EVALUATION OF THE EFFICACY OF A CENTER-BASED EARLY INTERVENTION PROGRAM

Anna K. Cantrell

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Thesis Committee:

Kimberly J. Ujcich Ward, Ph.D., Chair

James C. Tate, Ph.D.

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ABSTRACT

The purpose of this study was to evaluate the efficacy of a center-based early intervention program serving individuals ages 15 to 36 months with developmental delays. Archival data were collected, including intervention goal information and developmental assessment outcomes. The findings support the hypothesis that communication skills were more frequently targeted in goals than social/emotional or cognitive skills, but that a higher percentage of social/emotional goals were mastered. Number of months a participant spent in early intervention was not predictive of the percent of overall goals mastered. Communication and gross motor skills were shown to progress similarly with age across assessments, while cognitive, fine motor, and social/emotional skills increased marginally and self-help skills decreased. Significant decreases were seen in percentage of delay in cognitive, fine motor, social/emotional, and self-help skills, and goal mastery was not predictive of developmental progress made as measured in this early intervention program.

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INTRODUCTION

Early intervention programs aim to improve cognitive, communication, physical, social, and adaptive skills in infants and young children with, or at risk for, developmental delays. Early intervention programs were born from research supporting the great learning capabilities of children in the first few years of life. The goal of these programs is to improve these abilities such that the child functions more independently and needs fewer services later in life.

As indicated by "Part C" of the Individuals with Disabilities Education Act (IDEA; P.L. 94-142; P.L. 99-457), federal funding has been provided for qualifying children to receive early intervention services prior to entrance into the public education system (U.S. Department of Education, 2010). Since the implementation of Part C, early intervention services have become more accessible to children with developmental delays, and research in the area has increased (U.S. Department of Education). A particular focus of research has been the efficacy of early intervention, or specifically the extent to which early intervention program participation results in positive outcomes for children. These outcomes have included children's progress as indicated by objective or standardized assessment processes and by informal or anecdotal methods. This review will provide a summary and critique of studies evaluating children's progress in a variety of functional domains as a result of early intervention participation. Both objective measures of child outcomes and parent and teacher report measures will be reviewed. Because of challenges, such as ethical issues surrounding control groups and the inability

to randomly assign participants, studies in this field sometimes have significant methodological limitations, which also will be discussed in this review.

Objective Measures of Child Outcomes

Cognitive abilities. Measuring cognitive development throughout the course of early intervention provides a standardized way of assessing child progress as a function of participation in an early intervention program. Many early intervention programs involve teaching cognitive skills, and the effects of these programs on cognitive ability levels have been evaluated in various groups using multiple types of measurements.

The cognitive abilities of children with autism have been measured on multiple occasions to determine the efficacy of using early intervention programs with this population. In a study conducted by Remington et al. (2007), cognitive skills were assessed using the Stanford-Binet Intelligence Scale: Fourth Edition (SB:FE; Thorndike, Hagen, Sattler, Delaney, & Hopkins, n.d.) or the Bayley Scales of Infant Development (Bayley, 1969). The Bayley Scales of Infant Development were used to obtain a cognitive measure for those with intellectual disabilities or those who were not able to complete the SB:FE. Participants included 44 children with autism between the ages of 30 and 42 months who were placed in either the treatment group ($N = 23$) or the control group ($N = 21$) based on the type of therapy preferred by the parents or caregivers. Home-based Early Intensive Behavioral Intervention was used with the treatment group, and standard public services were administered to the control group. The assessments were administered to both groups at baseline, 12 months, and 24 months into the intervention. The results showed a significant main effect for treatment group from

baseline to 12 months and from baseline to 24 months, with those in the intensive intervention showing more improvements than those in the control group. Cognitive scores for the control group actually decreased from baseline to the 12-month assessment, and although an increase occurred from the 12-month assessment to the 24-month assessment, the group never reached its mean cognitive level that it achieved at baseline. These data suggest that the Early Intensive Behavioral Intervention had a positive effect on overall cognitive development with this population.

