elementary school children with disabilities (Thomas, 1976; Holman, & Baer, 1979; Hallahan, Marshall, & Lloyd, 1981; Hallahan, Lloyd, Kneedler, & Marshall, 1982; Rhode, Morgan, & Young, 1983). Recently, strategies used with elementary school children with and without disabilities were adapted for preschool children with disabilities. Sainato et al. (1990) demonstrated the use of a self-evaluation package, with preschool children with disabilities to increase independent activity completion and active engagement. Four children, ages four to five, who were identified as autistic, and enrolled in an integrated preschool setting were taught to assess their performance on activity completion during a table time activity following training in the use of a self-evaluation package. The children were taught to mark a "happy face" for each component of the activity they completed successfully and a "sad face" for each step they were unsuccessful. Children were able to select a small toy or sticker when they correctly matched the teacher for seven of the nine evaluation questions for each activity. After children were able to correctly self-assess teacher feedback was then removed and the children continued to self-
assess accurately. Results indicate that the children's appropriate behavior was originally maintained by high levels of teacher prompting. Prior to intervention when the teacher decreased the amount of direction to children during activity completion the level of appropriate behavior dropped to unacceptable levels. The self-evaluation package significantly improved child behavior and teachers were able to maintain children's appropriate behavior with minimal intervention. These results have been systematically replicated across various populations of young children in a study of generalized outcomes in the use of self-evaluation programs for not only independent child engagement during activities (Sainato, Cavenaugh & Fumich, 1992), but for social behavior of children with disabilities (Sainato, Goldstein & Strain, 1992).

Although self-evaluation tactics prove promising for promoting independent child engagement, teachers who reviewed descriptions of interventions recommended the development of a strategy that would enable children to engage independently in activities which were typically presented in independent activity centers. Such a strategy may be found in research that has focused on the transfer of stimulus control from prompts presented by the teacher to self-regulated prompts by the student.

Transfer of Stimulus Control Strategies

From a behavior analytic perspective, behavior is occasioned by the occurrence or presentation of a stimulus. The extent to which a stimulus exerts control over a behavior is said to occur when a change in a particular property of a stimulus produces a
change in some response characteristic, such as the rate or probability with which a response occurs (Rilling, 1977). In short, a particular behavior is more likely to occur in the presence of one stimulus rather than another.

In the special education preschool classroom an example of stimulus control is the presence of the teacher which is necessary to occasion the engagement of children in activity. Consider the following situation; a teacher in a preschool class for children with disabilities announces that each child can choose an activity center to play in. Alex, a four year old child with developmental disabilities stands in front of the teacher until she says "Alex, where do you want to play today?" Once Alex has chosen the puzzle area, with the teacher's help, he does not independently engage in selecting and completing a puzzle. Instead, he waits until the teacher approaches him and prompts him to select a puzzle. Alex begins to work on the puzzle, however, each time the teacher leaves his side to attend to another child he stops working. During this play session the teacher goes back to prompt Alex several times to "keep working" until he has finished putting the puzzle together. This type of situation occurs frequently in special education preschools. Often children with disabilities have the skill to complete a task accurately, however they fail to perform the necessary responses to complete the task in the absence of teacher prompts. Despite the need for independent work skills for success in kindergarten, preschool children with disabilities are
rarely taught or expected to function with minimal teacher assistance (Rule, et al., 1990).

Two strategies that have been used to shift the source of stimulus control away from teachers to students are the use of picture cues and the use of auditory prompts (Alberto, Sharpton, Briggs & Stright, 1986; Briggs et. al., 1992). The use of these strategies involves the regulation of antecedent stimuli which provides the ultimate benefit of enabling individuals who previously relied on others to perform tasks to develop a degree of self-control.

Picture Prompt Strategies

Various picture prompt strategies have been used to assist adults with mild to severe disabilities to perform independent of on-going trainer assistance on vocational tasks (Connis, 1979; Sowers, Rusch, Connis & Cummings, 1980; Wacker & Berg, 1983; Wacker & Berg, 1984; Wacker & Berg, 1984); daily living skills (Spellman, DeBriere, Jarboe, Cambell, & Harris, 1978; Thinesen & Bryan, 1981; Martin, Elias-Berger, & Mithaug, 1987) and food preparation tasks (Johnson & Cuvo, 1981; Martin, Rusch, James, Decker & Trtol, 1982). In general, picture cues provide a step-by-step pictorial sequence of steps for the completion of a specific task.

Auditory Prompt Strategies With Adolescents and Young Adults

The need for an alternative antecedent regulation strategy has prompted the use of auditory prompts for the completion of a variety of functional tasks. A recent application of the regulation
of antecedent cues and the transfer of stimulus control is found in the use of self-operated auditory prompt strategies. This strategy requires the use of a tape recorder and cassette tapes which provide scripted step-by-step directions for the completion of a specific task. A number of studies have been conducted in which self-operated auditory prompt devices have been used to provide cues which facilitate instruction, generalization, and maintenance of self-care, domestic and vocational skills of individuals with a variety of special needs.

Alberto et al. (1986) investigated an alternative approach, from picture cues, for teaching students to perform tasks, through the shift of stimulus control from the teacher to a self-operated auditory prompting device. These investigators conducted a study in which three adolescents with severe disabilities were trained to complete two of three activities; a vocational assembly task, the use of a washing machine and/or a food preparation sequence, using a miniature cassette recorder with tape recorded instructions. Instruction for each of the tasks was conducted in the school setting most appropriate for the task. A multiple baseline design across tasks for each subject was used to demonstrate the effectiveness of the auditory prompt strategy.

The students progressed through four phases for each task: baseline, acquisition, faded assistance and maintenance. During baseline, in the absence of the auditory prompt device, students were unable to complete the activities independently. Following a brief introduction of the steps necessary to complete the task, as
well as feedback to correct performance errors, each student attained mastery for their respective tasks during the acquisition phase. The third phase involved the elimination of the instruction, on the task steps asking the student to call the teacher to evaluate his/her work. Additionally, latency between directions were adjusted to allow for the completion of the tasks with a range of time that a non disabled person would need to complete the task. Performance maintained a 90-100% level. In the final phase of the study students returned to baseline conditions in which only an initial cue to complete the task, was provided in the absence of the prompt system. Students continued to complete the tasks at a high level of competency at the end of 2 week and 8 month probes.

Subsequently, in 1990, Briggs, et al. used a multiple baseline design across settings and tasks to demonstrate the generalized use of a self-operated auditory prompt system on the mastery of similar and dissimilar domestic tasks in same and different environments. Students were trained at 100% mastery to operate a walkman-type tape player with headphones. Training was then initiated for the completion of the first task. When the student met the criterion of 80% correct completion of the task, independent of teacher help for three consecutive sessions, phase two of the study began.

Phase two consisted of training the first task in a second setting. Once the criterion (80% correct completion of the task, independent of teacher help, for three consecutive sessions) was met, two baseline probes were conducted on the second task in the
first setting. During the final phase a task which was motorically similar to the first was trained. Following training, task performance was maintained with continued use of the auditory prompt system at a level of 100% correct completion for up to four weeks. Self-management and self-correcting skills were developed through the use of self-evaluation questions throughout the scripted tape recorded task instructions. In conclusion, students were able to generalize the use of the prompting device to new tasks, and settings, however, training was necessary for the mastery of skills to complete each task in each setting.

Schultz (1991) also successfully taught three teenage boys with developmental delays to complete domestic tasks using a self-operated audio prompting device. A multiple baseline design across behaviors was used to demonstrate the effects of a self-operated auditory prompting device on the mastery and the maintenance of task completion. This study measured the number of steps from a specific task analysis that the student performed independently. Tasks included washing windows, dishes, and clothes. Results show that students learned to complete two of the three tasks independently. Furthermore, students maintained their performance of the daily living tasks without the auditory prompt device at 100% criterion.

Trask, Grossi & Heward (1994) completed a study in which three young adults with visual impairments and developmental disabilities were taught to prepare three different recipes using an auditory recording with a self-operated on-off remote control
switch. A multiple baseline design across behaviors was used to determine the extent to which the students learned to follow trained recipe recordings and the generalization of trained skills to untrained recipes requiring similar preparation steps to those which were used in trained recipes. Results indicate that all of the students were successfully taught to use the audio prompt system. Additionally, all of the students generalized their recipe making skills to similar untrained and more complex recipes.

Two general conclusions can be drawn from the studies using auditory prompting devices with adolescents and young adults. First, for adolescents and adults with moderate and severe disabilities the use of self-operated auditory prompting devices have proven successful in the reduction of trainer support for the completion of a variety of independent living skills. Second, the acquisition of new skills is a necessary aspect of task completion which has been positively effected by the use of an auditory prompting device. The issue of fluency has not been addressed with adolescents or young adults.

Davis, Brady, Williams and Burta (1992) recently extended the use of a self-operated auditory prompting system to investigate its influence on performance fluency. A multiple baseline design across participants was used to demonstrate the effect of the auditory prompting intervention. Three young adults who exhibited a range of disruptive behaviors at previous job sites, and in the classroom participated in the study. Each participant was provided a Sanyo stereo cassette recorder and headphones.
Each participant selected a favorite music tape to listen to while they either dried and lined up trays or filled salt and pepper shakers. The experimental conditions included (a) baseline without music (b) baseline with music, (c) auditory prompt intervention. During baseline without music all participants performed their respective vocational task without music or prompts. In the baseline with music condition the music was available and uninterrupted throughout task completion. For the final condition prompts on such as "keep working" for all participants and an additional prompt to one of the participants, Steven, to decrease stereotypic behavior, were interspersed on a variable interval schedule throughout the music tapes. For each participant the schedules of auditory prompts differed (i.e., 30 sec, 18 sec, 7 sec or 2 minutes of prompts/three minutes no prompts). In conclusion, auditory prompts were successful in increasing the task fluency of all three participants with greater degrees of fluency occurring during richer schedules of prompts (i.e. 7 and 10 seconds).

The Davis et al. (1992) study differs from previous studies using auditory prompting in that the intervention involves the presentation of prompts to keep working rather than a script of the steps necessary to complete a specific task. The added dimension of fluency is an important variable that should be investigated further in light of the current emphasis in the education toward the normalization of behavior.
Summary

Previous studies using auditory prompting devices with adults and adolescents across a variety of settings and tasks have proven successful. This success has led to further investigation and application to studies with young children with developmental disabilities.

Auditory Prompt Strategies with Young Children

The adaptation of auditory prompting strategies to preschool age children required the development of a device which was age and developmentally appropriate. Therefore, studies using self-operated auditory prompting devices for children have presented these devices in the form of a bunny and a puppy.

Brandt, Sainato & Ward (1992) conducted a study in which they applied the use of an auditory prompting device to increase independent table-time activity skills of preschoolers with developmental disabilities, during a regularly scheduled independent table-time activity period each morning. Four children, in an urban, public, special education preschool classroom were taught to operate an auditory prompting device which consisted of a compact cassette recorder placed inside a Duplo Bunny (a stuffed animal with a hollow cavity in the body) with an on-off remote pedal extending from the recorder and placed on the table in front of the child and bunny. A multiple baseline design across four preschool children with disabilities was used to demonstrate the effects of the self-operated auditory prompting device on children's performance during task completion. The
results of this study indicate that following training to use the auditory prompting device, all of the children significantly increased the extent to which they independently completed the steps of each task. Further evidence of the effects of this intervention are indicated by significant increases in the amount of time children were actively engaged and significant decreases in the amount of time the teacher provided prompts to children to attend to the assigned task. More importantly, for all of the children, independent engagement was maintained following the removal of the auditory prompting device.

In 1993 a second study was conducted using a similar device (i.e. "Idea Pup") with preschool children with developmental disabilities (Stemley, 1993). This study was conducted in an urban private non-profit preschool program for children with special needs. Three children with developmental disabilities who were unable to independently engage in or complete table-time activities were taught to complete tasks through the use of the auditory prompt strategy that Brandt, Sainato and Ward used in their 1992 investigation. This study resulted in less significant increases than those obtained in the Brandt et al. study. For two of the children, intervention produced little change in the number of steps completed independently, child engagement or teacher prompting. For a third child, Meg intervention resulted in significant increases in child engagement and the percentage of task steps completed independently. Child engagement increased from a mean of 59% during baseline to a mean of 87% during
intervention. Child engagement maintained at 83% following intervention. The number of independent steps Meg completed increase from a mean of 59% to a mean of 73% following training to use the auditory prompting device. During maintenance Meg performed a mean of 97% of the task steps independently. The experimenter reported that the two children who made no improvement in their independent work skills were not under instructional control. Stemley (1993) concluded that the ability to listen to and follow direction are critical prerequisite skills to benefit from use of "Idea Bunny".

In conclusion, these studies provide evidence that preschoolers can learn to use self-operated auditory prompting device to complete tasks and to increase child engagement. However, preliminary studies on the adaptation of auditory prompting with preschool children with disabilities leave many important questions focusing on the issue of generalization.

**Generalized Outcomes**

One of the primary goals of early intervention is to "provide services in a way that ensures that children will be able to use what they have learned (Bailey & Wolery, 1991)". This goal refers to the generality of behavior change. Stokes and Baer (1977) have defined the concept of generalization as:

the occurrence of relevant behavior under different, non training conditions (i.e. across subjects, settings, people,
behaviors, and/or time) without the scheduling of the same events in those conditions. Thus, generalization may be claimed when no extra training manipulations are needed for extra training changes; or may be claimed when some extra manipulations are necessary, but their cost is clearly less than that of direct intervention. Generalization will not be claimed when similar events are necessary for similar effects across conditions. (p. 350)

Historically, generalization was thought to be a passive phenomenon (Stokes & Baer, 1977) resulting from a failure to discriminate (Skinner, 1938, 1953). An increase in the importance of generalization, as an outcome of intervention, began with the start of applied behavior analysis, and the publication of Baer, Wolf, & Risley's article (1968) defining the dimensions of applied behavior analysis. Included as a defining characteristic is the generality of behavior change. Today the generality of behavior change continues to be recognized as a defining characteristic of applied behavior analysis (Baer, Wolf, & Risley, 1968), as well as a primary goal of intervention. The importance of generality has become an ongoing challenge of applied behavior analysis resulting in efforts to develop a technology of generalization (Stokes & Baer, 1977)

Research focusing on the generality of behavior change has resulted in two clear findings. The first is that children with disabilities often do not generalize well (Bailey & Wolery, 1992, p. 47). Failure to learn from casual interactions with the environment or failure to generalize behavior change results in the need for direct intervention to teach specific target behaviors.
Once the target behavior has been identified a behavior change program is developed. According to Cooper et al. (1987, p.553) for behavior change to be truly worthwhile and effective, it must last and be useful to the child in different settings and in various ways. Though the importance of generalized outcomes is widely accepted, it is not always realized that generalization does not occur automatically (Stokes & Baer, 1977). Baer (1981), stated this fact clearly when he said "no one learns a generalized lesson unless a generalized lesson is taught". It is not enough for the child to emit the behavior with his teacher in his special education preschool classroom. He must emit the behavior in a variety of ways with different people and under different conditions, if the behavior change is to be a functional skill. For preschool children with disabilities, changes made prior to transition to the typical kindergarten setting must be programmed for generalization.

Second, research on the generality of behavior change has produced a number of strategies that can be used to help promote generalization (Stokes & Baer, 1977; Bailey & Wolery, 1992). These strategies include: (a) aiming for natural contingencies of reinforcement; (b) teaching enough examples; program common stimuli; (c) train loosely; (d) use indiscriminable contingencies, and (e) teach self management techniques.

In conclusion, the importance and need for programming for generalization is clear. In an effort to ensure the maintenance and transfer of behavior change to untrained conditions we must incorporate proven strategies, to promote generalization, into
interventions used to teach target behaviors. "If our knowledge of effective instructional procedures is to have any real impact on the performance of handicapped students in regular education classes, we must ensure that the skills learned in special education will transfer to regular class settings" (Anderson-Inman, Walker, & Purcell, 1984, pp. 17-18).

Summary of Literature Review

The passage of PL. 99-457 young children with disabilities won the right to a free appropriate education in the least restrictive environment. Over the past ten years a number of researchers have written about the transition and inclusion of young children with disabilities. With a focus on inclusion researchers have attempted to identify those skills which are crucial for children to succeed in Kindergarten and later school years. Research has identified the ability to work in an independent fashion as a critical skill for success in the regular classroom setting.

Research has also found that young children with disabilities may be deficient in their ability to select and engage in activities independent of teacher prompting. Many children who have the skills to complete a task correctly remain dependent upon the teachers prompt to remain engaged in task completion. Researchers have begun to develop strategies to teach children the necessary "survival skills" for success in kindergarten. Additionally, strategies used with adolescents and adults to teach
independent work skills have been adapted for use with preschool children with disabilities.

This chapter reviewed three areas of literature: (a) time on task and achievement, (b) transfer of stimulus control, and (c) generalized outcomes. First, the relationship between time on task and achievement was reviewed to establish the rational and basis for the development of a strategy to increase preschool children's engagement in task completion. Second, transfer of stimulus control using the relevant behavioral strategies involved in the use of educational tactics such as picture prompting and auditory prompting. The review of studies using auditory prompting devices with adolescents and young adults provided the impetus for "Idea Bunny" which is an age and developmentally appropriate adaptation for preschool age children. Finally, early intervention researchers in applied behavior analysis has established the importance of programming for generalized outcomes. For intervention to be successful to be considered effective it must result in behavior change that maintains and generalize to different stimulus conditions that were not a part of training.
CHAPTER III

METHOD

This section describes the research methodology and methods of data analysis used to answer the experimental questions. Included in this section are descriptions of the participants, setting, procedures, research design, dependent variables and their measurements, as well as a list of materials.

Participants

Four preschool children with developmental disabilities, age 4 to 5 years, who were enrolled at a private nonprofit urban preschool for children with disabilities, participated in this study. Each child exhibited delays in one or more areas of development. Selection for participation was based upon several criteria; a) low levels of engagement and independent performance on activities, b) the ability to follow one step directions, c) the absence of severe behavior problems, d) the absence of hearing deficits, and e) a history of consistent attendance at school. Additionally, each of the participating children have been targeted to transition into a less restrictive public kindergarten environments during the following academic year.
Permission slips and release of information forms were sent to the parent or guardian of each of the target children detailing the intent of the study and providing background information about the investigator (See Appendices A, and B). All signed permission slips were obtained prior to the start of data collection.

**Child 1- Isabel**

Isabel was a 49 month old female with developmental disabilities who began receiving special education services in autumn 1992 at a county half-day preschool program. Initial testing identified significant language, social and cognitive delays. In 1993 Isabel transitioned into the full day special education program at a private nonprofit urban preschool. The Battelle Developmental Inventory (Newborg, Stock, Wnek, Guidubaldi & Svinicki, 1988) was administered in May of 1994 to provide information on Isabel's current level of functioning. Test results place Isabel at the developmental age of 36 months. Subtest scores ranged from 27-45 months. See Table 1.

Isabel typically engaged in inappropriate behavior when expected to complete a task independent of teacher prompts. Isabel required 2 to 3 prompts to choose the appropriate materials, and would often exhibit behavior which resulted in escape from the task by asking questions, standing on her chair, crawling on the floor or stating that she didn't want to or couldn't complete the task.
Table 1.
Child Demographic Information

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<tr>
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Note: All scores and ages given in months and based on the Battelle Inventory of Early Development (1988).
Child 2- Derek

Derek was a 55 months old male, with developmental disabilities who had received special education services at a private nonprofit urban preschool since the age of 27 months. Upon entrance into the preschool, testing identified delays for Derek in the areas of self-help, language and adaptive behavior. Additionally, Derek was reported to be very non-compliant and resistant to following directions. Because no previous testing information was available for Derek, The Battelle Developmental Inventory (Newborg et al., 1988) was administered in May of 1994 to provide information on Derek's current level of functioning. Test results place Derek at the developmental age of 46 months. Subtest scores ranged from 38-63 months. See Table 1.