The cognitive skills of young children who were exposed to cocaine prenatally were assessed after their participation in one of three levels of early intervention. Claussen, Scott, Mundy, and Katz (2004) evaluated the effects of three different types of early intervention: center-based, home-based, and primary care. Children in the center-based group received interventions that were curriculum-based and provided in a group setting for 25 hours per week. Services were provided with a 1:3 adult to child ratio with regular meals supplied daily. Those in the home-based group received curriculum-based interventions that were provided at their home by teachers. The children in this group had one-on-one interactions with the teacher 2 days per week for 90 minutes each day for a total of 3 hours per week. The primary care group received no form of intervention services but were provided support services, such as medical care, family services, aid from a social worker, and transportation services, all of which were also available to the other two groups. Assessments were conducted once the child reached 36 months of age. To measure the cognitive effects, the Bayley Scales of Infant Development (Bayley, 1969) Mental Scale was used. A statistically significant difference was found between

the three groups with center-based scoring the highest, followed by home-based, and then the primary care group. The center-based group's mean standardized score fell within the normal range, and the home-based group's mean was close to falling within the at-risk range. Cognitively speaking, this study found that children who were prenatally exposed to cocaine benefitted most from a center-based intervention when compared to a home-based intervention or no intervention.

The effects of early intervention on cognitive skills have been evaluated within specific cultural and socioeconomic groups, such as children from low-income and low-education families living in Istanbul. Kagitcibasi, Sunar, and Bekman (2001) evaluated the efficacy of the Turkish Early Enrichment Project (TEEP) in center-based and home-based (mother-focused) settings. Children were either 3 or 5 years of age at baseline, and were divided into four groups based on their daily care arrangements prior to their participation in the study. The four groups consisted of children in education-based nursery schools, custodial day cares (which were affiliated with the factories where the mother was employed), and children who were not in any form of child care (home-based). The latter group was then divided into two levels: mother-training and no mother-training. Four measures were used to evaluate cognitive abilities among the three groups. The Stanford-Binet Intelligence Test (Turkish adaptation), along with a combination of three Wechsler subtests, known as the "Analytical Triad," were among the measures used. The "Analytical Triad" is composed of the WPPSI Block Design subtest, and the WISC-R Object Assembly and Picture Arrangement subtests (Savasir & Sahin, 1988, as cited in Kagitcibasi, Sunar, & Bekman, 2001). A Turkish version of the

Children's Embedded Figures Test (CEFT) and academic achievement tests in

mathematics and general ability were also evaluated. Analyses were conducted at

baseline and four years later. The results of the study indicated that at baseline, children

who had been attending the nursery school program had higher IQ scores than children in

the custodial group. Both groups had higher IQs than children who were home-based.

The four-year findings reported that children in the nursery school group significantly

outperformed those in the other two groups on 23 measures and showed nonsignificantly

more well developed abilities on 5 additional measures. The custodial group

outperformed the other groups on three measures, and the home group never

outperformed the other groups. The mother-training group significantly outperformed the

no mother-training group on 12 measures and nonsignificantly outperformed it on an

additional 15 measures. The no mother-training group never outperformed the mother-

training group. These results suggest that center-based early intervention approaches are

the most efficacious way of increasing cognitive abilities within this population.

One of the initial evaluations of an early intervention program, as conducted by

Bailey and Bricker (1985), examined the efficacy and effectiveness of using early

intervention services with children who had identified disabilities. Cognitive abilities

were measured using the Cognitive scale of the Comprehensive Early Evaluation and

Programming System (CEEPS) (Brick & Gentry, 1982 as cited in Bailey & Bricker,

1985). Participants were divided into two groups (home-based or center-based) based on

their age. Children ages birth to 15 months were placed in the home-based group, and

those ranging from 15 to 36 months were placed in the center-based group. The range of

disability varied among participants, as well as among groups. The children were divided into 5 subgroups by the staff prior to the intervention: nondisabled, at risk, mildly, moderately, and severely disabled. This study spanned over the course of 2 years, with 36 participants in Year 1 and 46 participants in Year 2. In Year 1, 25 children were in the center-based program, and 11 were in the home-based program. Twenty-eight children were identified as either mildly, moderately, or severely disabled, two were classified as at risk, and six fell into the nondisabled category. In Year 2, 29 children were in the center-based group, and 17 children were in the home-based group. Thirty-four children were identified as disabled, four were classified as at risk, and eight were in the nondisabled category. The CEEPS was administered on two occasions with a 5- to 7-month time span between administrations. Children in both groups (center- and home-based) showed significantly more well developed cognitive skills on the second evaluation than on the first in the cognitive domain of the CEEPS. These significant differences were seen in Year 1 and Year 2. This study suggests that early intervention programs are efficacious in increasing cognitive abilities in children of varying levels of disability.

Similar to the study conducted by Bailey and Bricker (1985), Hanson (1985) studied the effects of a developmentally oriented early intervention program with children who had disabilities, broadly defined. Twenty-four children participated in this study, ranging in age from 4 weeks to 3 years of age. The children were classified as mildly disabled (1%), moderately disabled (54%), or severely, multiply disabled (38%). The intervention consisted of center-based and home-based components. The center-

based activities were grouped according to age, with the younger children receiving one-on-one teaching and the older children working in small groups. Parents were sometimes present during their child's time at the center. Nondisabled peer models attended the program as well. Home visits and parent-training were also a part of the intervention program. This intervention targeted cognitive functioning, among other areas of development. Cognitive functioning was measured with the Bayley Scales of Infant Development (Bayley, 1969) Mental Scale and the Uniform Performance Assessment System (UPAS; Haring, White, Edgar, Affleck, & Hayden, 1981). Pre- and post-testing were conducted approximately 10 months apart. A significant increase was seen on the Bayley Scales between time 1 and time 2. Similar results were seen on the UPAS; however, it should be noted that the psychometrics of the UPAS have not been evaluated. This study further suggests the efficacy of early intervention programs in increasing cognitive abilities in young children who have disabilities.

Maladaptive behavior. The presence of maladaptive behavior in children becomes an area of concern when those behaviors impede the daily functioning of the child, as well as the functioning of others around them. Because of this, some studies of early intervention services target and measure the progression of maladaptive behaviors throughout the course of such services. Maladaptive behaviors, such as verbal and nonverbal behaviors (e.g., yelling, crying) and repetitive/stereotypic behaviors are common in children with autism (Shattuck et al., 2006). Paynter, Scott, Beamish, Duhig, and Heussler (2012) assessed such behaviors exhibited by this population as an outcome of an early intervention program. The Psychoeducational Profile-3 (PEP-3; Schopler,

Lansing, Reichler, & Marcus, 2005) Maladaptive Behaviors domain was used to assess such behaviors. Pre- and post-testing differences showed a pattern of improvement in characteristic motor behavior, but the difference was not significant. Characteristic verbal behaviors did not improve; rather they slightly increased between Time 1 and Time 2. Further, more focalized attention should be paid to the progression of these behaviors in children in early intervention services before inferences about the relationship between the two can be made.

Language and communication outcomes. Language development is a critical developmental skill for children between the ages of 0 and 3 years old, and because of this, it is a frequently targeted and measured outcome in early intervention programs (Ward, 1998). Growing evidence suggests that children who have trouble acquiring language often continue on to have difficulty learning (Ward). Two types of language are generally measured in early intervention: receptive language and expressive language. Varying levels of progress in children were found among the early intervention programs that measured language development outcomes.

Diagnostic and Statistical Manual- Fourth Edition (DSM-IV-TR; American Psychiatric Association, 2000) criteria for autistic disorder requires some type of impairment in communication for diagnosis, making language impairment a commonality among this population. Three studies with children with autism found patterns of improvement in language as a function of early intervention participation. More specifically, Remington et al. (2007) found that both receptive and expressive language increased significantly after 24-months of intensive behavioral intervention at home.

These changes were measured using the Reynell Developmental Language Scales- Third Edition (Edwards et al., 1997). Patterns of improvement on the communication domain of the PEP-3 were seen in another group of children with autism participating in a center-based early intervention program (Paynter et al., 2012); however, the overall difference in communication was not significant. Paynter et al. also found a significant difference on the cognitive verbal/preverbal subdomain, as well as on the receptive language domain of The Mullen Scales of Early Learning (MSEL; Mullen, 1995).

Observational data were used to measure language development in children with autism in a combination center-based and home-based program (McGee, Morrier, & Daly, 1999). This study included children with an average age of 29 months at entry and 43 months at exit. At entry, 36% of the children had some verbalization, and at exit, 82% regularly verbalized meaningful words, suggesting that early intervention increased verbalization over time in this group of children. The results of these three studies suggest that early intervention programs work to increase receptive and expressive language in children with autism.

Similar results were seen in an early intervention study of children prenatally exposed to cocaine (Claussen et al., 2004). Assessments were conducted at 36 months of age across three different groups: center-based, home-based, and primary care. The Reynell Developmental Language Scale (Edwards et al., 1997) was used to measure receptive and expressive language abilities across the groups. An overall significant difference was found between the three groups on both the receptive and expressive language scales, with center-based receiving the highest scores, and home-based and

primary care receiving similar lower scores. These differences, however, were not measured in a pre- and post-testing format. The differences between the groups were only measured at 36 months-of-age. The study provides no information about the level of language development of the children prior to the intervention.