Direct observations of Derek supported teacher reports of frequent non-compliance with academic tasks. Derek would choose toys and engage in appropriate play with his peers in the absence of teacher prompts, however, when asked to complete tasks involving challenging materials Derek often refused to engage in the activity or gather the appropriate materials, arranged them on the table and then immediately put them away before attempting to complete the task. The teacher nominated Derek to participate in this study because of his behavior as well as the fact that at the end of this academic year he was to transition into a kindergarten classroom for children who are typically developing.
Child 3- Emma

Emma was a 55 month old female with developmental disabilities. Emma has received early intervention services since 1991. Previous testing indicated language, motor and cognitive delays. Additionally, Emma has a history of behavior problems including non-compliant and aggressive behavior. In autumn of 1992 Emma entered the full day special education program at a private non-profit preschool. Following selection to participate in this study, The Battelle Developmental Inventory (Newborg et al., 1988) was administered in May of 1994 to provide information on Emma’s current level of functioning. Test results place Emma at the developmental age of 37 months. Subtest scores ranged from 17-57 months. See Table 1.

Emma frequently sought the attention and affection of adults. Her affect was usually unexpressive and she rarely smiled. During free-play Emma typically chose the quiet area with books, puzzles and tapes. Often, when provided with novel activities she selected these tasks. Direct observations support teacher reports of Emma’s dependence upon teacher prompts in following directions to complete art or pre-academic activities requiring her to follow specific directions. Frequently, during independent table-time activities Emma engaged in inappropriate behavior (e.g. eating glue and paint, pinching or biting a peer; taking a peer’s materials) that drew the teacher’s attention and resulted in reprimands or time out from the activity. Emma was to transition to kindergarten in the fall of 1994. The exact placement had not been decided.
Child 4- Andre

Andre was a 65 month old male with mild-moderate mental retardation who has received special education services since 1989. Since autumn 1991 Andre had received services through the full day special education preschool program at private nonprofit urban preschool. Following selection to participate in this study The Battelle Developmental Inventory (Newborg et al., 1988) was administered in May of 1994 to provide information on Andre's current level of functioning. Test results placed Andre at the developmental age of 32 months. Subtest scores ranged from 14 to 29 months. Andre presented delays in all developmental domains. See Table 1.

Classroom observations by the investigator, supported teacher reports that Andre typically engaged in parallel play, and usually chose the housekeeping area or the toy cars and trucks during free-play. He communicated with his parents, teachers and peers using single word statements, noises and gestures. Andre was very dependent upon teacher attention. He required several verbal and physical prompts to complete each step of simple art or small group activity. When asked to engage in independent tasks, he frequently left the work/play area or engaged in aggressive behavior toward a peer. Teachers reported that they did not expect Andre to learn to work independent of teacher prompts, but supported his participation in the study. In the fall of 1994 Andre will transition into a public kindergarten classroom for children with developmental handicaps.
Investigator

The investigator, a doctoral candidate in Applied Behavior Analysis and Special Education at The Ohio State University has 10 years of experience working with individuals with special needs ranging from infants to adults. Her past two years of research and study has concentrated on issues related to the education and preparation of young children with disabilities for transition to a less restrictive educational environment with their typical peers.

Research Setting

This study was conducted in a non-profit urban preschool located in a large midwest city. The preschool center provides curriculum based instruction for over 70 children ranging in age from 2 to 6 years. In addition, the center enrolled typically developing peers in an effort to provide integrated programming options. Each classroom contained approximately eight children with special needs and four typically developing peers.

This study was conducted in the children's special needs classroom between 9:30 am and 11:00 am, Monday through Friday, during the regularly scheduled center-based activity period. Children typically engaged in activity centers such as art, blocks, cars and trucks, housekeeping, sensory stimulation and art during this period of the day. A classroom routine had been established in which children choose an activity area, and were expected to engage in the activity independent of teacher prompts for a predetermined period of time (i.e., 10 - 15 minutes), before moving to another area. After children chose an area they indicated their
choice by placing a name card in a pouch located at the activity center. See Figure 1.

An activity center containing table top activities such as sorting, counting bears, and shape matching was created within the classroom. This activity center was clearly marked with a sign with the words "Magic Circle". A line of colored tape was placed on the floor in a semicircle to indicate the boundary of the "Magic Circle" area. Children were instructed that only one child is allowed in the "Magic Circle" at a time. A child sized table and chair was placed in the center, for use during the activity. An adjacent book shelf contained all of the necessary activity materials (See Figure 2). This activity center was use for the completion of both trained and untrained (generalization) activities. The activities chosen for this study were typical of those considered to be a part of the preschool curriculum.

**Definition and Measurement of Dependent Variables**

The focus of this study was to teach young children with disabilities to perform independently during table time and learning center activities. Development of these skills may promote successful transition and inclusion into the regular education setting with typically developing peers and ensure children's successful learning experiences.

**Types of Data Collected**

Three dependent variables were measured: (a) the number of steps performed independently based on a specific task analysis of the activity, (b) the number of intervals the child spent in active
Figure 1. Environmental Arrangement of Preschool Classroom
Figure 2. The "Magic Circle" with Idea Bunny as it was placed on the table in the Classroom.
task completion, (c) the number of teacher prompts given to the child as she completes the assigned task.

Activities were selected for each child dependent upon the child's current skill repertoire, Individual Education Plan (I.E.P.), teacher recommendations and direct observations.

Number of steps performed independently. For each of the tasks in which the child engaged during this study, a task analysis was developed. Each of the task analyses were developed through direct observation of both children with developmental disabilities and same aged typically developing peers. Each task was broken down into the necessary component steps for correct completion of the activity. A sample task analysis is presented in Figure 3. These steps were incorporated into the task analyses and used in the development of tape recorded task scripts. The task scripts were presented to four typically developing peers of the same age as the target children, who have mastered the skill, to determine the validity of the task analysis. Based upon observations the wording of the scripts were altered, revised and retested. The task analysis was then used to develop the tape recorded script. Figure 4 presents the task script for a bear count activity. See Appendix C for each of the task scripts used to develop the audio tapes.

The total number of steps completed as well as the level of independent performance was determined by counting the number of steps marked on the data sheet, by the observer. The level of independence (i.e., prompt level) was coded as: (a) Independent, the
Bear Count

1. Choose the counting tray and basket of bears from the shelf
2. Take both items to the table
3. Turn the tray so the numbers are seen
4. Read the number and match bears to the dots on the counting tray
5. Count that number of bears into the cup
6. Put the bears back into the basket
7. Return the counting tray and the basket of bears to the shelf

Figure 3. Task analysis for the bear count activity
Bear Count Script

Hello my friend! I am happy you came to see Idea Bunny today? Today we are going to have fun counting bears. Go to the shelf and find the basket of bears and the counting board. Bring both items back to the table (BEEP). Great you brought the counting board and the basket of bears back to the table. Now look at the counting board you will see the different colored numbers and dots. Match the bears to the dots under the numbers and count the bears into the cup. Keep working until you have counted bears into all of the cups (BEEP). Way to go! When you have finished counting bears into each cup put the bears back into the basket (BEEP). OK. Now that all of the bears are back in the basket stand up stand up and carry the basket of bears and the counting board back to the shelf where you got them (BEEP). Wonderful! Now that you are finished with your work raise my ears and put them together so the teacher will come to check your work. I had a great time playing with you today. See you again soon. (BEEP)

Figure 4. Task Script for bear count
completion of the step in the absence of teacher prompts; (b) Verbal Prompt, the completion of a step following a verbal prompt by the teacher (e.g., "where does this piece go?"); (c) Gestured Prompt, the teacher modeled the step and then gives the child an opportunity to imitate the same behavior (e.g., the teacher picks up the bears, matches them to the dots, removes the bears and lets the child match the bears to the dots); (d) Physical Prompt, hand over hand the teacher guides the child in completing the step (e.g., teacher places her hand on the child's together they pick up the bear and match it to the dot), or (e) Incomplete or No Response, the child fails to complete the step or does not respond to teacher prompts and does not complete the step. Figure 5 provides an example of the data collection sheet used to code the child's level of independence in completing each step of the task.

Child engagement. Independent work skills included both appropriate child engagement in the assigned task and the absence of teacher prompts. Child behavior was measured using a continuous 5 second partial interval recording system. A cassette recorder with earphones, and a tape of five second intervals which were designated by a beep, was used to indicate to the observers when behavior is to be recorded. A data collection sheet was used to record both teacher and child behavior for each 5 second interval (See Appendix D). Child behaviors recorded included on-task, off-task, waiting or disruptive behavior.
**INDEPENDENT STEP COMPLETION DATA COLLECTION SHEET**

Total # of Independent Steps _____ % Independent Steps _____

Child Name: ___________________________ Date: ____________

Trainer: ________ Data Collector: ________ IOA: ________

Condition: With / Without Auditory Prompt System

Baseline / Training / Maintenance / Generalization

Code:

I = Independent
V = Verbal Prompt
M = Modeling
P = Physical Prompt
N = Incorrect, No response, or Refused

**Bear Count**

- Pick the counting tray and bears from the shelf  I  V  M  P  N
- Take both items to the table  I  V  M  P  N
- Turn the tray so the numbers are seen  I  V  M  P  N
- Read the number and count the dots on the counting tray  I  V  M  P  N
- Count that number of bears into the cup  I  V  M  P  N
- Put the bears back into the basket  I  V  M  P  N
- Return the counting tray and bears to the shelf  I  V  M  P  N

Figure 5. Data collection sheet for task completion
Child Behaviors

On-task behavior. On task behavior represented child engagement and was defined as the child's appropriate active engagement in task completion. On-task behavior in this study is described below in three categories as: (a) attention to instruction or task, (b) management, and (c) work behavior. The following statements describe attending behaviors that are on-task:

1. The child's eyes are directed at the teacher's face when the teacher is giving oral instructions or directions to the child, or
2. The child's eyes are directed at the task on the table when the teacher is explaining or modeling the task, or
3. The child's eyes are directed at the auditory prompt device giving direction to complete a step in the sequence of an activity, or
4. The child's eyes are directed at the auditory prompt device giving an instruction for the completion of the next step of the activity, and
5. The child's on-task attending must occur for the majority of the interval.

The following statements describe management behaviors that are on-task:

1. The child walks directly to the task materials shelf immediately following the teacher or the auditory prompt device's direction to do so, or
2. The child sits at the table and with her eyes directed toward the auditory prompt device and pushes the on/off pedal to
hear the next step, within two consecutive intervals of observations of the child, or

3. The child walks directly back to the table and places the task materials on the table, or

4. The child walks directly to the task material shelf and returns the task materials to the shelf, or

5. The child is walking in a direction to leave the magic circle after having been excused from the table.

The following statements describe work behavior that is on-task:

1. The child's eyes are directed toward the task on the table that he or she is working on for the majority of the interval, or

2. The child is actively and appropriately ("appropriate" work behavior will be defined for each task prior to starting this study) manipulating the task for the majority of the interval, and

3. The child does not need to be sitting in his chair with feet on the floor provided he meets the other on-task qualifications.

4. Comments or questions by the child, related to the table task, directed toward the investigator are appropriate on-task behaviors.

5. Non-disruptive talk to herself or the auditory prompt device is coded as on-task.

**Off-task behaviors.** Off-task behavior is defined as any behavior that does not involve appropriate active engagement in the task. Off-Task behavior is described below as three distinct categories of behavior: (1) attending, (2) management, and (3) work
behaviors. The following statements describe attending behavior that is off-task:

1. The child's eyes are directed away from the teacher's face when the teacher is giving oral instructions or directions to the child, or

2. The child's eyes are directed at the task on the table when the teacher is explaining or modeling the task, or

3. The child's eyes are directed away from the auditory prompt device when the auditory prompt device is giving a prompt to completes a step in the completion of an activity, or

4. The child's eyes are directed away from the task on the table while the auditory prompt device is giving a prompt for the completion of the next step of the activity, and

5. The child is off-task for the majority of the interval.

The following statements describe management behavior that is off-task:

1. The child does not walk directly to the Magic Circle area following the teachers direction to do so, or

2. The child does not walk directly to the task materials shelf immediately following the teacher or the auditory prompt device's direction to do so, or

3. The child takes longer than two consecutive intervals to push the on/off pedal to hear the next step following the completion of the previous step, or

4. The child does not walk directly back to the table and places the task materials on the table, or
5. The child does not walk directly to the task material shelf and return the finished task materials to the shelf, or

6. The child does not leave the magic circle area within two consecutive intervals after being excused.

The following statements describe work behavior that is off-task:

1. The child's eyes are directed away from the task on the table that he or she is working on for the majority of the interval, and

2. The child is does not appropriately manipulate the task materials for the majority of the interval (e.g. The child is to count bears into cups but instead is holding two bears and having them talk to each other), or

3. The child is out of her seat and does not meet the other on-task qualifications listed above.

4. The child leaves the magic circle area without permission and fails to return after two consecutive intervals.

Waiting behavior: Waiting indicates any behavior which takes place while the child is waiting for the teacher intervention in response to a problem or question related to the completion of the activity. The statements below describe waiting.

1. A child's behavior cannot be coded as "waiting" (W) until he has first raised his hand indicating that his work is finished.

2. Waiting is passive.

3. The child is sitting quietly in her chair with feet on the floor or standing at a specified place (i.e. activity shelf or table)
and is waiting to receive instructions, materials, feedback, reinforcement or teacher attention.

4. The child is not attending, managing, or working as defined in "on-task" above.

5. The child is not "off-task" as defined above.

Disruptive Behavior. Disruptive behavior is any behavior, verbal or nonverbal, in which the target child interrupts the work/play of other children. Disruptive behavior is described in the following statements:

1. Disruptive behaviors must interfere with or distract other children from their tasks.

2. The child shouts, exhibits echoic speech, or perseverates on a word, sound, or movement, or makes other loud noises not related to the table task to the extent that others are distracted, or

3. The child hits, pushes, grabs, etc. his or her peers, the teachers or the investigator, or

4. The child interferes with her peers attempts to work/play, or

5. The child throws, kicks objects at or near the Magic Circle area, or

6. The child attempts to dismantle the auditory prompt device.

Teacher Behavior.

As children's level of independence during activity selection and completion increased, the number of teacher prompts
necessary for the child to complete activities was expected to decrease. In addition to coding the child's behavior, the teacher's behavior was coded during task completion. Teacher behaviors include: instruction, prompt, praise, negative interactions, or no interaction.

**Instruction.** The definition of instruction is described in the following statements.

1. Teacher talk that initially describes or explains to the child a task or routine.
2. The initial instruction/explanations given by the teacher to direct the child to begin a task or routine.
3. "Instructions" end once the child has been told that it is their turn "to go to the Magic Circle or to work with Bunny", unless the teacher prefaces additional talk with the word "instructions". Subsequent teacher talk is coded as "prompts" (Pt), "praise" (P), or "negatives" (N).

**Prompt.** A prompt is any behavior that the teacher displays which is used to guide or redirect the child to complete the task. The following statements define prompt behavior:

1. Verbal commands, instructions, or feedback given to the child as a means of cueing the child to initiate a task, to correctly perform a step in a task, comply with a direction, or redirect a child's behavior were coded as prompts.
2. Physical guidance as a means of cueing the child to initiate a task, to correctly perform a step in a task, comply with a direction, or redirect a child's behavior were coded as prompts.
3. Modeling the behavior the child is to perform, by which the teacher shows the child what to do by demonstrating how to do the step or the task was coded as a prompt.

4. Prompts were not the initial explanation of a task or routine to the child.

5. Prompts are recorded as they occurred. They need not occur for the majority of the interval to be recorded.

Praise. Praise is regarded as any verbal or gestured response to reinforce the child for engaging in the task appropriately. The following statements define praise:

1. Any positive verbal comment by the teacher i.e. "good job", "great", etc., directed to an individual child.

2. Physical praise i.e. a pat on the back, must be accompanied by a verbal praise statement to be coded as praise.

3. Praise statements must occur in isolation from prompts or other teacher talk to be coded as an instance of teacher behavior. For example, a praise statement that follows or precedes a prompt in the same interval does not get coded as praise (P), the interaction is coded as a prompt (Pt).

Negative statement. A negative statement is any corrective statement or gesture directed at the child to stop the child's engagement in inappropriate behavior.

1. A verbal reprimand intended to stop disruptive behavior, i.e. "Chris stop yelling to Pat", or

2. Placing the child in time out, or
3. Corrective feedback, i.e. "No, the red cup says 3, put three bears in the red cup", is not coded as a negative teacher statement.

No teacher interaction. The teacher is not interacting with the child when she does not respond to the child in any way; verbally, gestured or physically. The following statements define no teacher interaction:

1. The teacher is not giving the child eye contact and is not directing attention toward the child, or
2. The teacher is not engaged in any of the other teacher behaviors defined above.
3. The teacher does not hear a child's request for help or has not responded to the child and is engaged in behavior other than those defined above as teacher behaviors, or
4. The teacher is outside of the magic circle and her attention is directed toward a child whose behavior is not being coded.

Appendix D provides an example of the data sheet used to code both child and teacher behaviors for each 5 second interval.

Training Data. During the training phase of the study the investigator made decisions related to the effectiveness of training, and when to proceed to the next experimental phase based on the child's ability to operate the auditory prompt system with minimal errors. The data collection sheet presented in Appendix D was used to document the child's performance in the completion of each step necessary to operate the auditory prompt system. In general there are three steps that children must learn: (a) press
the pedal to listen to "Bunny's" words, (b) stop when you hear the beep, (c) do what "Bunny" said. Each step is used in the completion of each component of the task. A plus (+) sign was marked if the child completed the step without teacher prompts. A minus (-) sign was marked if the child either fails to complete the step or requires teacher prompts to complete the step.

For the child to meet criterion for pressing the pedal and listening to "Bunny's" words the child had to have her eyes or ear directed at "Idea Bunny", while she placed her hand on the pedal holding it down to advance the taped message from the beginning of the prompt until the beep was heard without pausing or interrupting the taped prompt. To meet criterion for stopping at the beep the child had to lift their hand off the pedal after the beep was heard and prior to the start of the next segment of the tape. The child met criterion for doing what Bunny said if he followed the taped instruction without teacher prompts. Movement from training to the subsequent condition when the child worked alone with the auditory prompt device was dependent upon the child's ability to operate "Idea Bunny" with two or less errors during three consecutive sessions.

Specific Training Activities

The focus of this study was to increase children's independent task completion. The activities chosen required skills which the children had been taught but required more practice (i.e., sorting, matching, counting). Each of the activities was novel to the children, however they did have the skills to complete the
tasks accurately. The materials used in this study were only available to the children when they participated in the Magic Circle. The materials were stored on a shelf out of the children's reach during time when the study was not being conducted to eliminate the possibility of practice effects outside of the experimental setting. Each activity is described below.

**Bear count.** This activity consisted of a laminated counting board and a basket of miniature plastic bears. The counting board contained four sections. Each section had a numeral with the corresponding number of dots below it. Above the numeral and dots was a cup in which to place the bears into after the child matched the bears to the dots. The numbers on the board were single digits, presented in the order 1, 5, 6, 5. On a second board the numbers were presented in the order 3, 2, 7, 5.

**Picture completion.** This activity constructed by the experimenter required the child to choose a bag of picture cards and sequence the cards to complete a picture. There were three cards for each picture and each of the three small zip-locked bag contained two sets of cards. A total of 10 sets of picture cards, of equal difficulty, were randomly chosen to fill the three zip locked bags in an effort to reduce practice effects and increase novelty.

**Parquetry patterns.** This consisted of a basket of different colored shapes and a variety of design cards. The shapes included circles, squares, triangles and diamonds in the colors red, green, blue, and yellow. The child selected the design card he wanted to complete and matched the shapes from the basket to the design on
the card, by both shape and color. The design card was constructed by the experimenter.

Where I Live. This activity, also constructed by the experimenter, consisted of three 8"x11" picture boards and a basket of small pictures. The large picture boards included a barn, a house, and beach/ocean scenes. The basket contained 21 small pictures of animals or objects that would be found in one of the three places (i.e. house, barn and ocean). The child matched the small pictures of animals or things to the place where they were found.

Vehicle sort. This activity consisted of a bucket of small rubber vehicles in the shapes of cars, buses, trains, fire engines, planes and boats, and a sorting tray. There were 4-7 of each type of vehicle in the bucket. The child emptied the bucket of vehicles onto the table and sorted the vehicles by shape placing each type of vehicle into a different section of the sorting tray.

Specific Untrained Activities

The generalization activities incorporated a combination of steps and skills necessary to complete the trained tasks.

Dress me. The "Dress me" board was an 11x14 inch, laminated board with pictures of a chest, head, legs, feet and hand, as well as a basket of small pictures such as hats, shorts, socks, shoes, shirts and sunglasses which are worn on the various parts of the body. The clothing was to be matched to the body part. This activity was constructed by the experimenter.
Word match. This activity consisted of a basket of thirty 1-inch tall plastic letters and a variety of word cards. The laminated word card contained a picture of an object and the name of that object outlined in black. The words on the card ranged from 5 to 6 letters (i.e. flower, plane, sheep). The child searched the letters in the basket to find the letters to match those outlined on the card. The word cards for this activity were constructed by the experimenter.