Conflicting results of language abilities after participation in early intervention services were found in children of diverse disabilities (Bailey & Bricker, 1985). Using the Gesell Developmental Schedules language scale (Ilg & Ames, 1965), no significant difference was found between the pre- and post-testscores. Contradictory results were found, however, using the Communication scale on the CEEPS assessment, which showed a significant difference between the pre- and post-testing results. This contradiction begs the question of why the inconsistency? It is possible that the assessment measures are measuring different skills and have inadvertently labeled them similarly, or one (or both) of the assessment measures is not accurately measuring what it claims to be measuring.

Some difficulties accompany the measurement of such skills. As mentioned above, using different assessment measures could limit the meaningfulness of comparing studies. Without clear definitions of the behaviors measured, it is inappropriate to compare results of such assessments because the tools could be measuring different skills. The specificity of the populations studied (e.g., children with autism) poses another problem in comparing results. With the literature available, it is difficult to make inferences about the efficacy of early intervention programs on language development with children who fall outside of the parameters of the populations studied.

In summary, early intervention efficacy studies are finding that programs provide varying degrees of impact on language abilities. These studies, however, find common ground in that they resulted in some improvement in language abilities over the course of early intervention in varying populations. These findings support the efficacy of using early intervention programs to better develop language and communication abilities in children.

Social skills assessment. The development of social skills has not been as thoroughly measured as other constructs within early intervention programs. Social development as a function of early intervention differs from the other constructs typically measured in that certain consideration should be given to the type of intervention (i.e., center-based vs. home-based programs). Although few have measured social development throughout early intervention, a few studies have found improvement in social development in children attending center-based programs.

The progression of social development was measured throughout an early intervention program serving children with various disabilities (Bailey & Bricker, 1985). Within this program, social development was measured using two different scales and the results were inconsistent. A significant difference was found between pre-and post-test scores on the Personal-Social scale of the Gesell Developmental Schedules (Knobloch & Pasamanick, 1960) for the Year 2 center-based program. The same significant results were not seen in Year 3, but some improvement did occur. The opposite results were seen within the home-based groups. The pre-and post-test scores of the Year 2 and Year 3 home-based groups decreased. The Social scale of the CEEPS (Brick & Gentry, 1982

as cited in Bailey & Bricker, 1985) showed a significant difference in both the center-based and home-based programs in Year 2, with center-based scoring higher than home-based. Results for Year 3 were not provided. Although these results suggest that center-based programs are more efficacious in improving social development, it is important to note that in this study, the home-based group was comprised of children birth to 15 months of age, and the center-based program was comprised of children ages 15 to 36 months. This difference in samples makes cross program comparisons difficult.

Lack of social interaction is required in the diagnosis of autistic disorder, according to the *DSM-IV-TR* (American Psychiatric Association, 2000), making it an area of focus in early intervention programs for children with autism. Paynter et al. (2012) assessed such behaviors exhibited by this population as an outcome of a center-based early intervention program. The Psychoeducational Profile-3 (PEP-3; Schopler, et al., 2005) Social Reciprocity subdomain of the Maladaptive Behaviors domain was used to assess such behaviors. Pre- and post-testing differences showed a significant improvement in social reciprocity. More specifically, this study found a significant improvement in behaviors such as situation-appropriate facial expressions, communicative body language, friendship, and seeking and returning appropriate social responses (Shattuck et al., 2006) in children with autism after their participation in early intervention services.

McGee et al. (1999) found similar patterns of improvement in social development in their center-based early intervention program for children with autism. Spanning over the course of approximately 1 year, 71% of children in this program showed

improvement in social progression. Social progression was defined as the time spent by the child standing in close proximity (3 feet) of another child. This was an observational measure developed for this study and has no reported psychometric support, limiting the interpretability of this finding or its significance.

The few measurements of social development throughout early intervention programs make it difficult to compare and conclude that early intervention does improve social skills within this early intervention population. With the differences in age between the center- and home-based groups in Bailey and Bricker (1985), a comparison of the groups is not as meaningful. The observational data provided in McGee et al. (1999) is not an optimal form of measurement, with room for interpretation and problems with reliability and validity. Although these studies suggest that social development may improve as a result of early intervention center-based programs participation, additional research is needed to more clearly describe this area of skills development

Gross and fine motor skills. The measurement of physical development as a function of early intervention programs has yielded conflicting results among various populations of children. Studies assessing these developments have typically assessed both gross and fine motor skills, viewing the skill sets as separate outcomes. For instance, Bailey and Bricker (1985) assessed gross and fine motor skills using the Gesell Developmental Schedules (Knobloch & Pasamanick, 1960). A significant increase in skills occurred between pre- and post-testing on the Gross Motor scale for the center-based group in Year 2, and for the home-based group in Year 3. No significant differences were seen, however, on the Fine Motor scale at any time during the

intervention. Fine motor skills actually decreased in the Year 3 center-based group and in the Year 2 and 3 home-based groups.