Observers

Two observers who were first and second year doctoral students in Applied Behavior Analysis and Special Education participated in this study. The primary observer recorded the behavior of the experimenter and each child during the table-time activity daily. A second observer collected reliability data for at least 25% of the sessions for each child, across all phases of the study to insure procedural integrity and the reliability of data collection. Observer training was conducted by the investigator in the resource room of the center where the study was conducted. Observers were trained and practiced collecting data with children from different classrooms who did not participate in the study, during the completion of various tasks with and without the auditory prompt system. Observer training took place for one hour each day for 5 consecutive days. Appendix E provides a list of decision rules that were be used during observer training and throughout the study. Training continued until the observers reached 95% agreement for three consecutive observation sessions.
for all of the dependent variable measures. Interobserver agreement was calculated on the exact point by point coding of steps completed independently and on interval by interval basis of the amount of time children were actively engaged in the assigned task, as well as, the number and type of teacher prompts given to the child.

Procedures to Ensure Believability of Data

The same formula was used to establish the percentage of agreement between observers to ensure the believability of the dependent variable measures and procedural integrity. The formula used was the number of agreements divided by the total number of agreements plus disagreements multiplied by 100 (Cooper, Heron & Heward, 1987).

\[
\text{\# of agreements} \quad \frac{\text{\# of agreements}}{\text{\# of agreements + disagreements}} \times 100 = \text{\% of Agreements}
\]

Procedural Fidelity and Reliability

Procedural fidelity measures were taken on the implementation of child training and intervention procedures. A checklist for each condition was used by the observer to record the occurrence, nonoccurrence or need for improvement of the procedures during each of the experimental conditions (See Appendix F). To ensure the believability of the procedural fidelity measures the secondary observer collected reliability data.
Interobserver agreement was calculated on the exact point by point rating of each procedural item for each child. The formula used was the same as that used to calculate agreement for the dependent variables.

**Materials**

The following materials were used to conduct this study:

- **Consent for participation.** The parent or guardian for each child signed a consent form prior to participation in this study. (See Appendix A)

- **Release of information.** A Consent Form for release of information was required for each child. This form permits the investigator access to confidential information from The Dahlberg Learning Center and community agencies. (See Appendix B)

- **Data collection forms.** Three data collection forms were developed to code: 1) the level of independence in task completion; 2) child engagement/teacher Behavior; 3) child training. (See Appendix D)

- **Procedural reliability check lists.** This form was used by the primary and reliability observers to ensure the integrity of the application of the procedures. (See Appendix F)

- **Data summary sheets.** For each child a data summary sheet was used to summarize the daily observations recorded on the data collection sheets. (See Appendix G)

- **Tape recorder.** A Radio Shack Realistic Compact Cassette Recorder with voice actuation- (catalog number 14-1056) was used. This recorder has a remote outlet to which an on/off remote
pedal was connected. A second tape recorder was used to play a 5-second continuous interval tape used by the observers to code child and teacher behavior. This recorder was a Panasonic miniature cassette recorder with an outlet for the earphone jack.

**On-off remote pedal.** A Radio Shack Realistic Remote Foot Switch- catalog number 44-610B was connected to the compact cassette recorder. The remote pedal was dismantled and the four (4) springs, which create resistance to activate the switch, were removed to allow the activation of the recorder with a very light touch of the pedal. The pedal enabled the child to start and stop the tape containing a recorded script of instructions for task completion.

**Auditory prompting device- "Idea Bunny".** The auditory prompt device was termed "Idea Bunny" for this study. Idea Bunny is a cloth DUPLO bunny with a zippered pouch within its body which was produced by the DUPLO toy company. The Realistic compact cassette recorder with voice actuation was placed within the storage pouch of Idea Bunny. An opening on the bottom of the bunny allowed the cord of the on/off remote pedal to be extended from the recorder and placed on the child sized table in the activity center.

**Cassette tapes.** Cassette tapes were used to record the task scripts for each activity in which the children engaged throughout the study.

**Table time activities.** A complete description of each of the training and generalization activities was provided above. In
general, the materials used by the experimenter to create the Counting Board, Dress Me Board and pictures, the Where I Live activity boards and pictures consisted of construction paper, glue, marker. The boards and pictures were then laminated with heavy weight plastic to ensure their durability throughout the study. Additional materials such as the bears and vehicles were obtained in from a resource room located in the preschool. The original manufacturers are not known since these material were not found in their original containers.

**Experimental Design**

A multiple baseline design across children was used to determine the effect of the self-operated auditory prompt system (i.e., Idea Bunny) on children's independent completion of trained and untrained table-time activities. The dependent variables, child engagement, teacher prompts, and number of steps completed were measured during the following conditions: (a) Baseline without tape recorded instructions, (b) Alone with bunny, (c) Training to use "Idea Bunny", (d) Alone with bunny following training, (e) Maintenance of independent engagement following the removal of the auditory prompt system (f) Generalization to untrained tasks and, (g) Follow-up. In the multiple baseline design experimental control is demonstrated when changes in the dependent variable occur as the independent variable is introduced to one child, and concurrently untreated baselines of the other children remain unaffected.
Five different activities were trained and used for each child throughout the study. Two additional generalization activities were developed through the combination of task analysis steps used in the five trained tasks. Activities were counterbalanced across children and sessions. Target children participate in the study each day they attended school. One at a time, each child took a turn in the Magic Circle (i.e. the table-time activity center) for data to be collected. The order in which children used the center were counterbalanced across sessions. All of the children began in the baseline phase without Idea Bunny. The movement of a child to each successive phase was staggered to allow for comparison conditions to emerge. Children proceeded to the next phase dependent upon steady state performance of the dependent variables. The schedule of tasks completed during each condition for each child was counterbalanced to control for possible order effects. To control for differential effects of praise children received praise following each session. Data was collected to ensure procedural integrity and ongoing training and calibration was initiated to maintain procedural integrity so as to control for gains made due to changes in investigator behavior. Observational data collection was the same during all conditions of the experiment.

Data Analysis

The data for each of the children were graphed daily. The number of steps completed independently, intervals of active engagement and intervals of teacher prompts were the basis of
experimental analysis. Visual inspection was used to evaluate experimental effects. Our interest was in the clinical significance of the intervention. Though inferential statistics may show statistically significant differences between conditions they were not used. Social validation studies or systematic replications that identify confounding sources of variance are productive ways to proceed if experimental effects are not obvious (Johnston & Pennypacker, 1993).

Visual inspection of the data derived from daily observations provided the basis for decisions about the progress of the experiment and changes in experimental conditions. Stability in the baseline data of the children determined the order in which children began the subsequent conditions. Following training and intervention the degree to which skills generalize to the untrained tasks determined the degree to which additional training was necessary. The examination of data will assist in guiding decisions.

Procedure

General Procedures

Prior to the start of data collection the classroom teacher was asked to identify children with developmental delays in their classrooms who were: (a) targeted to transition to kindergarten in the next academic year, and (b) who consistently demonstrated a lack of independent performance in the absence of classroom teacher prompts. Following the selection of participant children, an explanation of how the study was expected to proceed was
provided to the teachers. The participating classroom teacher was then asked to continue their typical classroom schedule and activities. Classroom teachers were also asked not to intervene with the investigator, target children, or observers. The teachers were also asked to refrain from discussing with the target children their participation in the study, except on a general level when the child initiated an interaction about their participation in the "Magic Circle".

**Baseline**

In the baseline without auditory prompt device condition the investigator provided an initial cue to the child to go to the "Magic Circle" to complete the assigned activity for that day. For example the investigator would say "Alex, it is your turn to go to the Magic Circle. Today I would like you to do the bear count activity." If the student does not respond the cue was repeated and prompts were given. Data was collected on the number of steps of the activity that the child completed independently, time actively engaged and teacher prompts. Children had the opportunity to complete each step of each task independent of teacher prompting. Data collection began the moment the teacher give the initial cue. The session ended when the child either walked out of the "Magic Circle" area, stated that they were finished, or if the child was observed to be off-task for three consecutive minutes. These three criteria were used to determine if a child was finished with a trained task or a generalization task throughout all conditions/phases of this study.
Alone with Bunny

During the alone with bunny condition the auditory prompt device (i.e. "Idea Bunny") containing a tape recorded script for the activity, along with the control pedal extending from it, was placed on the activity table in front of the child. The investigator provided an initial instruction to the child before he began his turn in the Magic Circle. The scripted instruction given to the child was as follows:

"This is Idea Bunny. He is going to be your teacher. To make him talk you need to press this peddle. Listen carefully to Bunny’s words, stop at each beep, and do what he asks. Keep working until you are finished with the activity"

The investigator then walked away allowing the child the opportunity to complete the activity using "Idea Bunny", without teacher assistance. Additional prompts or feedback on how to operate "Idea Bunny" were not be provided during this condition. The child was praised for coming to the Magic Circle when he or she has indicated that they had finished. Data was collected on the number of steps of the activity that the child completed independently, time actively engaged and intervals of teacher prompts. Data collection began the moment the investigator gave the initial instruction.

Training

During training the investigator told the child how to use the auditory prompt system as she modeled how to operate "Idea
Bunny". Training was conducted in the following way. The investigator sat at the child sized table in the Magic Circle activity center with the child. At the start of the training session the investigator said to the child:

"Today I am going to show you how to work with "Idea Bunny" so he can be your teacher. First you will press the peddle, holding it down to listen to Bunny's words. When you hear the beep lift your hand off the pedal and stop and do what Bunny says. Watch how I work with "Idea Bunny."

The teacher then modeled and verbally described each step used to operate the auditory prompt system. These were as follows: (a) listen to the scripted tape (b) stop at each beep to complete that step, and (c) finish the activity as instructed to on the tape, as the child observed the teacher. The investigator then said: "Now it is your turn to work with "Idea Bunny". The investigator rewound the tape and the child was given the opportunity to operate the auditory prompt system independently to complete the activity. The investigator provided prompts, feedback, and praise for the child to complete the activity. One training session was conducted per day for each child during this phase of the study. As the child's level of independent performance increased, modeling was discontinued, and prompts and feedback were faded, along with the investigator's physical proximity to the child. Data were collected on: (a) the number of steps of the activity that the child completed independently, (b) child behavior,
and (c) teacher (i.e. investigator) behavior. The investigator used a discrete trials training data collection sheet to document the steps independently performed by the child while operating the auditory prompt system (See Appendix D). The children were taught three steps to use "Idea Bunny" effectively. These were as follows: (a) Press the pedal and listen to "Bunny's" words, (b) stop at the beep and, (c) do what Bunny says. Data collection began the moment the investigator began training. Training ended when the child operated the auditory prompt device with two errors or less when completing the training activity during each of three consecutive sessions.

**Alone with Bunny 2**

Observations of child performance determined when the child moved to the intervention condition, referred to as "Alone with Bunny 2". During this condition the investigator gave the child the initial verbal cue "Alex it is your turn to work with Idea Bunny". The child was then expected to go to the Magic Circle to work with "Idea Bunny" independently. When the child did not follow the direction to go the activity center, was disruptive, off-task or worked inappropriately with "Idea Bunny" or activity materials the investigator provided prompts necessary for the activity to be completed. The child was praised following completion of the activity for his participation. Data was collected on the number of steps of the activity that the child completed independently, time actively engaged and intervals in which teacher prompts
occurred. Data collection began the moment the teacher gave the
cue to go the activity centers.

Maintenance

During maintenance "Idea Bunny" was removed from the
activity center. This condition was identical to Baseline Without
the Auditory Prompt Device. The investigator gave an initial cue
such as:

"Alex, It is you turn to work in the Magic Circle, Today I
want you to do the Bear Count Activity".

The child was then observed to see if he/she went to the
center, choose the appropriate materials and completed the
activity. Data was collected on the number of steps of the activity
that the child completed independently, the intervals of time the
child is actively engaged and intervals of teacher prompts. Data
collection began the moment the investigator gave the initial cue
to the child.

Generalization to Untrained Tasks

Sessions to measure the extent to which children generalized
to untrained tasks were conducted during each of the experimental
conditions. For each of the experimental conditions the procedures
followed during the completion of generalization tasks were the
same as those for the training tasks, with the exception of one
critical element, the children did not receive any instruction or
prompts on how to use the auditory prompt device to complete the
activities. The specific procedural differences between trained
and untrained tasks are described below for each of the experimental conditions. During the baseline without auditory prompt condition the procedures for the generalization tasks sessions were the same as those for the training tasks. The children were provided an initial cue to go to the "Magic Circle" to complete the assigned task. The cue was repeated and prompts were given if the child did not respond. During the baseline with auditory prompt device condition the prompt tapes for the generalization tasks were placed in the auditory prompt device. No instruction or teacher prompts were provided on how to use the auditory prompt device. During the training and alone with auditory prompt conditions the children continued to use the auditory prompt device to complete the generalization tasks without teacher assistance or training. Training to use the auditory prompt device was conducted only during the completion of the five training tasks. When the child progressed to the maintenance condition without the auditory prompt device "Idea Bunny" was removed during the completion of the generalization tasks.

Follow-up

The follow-up condition was identical to the Baseline and Maintenance conditions. Children were cued by the investigator to complete one of the five trained tasks which included: Picture Completion, Bear Count, Vehicle Sort, Parquetry Patterns (i.e. Shape Match) and the Where I Live activities. The following instruction was given:
"Alex, It is your turn to work in the Magic Circle, Today I want you to do the Picture Completion Activity".

Identical to previous conditions, the child was then observed to see if he or she went to the center, choose the appropriate materials and completed the activity. Data was collected on the number of steps of the activity that the child completed independently, the intervals of time the child was actively engaged and intervals in which teacher prompts occurred. Data collection began the moment the investigator gave the initial cue to the child.

Social Validity.

Previous investigations of the effect of an auditory prompt device with preschoolers with disabilities have been presented to over 200 teachers who serve preschoolers with special needs. The response received has been overwhelmingly in favor of the use of an auditory prompt device to teach independent work and play skills. Suggestions from teachers have been incorporated into the design of this investigation. Teacher, parent and student opinions provide valuable information in the development of a strategy that is not only effective but is accepted and were therefore be used. This investigation included questionnaires which explored the degree to which this strategy is reported as a favorable strategy by teachers (See Appendix H and I). Secondly, the children that participated in this study were asked simple questions about their participation (See Appendix H). Finally, 10 two minute segments of video tape of the children performing during the various phases of
the study while engaged in trained and untrained tasks were randomly viewed by 20 preschool and kindergarten teachers. The professional experience of teachers who rated the videos ranged from less than one year to nine years teaching children who were mild to severely disabled in various segregated, mainstreamed and full inclusion classrooms. All of the teachers were enrolled in a graduate level course at the Ohio State University. The teachers viewed and rated each of the 10 segments according to the extent to which the children were engaged appropriately, and independently and the extent to which they were considered to be potentially successful in a typical or mainstreamed classroom (See Appendix I). All of these teachers were naive to the study. Following the video ratings the procedures and results were briefly described to the teachers. The teachers were then asked to answer the following four questions: (a) Do you think that using "Idea Bunny" to increase children's independent work/play skills was an effective strategy, (b) Would you like the Magic Circle center to be a part of your classroom, (c) Do you think the ability to work/play independent of teacher attention is an important skill for success in kindergarten, (d) would you like to learn to train other children to use "Idea Bunny". A Likert type scale was used to rate teacher opinions.
CHAPTER IV

RESULTS

This chapter presents the results of the study. The chapter begins with a summary of the procedures to ensure believability of the data for each child within each of the experimental conditions. Child data are presented for three dependent variable measures; child engagement, teacher prompts, and independent completion of task steps, for both trained and generalization tasks. Finally, the social validation measures from the children, classroom teachers and a group of educators naive to the study, are summarized.

Procedural Reliability

Treatment integrity data was collected to ensure the fidelity of: (a) the experimental procedures implemented during each condition, and (b) the environmental arrangement of the materials within the experimental setting. Data were collected using a checklist appropriate for each condition of the study (See Appendix F). Treatment integrity data were collected during 108 of 274 (39%) sessions conducted for all children during all of the experimental conditions. The experimenter correctly implemented the experimental procedures 100% of the time across all children.
Additionally, the experimental setting was appropriately arranged for 99% of the observations. There was only one instance in which the observer reported the need for improvement regarding the experimental setting. Specifically, the need for improvement referred to proper setup of the auditory prompt tape for Derek, during a training session.

Interobserver agreement on procedural integrity measures were collected for 90 of 274 (33%) sessions conducted for all children during all of the experimental conditions. Interobserver agreement was recorded as 100% for all of the sessions in which procedural integrity was collected by both observers.

Interobserver Agreement on Dependent Variable Measures

Interobserver agreement measures are presented for each of the dependent variables for each child during each of the experimental conditions. The first table in Appendix J shows the number and percentage of sessions across children, conditions and type of task (i.e. trained tasks versus generalization tasks) in which interobserver agreement data was collected. For trained tasks total interobserver agreement data was collected by a second observer for 72 of 225 (32%) sessions. Total interobserver agreement for generalization tasks was collected by a second observer for 23 of 49 (47%) sessions. Interobserver agreement was calculated for each of the dependent variables during each condition.

Task Completion. The second table in Appendix J provides a summary of the interobserver agreement measures for task.
completion with trained tasks. Interobserver agreement during baseline ranged from 86% to 100% with a mean of 94%. During the alone with bunny, training, maintenance, and follow-up conditions interobserver agreement was 100% for all children.

The second table in Appendix J provides a summary of the interobserver agreement measures for task completion with the generalization tasks. Interobserver agreement was calculated for Isabel and Emma during the baseline condition. Agreement ranged from 71 to 100% for a total mean of 93%. For the remaining conditions of the study agreement was 100 percent.

Child Engagement. The third table in Appendix J summarizes the interobserver agreement measures for child engagement with trained tasks. During baseline interobserver agreement ranged from 75% to 100% for a total mean of 89% for all children. Interobserver agreement during the alone with bunny condition ranged from 90% to 100% for a total mean of 96%. With each subsequent condition interobserver agreement increased. Agreement during training ranged from 96% to 100% for total mean of 97%. Alone with bunny-2 agreement ranged from 96% to 100% for a total mean of 99%. During the maintenance and follow-up total agreement for all children was 100%.

The third table in Appendix J presents the summary of interobserver agreement measures for child engagement during the completion of the generalization tasks. During baseline interobserver agreement was collected for Isabel and Emma. Agreement ranged from 89% to 96% with a mean of 94%. During the
alone with bunny condition agreement measures were calculated for Isabel, Derek and Andre. Interobserver agreement ranged from 94% to 100% for a total mean of 96%. Agreement measures were collected for all children during training with a range of 93% to 100% percent and a total mean of 98%. During alone with bunny-2 agreement measures were calculated for Derek, Emma and Andre for a range of 86 to 100% and a total mean of 98%. Agreement measures were calculated for Isabel, Derek and Emma during maintenance. The range of interobserver agreement was 95% to 100% with a total mean of 99%.

Teacher Behavior. The fourth table in Appendix J presents a summary of the means and ranges of interobserver agreement for teacher behavior during sessions when children completed trained tasks. During baseline interobserver agreement ranged from 80% to 95% percent for a total mean of 95% for all children. During the alone with bunny condition interobserver agreement was 100% for all children. Agreement during training ranged from 90% to 100% for total mean of 98%. Alone with bunny-2 agreement ranged from 98% to 100% for a total mean of 99.6%. During maintenance and follow-up total agreement for all children was 100% percent.

Interobserver agreement of teacher behavior during the completion of generalization tasks are summarized in Appendix J. During baseline interobserver agreement collected for Isabel and Emma ranged from 92% to 100% percent with a mean of 94.5%. Alone with bunny agreement measures were calculated for Isabel, Derek and Andre for a range 94% to 100% and a total mean of 97%. 
Agreement measures were collected for all children during training with a range of 97% to 100% percent and a total mean of 99.8%. During alone with bunny-2 agreement measures were calculated for Derek, Emma and Andre for a range of 99.5% to 100% and a total mean of 99.8%. Agreement measures calculated for Isabel, Derek and Emma during was 100%.