A second assessment tool, the CEEPS (Brick & Gentry, 1982 as cited in Bailey & Bricker, 1985), also was used to assess Gross and Fine motor skills with the Year 2 group of children. The results found significant increases in gross and fine motor skills in the center- and home-based groups. These results are not consistent with the results of the Gesell Development Schedules, which highlights one of the difficulties in comparing evaluations of early intervention programs such as these. Different assessment tools may yield different results.

Varying degrees of change were found in gross and fine motor skill development among studies of specific populations in early intervention programs. Children prenatally exposed to cocaine and participating in a center-based program saw greater improvement on the Gross Motor scale of the Peabody Developmental Motor Scale (Folio & Fewell, 1983) than those with no form of intervention (Claussen et al., 2004). Assessments of this group, however, were performed only at 36 months of age, so the skill level of these children prior to the intervention is unknown.

Contrasting the aforementioned studies, Paynter et al. (2012) saw significant improvements on pre- and post-testing results on the fine motor and visual-motor imitation subdomain of the Motor Skills Domain of the PEP-3 (Schopler et al., 2005) in children with autism. No significant difference was seen on the gross motor subdomain.

Across studies, the results of outcomes related to development of gross and fine motor skills throughout the course of early intervention services conflict. As discussed,

these differing results may be a product of assessment tools, or of the inconsistent measurement of these skills across various measurements. The relationship between early intervention programs and the development of gross and fine motor skills is unclear; however, these studies suggest that a more consistent means of measurement may be helpful in assessing such a relationship.

Goal acquisition. Because Individual Family Service Plans (IFSPs) are required for children in early intervention programs in the United States, often times these children are working towards a set of goals (U.S Department of Education, 2010). Goal acquisition throughout an early intervention program for children with disabilities was measured using the Curriculum Objectives Checklist (Hanson, 1985). The assessment was conducted in a pre-and post-testing format with approximately 9 months between test administrations. In Year 1 and Year 2, participants significantly increased the number and percentage of items passed, according to the checklist. Criteria for passing an item on the checklist, however, were not provided.

This is an area where the research is lacking. Because so much of the focus in early intervention programs is on goal acquisition, more programs should be looking at the number and type of individual goals met throughout the course of early intervention participation.

Parent and Teacher Report of Child Outcomes

In addition to objective measures most often administered by professional staff, some researchers have studied child outcomes of early intervention participation by evaluating parent or staff reports. These methods may be more limited psychometrically

due to potential reporter bias, but they do provide additional information about child outcomes. This information is useful because parent and teacher perceptions may, in turn, affect child participation in and responsiveness to an intervention program.

Adaptive functioning behaviors. Adaptive functioning behaviors encompass a wide range of skills that, when looked at as a whole, define the extent to which an individual is capable of independently caring for themselves in real-life situations (Paul et al., 2004). The Vineland Adaptive Behavior Scales-Survey Form (VABS; Sparrow, Cicchetti, & Balla, 2008) is a tool that parents and/or caregivers use to rate an individual's behaviors divvied into the following categories: Communication, Daily Living Skills, Socialization, and Motor Skills. Two studies of early intervention programs for children with autism used the VABS – Survey Form to assess Daily Living Skills prior to and after the intervention (pre- and post-testing). Paynter et al. (2012) reported that, based on parent completion of the VABS, patterns of improvement occurred between assessments on the domain, as well as the subdomains, but no significant differences were found. Assessing this same class of children, teachers reported a significant increase on the Academic subdomain of the Daily Living Skills domain, but reported virtually no change in the overall domain score, or in the other subdomain scores (Personal and Community). The variation in the results of the parent and teacher reports of adaptive behaviors brings into question the usefulness of such assessments, and should be considered when interpreting such results.

Improvements in adaptive behavior were reported in a study of children in a home-based early intensive behavioral intervention program (Remington et al., 2007).

Subdomain scores were not reported with this group, but a significant improvement was seen in Daily Living Skills of the VABS from baseline to 12 and 24 months after participation in the intervention. The article does not specify who completed the survey, so it is unclear to which data these results can be compared.

Assessment of social and challenging behaviors. Parental reporting of various types of children's interactive behaviors has been measured as a function of early intervention programs. Tools used to assess these areas of development include socially appropriate behaviors, as well as behaviors that inhibit or prevent socially appropriate interactions. Prosocial behaviors (e.g., friendliness, cooperation, nurturance) fall under the umbrella of one of the behaviors assessed prior to and after participation in an early intervention program (Eivers, Brendgen, Vitaro, & Borge, 2012). Mothers of children with autism who completed the Positive Social scale of the Nisonger Child Behavior Rating Form (Tasse, Arman, Hamer, & Rojahn, 1996) reported a significant increase in positive social behavior (Remington et al., 2007). The fathers reported a marginally significant increase on this same scale.

Similar behaviors were assessed in children prenatally exposed to cocaine. The Adaptive Social Behavior Inventory (Hogan, Scott, & Bauer, 1992) was completed by parents when their child reached 36-months-of-age (Claussen et al., 2004). No significant differences in parent reports were found between the three groups (center-based, home-based, and primary care). Because a baseline was not established in this study, it is unclear if any improvement in prosocial behavior occurred after the intervention.

Parent-reported behavior problems were also assessed within these two populations. In the group of children with autism, parents reported no significant difference in behavior problems prior to and after the intervention, as measured using the Developmental Behavior Checklist (Einfeld & Tonge, 1995; Remington et al., 2007). In the group of children prenatally exposed to cocaine, parents reported no significant differences between groups in total behavior, as measured using the Child Behavior Checklist (Achenbach & Edelbrock, 1983; Claussen et al., 2004), suggesting that the type of program (center-based, home-based, or primary care) has minimal influence on problem behaviors.

Gross and fine motor skills. Using the Motor domain on the Vineland Adaptive Behavior Scales-Survey Form (VABS; Sparrow, et al., 2008), parents of children with autism reported the gross and fine motor ability levels of their children prior to and after early intervention services. Parents of children participating in a home-based program reported a significant improvement in motor skills throughout early intervention (Remington et al., 2007). This study did not report the subdomain (gross and fine motor) scores for this group.

Parents of children with autism in a center-based early intervention program reported little improvement in gross motor skills but significant improvement in fine motor skills on the Motor scale of the VABS (Paynter et al., 2012). Teachers also completed the VABS, and reported a non-significant increase in fine motor skills, but reported little change in gross motor skills. These results coincide with the results of the PEP-3 Motor Skills domain that was also administered in this study. Both assessments

saw significant improvement in fine motor skills, but little, if any, changes in gross motor skills.

These results suggest that early intervention programs may result in some change in fine motor skills, but the same change is generally not seen in gross motor skills, according to parent report. Because these studies deal solely with children with autism, the results may not generalize to other populations of children in early intervention programs.

Communication skills. The development of communication skills as a function of early intervention participation is an area of interest particularly within the autism population. Multiple studies of early intervention outcomes for children with autism have assessed these skills using the Communications domain of the VABS-Parent Survey Form. Parents of children in a center-based program reported a significant improvement on the expressive and written domains, along with some (non-significant) improvement on the receptive scale (Paynter et al., 2012). In completing these same assessments, teachers reported some improvement on all three scales (receptive, expressive, and written), but the improvement was not significant. Overall, some improvement was reported on the Communication domain of the VABS by both parents and teachers, but the improvement was not significant.

Parents of children with autism in a home-based early intervention program reported no significant difference between groups (intervention and comparison) in communication skills as measured on the Communication domain of the VABS (Remington et al., 2007). An improvement in ratings was seen in the intervention group

over time; however, improvements were also seen in the comparison group. No significant interaction was found between the groups. Because of this, it is difficult to distinguish if the improvements in the intervention group are a product of the intervention or of the passage of time.

The results of these studies render an unclear picture of parent-reported development of communication skills throughout early intervention programs for children with autism. The specificity of this population lessens the generalizability of these findings, and suggests that further assessments of the relationship between early intervention programs and communication skills in participants with developmental delays other than autism would be beneficial.