**Independent Task Completion**

Four research questions related to task completion were addressed in this study: (a) Can children be trained to use the auditory prompt system to complete tasks independently, (b) What are the effects of the use of a self-operated auditory prompt device on independent choice and completion of table-time activities with preschoolers with disabilities, (c) What are the effects of the removal of the auditory prompt system on children's maintenance of independent task completion and, (d) To what extent does independent task completion generalize to untrained tasks. The dependent variable, independent step completion, was measured by collecting data on the level of independence exhibited by the child for each step necessary to complete a task (See Figure 6). There were seven steps for each of the tasks used in the study. The result of each child's performance during each of the experimental conditions is presented below (See Tables 2 and 3).

**Child J: Isabel**

**Baseline.** During baseline Isabel's performance was variable. She completed a mean of 3 steps independent of teacher prompts with a range of 1 to 5 steps across the 11 baseline sessions.
Figure 6. Number of steps completed independent of teacher prompts.
### Table 2.

Mean and Range of the Number of Independent Steps Completed with Trained Tasks in each Condition for each Child

<table>
<thead>
<tr>
<th>Child</th>
<th>Baseline</th>
<th>Alone with Bunny</th>
<th>Training</th>
<th>Alone with Bunny 2</th>
<th>Maintenance (No Bunny)</th>
<th>Follow-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isabel</td>
<td>11</td>
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<td>4</td>
<td>0</td>
<td>19</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1-5)</td>
<td>0</td>
<td>(3-7)</td>
<td>(6-7)</td>
<td>(6-7)</td>
</tr>
<tr>
<td>Derek</td>
<td>13</td>
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<td>4</td>
<td>0</td>
<td>24</td>
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</tr>
<tr>
<td></td>
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<td>(0-5)</td>
<td>0</td>
<td>(3-7)</td>
<td>(6-7)</td>
<td>(6-7)</td>
</tr>
<tr>
<td>Emma</td>
<td>19</td>
<td>3.5</td>
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</tr>
<tr>
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<td>(0-6)</td>
<td>0</td>
<td>(3-7)</td>
<td>(5-7)</td>
<td>(6-7)</td>
</tr>
<tr>
<td>Andre</td>
<td>10</td>
<td>2.3</td>
<td>3</td>
<td>0</td>
<td>15</td>
<td>4.7</td>
</tr>
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<td>(0-7)</td>
<td>(6-7)</td>
<td>(6-7)</td>
</tr>
</tbody>
</table>
Table 3.
Mean and Range of the Number of Independent Steps Completed during Generalization Tasks in each Condition for each Child

<table>
<thead>
<tr>
<th>Child</th>
<th>Baseline</th>
<th>Alone with Bunny</th>
<th>Training</th>
<th>Alone with Bunny 2</th>
<th>Maintenance (No Bunny)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isabel</td>
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<td>(3-4)</td>
<td>0</td>
<td>(0-7)</td>
<td>7</td>
<td>(6-7)</td>
</tr>
<tr>
<td>Derek</td>
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<td>0</td>
<td>4</td>
<td>6.3</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
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<td>(6-7)</td>
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<td></td>
<td>0</td>
<td>(6-7)</td>
<td>(6-7)</td>
<td>(6-7)</td>
</tr>
<tr>
<td>Emma</td>
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<td>6.3</td>
<td>3</td>
</tr>
<tr>
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<td>(0-6)</td>
<td>(6-7)</td>
<td>(6-6)</td>
</tr>
<tr>
<td>Andre</td>
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<td>5.5</td>
<td>2</td>
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<td></td>
<td>1</td>
<td>(5-6)</td>
<td>(6-6)</td>
<td>(6-7)</td>
</tr>
</tbody>
</table>

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**Alone with Bunny.** During baseline with the auditory prompt device independent performance dropped to 0 steps during all four sessions.

**Training.** For the first four training sessions Isabel's level of independent performance stabilized at 3 to 4 independent steps. Performance during the remaining 13 days of training was variable with an upward trend to 7 of 7 steps completed independently. Overall, during training Isabel completed a mean of 5 steps independently with a range of 3 to 7 steps.

**Alone with Bunny 2.** Following training Isabel maintained her level of independent performance with a mean of 6.8 steps and a range of 6 to 7 steps completed independent of teacher prompts. Across the eleven maintenance sessions she required prompts for one of seven steps during three sessions. For the remaining eight sessions she completed each task independent of prompts.

**Maintenance.** When the auditory prompt device was removed Isabel's independence increased slightly with a mean of 6.9 steps and a range of 6 to 7 steps. Across the 14 sessions Isabel required prompts for one step during 2 sessions. For the remaining 12 sessions each task was completed independent of teacher prompts.

**Generalization to Untrained Tasks.** During the baseline condition Isabel completed a mean of 3.7 steps with a range of 3 to 4 steps. The number of steps completed independent of teacher prompts dropped to zero during the alone with bunny condition when the auditory prompt device was introduced without training. Following the initiation of training to use "Idea Bunny" Isabel
generalized the use of the auditory prompt device to complete tasks that were not used during training, resulting in a mean of 5 steps with a range of 0 to 7 steps completed independently. For three of four generalization probes during training Isabel completed 6 of 7 steps independent of teacher prompts. Following training her performance on generalization tasks increased during the second alone with bunny condition with a mean 7 and range of 7 steps. When "Idea Bunny" was removed Isabel maintained her independent performance with a mean of 6.7 steps with a range of 6 to 7 steps.

Follow-up. Follow-up data was collected two weeks and four weeks following the discontinuation of daily sessions in the Magic Circle. During both follow-up sessions Isabel completed all 7 steps independently.

Child 2- Derek

Baseline. Derek's mean performance during baseline was 2.4 steps with a range of 0 to 5 steps. Performance during the first eight baseline sessions varied between 0 and 5 steps. His behavior stabilized at 4 steps for session 9 through 12. This condition ended on the thirteenth session with 3 steps completed independent of prompts.

Alone with Bunny. The introduction of the auditory prompt device resulted in a significant decrease in Derek's performance. During the 4 baseline sessions with "Idea Bunny" Derek did not perform any steps independent of the teacher. Furthermore, he
refused to select or complete the tasks when teacher prompts were provided.

**Training.** The initiation of training to teach Derek how to use the auditory prompt system resulted in a marked increase in his independent step completion. He ended the first day of training with 6 of 7 steps completed independently. During the second and third training sessions his performance dropped to initial baseline levels with 3 and 4 steps completed independently. The subsequent 16 training sessions show a gradual upward trend to 7 of 7 steps for the remaining 6 sessions of training. Overall, Derek completed a mean of 5.9 steps with a range of 3 to 7 independent steps completed during training.

**Alone with Bunny 2.** Following training Derek completed a mean of 6.7 steps with a range of 6 to 7 steps independent of teacher prompts during the alone with bunny condition. During 8 of 11 sessions Derek performed 7 of 7 steps independently.

**Maintenance.** Following the removal of the auditory prompt system Derek's level of independent step completion maintained at a mean of 6.75 independent steps with a range of 6 to 7 steps.

**Generalization to Untrained Tasks.** Across the three generalization probes, during baseline, Derek did not perform any steps independent of teacher prompts. Introduction of the auditory prompt device did not change Derek's level of independence. He completed a mean of zero steps during this condition. Training to use the auditory prompting device produced generalized effects to the untrained tasks resulting in a robust change to a mean of 6.3
steps with a range of 6 to 7 steps. His performance maintained following training with a mean of 6.7 steps with a range of 6 to 7 steps. In the absence of the auditory prompt device Derek continued to perform a mean of 6.5 steps with a range of 6 to 7 steps.

**Follow-up.** Derek was not present for the follow-up session two weeks following the discontinuation of daily sessions in the magic circle. During the four week follow-up session he completed all 7 steps independently.

**Child 3- Emma**

**Baseline.** During the baseline condition Emma completed a mean number of 3.5 steps with a range of 0 to 6 steps. The first nine baseline sessions show an upward trend from zero to 6 steps. Her behavior decreased to an mean of 3 steps for the subsequent five sessions. During the final session of this condition she completed 5 steps independently.

**Alone with Bunny.** When the auditory prompt device was introduced without training it served as an effective distracter from task completion. Across the four days in this experimental condition, Emma did not complete any of the task steps independently.

**Training.** The first day of training resulted in a significant increase in behavior with Emma completing 5 of 7 steps independently. The following 4 training days show a slight decrease to 3 and 4 steps. Her level of independent step completion increased from 6 to 7 steps for the remaining 14 days.
of training, except for one session when she performed 5 steps independently. Overall, during this condition Emma completed a mean of 5.6 steps with a range of 3 to 7 steps independent of teacher prompts.

Alone with Bunny 2. Following training Emma maintained her level of independent step completion when the teacher allowed her to work with "Idea Bunny" alone. During this condition she completed a mean of 6.6 steps with a range of 5 to 7 steps. She performed all of the task steps independently during 8 of the 11 maintenance sessions.

Maintenance. When the experimenter removed the auditory prompt device Emma maintained her level of independent step completion at 6 to 7 steps for a mean of 6.8 steps. Emma completed all seven task steps without prompts for 8 of sessions the 11 sessions without "Idea Bunny"

Generalization to Untrained Tasks. During the initial baseline condition Emma performed similarly when completing either training or generalization tasks. During this condition she completed a mean of 4 steps with a range of 3 to 5 steps. Her data show an upward trend from 3 to 5 steps followed by a decrease in performance to 4 steps. Availability of the auditory prompt device without training resulted in the same result for all tasks (i.e. training and generalization tasks). Emma did not complete any steps on generalization tasks during this condition. Training to use "Idea Bunny" did not produced an immediate effect on Emma’s performance on untrained tasks. During training she did not
complete any step independently on either of the generalization tasks. Later, during the training condition, use of the auditory prompt device generalized to the untrained tasks for 6 of 7 steps independent for the final two generalization probes. Overall, during training, she performed a mean of 3 steps with a range of 0 to 6 steps independent of teacher prompts. He performance on generalization tasks maintained following training for a mean of 6.3 steps with a range of 6 to 7 steps. When "Idea Bunny" was removed she continued to complete a mean and range of 6 steps independent of prompts.

Follow-up. Emma did not attend school for the two week follow-up session. During the four week follow-up session she completed all 7 steps independently.

Child 4- Andre

Andre's data represents the fourth tier in the multiple baseline. Probes of his behavior were taken during the initial baseline condition. Absence of data during sessions for successive conditions are due to Andre's absences from school and not due to lack of opportunity to participate in the magic circle.

An additional consideration when interpreting Andres data is the number of tasks used during training. The technical method describes five training tasks and two generalization tasks used during this study. For Emma, Isabel and Derek all seven tasks were used during the study. For Andre only three of the five tasks were trained (i.e. parquetry patterns, vehicle sort and picture sequencing) and, only one of the two untrained tasks were used.
during the generalization probes (i.e. word match). This deviation from the methodology was made due to Andre's general level of functioning. The trained tasks for Andre were: vehicle sort, parquetry patterns and, picture completion.

**Baseline.** During baseline Andre completed a mean of 2.3 steps with a range of 0 to 5 steps. The first three data points show an upward trend from 0 to 5 steps completed independently followed by a downward trend to 0 steps for the last two sessions in the baseline condition.

**Alone with Bunny.** Andre's performance during the alone with bunny condition was consistent with the performance of Emma, Derek and Isabel. During the three sessions in this condition Andre did not perform any task step independent of teacher prompts.

**Training.** Training Andre to use the auditory prompt device resulted in a clear upward trend from 0 to 7 steps completed independently. Overall, Andre completed a mean of 4.7 steps with a range of 0 to seven steps during training.

**Alone with Bunny 2.** Andre maintained his level of independence following training, with a mean of 6.5 and a range of 6 to 7 steps completed independent of teacher prompts.

**Maintenance.** Following removal of the auditory prompt device Andre continued to maintain his level of independent step completion with a mean of 6.4 steps and a range 6 to 7 steps.

**Generalization to Untrained Tasks.** For Andre, only one task was used to probe the generalized effect of the intervention (i.e. word match). The generalization probe during baseline shows a
mean and range of 2 steps. Introduction of "Idea Bunny" without training resulted in a drop to zero steps. Training to use the auditory prompt device produced an immediate, robust effect on the completion of the untrained task for a mean and range of 6 steps. His performance maintained following the training condition for a mean and range of 6 steps. Removal of "Idea Bunny" resulted in a slight increase in Andre's performance for a mean of 6.5 and a range of 6 to 7 steps.

Follow-up. During both the two week and the four week follow-up sessions Andre maintained his level of independent performance completing 7 of 7 steps independently.

Child Engagement

The primary experimental question related to child engagement is as follows: What is the effect of the self-operated auditory prompt device on children's active engagement in task completion? The dependent variable child engagement was measured using a five second partial interval continuous recording system. The results are presented as percentage of intervals engaged in task completion, for each child, during each of the experimental conditions (See Figure 7). The result of each child's performance during each of the experimental conditions is described below (See Tables 4 and 5).

Child 1- Isabel

Baseline. During baseline Isabel was engaged for a mean of 70% of the time with a range of 100% to 19%. The first three baseline sessions show an initial sharp downward trend, with a decrease
Figure 7. Percentage of intervals children were actively engaged in table/time activities (circles) and in which teachers prompts were provided (triangles). Notes: TT = trained task, UT = untrained tasks, and FU = Follow-up.
Table 4.
Mean and Range of the Percentage of Intervals of Engaged Time during Trained Tasks in each Condition for each Child

<table>
<thead>
<tr>
<th>Child</th>
<th>Baseline</th>
<th>Alone with Bunny</th>
<th>Training</th>
<th>Alone with Bunny 2</th>
<th>Maintenance (No Bunny)</th>
<th>Follow-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isabel</td>
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<td>86.9</td>
<td>93.8</td>
<td>96</td>
</tr>
<tr>
<td></td>
<td>(19-100)</td>
<td>(12-44)</td>
<td>(79-98)</td>
<td>(87-100)</td>
<td>(77-100)</td>
<td></td>
</tr>
<tr>
<td>Derek</td>
<td>13</td>
<td>48</td>
<td>24.5</td>
<td>89.9</td>
<td>98</td>
<td>99.6</td>
</tr>
<tr>
<td></td>
<td>(2-100)</td>
<td>(11-42)</td>
<td>(79-100)</td>
<td>(91-100)</td>
<td>(97-100)</td>
<td></td>
</tr>
<tr>
<td>Emma</td>
<td>19</td>
<td>69.3</td>
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<td>91</td>
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<td>99.4</td>
</tr>
<tr>
<td></td>
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<td>(77-100)</td>
<td>(84-100)</td>
<td>(94-100)</td>
<td></td>
</tr>
<tr>
<td>Andre</td>
<td>10</td>
<td>46.5</td>
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<td>87.6</td>
<td>93.6</td>
</tr>
<tr>
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<td>(76-100)</td>
<td></td>
</tr>
</tbody>
</table>
Table 5.
Mean and Range of the Percentage of Intervals of Engaged Time During Generalization Tasks in each Condition for each Child

<table>
<thead>
<tr>
<th>Child</th>
<th>Baseline</th>
<th>Alone with Bunny</th>
<th>Training</th>
<th>Alone with Bunny 2</th>
<th>Maintenance (No Bunny)</th>
</tr>
</thead>
<tbody>
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<td></td>
<td></td>
</tr>
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<td>88-96</td>
<td>77-100</td>
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<td>1</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td></td>
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<td>26-86</td>
<td>91-100</td>
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<td>4</td>
</tr>
<tr>
<td></td>
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<td>12-99</td>
<td>97-99</td>
<td>99-100</td>
</tr>
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<td>76-85</td>
<td>55-100</td>
<td>91-97</td>
</tr>
</tbody>
</table>
from 100% to 19%. Child engagement increased during the fourth session to 85%, followed by a second downward trend from 90% to 48%.

**Alone with Bunny.** The introduction of the auditory prompt device resulted in a further decrease in child engagement. During this condition Isabel was engaged for a mean of 21% of the time with a range of 12% to 44%. For three of the four sessions in this condition she was engaged for only 12% to 15% of the time.

**Training.** The initiation of training resulted in a significant increase in child engagement. During training she was engaged for a mean of 87% of the time with a range of 79% to 98%. Her behavior during training shows a gradual upward trend with some variability.

**Alone with Bunny 2.** Following training Isabel's level of engagement increased slightly with mean of 94% and a range of 87% to 100%.

**Maintenance.** When the experimenter removed the auditory prompt device Isabel's level of engagement increased stabilizing at a mean of 96% with a range of 77% to 100%. For 7 of the 13 sessions she was engaged 100% of the time.

**Generalization to Untrained Tasks.** Isabel began the baseline condition engaged in the completion of the generalization tasks from 90% and 92%, of the observed intervals. During the final generalization probe her behavior decreased significantly to 56%. Overall, she was engaged for a mean of 81% of the time with a range of 56% to 92%. The amount of time she was engaged in the
completion of tasks declined to a mean and range of 14% during the second baseline condition when "Idea Bunny" was available prior to training. During training Isabel engaged in task completion at a mean of 64% of the time with a range of 20% to 97%. There was a slight increase during the first two probes with 47% and 20% engaged, followed by a significant change in the level of engagement for 92% and 97% during the last two probes in the training condition. Her behavior maintained following training for a mean of 92% and a range of 88% to 96% during the alone with bunny condition. Her behavior decreased slightly to 77%, during the first generalization probe following the removal of "Idea Bunny". However, engaged time increased to 100% during the final two probes. Overall, she was engaged for a mean of 88.5% of the time with a range of 77% to 100%.

**Follow-up.** Isabel was engaged 100% of the time during the two and four week follow-up probes.

**Child 2: Derek**

**Baseline.** Derek's behavior showed much variability during the baseline condition. He was engaged for a mean of 48% of the time with a range of 2% to 100%. Variability was not a function of the task selected for completion. On the days during which engaged time was low Derek was typically engaged in non-compliant behavior. His behavior was not aggressive.

**Alone with Bunny.** Introduction of the auditory prompt device resulted in a clear downward trend. During this condition Derek
was engaged for a mean of 24.5% of the time with a range of 11% to 42%.

Training. Training resulted in a significant increase in the level of engaged time with a mean of 90% and a range of 79% to 100%. The first 20 training sessions show a stable data path with some variability followed by the final three training sessions during which Derek was engaged in task completion for 98% to 100% of the time.

Alone with Bunny 2. Following training Derek's level of behavior increased and stabilized with little variability for a mean of 98% and a range of 91% to 100% of the time engaged.

Maintenance. Removal of the auditory prompt device resulted in an increase in the level of engagement. During this condition Derek was engaged for a mean of 99.6% with a range of 97% to 100%. Derek was engaged in task completion 100% of the time for 7 of the 8 sessions.

Generalization to Untrained Tasks. During baseline Derek was engaged for a mean of 11% with a range of 4% to 15%. Engagement was less during the completion of generalization tasks versus tasks that were trained. During the second baseline condition when the auditory prompt device was available without training, Derek was engaged 10% of the time. Training produced a gradual increase in the amount of time he was engaged in untrained tasks for a mean of 56.5% with a range of 26% to 86%. Following training child engagement increased to a mean of 97% with a range of 91% to
100%. Derek's performance maintained following the removal of "Idea Bunny" with a mean of 99.5% with a range of 98 to 100%.

Follow-up. Derek was absent the day that the two week follow-up session was conducted. During the four week follow-up probe he was engaged in task completion 100% of the time.

Child 3- Emma

Baseline. During baseline Emma was engaged for a mean of 69% of the time with a range of 3% to 95%. During this condition Emma’s behavior shows much variability which was not a function of the task selected for completion.

Alone with Bunny. Emma’s behavior decreased significantly to a mean of 12% with a range of 9% to 14% percent when the auditory prompt device was introduced without training.

Training. Training resulted in a robust change in the amount of time Emma was engaged in task completion to a mean of 91% and a range of 77% to 100%.

Alone with Bunny 2. Emma maintained her level of engagement when left alone with the auditory prompt device, following training. During this condition she engaged in task completion a mean of 95.4% of the time with a range of 84% to 100%. Emma was engaged 92% to 100% of the time for 10 of the 11 maintenance sessions.

Maintenance. Removal of the auditory prompt device resulted in an increase in the level and a decrease in the variability of the percent of child engagement. During this condition Emma was engaged in task completion for a mean of 99.4 percent of the time
with a range of 94% to 100%. For 10 of the 11 maintenance sessions without "Idea Bunny" Emma was engaged 100% of the time.