Social skills. Parent-reported ratings of social skills in children with autism have been measured using the VABS Socialization scale prior to and after their child's participation in an early intervention program. This scale measured skills such as interpersonal relationships, play and leisure time, and coping skills. Remington et al. (2007) found no significant differences in social skills over time or between groups (intervention and comparison) for this home-based intervention. Using the same scale to assess these skills in children with autism in a center-based program, Paynter et al. (2012) found that no significant differences in social skill level was reported by parents or teachers.

Different types of social skills were assessed in Turkish children from low-income families. The Dependency, Self-Concept, and Aggression subdomains of Rohner's Parental Acceptance-Rejection Questionnaire (Rohner, 1980, as cited in

Kagitcibasi et al., 2001) were completed by the mothers after the intervention

(Kagitcibasi et al.). Because a component of this study included a focus on mother

training, the results were analyzed in terms of the type of care received (intervention,

center-based, or home-based), as well as in terms of the type of training received by the

mother (mother-training or no mother-training). Mothers reported children in the home-

based group as being more dependent, and children in the center-based group were rated

lower in self-concept. Children in the mother-training group were rated as less

aggressive and higher in self-concept. Finally, there was no significant interaction

between the groups. No baseline analysis was reported for this assessment; therefore, the

amount of improvement over the course of the study is unknown.

The findings of these three studies are applicable to very specific populations,

which poses a problem because it limits the generalizability of these findings. The

relationship between early intervention and socialization skills as reported by the parents

is unclear, and further research is needed.

Effectiveness Issues in Early Intervention

The term "effectiveness" is used in outcome research to describe the extent to

which results of intervention evaluation outcomes (i.e., efficacy) can be translated to real

world application (Weisz & Kazdin, 2010). It refers to issues such as cost/benefit

analysis, generalizability, and feasibility of interventions. In terms of effectiveness,

research on early intervention programs for children with disabilities is in its infancy.

One aspect of effectiveness refers to how an intervention program is perceived by

those participating. Assessing parental level of satisfaction with early intervention

programs provides information about the parents' opinions about the program and may be related to the parents' likelihood of enrolling a child and continuing the child's services within a program. There are multiple stress-related aspects of having a child in an early intervention program. Obligations of time, money, resources, and training all factor into a parent's decisions concerning placing their child in an early intervention program and continuing with such services. Two studies (Remington, et al., 2007; Bailey & Bricker, 1985) demonstrate how such factors can be evaluated.

Parents of children with autism who participated in an early intensive behavioral intervention completed the Parent and Family Problems subscale of the Questionnaire on Resources and Stress-Friedrich short form (Friedrich, Greenberg, & Crnic, 1983) to gauge parental stress (Remington et al., 2007). The stress level of parents did not change across time or group (intervention vs. comparison). Bailey and Bricker (1985) created and administered a parental satisfaction questionnaire to parents of children with disabilities. The questionnaire was completed by 20 (of 22) parents at the end of the school year. Of the questionnaires completed, 65% rated the program services as "excellent," and 25% rated them as "very good." Similar results were reported in the following year. Although these studies suggest that parents were satisfied with early intervention services and that their children's involvement in the EI program did not negatively affect their views of their children, these were two relatively small studies. Future studies of efficacy could also include such measures of parental satisfaction and perception, and assess how child outcomes and satisfaction might be related.

Practical issues also may be of concern when considering outcomes of early intervention programs. Operational costs and staff continuity are two such factors that need to be considered when evaluating intervention outcomes. Specifically, how expensive are early intervention programs to run and what staffing requirements result in positive child outcomes are two pertinent questions. Of the early intervention studies evaluated, only one calculated an operation cost for a child's participation in the program. Such factors as time, teacher salaries, teacher/aid training, building costs, supplies, etc. were considered in the calculation of the operation cost. Bailey and Bricker (1985) calculated the monthly cost per teacher as $1,439.00. The total calculated monthly cost per child in the center-based program was $2,645.00, and the monthly cost per child in the home-based program was $1,059.00. However, because this study was conducted in 1985, these values are outdated and may not apply to early intervention programs today.

Program cost becomes an issue when the amount needed per child exceeds the available funding or the resources of the family. Program costs were of particular concern in a study of children who were prenatally exposed to cocaine. In this study, the majority of the families were of low socioeconomic status, with 85% receiving some type of public assistance (Claussen et al., 2004). Because of this financial issue, the program administrators provided transportation, meals, medical care, and family assistance for the children to be able to participate in the intervention. The higher the cost of services, the less accessible the intervention is to children in need. In some cases, such as the one cited above, the relationship between the needs of the child and the financial resources of the family is an inverse relationship.