**Generalization to Untrained Tasks.** Emma was engaged for a mean of 85% with a range of 76% to 100% during baseline. Engagement during the baseline condition was slightly higher during the completion of generalization versus training tasks. The introduction of bunny without training, during the second baseline condition resulted in a significant decrease in Emma's level of engagement to 9%. Training to use "Idea Bunny" did not produce an immediate generalized effect to the untrained tasks. During the first two generalization probes Emma was engaged 15% and 12% of the time. The later two probes show a generalized effect with engagement at 89% and 99%. Overall, Emma was engaged for a mean of 54% with a range of 26% to 86% during the training condition. Following training Emma's behavior increased to a mean of 98% with a range of 97% to 100%. Removing "Idea Bunny" resulted in a slight increase in child engagement for a mean of 99.5% with a range of 99% to 100%.

**Follow-up.** Emma was not present for the two week follow-up probe. She was present and engaged 100% of the time during the four week follow-up probe.

**Child 4- Andre**

**Baseline.** During baseline Andre was engaged in task completion for a mean of 46.5% of the time with a range of 17% to 70%. Andre's data show much variability which did not coincide with the task selected for completion.
Alone with Bunny. During this condition Andre was engaged in task completion for a mean of 17% with a range of 15% to 17%. Andre behaved similarly to the other three participants when the auditory prompt system was introduced without training by showing a significant decrease in his level of engagement.

Training. Training resulted in an immediate change in the amount of time Andre spent engaged in task completion. During this condition he was engaged for a mean of 88% of the time with a range of 68% to 99%.

Alone with Bunny 2. During maintenance Andre maintained a mean of 88% with a range of 74% to 100%. The data path shows an initial decrease in the level of performance compared to the training data with an upward change in level for the final two sessions in this condition.

Maintenance. Andre maintained his level of engagement following the removal of the auditory prompt device. During this condition he was engaged in task completion for a mean of 94% with a range of 76% to 100%. For three of the five maintenance sessions without "Idea Bunny" Andre engaged in task completion 100% of the time.

Generalization to Untrained Tasks. During baseline Andre was engaged 50% of the time during the completion of the generalization task. His behavior decreased to 18% during the second baseline condition with "Idea Bunny". Training resulted in a significant generalized effect on engaged time with the untrained task for a mean of 80.5% and a range of 76% to 85%. Following
training there was a moderate drop in engaged time during the first generalization probe during the alone with bunny condition to 55%. Engagement increased during the second probe to 100% for an overall mean of 77.5% with a range of 55% to 100%. His behavior maintained when "Idea Bunny" was removed for a mean of 94 percent with a range of 91% to 97%.

Follow-up. Andre was engaged in task completion 100% of the time during the two week and four week follow-up probes. He maintained the level of engagement he had achieved during the maintenance sessions following training.

Teacher Prompts

The dependent variable teacher prompts was measured using the same five second partial interval continuous recording system which was used to measure child engagement. Data were collected on teacher behavior in an attempt to answer the following research question: What is the effect of the self-operated auditory prompt device on the frequency of teacher prompts during table-time activities? The data are presented as the percentage of intervals in which teacher prompts occurred are presented (See Figure 7). The results are described below for each child during each of the experimental conditions (See Tables 6 and 7).

Child 1: Isabel

Baseline. Isabel required teacher prompts a mean of 13% with a range of 4% to 33%. There was a gradual downward trend in the percentage of teacher prompts as the baseline condition progressed.
Table 6.
Mean and Range of the Percentage of Intervals with Teacher Prompts during Trained Tasks in each Condition for each Child

<table>
<thead>
<tr>
<th>Child</th>
<th>Baseline</th>
<th>Alone with Bunny</th>
<th>Training</th>
<th>Alone with Bunny 2</th>
<th>Maintenance (No Bunny)</th>
<th>Follow-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isabel</td>
<td>11</td>
<td>13</td>
<td>4</td>
<td>1.25</td>
<td>19</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(4-33)</td>
<td></td>
<td>(0-5)</td>
<td>(0-36)</td>
<td>(0-4)</td>
</tr>
<tr>
<td>Derek</td>
<td>13</td>
<td>22</td>
<td>4</td>
<td>4.8</td>
<td>24</td>
<td>8.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0-47)</td>
<td></td>
<td>(0-15)</td>
<td>(0-22)</td>
<td>(0-5)</td>
</tr>
<tr>
<td>Emma</td>
<td>19</td>
<td>20.5</td>
<td>4</td>
<td>9.25</td>
<td>19</td>
<td>9.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(9-38)</td>
<td></td>
<td>(7-11)</td>
<td>(0-30)</td>
<td>(0-4)</td>
</tr>
<tr>
<td>Andre</td>
<td>10</td>
<td>30</td>
<td>3</td>
<td>9</td>
<td>15</td>
<td>14.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(11-83)</td>
<td></td>
<td>(8-15)</td>
<td>(1-47)</td>
<td>(2-9)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0-5)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0-0)</td>
</tr>
</tbody>
</table>
Table 7.

Mean and Range of the Percentage of Intervals with Teacher Prompts during Generalization Tasks in each Condition for each Child

<table>
<thead>
<tr>
<th>Child</th>
<th>Baseline</th>
<th>Alone with Bunny</th>
<th>Training</th>
<th>Alone with Bunny 2</th>
<th>Maintenance (No Bunny)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isabel</td>
<td>3 27 (21-33)</td>
<td>1 0</td>
<td>4 6 (0-17)</td>
<td>2 1.5 (0-3)</td>
<td>3 3 (1-5)</td>
</tr>
<tr>
<td>Derek</td>
<td>3 17.6 (8-30)</td>
<td>1 0</td>
<td>4 2.5 (1-4)</td>
<td>4 .25 (0-1)</td>
<td>2 1 (0-2)</td>
</tr>
<tr>
<td>Emma</td>
<td>4 13.5 (8-22)</td>
<td>1 9 (0-5)</td>
<td>4 2.75 (0-2)</td>
<td>3 .67 (0-2)</td>
<td>2 1</td>
</tr>
<tr>
<td>Andre</td>
<td>1 36 (36)</td>
<td>1 6 (3-19)</td>
<td>2 11 (5-5)</td>
<td>2 5 (0-11)</td>
<td></td>
</tr>
</tbody>
</table>
Alone with Bunny. During the baseline with "Idea Bunny" teacher prompts decreased further to a mean of 1.25% with a range of 0% to 5%.

Training. Training resulted in an initial change in the level of prompts followed by a downward trend to a low of 0% to 2% for the final two training sessions. Overall, Isabel received a mean of 15% of the time with a range of 0% to 36%.

Alone with Bunny 2. Following training, teacher prompts remained low with a mean of 1.3% prompts with a range of 0% to 4%. During 5 of the 11 maintenance sessions with the auditory prompt device Isabel completed the task in the absence of teacher prompts.

Maintenance. Removal of the auditory prompt device produced no change in the percentage of teacher prompts. Teacher prompts were provided a mean of 1.3% of the time with a range of 0% to 6%. For 9 of the 14 the sessions there were 0% prompts.

Generalization to Untrained Tasks. In baseline prompts were provided a mean of 27% of the observed intervals, with a range of 21% to 33% percent during the completion of the generalization tasks. The percentage of prompts dropped to 0% during the alone with bunny condition. Prompts increased slightly during training for a mean of 6% with a range of 0% to 17%. Following training prompts decreased in level to a mean of 1.5% with a range of 0% to 3%. Prompts remained low following the removal of "Idea Bunny" for a mean of 3% with a range of 1% to 5%. 
Follow-up. Isabel did not require any prompts during the two week or the four week follow-up probes.

Child 2- Derek

Baseline. During baseline prompts were variable with a mean of 22% and a range of 0% to 47%.

Alone with Bunny. Prompts decreased when the auditory prompt device was available without training to a mean of 4.8% with a range of 0% to 15%. There were no prompts given during 2 of 4 sessions.

Training. During training prompts were provided a mean of 8.5% with a range of 0% to 22%. The start of training resulted in an initial increase in teacher prompts to 22% followed by a downward trend to 0% for the final two training sessions.

Alone with Bunny 2. Teacher prompts remained low following training with a mean of 2.3% with a range of 0% to 5%.

Maintenance. Prompts decreased slightly to a mean of 0.75% with a range of 0% to 4%. The were 0% teacher prompts during 6 of the 8 maintenance sessions without "Idea Bunny".

Generalization to Untrained Tasks. During baseline Derek was prompted a mean of 18% of the time with a range of 8% to 30%. Teacher prompts dropped to 0 percent during baseline with "Idea Bunny". The level of teacher prompts increase slightly low during training for a mean of 2.5% with a range of 1% to 4%. Following training prompts dropped to .25% with a range of 0 to 1 percent. During the return to the alone with bunny condition 0% teacher prompts were provided during 3 of 4 maintenance sessions.

,
Teacher prompts remained low following the removal of "Idea Bunny" for a mean of 1% with a range of 0% to 2%.

Follow-up. Derek did not attend school the day the two week follow-up probes were conducted. During the four week follow-up probe he required 0% teacher prompts.

Child 3- Emma

Baseline. During baseline prompts were provided a mean of 20.5% of the time with a range of 9% to 38%. The data path show a pattern which appears to be independent of the task selected for completion.

Alone with Bunny. During the alone with bunny condition the percent of prompts dropped and stabilized for a mean of 9.25% with a range of 7% to 11% during baseline with "Idea Bunny".

Training. Training resulted in an initial increase in prompts with a high of 30% followed by a downward trend to a low of 0% during the final two training sessions. Overall, teacher prompts were provided a mean of 9.1% with a range of 0% to 30% percent.

Alone with Bunny 2. Prompts remained low following training with a mean of 1.3 with a range of 0% to 30%. During 4 of 11 maintenance sessions teacher prompts were 0%.

Maintenance. Following the removal of "Idea Bunny" teacher prompts dropped to a mean of .45% with a range of 0% to 3%.

During 9 of the 11 maintenance sessions without "Idea Bunny" teacher prompts were 0%.

Generalization to Untrained Tasks. The mean percentage of teacher prompts during generalization tasks was 13.5% with a
range of 8 to 22 percent. During baseline with "Idea Bunny" prompts were provided 9% of the time. During training prompts dropped to a mean of 2.75% with a range of 0% to 5% percent. Prompts remained low following training with a mean of 67% and a range of 0 to 2 percent. Removal of the auditory prompt device did not effect teacher prompts significantly. During maintenance without "Idea Bunny" prompts were provided a mean of 1% of the time, with a range of 0% to 2%.

Follow-up. During the four week follow-up probe Emma received 0% teacher prompts. She was not at school the day the 2 week follow-up session was conducted.

Child 4- Andre

Baseline. During baseline the percent of teacher prompts was variable with a mean of 30% and a range of 11% to 83%.

Alone with Bunny. Teacher prompts dropped and stabilized when he was left alone with bunny prior to training for a mean of 9% with a range of 8% to 15%.

Training. During training prompts increased initially with a high of 47% followed by a downward trend to a low of 1%. A mean of 14% prompts with a range of 1% to 47% were given during this condition.

Alone with Bunny 2. Prompts remained low following training for a mean of 4.6% and a range of 2% to 9%.

Maintenance. During maintenance without "Idea Bunny" prompts dropped slightly to a mean of 3.2% with a range of 0% to 5% percent.
Generalization to Untrained Tasks. Prompts were given 36% of the time in baseline, during completion of the generalization task. Prompts dropped to 6% percent during the initial alone with bunny condition. The mean percent of teacher prompts, during training, was 11% with a range of 3% to 19%. Prompts were low and stable following training with a mean and range of 5%. During the maintenance without "Idea Bunny" condition teacher prompts were 0% for the first generalization probe, followed by an increase in prompts to 11% during the second probe. Overall, there were a mean of 5.5% prompts with a range of 0% to 11% when "Idea Bunny was no longer available.

Follow-up. Andre did not require any prompts during the two or four week follow-up sessions.

Summary

In general, each of the children learned to use the self-operated auditory prompt device to complete table-time tasks. Specifically, there were significant increases in independent task completion and child engagement following the start of training to use "Idea Bunny". Teacher prompts decreased and the children's performance on trained tasks showed generalized effects to untrained tasks. During each of the follow-up sessions children performed all seven task steps independently. They were engaged in task completion 100% of the time and required no teacher prompts. The similarities between each child's performance throughout the study are analyzed below. The similarities between
the four children are important considering the extent of the children's developmental delays ranged from 9 to 33 months.

Independent Task Completion

Figure 8 displays the mean number of independent steps for each child during each of the experimental conditions. The most striking aspect of these data is that each child performed similarly within each of the experimental conditions. Additionally, training to use the auditory prompt device resulted in similar changes in the level of children's independence in task completion. There is some variability in the children's mean number of independent steps, during the completion of generalization tasks. (See Figure 9). During baseline Derek performed significantly fewer steps in comparison to the Isabel, Emma and Andre. During the alone with bunny condition when the auditory prompt device was present without training, none of the children performed any of the task steps independently. Following training, the children performed similarly during the maintenance and follow-up conditions.

Child Engagement

During the initial baseline condition there were greater similarities between children's engagement during training tasks than untrained tasks (See Figures 10 and 11). Child engagement during the second baseline condition dropped significantly for all children regardless of the task. During the completion of training tasks child engagement increased significantly for all children when trained to use the auditory prompt device. The children's level of engagement maintained during the subsequent maintenance
Figure 8. Mean number of independent steps during the completion of training tasks for each child during each of the experimental conditions.
Figure 9. Mean number of independent steps during the completion of generalization tasks for each child during each of the experimental conditions.
Figure 10. Mean percent of intervals of engaged time during the completion of training tasks for each child during each of the experimental conditions.
Figure 11. Mean percent of intervals of engaged time during the completion of generalization tasks for each child during each of the experimental conditions.
conditions when they were left alone with "Bunny" or when completing tasks without "Bunny". Furthermore, following training to use the auditory prompt device children level of engagement significantly increased and maintained during the completion of untrained tasks (i.e. generalization tasks).

**Teacher Prompts**

With regard to the percentage of intervals in which teacher prompts were given there was clearly more prompting during baseline one than during any other condition for both the training and generalization tasks (See Figures 12 and 13). Teacher prompts decreased for each child during the maintenance condition when the auditory prompt device was (Alone with Bunny) and was not (No Bunny) available. Two of the children, Isabel and Andre, required no teacher prompts during a two week follow-up session.

**Social Validity**

Following the completion of the study, each of the children, the two classroom teachers and 20 teachers who were naive to the study were asked to complete a questionnaire regarding the effectiveness of the use of the self-operated auditory prompt device to increase independent child engagement. The 20 naive teachers viewed and rated the behavior of children performing either trained or generalization tasks during 10 two-minute segments of videotape that were filmed throughout the study.

**Children's responses to Questionnaire.** Table 8 summarizes three of children's responses to questions that were read to them.

The use of smiling, sad and indifferent faces assisted children to
Figure 12. Mean percent of intervals of teacher prompts for each child during the completion of training tasks for each of the experimental conditions.
Figure 13. Mean percent of intervals of teacher prompts for each child during the completion of generalization tasks for each of the experimental conditions.
Table 8.

Summary of Children's Responses to the Child Satisfaction Questionnaire.

<table>
<thead>
<tr>
<th>Question</th>
<th>Isabel</th>
<th>Derek</th>
<th>Emma</th>
<th>Andre</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Did you like working with &quot;Idea Bunny&quot;?</td>
<td>Happy Face</td>
<td>Happy Face</td>
<td>Happy Face</td>
<td>Happy Face</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Yea Bunny</td>
</tr>
<tr>
<td>2. Did &quot;Idea Bunny&quot; help you to work better?</td>
<td>Happy Face</td>
<td>Happy Face</td>
<td>Happy Face</td>
<td>No Response</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Would you like &quot;Idea Bunny&quot; to stay in your classroom?</td>
<td>Happy Face</td>
<td>Happy Face</td>
<td>Happy Face</td>
<td>No Response</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Yea</td>
</tr>
<tr>
<td>4. Would you like to use &quot;Idea Bunny&quot; to help you do new things?</td>
<td>Happy Face</td>
<td>Happy Face</td>
<td>Happy Face</td>
<td>No Response</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Yea</td>
</tr>
<tr>
<td></td>
<td>Isabel</td>
<td>Derek</td>
<td>Emma</td>
<td>Andre</td>
</tr>
<tr>
<td>---</td>
<td>--------</td>
<td>-------</td>
<td>------</td>
<td>-------</td>
</tr>
<tr>
<td>5. During free-choice what is the thing you like to do best?</td>
<td>&quot;Idea Bunny&quot;</td>
<td>Playdoh</td>
<td>&quot;Idea Bunny&quot; and Playdoh</td>
<td>He pointed to &quot;Idea Bunny&quot;</td>
</tr>
<tr>
<td>6. Is there anything you did not like about working with &quot;Idea Bunny&quot;?</td>
<td>No.</td>
<td>Yea. hearing his neck squeak (This is the sound heard when the tape is rewound)</td>
<td>Yea. because I have to stop something else. He's OK if I can use him another time.</td>
<td>No Response</td>
</tr>
<tr>
<td>7. Is there anything you did not like about the activities you worked on with &quot;Idea Bunny&quot;?</td>
<td>They were good.</td>
<td>They were good.</td>
<td>They were good.</td>
<td>No Response</td>
</tr>
</tbody>
</table>
answering four of the questions. The responses of Isabel, Derek and Emma were able to distinguish between the faces. The fourth child Andre, was not able to verbally respond to the questions asked and was not reliable in distinguishing between the happy, sad or indifferent faces used for the first four questions. The children who did answer all of the questions reported that they liked working with "Idea Bunny", he helped them to work better, they wanted him to stay in their classroom and help them to do new things. Two of the children, Isabel and Derek, chose "Idea Bunny as the thing they like to do best during free-choice. When asked if there was anything they did not like about working with "Idea Bunny" Emma and Derek responded by saying "yea". Specifically, Emma responded by saying he didn't like having to "stop something else" to use "Bunny" but "He's OK if I can use him another time". Derek said that he didn't like "hearing his neck squeak" (this is the sound made when the auditory tape is being rewound). All of the children said that the activities they worked on with "Idea Bunny" were "good".

Teacher Responses to Questionnaire. Both of the classroom child care teachers completed the questionnaire and answered yes to the first 10 questions (See Appendix H). The teachers responses to questions 11 through 14 are presented in table 9.

In general the teacher's responses were positive. The teacher's reported that "Idea Bunny" was an effective strategy that they wish to incorporate into their classroom. The teachers requested information on how to develop additional auditory
<table>
<thead>
<tr>
<th>Questions</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>11. What changes did you notice in the children's behavior during other times of the day, after they began to work with &quot;Idea Bunny&quot;?</td>
<td>I noticed the children were better able to problem solve independently. They also were able to work and play both as a group and independently without teacher assistance more consistently. The children were able to complete work/play tasks consistently and independently. The children are also problem solving much better.</td>
</tr>
<tr>
<td>12. What did you like about this program?</td>
<td>Marie based the activities on each child's abilities and thoroughly explained and trained each student so they were successful in using &quot;Idea Bunny&quot;. Marie thoroughly explained all procedures to the children before working with them. She is very personable and it was great to work with her. She also took great consideration in working within the limits of each child's abilities.</td>
</tr>
</tbody>
</table>
Table 9.

Summary of Classroom Teachers Responses to the Teacher Satisfaction Form (Cont.)

<table>
<thead>
<tr>
<th>Questions</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>13. What did you not like about this program?</td>
<td>There was nothing I did not like or enjoy about this program.</td>
</tr>
<tr>
<td></td>
<td>I can honestly say there was nothing to dislike about this program.</td>
</tr>
<tr>
<td>14. What suggestions do you have for modifications or improvements of the</td>
<td>I would like to incorporate the &quot;Idea Bunny as a center in my classroom. The children really enjoyed it and it increased their confidence in themselves by being successful at the tasks. I would modify the program by having more space for the center and vary the activities according to the children's IEP goals.</td>
</tr>
<tr>
<td>program?</td>
<td>I would like to incorporate this into my classroom. This is a great way to practice or fine tune IEP goals. This would become a permanent center in my room. The only things I would modify are: (1) more variation in activities, (2) more space (larger area) for the center set-up.</td>
</tr>
</tbody>
</table>
prompt tapes. The Magic Circle center has been expanded to occupy a larger amount of space within the classroom.

**Naive Teacher Ratings of Video Tapes and Responses to Questionnaires.**

All 20 of the teachers were enrolled in a graduate course in Early Childhood Special Education. Thirteen of the teachers held Bachelor degrees. One teacher held a social work degree and the remaining five teachers held Master of Arts degrees in Special Education. Seventeen of the teachers were currently teaching preschool. Two of the teachers held administrative positions in schools where there was at least one preschool class for children with special needs. The number of years experience ranged from less than one year to nine years. The teachers taught in a range of segregated, mainstreamed and full inclusion classrooms with most of the children being three to six years of age. The children that were taught by the teacher ranged from those who were typically developing to children with mild to severe disabilities. Tables 10 and 11 provide a summary of the teachers responses to the children's behavior as well as their responses to the program satisfaction form.

Teacher responses to observations of children were fairly consistent (See Table 10). Sixteen teachers thought that using "Idea Bunny" to increase children's independent work/play skills was an effective strategy (See Table 11). One teacher responded "No" and three were unsure if "Idea Bunny" was effective. Fourteen of the teachers would like the Magic Circle and "Idea Bunny to be a
### Table 10

**Summary of Agreement of Naive Teacher Social Validity Survey.**

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Dependent upon Teacher Prompts?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>19</td>
<td>13</td>
<td>20</td>
<td>1</td>
<td>20</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>17</td>
<td>2</td>
</tr>
<tr>
<td>No</td>
<td>1</td>
<td>7</td>
<td>0</td>
<td>19</td>
<td>0</td>
<td>18</td>
<td>20</td>
<td>20</td>
<td>3</td>
<td>18</td>
</tr>
<tr>
<td>2. Completing task appropriately?</td>
<td></td>
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<tr>
<td>Yes</td>
<td>11</td>
<td>15</td>
<td>0</td>
<td>20</td>
<td>0</td>
<td>18</td>
<td>20</td>
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<td>5</td>
<td>20</td>
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<td>2</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
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<tr>
<td>3. How independent?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>1- Very dependent</td>
<td>1</td>
<td>1</td>
<td>9</td>
<td>0</td>
<td>17</td>
<td>0</td>
<td>0</td>
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<td>0</td>
<td>1</td>
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<td>11</td>
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<td>4</td>
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<td>3- Average</td>
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<td>2</td>
<td>1</td>
<td>7</td>
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<td>3</td>
<td>4</td>
<td>2</td>
<td>9</td>
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<tr>
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<td>0</td>
<td>0</td>
<td>6</td>
<td>0</td>
<td>4</td>
<td>16</td>
<td>16</td>
<td>1</td>
<td>10</td>
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Table 11

Summary of Teacher Satisfaction for Naive Teachers

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
<th>Not sure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Do you think that using &quot;Idea Bunny&quot; to increase children's independent work/play skills was an effective strategy?</td>
<td>16</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>2. Would you like the &quot;Magic Circle center and &quot;Idea Bunny&quot; to be a part of your classroom?</td>
<td>14</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>3. Do you think the ability to work/play independent of teacher attention is an important skill for success in kindergarten?</td>
<td>20</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4. Would you like to learn to train other children to use &quot;Idea Bunny&quot;?</td>
<td>12</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>
part of teacher their classroom. Three did not want it in their classroom and three were unsure. All 20 teachers thought the ability to work/play independent of teacher prompts is an important skill for success in kindergarten. Twelve teachers would like to learn to train children to use "Idea Bunny". Four teachers did not want to learn how to train other children. The remaining four teachers were unsure.
CHAPTER V
DISCUSSION

The results of the study investigating the effects of a self-operated auditory prompt device on the acquisition, maintenance and generalization of independent work skills with four preschool children with disabilities are discussed in this chapter. Individual and group performance on independent step completion, child engagement and teacher behaviors are analyzed. The areas of discussion include: (a) limitations to the study, (b) results of the study relative to the research questions, (c) implications for practical application and, (d) suggestions for future research.

Limitations of the Study

Child Characteristics

Four children ages 49 to 65 months participated in this study. The Battelle Inventory of Early Development was administered to each child. Results showed overall developmental delays ranging from 9 to 39 months. Three of the children were delayed 9 to 18 months. A fourth child (Andre) was 33 months delayed in his development. Andre was the only child who experienced delays.
in expressive language (48 months). It is not known if the effects of the self-operated auditory prompt device would produce similar effects with other individuals with different disabilities, skill levels or ages.

**Experimental Setting**

The research setting was the children's special education classroom, within a private nonprofit preschool located in a large urban city in the Midwest. The study was conducted in an activity center called "The Magic Circle" which was created for the completion of independent table time activities. Despite the designation of one area of the classroom for the completion of table time tasks, all variables could not be controlled. The extent to which variability in the classroom environment such as visitors, substitute teachers, special events, changes in routine and noise level had on the outcomes could not be measured.

**Experimenter**

The experimenter, a doctoral candidate in Applied Behavior Analysis and Special Education at The Ohio State University, served as the teacher in this study. All of the cues to participate, prompt to complete tasks and training were conducted by the experimenter. The present study did not measure children's performance during direct interactions with the classroom teachers. Children may have behaved differently in the presence of the classroom teacher, parent or another person.
Observers

Two doctoral students in Applied Behavior Analysis and Special Education at the Ohio State University recorded both child and teacher behavior. The data collectors sat in child size chairs, within the children's view, approximately eight feet from the "Magic Circle" activity center. It is not possible to determine the reactive effect observers may have had on the children's performance.

Length of Sessions

Daily sessions for each child lasted an average of five and a half minutes. The extent to which the children could maintain their level of independent engagement during longer sessions is unknown.

Number of Activities Trained

A total of five activities were used to train children to operate a self-operated auditory prompt device. These activities were used throughout the study with some variability in the exact materials used. For example, the Parquetry Pattern activity consisted of a basket of shapes and 10 different design cards. Children could choose any one of the 10 design cards to complete during the session. Despite the large variety of different age and developmentally appropriate tasks that could have been chosen for use in this study only a small sample of five were selected. The children's performance may have been effected by the use of a larger number or a different selection of tasks.
Number of Generalization Tasks

Two untrained tasks were chosen to measure the generalized effects of the use of the self-operated auditory prompt device. Each of the untrained tasks were different from the training tasks but contained similar components. The effect of the use of a limited number and type of untrained tasks on the outcomes of the study is unknown.

Number of Generalization Sessions

The experimenter intentionally limited the number of generalization probes to reduce possible practice effects with untrained tasks, however the total number of generalization probes sessions were further for each child was limited due to child absences from school as well as the availability of the second observer. Child absences and observer availability also reduced the number of generalization sessions in which interobserver agreement measures could be calculated.

Research Question One

Can preschool children with disabilities be trained to use a self-operated auditory prompt device to complete age and developmentally appropriate tasks?

All of the children learned to follow each of the component steps for the operation of "Idea Bunny" including: (a) pressing the pedal and listening to "Bunny's" words, (b) stopping at the beep, and (c) doing what "Bunny" said. During the first training session there were immediate robust changes in the children's performance for each of the dependent variable measures which include: number of
each of the dependent variable measures which include: number of independent steps, child engagement and teacher prompts (See Figures 1 and 2).

Results of the present study extend the previous line of inquiry investigating the effects of auditory prompt devices with adolescents (Alberto et al., 1986; Briggs, et al., 1990; Schultz, 1991) and adults (Trask, et al., 1989) to preschool children with disabilities. In general, training preschool children with disabilities to operate "Idea Bunny" parallels previous studies demonstrating that preschool (Sainato, et al., 1990; Sainato, et al., 1992; Sainato, Goldstein & Strain, 1992) and elementary school children (Thomas, 1976; Holman & Baer, 1979; Hallahan et al., 1982; Hallahan et al., 1982; Rhode et al., 1983) can learn to follow procedures that will result in increases in independent engagement.

The results of the present are similar to Brandt's (1992) findings and provide support her conclusion that children can be taught to use a self-operated auditory prompt device to complete independent table time activities. When comparing the results of Brandt's study and the present study three factors should be considered. First, there were differences in the age of the children who participated in each study. Developmentally the children in the present study ranged in age from 32 to 46 months. In comparison three of the children who participated in Brandt's (1992) study performed at a higher level of development with ages that ranged from 37 to 50 months. A fourth child in Brandt's
Second, the number of sessions used to train the children in each study differed. Brandt (1992) conducted a mean of 14 training sessions (range of 7 to 20 sessions). During the present study training took a mean of 19 sessions (range of 15 to 24 sessions). These differences are significant.

Third, in Brandt's (1992) study only the two eldest children learned to complete 6 to 7 steps with training. The remaining two children failed to achieve a consistent performance at or above six steps. In the present study, all of the children learned to complete 6 to 7 steps independent of prompts. This level of performance was maintained during subsequent conditions (maintenance and follow-up). In comparison to Brandt's (1992) study, the greater number of training sessions conducted across the four children in the present study are justified in relative to the level of independence achieved and maintained by each child, regardless of their developmental age.

Research Question Two

What is the effect of the use of a self-operated auditory prompt device on independent choice and completion of table time activities with preschool children with disabilities within the classroom?

For all four children, the use of the auditory prompt device resulted in significant increases in independent choice and completion of table time activities. Prior to training children
completed three or fewer independent task steps. Following training children consistently maintained their level of independent step completion at 6 to 7 steps when alone with bunny. The performance of children in the present study is similar to the performance of two of the children in the Brandt (1992) study who consistently completed 6 to 7 steps independently, following training. The remaining two children in Brandt’s (1992) study made less significant gains in independent step completion with a mean 5 steps following training. Previously, researchers have reported similar gains in independence for adolescents and adults following training to use a self-operated auditory prompt system for the completion of various domestic self-care and vocational tasks (Alberto et al., 1986; Briggs, et al., 1990; Schultz, 1991; Trask, et al., 1989).

Research Question Three

What is the effect of the self-operated auditory prompt device on children’s active engagement in task completion?

In this study the amount of time spent actively engaged in task completion increased for all four children, following training to use the auditory prompt device. During the baseline condition two of the four children (i.e. Isabel and Emma) were engaged 70% (mean) of the time. The remaining two children engaged in task completion at a much lower level at 47.5% (mean). During the initial alone with bunny condition when the auditory prompt device was available without training, engagement decreased for all of the children to a mean of 19% and a range of 12% to 25.5%.
Decreases in the children's level of performance when the auditory prompting device introduced without training was due to the novelty of "Idea Bunny" which served as an effective distracter. In addition, children were not able to operate the device correctly without training. The children would attempt to operate the auditory prompting device in one of two ways. Either they would press the pedal advancing the tape from beginning to end without stopping, or they would repeatedly push and release the pedal so as to advance the tape without hearing the words on the tape. For example, during the first baseline session with the auditory prompt device Isabel repeatedly pushed and released the pedal. Half way through the tape she stood up from her seat, told the experimenter it needed batteries and left the Magic Circle area. In contrast, Derek would talk to "Bunny", patting him on the head and asking him questions, while pressing the pedal and advancing the tape from beginning to end without attending to "Bunny's" words or following his directions. When the children were trained to use the auditory prompting device engaged time increased to a range of 87% to 91% across the four children. Engagement remained at consistently high levels following training for all of the children (range of 88% to 99.4%).

These results support Brandt's (1992) conclusion that a self-operated auditory prompting device can effectively increase preschool children's active engagement during the completion of independent table time activities. Following training, the results of the present study show similar increases active engagement.
that were attained by all four children in Brandt's study. Prior to training, differences between the two studies must be considered when discussing the similarities in the children's behavior. First, during baseline each of the children in Brandt's study were engaged at much higher levels, with a range of 52% to 88%, than the children in the present study. Second, the children in Brandt's study remained actively engaged at higher levels when the auditory prompt device was introduced without training, during the alone with bunny condition. Furthermore Brandt did not measure engagement during the training condition. These differences provide support for the contention that the present study extends the effectiveness of the self-operated auditory prompt device to children who demonstrate initially lower levels of active engagement during the completion of independent table time activities.

Previous studies using auditory prompting devices to increase independent performance have not provided measures of engaged time. The primary dependent variable measured in these studies was the number or percentage of task steps completed independently (i.e., mastery of task completion). Thus comparisons between previous studies and the present one are unable to be made. However, Alberto (1986) did incorporate a time component to his criterion of mastery. This provided a contingency for students to complete the vocational assembly task, use of a washing machine and food preparation within the range of time a non disabled person would require.
Research Question Four

What is the effect of the self-operated auditory prompt device on the frequency of teacher prompts during table time activities?

Use of the self-operated auditory prompting device resulted in significant decreases in the percent of teacher prompts delivered to all four children. During the baseline condition the children received teacher prompts between 13% to 30% of the time. Following training to use the auditory prompt device the percent of teacher prompts received dropped significantly for all of the children to below 4.6% and as low as 1.3%. Of the four children Andre received teacher prompts for a greater percentage of the time than the other children with a baseline mean of 30% and a post training mean of 4.6%. In summary, there is evidence to support the contention that stimulus control transferred from the teacher to the auditory prompt device.

The results of this study support Brandt's (1992) findings which show significant decreases in the percent of teacher prompts following training to use the auditory prompt device. In Brandt's study teacher prompts ranged from means of 22% to 50% during baseline to 3% to 10% following training to use the auditory prompt device. In comparison, the children in Brandt's study required a greater percentage of teacher prompts throughout the study, than the children who participated in the present study. One general conclusion that can be drawn from these results is that despite differences in the age and level of development all of the children who have participated in these studies, the percentage of
teacher prompts has been significantly reduced during the completion of table time activities following training to use the auditory prompt device.

All of the previous studies reported decreases in the amount of prompts adolescents or adults required during the completion of various self care, domestic or vocational tasks (Alberto et al., 1986; Briggs, et al., 1990; Schultz, 1991; Trask, et al., 1989). Stemley, (1992) study is the only study reporting no change in teacher prompts for any of the participants trained to use a self-operated auditory prompt device.

Research Question Five

To what extent does independent task completion using the self-operated auditory prompt device maintain following training?

All four children maintained their level of independence following training to use the self-operated auditory prompt device. During the alone with auditory prompt condition the number of independent steps completed ranged between 6 to 7 steps, child engagement ranged between 87.6% and 98%, and teacher prompts ranged between 1.3% and 4.6% across the four children. In conclusion children made significant improvement on all three of the dependent variable measures. These results are consistent with the performance of three of the children who participated in Brandt's study. There was insufficient data to determine maintenance of treatment effects for the fourth child in Brandt's study.
The results of this study provide additional support to investigations reporting the maintenance of independent task completion following intervention (Alberto et al., 1986; Briggs, 1990). Several examples are described below. The three adolescents with severe disabilities who participated in Alberto et al. (1986) continued to complete tasks at a high level of competency for two week and eight month probes. In Briggs (1990) study students trained to complete domestic tasks to 100% mastery using a walkman-type tape player with headphones, maintained their level of independence for at least four weeks.

**Research Question Six**

*What is the effect of the removal of the self-operated auditory prompt device on maintenance of children's independent task performance?*

For all four children, removal of the auditory prompt device resulted in slight increases in child engagement with means ranging between 94% and 99.5%. The percentage of interval in which teacher prompts were provided decreased slightly for Derek, Emma and Andre (i.e. 45%, 75% and 3.2%). For Isabel teacher prompts maintained at 1.3%. The number of independent steps completed maintained between 6 to 7 steps. These results are consistent with the maintenance data which is reported for two of the children in the Brandt study. Maintenance data were not collected from the remaining two children. Thus far the conclusion that can be drawn from these results is that improvement in children's independent work skills maintains following removal of...
the auditory prompt device. One previous study Briggs (1990) reported on three teenage boys with who developmental delays maintained their independent completion of domestic tasks at 100% in the absence of the auditory prompt device.

**Research Question Seven**

*To what extent does independent task completion generalized to untrained tasks?*

This study represents the first attempt to measure the extent to which increases in independent work skills generalize to untrained tasks. Two conclusions can be drawn from the results of this study (a) children can generalize the use of the auditory prompt device to untrained tasks that contained similar component to trained tasks, and (b) children maintain their level of independent work skills following the removal of the auditory prompt device.

With regard to the generalized use of the auditory prompt device to untrained tasks all four children began to correctly operate the auditory prompt device to complete untrained tasks during the training condition. During the baseline, alone with bunny and training conditions each child showed different patterns in their performance during the generalization probes. Following training there are two significant differences in the children's behavior that should be noted: (a) the children performed similar to each other during the completion of generalization tasks and (b) children performed at the same level of independence on both the trained and untrained tasks.
One explanation that may account for the generalized use of the auditory prompt device is the planned and unplanned adoption of strategies that promote the generalization of behavior change (Stokes & Baer, 1977). Teaching enough examples was the first strategy employed. The experimenter attempted to select training tasks that required a range of skills (i.e. counting, sorting, matching, sequencing) typically used in preschool activities.

Secondly, the auditory prompt device and the "Magic Circle" may have served as a common stimuli for the completion of independent table time tasks including the generalization tasks. The environment in which the children completed either the trained or untrained tasks was the same therefore one might expect transfer of training to the untrained tasks.

Third, the generalization tasks were selected incorporated elements of the tasks used in training (i.e. program common stimuli. For example, the "Dress Me" activity is a generalization task that is similar to the "Where I Live" activity. In the "Where I Live" activity the child matches pictures of animals (e.g. horse, whale), vehicles (e.g. tractor, boat, station wagon), and things (e.g., telephone, window) to the place where they are found (i.e. house, barn or ocean board). The "Dress Me" activity also involves matching pictures. To complete the "Dress Me" activity the child match’s pictures of different articles of clothing (e.g. socks, shirt, short) and things you wear on your body (e.g. glasses, or a baseball mitt) to the part of the body on the "Dress Me" board on which you would wear them (i.e. head, legs, chest, hand, and feet). Given
untrained tasks that were very different from the trained tasks the children may not have generalized use of the auditory prompt device.

In addition to the generalized use of the auditory prompt device to untrained tasks all four children maintained their level of independent performance following the removal of the auditory prompt device. These results suggest that with appropriate selection of training tasks teachers could successfully program the generalized use of the self-operated auditory prompt device to a large variety of untrained.

Results of the generalized use of the auditory prompt device in the present study are similar those obtained by Trask, Grossi and Heward (1989) and Briggs (1990). Trask et. al. (1989) taught three adults with vision impairments and developmental disabilities to complete simple microwave recipes using a self-operated auditory prompt system. All three adults successfully generalized use of the auditory prompt device to complete untrained recipes which contained similar preparation to those used during training. With minimal additional training Briggs (1990) taught three adolescents with disabilities to generalize use of an auditory prompt device to new tasks and settings.

**Research Question Eight**

*What are teachers opinions on the use of the self operated auditory prompt device?*

All 20 of the teachers who were naive to this study as well as the two classroom teachers noted that the ability to work/play
independent of teacher attention is an important skill for success in kindergarten. This opinion supports previous research efforts investigating factors which are critical for success in kindergarten (Carta et al., 1990; Fowler et al., 1991; Sainato, et al., 1989).

With regard to the self operated auditory prompt device the majority of the teachers responded favorably to use of "Idea Bunny" as an effective strategy to increase children's independent work and play skills. When asked if teachers would like the Magic Circle and "Idea Bunny" to be a part of their classroom, the majority of teachers answered yes. This study has resulted in a strong measure of acceptability. The two classroom teachers have made plans to make the Magic Circle a permanent activity area in their classroom. The teachers have also asked the experimenter to provide information to develop additional task tapes, train other children and measure children's progress. The responses of the teachers in this study are similar to those expressed by over 200 teachers obtained by Brandt et al. (1992) at various national conferences.

Research Question Nine
What are children's opinions of the use of the self operated auditory prompt device?

When asking questions of children who are young and experiencing developmental delays it is appropriate to question the reliability of their responses. With regard to the questionnaire presented to the four children who participated in this study, all
responded that they liked working with "Idea Bunny", he helped them to work better, they wanted him to stay in the classroom and, they wanted him to help them do new things. The children's responses are what an experimenter wants to hear after completing a study. What matters, however, is not what the children said but what they did. When "Idea Bunny" was no longer being used on a daily basis children asked the experimenter each day where he was and when he would be back. When the experimenter was informed by the classroom teachers that they wished to keep the Magic Circle and "Idea Bunny" the experimenter informed the children that he was on vacation and would return in the fall. One of the children, Derek, was upset. Derek knew the experimenter was moving out of town and he was concerned that "Idea Bunny" should stay with her. A compromise was made. Instead of "Idea Bunny" his friends "Busy Bear" and "Idea Dog" will take his place. In addition, the children who were not selected for participation in the study would frequently ask when it was their turn. They were told that everyone would have a turn at the end of the study, and they did.

Implications for the Classroom

Several researchers have described critical variables for success in kindergarten (Carta et al., 1990; Fowler, et al., 1990; Sainato & Lyons, 1989). Carta et al. (1990) compared the ecobehavioral environments of special preschool and kindergarten settings. Researchers found that children in the special preschool were more likely to be engaged in table time activities that
children in the regular kindergarten setting. Researchers also found that teacher prompting occurred at higher rates during pre-academic and fine motor activities, which are crucial for future success. In contrast, children in regular kindergarten received higher rates of teacher prompts during story time or free-play. Kindergarten classrooms often consist of a higher child to teacher ratio (Carta et al., 1990).

Children with disabilities who transition into a Kindergarten classroom unprepared to function in an independent fashion may not receive the level of prompts necessary to benefit from opportunities to engage in task completion. McWilliam (1991) summarized the benefits of engagement in task completion as follows: engagement promotes learning, prevents or reduces problem behaviors, and provides opportunities for children to come into contact with reinforcement (McWilliam, 1991). Effective strategies which present a positive, developmentally appropriate approach to intervention with young children are needed.

This study presents the second successful attempt to teach independent work/play skills to children with disabilities through the use of a self-operated auditory prompt device. Training children to use the self operated auditory prompt device produced robust changes in both teacher and child behavior. For children, significant increases in independent task completion and child engagement were observed. As children became more competent using "Idea Bunny" teacher prompts decreased to near zero. The
results of this study present several implications for the classroom.

Children who are dependent upon high frequencies of teacher attention often have difficulty completing tasks independently. When teacher attention is not available these children may engage in behavior considered inappropriate which will produce teacher response. These behaviors are often noted as problems by teachers and parents. When analyzed these behaviors are very appropriate and functional. The problem is not the child but is rather a problem of stimulus control. Stimulus control is established when a response is followed with reinforcement and the stimulus is correlated by an increased frequency of reinforcement (Cooper et al., 1987). For example, Tony is one of six children sitting at the art table. The teacher gives the children simple instructions to complete an activity. Tony has the skills to complete the activity but does not begin to work on the task. The teacher prompts Tony to begin working, and he does. As the teacher moves away from Tony to help other children he stops working and begins to poke the child sitting next to him with his glue bottle. From across the other side of the table the teacher says Tony finish your work. Tony responds by saying "I can't, I don't know how". The teacher walks back to Tony to review the directions and prompt him to work again. As the teacher moves away from Tony again he again stops working and begins rocking back and forth in his chair. This pattern of interaction between Tony and the teacher continues until the art session has ended. From a behavior analytic
perspective the teacher serves as a discriminative stimulus for Tony to follow direction. When the teacher is in close proximity Tony follows teacher prompts to do his work. When the teacher moves away or directs her attention to another child Tony begins to engage in behavior which results in the teacher presence and prompts. The teacher reinforces Tony's behavior each time she returns to address his behavior and provide another prompt. This situation is similar to interactions observed between the children selected for the present study and their teachers.

The transfer of stimulus control is a strategy which is used to change the control of behavior from one stimulus. "Stimulus manipulation procedures include stimulus fading and stimulus shaping," (Cooper et. al., 1987). In the present study the function of "Idea Bunny" was to provide an alternative stimuli that would occasion child engagement in task completion independent of teacher prompting. Training was conducted to train children how to operate "Idea Bunny" while gradually fading teacher prompts and the teacher's presence, leaving the child to work alone with auditory prompt device. The results of this study indicate that transfer of stimulus control from the teacher to "Idea Bunny" was effective. Maintenance of children's level independent work skills following removal of the auditory prompt device suggest that "Idea Bunny" is an effective strategy which provide and intermittent step that can be used by teachers to bridge the jump between child dependence upon teachers and independence.
Currently in early childhood education the selection of materials and classroom arrangements and activities is dependent upon developmentally appropriate practice. In early childhood special education developmentally appropriate practice is addressed through a child oriented, center based approach to intervention which addresses children's educational need through embedded goals within the context of play. "Idea Bunny" presents an age and developmentally appropriate approach to increase children's independence as well as providing children the opportunity to practice and refine fine motor and pre-academic skills. Furthermore, "Idea Bunny" is appropriate for all young children, not only those with disabilities.

One factor that influences whether effective technology is accepted and used by teachers is the response cost involved to incorporate its use into the classroom. The results of this study indicate that the teachers involved in the study agree that "Idea Bunny' is an effective strategy. The teachers have made plans to keep the Magic Circle center and use "Idea Bunny" throughout the year for children with and without disabilities. The teachers did express two concerns related to materials and training. First, with regard to materials the process involved to develop the new task tapes may prove to be too time consuming and labor intensive. Second, one on one training may not be feasible with limited time and high teachers-students ratios within the classroom. The total amount of time taken to train children who participated in the present study ranged between approximately 45 minutes and 2
hours. With further research and development a larger selection of task tapes as well as an efficient training "Idea Bunny" may be possible. This would allow the use of "Idea Bunny" to fit within the limitations of many programs.

**Suggestions for Future Research**

The use of self-operated auditory prompt devices with young children with disabilities is a relatively new line of inquiry which began with Brandt (1992). Results thus far have produced support for three conclusions: (a) children can be taught to use "Idea Bunny", (b) correct use of the auditory prompt device results in increased independent work/play skills, (c) independent performance maintains following the removal of the auditory prompt device and (d) children generalize use of the auditory prompt device to similar but untrained tasks. When considering the needs of young children with disabilities and what is presently known about the effects of the self-operated auditory prompt device it is appropriate to discuss questions that remain unanswered. The following are suggestions for future research on the use of the self-operated auditory prompt device to increase independent work skills.

First, this approach to teaching independent work skills has proven effective with children ages 4 and 5 who were 9 to 33 months delayed in their development. Replications and extensions of this study to children of different ages and levels of functioning are needed. Additionally, if this strategy is used in the
mainstream, or inclusion classrooms questions regarding its effect with children who are typically developing need to be addressed.

Effective application of this approach was expanded to include a child, Andre, who was mildly mentally retarded and without expressive language and exhibiting low receptive language. Because of the nature of the intervention, which requires a child to listen to direction and follow them, receptive language skills are considered a necessary prerequisite skill. The extent to which expressive language skills are necessary to learn to use the auditory prompt device is unclear. Further implementation is needed with individuals with language deficits of varying degrees to determine how appropriate or effective this intervention may be to increase children's independence and shape children's ability to follow directions.

Previous studies and the present study used five activities to measure the effect of the use of the auditory prompt device on independent task completion. The activities chosen include table-time activities which required children to engage in pre-academic skills such as counting, matching, and sorting. These activities encompassed a small portion of the variety of appropriate activities which could be used. Further examination is needed to investigate the range of activities that may be independently completed using "Idea Bunny".

Several questions remain unanswered regarding the generalized effects of independent child engagement following training to use the self-operated auditory prompt device. First,
this study represents the first attempt to measure the generalized effects of "Idea Bunny" with similar tasks that were not trained. The extent to which independent task completion will generalize to different activities is unclear. Second, the Magic Circle represents the only type of setting in which children have been trained and observed using "Idea Bunny". The extent to which use of the auditory prompt device may be appropriate and effective in other settings with in the classroom (i.e. art center, snack center, science center) is not known. Third, the data collected during two and four week follow-up probes support the contention that independent work/play skills maintain following removal of "Idea Bunny". The long term maintenance and transfer of skills to kindergarten classrooms is unknown. Finally, to date the primary intervention agent has been the experimenter. Experimenter have served as the teacher and trainer of children who participated in the previous study (Brandt, 1992) and the current study. Ultimately the goal of this line of inquiry is to provide teachers with an effective intervention to help prepare children for success in Kindergarten and the later grades. The effective tactics to train teachers to run the program and measure children's performance are unclear. Also, the integrity of the application of the experimental procedures and the effects of training when the classroom teacher serves as the primary intervention person are not known.

The training procedures used in this study involve one on one instruction in the Magic Circle activity center. Training typically
took place for five minutes a day for one to three weeks. In preschool and Kindergarten classrooms training children to use "Idea Bunny" one at a time may not be feasible for all children. The response cost of training each child one on one may be too high for teachers to incorporate "Idea Bunny" into their program. Alternative training strategies need to be investigated. Specifically, group training or peer training strategies may prove effective and efficient.

Summary

One of the primary goals of early intervention is to "promote child engagement, independence and mastery" (Bailey & Wolery, 1992, p. 35). The success of children in less restrictive kindergarten environments is facilitated by a curriculum that promotes the development of independent work/play skills necessary to meet the demands of an environment where independence is expected and less teacher attention is available.

Previous studies established the use of self-operated auditory prompt systems as an effective strategy to provide which facilitate instruction, generalization, and maintenance of self-care domestic and vocational skills with adolescents and adults (Alberto et al., 1986; Briggs et al., 1990; Schultz, 1991; Trask et al., 1989; Davis, et al., 1992). Success with adolescents and adults led to further investigation and application to young children with disabilities (Brandt, 1992).

The present study represents the second study in a line of inquiry to investigate the effects of a self-operated auditory
prompt device on the acquisition, maintenance and generalization of independent work skills. The dependent variables measured in the present study include: (a) number of task steps completed independent of teacher prompts, (b) child engagement, and (c) teacher prompts. Training children to operate the "Idea Bunny" consisted of modeling and shaping correct use of the auditory prompt device and fading teacher prompts. Following the training condition each child operated the auditory prompt system by themselves. The auditory prompt system was then removed to measure the maintenance of independent work skills without "Idea Bunny". Generalization to untrained tasks was measured throughout the study.

Results of the study indicate that all four children learned to operate the self-operated auditory prompt device. Following training increases in child engagement and independent task completion were observed. Observations also show decreases in teacher prompting. All four children maintained their levels of independent performance when working alone with and in the absence of "Idea Bunny". Finally, all four children generalized and maintained their level of independence with tasks that were not trained.

Children and classroom teachers indicated that the Magic Circle and "Idea Bunny" was an effective strategy. The children expressed their want to have "Idea Bunny" as a permanent part of their classroom. The classroom teachers support the children's desire and plan to incorporate the Magic Circle as a part of the
school curriculum. The majority of teacher's naive to this study also indicated that use of the self-operated auditory prompt device was an effective strategy to increase children's independent work skills.

Research investigating the application of self-operated auditory prompt devices is relatively new. The effect of the self-operated auditory prompt device across different tasks, settings and children is unclear. In addition, questions related to training and cost effectiveness need to be answered.
LIST OF REFERENCES


Cooper, J. O., Heron, T., & Heward, W. L. (1987). *Applied Behavior Analysis*. Merrill, Columbus, OH.


APPENDIX A

LETTER TO PARENTS AND
CONSENT FOR PARTICIPATION FORM
Dear ______________________,

I am a full-time graduate student at The Ohio State University. I am studying to earn a Doctorate in Special Education. As a requirement of this program, I am conducting a research project at the Dahlberg learning center. I am writing for your consent to include your son/daughter __________________________ in this research study. The study will be conducted in your child's classroom. The focus of this study is to teach children to independently choose activities and to complete activities independent of prompts from the teacher.

Attached is a form that gives your consent for __________________________ to participate in this study. If I have your permission please sign the attached form and return it to me in the enclosed envelope.

Please be assured that __________________________'s name will not be revealed in any publication, document, recording, videotape, photograph, computer storage or any other form of report or presentation developed from this research. Please feel free to call me, anytime, at my home if you have any questions or concerns related to this project. My telephone number is (614) 791-1119. If you are interested in the results of this study at its conclusion, I would be glad to talk with you about the.

Thank you for your consideration.

Sincerely,

Marie C. Ward M.S.
Parent/Guardian Consent Form
for Participation
in Educational Research

I agree to allow my child to participate in a research study to increase independent play and work skills in preschool children with special needs. This study will be conducted by Marie Ward, a doctoral candidate at The Ohio State University. This study will take place in my child's classroom until the end of the 1993-1994 school year. I understand that my child's identity will not be revealed in any publication, document, recording, video tape, photograph, computer storage, or in any other form of report or presentation developed from this research. I understand that I may withdraw my consent for my child's participation at any time.

_________________________ Name of Child

_________________________ Parent Signature _________ Date

_________________________ Marie Ward __________ Date
APPENDIX B

RELEASE OF INFORMATION FORM
RELEASE OF INFORMATION FORM

I _______________________________ hereby authorize ____________________________
( parent/guardian )

to release the following information to Dr. Diane Sainato and Marie C. Ward, M.S.,
Department of Educational Services and Research, The Ohio State University for the
purpose of providing descriptive information of ____________________________
for educational research.

_____ Medical records/Current Medication   _____ Social History
_____ Information on past services        _____ Educational Evaluations
_____ Educational treatment information  _____ Psychological evaluations

The doctrine of informed consent has been explained to me and I understand the
contents to be released and the need for information and that there are statutes and
regulations protecting the confidentiality of authorized information. I hereby
acknowledge that this consent is truly voluntary and is valid for a period of one year. I
further understand that I may revoke my consent at any time by giving written notice
to The Ohio State University. Such revocation does not affect the validity of my consent
for information disclosed prior to the revocation.

__________________________________________
Child's Name

__________________________________________    _______________________
Parent/Guardian Signature                  Date

__________________________________________    _______________________
Marie C. Ward                            Date
The Ohio State University
APPENDIX C

TASK SCRIPTS
Hello! Are you ready to have some fun with idea Bunny? Today we are going to match colored shapes to a design card. Go to the shelf and choose one (1) design card and the basket of different colored shapes, and bring both items back to the table (BEEP). Great you brought one design card and the basket of shapes back to the table. Now place the design card on the table so you can see the picture and match the shapes to the card comparing both the shape and color (BEEP). Super! Now that you have finished matching the shapes to the design put the shapes back into the basket (BEEP). Great job! Now that you have put all of the shapes into the basket stand up and carry the design card and the basket of shapes back to the shelf where you got them (BEEP). Wonderful! Now that you are finished with your work raise my ears and put them together so the teacher will come to check your work. I hope you had fun today. I did, see you again soon (BEEP).
Hello my friend! I am happy you came to see Idea Bunny today? Today we are going to have fun counting bears. Go to the shelf and find the basket of bears and the counting board. Bring both items back to the table (BEEP). Great you brought the counting board and the basket of bears back to the table. Now look at the counting board you will see the different colored numbers and dots. Match the bears to the dots under the numbers and count the bears into the cup. Keep working until you have counted bears into all of the cups (BEEP). Way to go! When you have finished counting bears into each cup put the bears back into the basket (BEEP). OK. Now that all of the bears are back in the basket stand up stand up and carry the basket of bears and the counting board back to the shelf where you got them (BEEP). Wonderful! Now that you are finished with your work raise my ears and put them together so the teacher will come to check your work. I had a great time playing with you today. See you again soon. (BEEP)
How are you today? Are you ready to have some fun? Today we are going to match pictures of animals, people and things to the places where you would find them. Go to the shelf and find the house, barn and ocean boards and the basket of pictures. Bring all of these items back to the table (BEEP). Great, you brought barn, house and ocean boards as well as the basket of pictures back to the table. Now that we have everything we need put the barn, house and ocean on the table so that you can see all of them at the same time (BEEP). OK. Now that you can see all of the boards take the pictures out of the basket and match each picture to the place where you would find it. Keep working until you have matched all of the pictures (BEEP). Great job! Now that you have finished matching each picture to the place where you would find it put all of the pictures back into the basket (BEEP). OK. Now that all of the pictures are in the basket stand up and carry the barn, house and ocean boards, and the basket of pictures, back to the shelf where you got them (BEEP). Wonderful! Now that you are finished with your work raise my ears and put them together so the teacher will come to check your work. I had fun today. I hope that you did too. See you again soon. (BEEP)
Hello! I'm glad you came to see me today. I have a great idea. Today we are going to complete pictures together. Go to the shelf and choose one (1) bag of picture cards and bring it back to the table (BEEP). Great, you brought one bag of picture cards to the table. Now take the cards out of the bag and put them on the table so the colored side of each picture is facing up. Choose one card and find the two cards that go with it to complete the picture. There are three cards for each picture. Keep working until each picture has been put together (BEEP). Great job! Now that you have put all of the pictures together put the picture cards back into the bag (BEEP). OK now that all of the picture cards are in the bag, stand up and carry the bag of cards back to the shelf where you got them.(BEEP). Wonderful!, Now that you are finished with your work raise my ears and put them together so the teacher will come to check your work. I hope you had fun today. I did, see you again soon (BEEP).
Hi there! Let's have some fun? Today we are going to sort vehicles such as planes, trains, cars, and boats. Go to the shelf and find the bucket of vehicles and the sorting tray. Bring both items back to the table (BEEP). Great you brought the bucket of vehicles and the sorting tray back to the table. Now, gently, pour the vehicles onto the table (BEEP). OK now that all of the vehicles are on the table, Compare the different shapes and sort the vehicles with same shape into a section of the sorting tray (BEEP). Great! now that you have finished putting all of the same shaped vehicles together put the vehicles back into the bucket (BEEP). Wonderful! Now that you have put all of the vehicles back into the bucket stand up and carry the sorting tray and the bucket of vehicles back to the shelf where you got them (BEEP). Well Done!, Now that you are finished with your work raise my ears and put them together so the teacher will come to check your work. It was great playing with you today. See you again soon (BEEP).
Word Match

Hi There! Do you want to have some fun? Today we are going to match letters of the alphabet to the letters on a word card. Go to the shelf and choose one (1) word card and the basket of letters. Bring both items back to the table (BEEP). Great you brought one word card and the basket of letters back to the table. Now place the word card on the table so you can see the word on the card, and find the letters in the basket that match the letters on the word card (BEEP). Super! Now that you have finished matching the letters to the word card put the letters back into the basket (BEEP). Great job! Now that you have put all of the letters into the basket stand up and carry the word card and the basket of letters back to the shelf where you got them (BEEP). Wonderful! You are finished with your work so raise my ears and put them together so the teacher will come to check your work. I hope you had fun working with me today. See you again soon (BEEP).
Hi there! Are you ready for some fun? Today we are going to match pictures of things you wear to the part of the body where you wear them. Go to the shelf and find the Dress me board that has pictures of a head, hands, legs, chest and feet, and the basket of pictures. Bring the Dress me board and the basket of pictures back to the table (BEEP). Great, you brought the Dress me board and the basket of pictures back to the table. Arrange the Dress me board so that you can see each body part on the board and take the pictures out of the basket. One at a time, pick up a picture and put it on the body part where you would wear it. Keep working until you have matched all of the pictures to the part of the body where you would wear them (BEEP). Terrific! Now that you have finished matching each picture to the place where you would wear it put all of the pictures back into the basket (BEEP). OK now that you have put all of the pictures back into the basket stand up and carry the Dress me board and the basket of pictures back to the shelf where you got them (BEEP). Wonderful!, Now that you are finished with your work raise my ears and put them together so the teacher will come to check your work. I had a great time today I hope that you did too. See you again soon (BEEP).
INDEPENDENT STEP COMPLETION DATA COLLECTION SHEET

Total # of Independent Steps _____  % Independent Steps _____

Child Name: ___________________________  Date: __________

Trainer: ________  Data Collector: ________  IOA: ________

Condition: With / Without Auditory Prompt System

Baseline / Training / Maintenance / Generalization

Code:

I= Independent
V= Verbal Prompt
M= Modeling
P= Physical Prompt
N= Incorrect, No response, or Refused

Parquetry Patterns

- Choose one (1) design card from the shelf  I  V  M  P  N
- Pick the bowl of shapes  I  V  M  P  N
- Take both items to the table  I  V  M  P  N
- Place the card on the table so the design is seen  I  V  M  P  N
- Match the shapes to the design pattern by color  I  V  M  P  N
- Place the shapes back into the bowl  I  V  M  P  N
- Return the shapes and the card to the shelf  I  V  M  P  N
INDEPENDENT STEP COMPLETION DATA COLLECTION SHEET

Total # of Independent Steps _____ % Independent Steps _____

Child Name: ___________________________ Date: _____________

Trainer: __________ Data Collector: __________ IOA: _________

Condition: With / Without Auditory Prompt System

Baseline / Training / Maintenance / Generalization

Code:
I= Independent
V= Verbal Prompt
M= Modeling
P= Physical Prompt
N= Incorrect, No response, or Refused

Bear Count

• Pick the counting tray and bears from the shelf  I  V  M  P  N
• Take both items to the table  I  V  M  P  N
• Turn the counting tray so the numbers are seen  I  V  M  P  N
• Read the number and count the dots on the counting tray  I  V  M  P  N
• Count that number of bears into the cup  I  V  M  P  N
• Put the bears back into the basket  I  V  M  P  N
• Return the counting tray and bears to the shelf  I  V  M  P  N
INDEPENDENT STEP COMPLETION DATA COLLECTION SHEET

Total # of Independent Steps _____   % Independent Steps _____

Child Name: _______________________  Date: __________

Trainer: ___________  Data Collector: ___________  IOA: ___________

Condition: With / Without Auditory Prompt System

Baseline / Training / Maintenance / Generalization

Code:

I = Independent

V = Verbal Prompt

M = Modeling

P = Physical Prompt

N = Incorrect, No response, or Refused

Where I Live

- Pick the pictures and habitat board from the shelf  I V M P N
- Take both items to the table  I V M P N
- Arrange the habitat board on the table  I V M P N
- Take the pictures out of the basket  I V M P N
- Match the pictures to the habitat  I V M P N
- Put pictures back into the basket  I V M P N
- Return the category board and basket to the shelf  I V M P N
INDEPENDENT STEP COMPLETION DATA COLLECTION SHEET

Total # of Independent Steps _____ % Independent Steps _____

Child Name: ___________________________ Date: ____________

Trainer: ___________ Data Collector: ___________ IOA: ____________

Condition: With / Without Auditory Prompt System

Baseline / Training / Maintenance / Generalization

Code:

I = Independent

V = Verbal Prompt

M = Modeling

P = Physical Prompt

N = Incorrect, No response, or Refused

Picture Sequencing

• Pick the basket of pictures from the shelf  I V M P N
• Take items to the table  I V M P N
• Take the pictures out of the basket  I V M P N
• Arrange the pieces on the table so the picture is seen  I V M P N
• Put the pictures in sequence  I V M P N
• Put the picture pieces in the basket  I V M P N
• Return the category board and basket to the shelf  I V M P N
INDEPENDENT_STEP_COMPLETION_DATA_COLLECTION_SHEET

Total # of Independent Steps _____  % Independent Steps _____

Child Name: _______________________  Date: _____________

Trainer: _________  Data Collector: _________  IOA: _________

Condition: With / Without Auditory Prompt System

Baseline / Training / Maintenance / Generalization

Code:

I= Independent

V= Verbal Prompt

M= Modeling

P= Physical Prompt

N= Incorrect, No response, or Refused

Vehicle Sort

• Pick the basket of vehicles and the sorting cups from the shelf  I V M P N
• Take both items to the table  I V M P N
• Take the vehicles out of the basket  I V M P N
• Place the similar vehicles into the same cup  I V M P N
• Repeat for each type of vehicle  I V M P N
• Place the vehicles back into the basket  I V M P N
• Return the cups and basket of vehicles to the shelf  I V M P N
INDEPENDENT STEP COMPLETION DATA COLLECTION SHEET

Total # of Independent Steps _____   % Independent Steps _____

Child Name: _________________________ Date: _____________

Trainer: __________  Data Collector: __________  IOA: __________

Condition: With / Without Auditory Prompt System
             Baseline / Training / Maintenance / Generalization

Code:
I= Independent
V= Verbal Prompt
M= Modeling
P= Physical Prompt
N= Incorrect, No response, or Refused

Dress Me Category Board

• Pick the category board and basket of pictures from the shelf  I V M P N
• Take both items to the table I V M P N
• Arrange the category board on the table I V M P N
• Take the pictures out of the basket I V M P N
• Match the pictures to the body parts I V M P N
• Put pictures back into the basket I V M P N
• Return the category board and basket to the shelf I V M P N
INDEPENDENT STEP COMPLETION DATA COLLECTION SHEET

Total # of Independent Steps _____ % Independent Steps _____

Child Name: ___________________________ Date: _____________
Trainer: ___________ Data Collector: ___________ IOA: __________
Condition: With / Without Auditory Prompt System
Baseline / Training / Maintenance / Generalization

Code:
I = Independent
V = Verbal Prompt
M = Modeling
P = Physical Prompt
N = Incorrect, No response, or Refused

Word Match

• Choose one (1) word card from the shelf  I  V  M  P  N
• Pick the bowl of letters  I  V  M  P  N
• Take both items to the table  I  V  M  P  N
• Place the card on the table so the word is seen upright  I  V  M  P  N
• Match the letters to the word card  I  V  M  P  N
• Place the letters back into the bowl  I  V  M  P  N
• Return the letters and the card to the shelf  I  V  M  P  N
Daily Data Collection: Auditory Prompt Study

Date: __________
Child: __________________________  Setting: __________________________
Observer: _______________________  Reliability: ________________
Condition: ______________________  Session: ________________

**Code:**
- **O** = On-task
- **Ø** = Off-task
- **W** = Waiting
- **D** = Disruptive
- **I** = Instruction
- **Pt** = Prompt
- **P** = Praise
- **N** = Negative
- **X** = No teacher interaction

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- Pt _____
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- N _____
- X _____
TRAINING DATA COLLECTION SHEET

CHILD NAME: ____________________ TRAINER: ____________________

CODE:  plus (+) = correct and independent or minus (-) = incorrect or with prompt

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<td>Follows direction</td>
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<td>Signals that he/she is done</td>
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APPENDIX E

DECISION RULES FOR DATA COLLECTION:
GENERAL INSTRUCTIONS AND GUIDELINES
Auditory Prompt Study
Observation and Data Collection:
General Instructions and Guidelines

1. Complete the top identifying information on each data sheet prior to beginning an observation session.

2. Each block on the data sheet represents a 5-second interval.

3. Within each block, the top codes (O O W D) represent child behavior.

4. Within each block, the bottom codes (I Pt P N X) represent teacher behaviors.

5. At least one letter code must be marked in each interval for both child and teacher behavior.

6. Child behavior must be coded as on-task, off-task or waiting in every interval.

7. An absence of teacher behavior is coded by marking an "X" in the interval.

8. On-task, off-task or waiting judgments are made at the tone at the end of each interval.

9. Disruptions and teacher behaviors are coded as they occur throughout the interval. Disruptions and individual teacher behavior can be coded only once per interval.

10. Only one occurrence of any given behavior can be coded per interval.

11. On-task or off-task supersedes waiting behavior (if duration's are equal) for coding purposes. An interval cannot have both on/off-task and a waiting marked.

12. Each observation interval begins and ends with the tone played on the 5 second continuous interval tape.
13. Each student is observed individually until his turn in the magic circle has ended. The end of an interval is indicated when the child has finished the task and left the area or the child says he is finished (regardless is the task is finished or not) and he leaves the magic circle area, or the experimenter indicates the session has ended.

14. An interval cannot have both disruption (D) and on-task (O) codes marked. Single brief disruptions (e.g. The child shouts a single word) are ignored unless their duration exceeds one-half of the interval.

15. When a child is excused from the magic circle or otherwise leaves the magic circle with permission (he/she is not off-task) record the child's absence by circling the interval following the completion of that interval.

16. Interobserver reliability is calculated on an interval by interval method and based on a point-by-point (code-by-code) comparison.

Decision Rules: Teacher Instructions; Finished Tasks; Waiting

1. During the teacher's initial instructions to a child a) teacher behavior should be coded as "I"; b) when the teacher states that it is time to work or that it is the child's turn to work in the magic circle or with bunny then all subsequent directions are coded as prompts; c) During instructions the child should be listening and their behavior should be coded as "O", "O", or "D".

2. A child cannot be waiting when a teacher is speaking to him or her.

3. The state of each task will be established before observation sessions. Observers will be told what the task will look like when it is finished. Likewise the child will be told what "finished" is.
a. The task is finished when either of the following conditions exist:

1. The task has been completed according to directions and meets the definition of finished, or

2. The child raises his/her hand indicating that the task is finished (the task may or may not meet the definition of finished)

b. After a task is finished the child's behavior is to be coded as "W" (waiting), "O" (off-task), or "D" (disruptive).

1. The child is waiting (W) when he/she is sitting quietly (with hand in the air or following the raising of his/her hand) or the child has raised Bunny's ears to indicate he/she is finished. The child's eyes are directed toward the table top, and the child is not manipulating the finished task.

2. The child is off-task (O) when his/her eyes are directed away from the table top or the child is manipulating the finished task.

3. Waiting or off-task codes are recorded for each interval until the teacher checks the child's work at which point the child is listening and this behavior is coded as on or off-task.
APPENDIX F
PROCEDURAL RELIABILITY CHECKLIST
PROCEDURAL RELIABILITY DATA COLLECTION SHEET

Condition: **Baseline**

Child's Name: ______________________________ Date: ____________
Observer: _________________________________
Reliability: _______________________________

**Code:**  
O- Observed, N- Not Observed, I- Needs Improvement,  
N/A- Not Applicable

|      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| A.   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| B.   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| C.   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| D.   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| E.   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| F.   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| G.   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| I.   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |

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1. Data collection sheets interval tape/record. available
PROCEDURAL RELIABILITY DATA COLLECTION SHEET

Condition: Alone with Bunny

Child's Name: _______________________________ Date: ____________
Observer: _________________________________
Reliability: _______________________________

Code: O- Observed, N- Not Observed, I- Needs Improvement, N/A- Not Applicable

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<td>B. Table and chair arranged</td>
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<td>C. Cue for child involvement</td>
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<td>D. Additional cues for participation following at least 3 second wait and non-compliance</td>
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<td>E. Provides initial instruction for the day</td>
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<td>F. Provides no additional instruction on use of APD</td>
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<td>I. Data collection sheets interval tape/record. available</td>
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PROCEDURAL RELIABILITY DATA COLLECTION SHEET

Condition: Training

Child's Name: ___________________________ Date: __________
Observer: ______________________________
Reliability: ____________________________

Code: O- Observed, N- Not Observed, I- Needs Improvement, N/A- Not Applicable

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A. Materials available on shelves and bunny available with tape
B. Table and chair arranged
C. Cue for child involvement
D. Additional cues following 3 second wait
E. Provides initial instruction for the day
F. Uses graduated guidance to provide prompts
G. Waits 5 seconds for a response following prompt before providing next prompt
H. Data collection sheets and recorder with interval tape available
PROCEDURAL RELIABILITY DATA COLLECTION SHEET

Condition: Alone with Bunny 2

Child's Name: ______________________________ Date: ____________
Observer: ______________________________
Reliability: ______________________________

Code: O- Observed, N- Not Observed, I- Needs Improvement, N/A- Not Applicable

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| A. Materials available on shelves and bunny available with tape |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| B. Table and chair arranged |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| C. Cue for child involvement |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| D. Additional cues following 3 second wait |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| E. Provides initial instruction for the day |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| F. Uses graduated guidance to provide prompts |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| G. Waits 5 seconds for a response following prompt before providing next prompt |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| H. Data collection sheets and recorder with interval tape available |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
PROCEDURAL RELIABILITY DATA COLLECTION SHEET

Condition: **Maintenance (No Bunny)**

Child's Name: ___________________________ Date: ____________

Observer: ________________________________

Reliability: ______________________________

Code:  O- Observed, N- Not Observed, I- Needs Improvement, 
       N/A- Not Applicable

| A. Materials available on shelves |   |   |   |   |   |   |
| B. Table and chair arranged      |   |   |   |   |   |   |
| C. Cue for child involvement    |   |   |   |   |   |   |
| D. Additional cues for participation following at least 3 second wait and non-compliance |   |   |   |   |   |   |
| E. Provides initial instruction for the day |   |   |   |   |   |   |
| F. Uses graduated guidance to provide prompts |   |   |   |   |   |   |
| G. Waits 5 seconds for a response following prompt before providing next prompt |   |   |   |   |   |   |
| I. Data collection sheets and recorder with interval tape available |   |   |   |   |   |   |
APPENDIX G
DATA SUMMARY SHEETS
<table>
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<tr>
<th>Date</th>
<th>Activity</th>
<th># Independent Steps Completed</th>
<th># Intervals on Task</th>
<th>Teacher Prompts</th>
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Daily Data Summary Sheet of Auditory Prompt Study

- Child: ____________________________ Setting: ____________________________
## Interobserver Agreement Summary Sheet

<table>
<thead>
<tr>
<th>Date</th>
<th>Session</th>
<th>Total</th>
<th>A</th>
<th>D</th>
<th>IOA %</th>
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<th>O</th>
<th>D</th>
<th>W</th>
<th>I</th>
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<th>P</th>
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</table>

- The table is used to record data related to independent steps, child behaviors, and teacher behaviors. It includes columns for date, session, total, and various behaviors with percentage agreement columns.
APPENDIX H

PROGRAM SATISFACTION FORMS
Teacher Satisfaction Form

Name: ___________________________ Date: __________

1. Do you think that using "Idea Bunny" to increase children's independent work/play skills was an effective strategy?
   YES     NO     NOT SURE

2. Would you like the magic circle center and "Idea Bunny" to remain a part of your classroom?
   YES     NO     NOT SURE

3. Do you think the ability to work/play independent of teacher attention is an important skill for success in kindergarten?
   YES     NO     NOT SURE

4. Was increasing the independent work/play skills an IEP goal/objective for child 1?
   YES     NO     NOT SURE

5. Was increasing the independent work/play skills an IEP goal/objective for child 2?
   YES     NO     NOT SURE

6. Was increasing the independent work/play skills an IEP goal/objective for child 3?
   YES     NO     NOT SURE

7. Was increasing the independent work/play skills an IEP goal/objective for child 4?
   YES     NO     NOT SURE

8. Would you like to learn to train other children to use "Idea Bunny"?
   YES     NO     NOT SURE
9. Did you notice a change in children's independent performance when children were working in the magic circle, following training to use "Idea Bunny"?
   YES  NO  NOT SURE

10. Did you notice any improvement in children's independent performance during other times of the day following training to use "Idea Bunny"
    YES  NO  NOT SURE

11. What changes did you notice any changes in children's behavior during other times of the day after they began to work with "Idea Bunny"

12. What did you like about this program?

13. What did you not like about this program?

14. What suggestions do you have for modifications or improvements of the program?
Child Satisfaction Form

1. Did you like working with Idea Bunny?

2. Did Idea Bunny help you to work better?

3. Would you like Idea Bunny to stay in your classroom?
4. Would you like to use Idea Bunny to help you do new things?

5. During free-choice (i.e. center time) what is the thing you like to do best?

6. Is there anything you did not like about working with Idea Bunny?

7. Is there anything you did not like about the activities you worked on with idea bunny?
APPENDIX I

TEACHER EVALUATION FORMS
NAIVE TEACHER EVALUATION FORM

Date: ______________
Name: _________________________
Degree(s): 
Certification(s):

Number of years teaching? _____________

Are you currently teaching? Yes No

Type of program/classroom?
Segregated Mainstreamed Full Inclusion

What is the age range of children you teach?

What is the total number of children in your classroom?

How many of the children in your class have disabilities?

What is the nature of the disabilities your students present?
Please answer the following questions for each child you will observe.

Scene 1
1. Is this child dependent upon teacher prompts?
   YES   NO
2. Is this child completing the task appropriately?
   YES   NO
3. Compared to typically developing children in a kindergarten class how independent is this child?
   1  2  3  4  5
   (very dependent)   (average)   (very independent)

Scene 2
1. Is this child dependent upon teacher prompts?
   YES   NO
2. Is this child completing the task appropriately?
   YES   NO
3. Compared to typically developing children in a kindergarten class how independent is this child?
   1  2  3  4  5
   (very dependent)   (average)   (very independent)
Scene 3
1. Is this child dependent upon teacher prompts?
   YES  NO
2. Is this child completing the task appropriately?
   YES  NO
3. Compared to typically developing children in a kindergarten class how independent is this child?
   1  2  3  4  5
   (very dependent)  (average)  (very independent)

Scene 4
1. Is this child dependent upon teacher prompts?
   YES  NO
2. Is this child completing the task appropriately?
   YES  NO
3. Compared to typically developing children in a kindergarten class how independent is this child?
   1  2  3  4  5
   (very dependent)  (average)  (very independent)
Scene 5

1. Is this child dependent upon teacher prompts?
   YES  NO

2. Is this child completing the task appropriately?
   YES  NO

3. Compared to typically developing children in a kindergarten class how independent is this child?
   1  2  3  4  5
   (very dependent)  (average)  (very independent)

Scene 6

1. Is this child dependent upon teacher prompts?
   YES  NO

2. Is this child completing the task appropriately?
   YES  NO

3. Compared to typically developing children in a kindergarten class how independent is this child?
   1  2  3  4  5
   (very dependent)  (average)  (very independent)
Scene 7
1. Is this child dependent upon teacher prompts?
   YES NO
2. Is this child completing the task appropriately?
   YES NO
3. Compared to typically developing children in a kindergarten class how independent is this child?
   1 2 3 4 5
   (very dependent) (average) (very independent)

Scene 8
1. Is this child dependent upon teacher prompts?
   YES NO
2. Is this child completing the task appropriately?
   YES NO
3. Compared to typically developing children in a kindergarten class how independent is this child?
   1 2 3 4 5
   (very dependent) (average) (very independent)
Scene 9
1. Is this child dependent upon teacher prompts?
   YES NO
2. Is this child completing the task appropriately?
   YES NO
3. Compared to typically developing children in a kindergarten class how independent is this child?
   1 2 3 4 5
   (very dependent) (average) (very independent)

Scene 10
1. Is this child dependent upon teacher prompts?
   YES NO
2. Is this child completing the task appropriately?
   YES NO
3. Compared to typically developing children in a kindergarten class how independent is this child?
   1 2 3 4 5
   (very dependent) (average) (very independent)
Naive Teacher Satisfaction Form

Name: ____________________________________ Date: __________

1. Do you think that using "Idea Bunny" to increase children's independent work/play skills was an effective strategy?
   YES          NO          NOT SURE

2. Would you like the magic circle center and "Idea Bunny" to be a part of your classroom?
   YES          NO          NOT SURE

3. Do you think the ability to work/play independent of teacher attention is an important skill for success in kindergarten?
   YES          NO          NOT SURE

8. Would you like to learn to train other children to use "Idea Bunny"?
   YES          NO          NOT SURE

9. Is "Idea Bunny" appropriate for a preschool classroom?
   YES          NO          NOT SURE

Comments: ________________________________
APPENDIX J
INTEROBSERVER AGREEMENT SUMMARY TABLES
Total Number and Percentage of Trained and Untrained Task Sessions in which Interobserver Agreement was Recorded

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* TT = Trained Task, UT = Untrained Task

*** Follow-up data was not collected for generalization tasks
## Mean and Range of Interobserver Agreement on Task Completion for Trained and Untrained Tasks

<table>
<thead>
<tr>
<th>Child</th>
<th>Baseline</th>
<th>Alone with Bunny</th>
<th>Training</th>
<th>Alone with Bunny 2</th>
<th>Maintenance (No Bunny)</th>
<th>Follow Up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isabel</td>
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<td>100</td>
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<tr>
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<tr>
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</table>

\(^{a}\) TT\(^{b}\) = Trained Task, UT = Untrained Task  
\(^{b}\) IOA data was not collected  
\(^{a}\) mean IOA  
\(^{b}\) range of IOA
**Mean and Range of Interobserver Agreement on Child Engagement for Trained and Untrained Tasks**

<table>
<thead>
<tr>
<th>Child</th>
<th>Baseline</th>
<th>Alone with Bunny</th>
<th>Training</th>
<th>Alone with Bunny 2</th>
<th>Maintenance (No Bunny)</th>
<th>Follow-Up</th>
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<tbody>
<tr>
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<td>UT*</td>
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<td>UT</td>
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<td>(75-93)(^b)</td>
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\(\star TT=\) Trained Task, \(UT=\) Untrained Task

** IOA data was not collected
\(a=\) mean IOA
\(b=\) range of IOA
### Mean and Range of Interobserver Agreement on Teacher Behavior for Trained and Untrained Tasks

<table>
<thead>
<tr>
<th>Child</th>
<th>Baseline</th>
<th>Alone with Bunny</th>
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<th>Alone with Bunny 2</th>
<th>Maintenance (No Bunny)</th>
<th>Follow-Up</th>
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</table>

* TT= Trained Task, UT= Untrained Task

** IOA data was not collected

a= mean IOA

b= range of IOA