Staff turnover and training issues have been recognized as a factor capable of influencing the efficacy of early intervention programs. Remington et al. (2007) cited staff turnover and lack of available staff as the reason why treatment goals were not met in their study. Children in this intervention were set to receive 40 hours of early intensive behavioral intervention every week, but were unable to fulfill that amount because of difficulty with staffing. Instead, children in this study received an average of 25.6 hours per week. Translating this to a real-world setting, staffing and training issues are expensive and difficult to counteract. For specialized programs, it may be difficult and costly to obtain and train staff members who are well suited to work with children in that intervention, but maintaining a consistent staff that is well-trained may be related to positive child outcomes.

Generalizability of Outcomes

One final aspect of treatment effectiveness that is crucial in transporting research findings from efficacy studies to the real world is generalizability. Demographic information of participants and their families provide an estimation of the extent to which a program will work with other similar populations in an everyday setting. In early intervention research, the specificity of the population and inclusion criteria for a specific early intervention program allow for tighter experimental control, but also can limit the extent to which one can say with confidence that a particular program would be efficacious with other children. Some early intervention outcome studies have focused on very specific populations of children or families, such as children living in low-income, low-education areas (e.g., Kagitcibasi et al., 2001), children with autism (e.g.,

Remington et al., 2007) children who were prenatally exposed to cocaine (e.g., Claussen et al., 2004), samples with almost 90% of the children coming from 2-parent homes in which the father is the primary wage earner (e.g., Bailey & Bricker, 1985), or programs primarily serving one gender (e.g., Paynter, et al., 2012). Because these studies focus on such specific populations, the outcomes reported may not be applicable to interventions serving other populations or those with more diverse groups of children. The specificity of child characteristics and family characteristics in these studies may have been related to the outcomes reported, thus the results may be of limited use when applied to a broader population of children.

Summary and Purpose of the Current Study

The field of early intervention research is limited in breadth, with several common methodological problems seen among the studies that have been conducted. One problem with early intervention efficacy research is the inability to separate intervention effects and the effects of outside variables. Parent satisfaction and attitude towards the early intervention program is one variable that could influence outcomes, but researchers have yet to find a way to explain this potential influence (Hanson, 1985). Concurrent placements or interventions are another outside variable that could influence outcomes. For instance, the provision of additional in-home tutoring may influence the child's performance in the early intervention program. This issue is particularly relevant for these young children with disabilities, because many are receiving multiple types of services (e.g., early intervention, speech therapy, occupational therapy). Stipulating that child participants only receive services provided by the early intervention program would

provide more clear experimental control, but is not ethical or practical as many children could benefit from multiple services. Similarly, researchers cannot ethically control a group of children in need of early intervention services to measure progress with and without intervention. Withholding services from a child in need is unethical and impossible in the research setting. Because of this methodological restriction, alternative comparisons have to be made. Most comparisons are made between various types of interventions, such as center-based and home-based (e.g., Remington et al., 2007, Claussen et al., 2004). Although these comparisons are helpful to identify types of services resulting in the best child outcomes, they do not provide us with a comparison of how a child's development is impacted by an early intervention program compared to his/her development without such services. The rationale behind federal incentives for early intervention programs is to produce diagnostic changes or decreases in the need for services in the future in qualifying children (U.S. Department of Education, 2010). Current research on early intervention programs, however, focuses more on changes in assessment scores than diagnostic or needs-based changes. By placing a stronger focus on diagnostic changes as a function of early intervention programs, the research can more strongly evaluate the goals of Part C.

Through this literature review, it is apparent that studies of the efficacy of early intervention programs show positive outcomes for children. Participation in early intervention programs has been shown to improve cognitive functioning, language skills, social skills, and gross and fine motor skills (e.g., McGee et al., 1999; Paynter et al., 2012; Remington et al., 2007). Some studies comparing center- and home-based

interventions found greater improvement in language and social skills in the center-based groups (e.g., Bailey & Bricker, 1985; Claussen et al., 2004). Various shortcomings have been identified, however, as areas in need of further research or improvement. In this relatively young field of study, researchers have experienced difficulty separating the effects of various interventions, as well as the effects of outside variables, such as parental perception of the effectiveness of the program. Such is the case in most early intervention programs in which the techniques used to "intervene" are not well-defined and when several areas of development or skills are being targeted at one time. Numerous forms of pre- and post-testing assessments have been used to evaluate the efficacy of such interventions, but this format provides little information about the speed of goal acquisition or the number and types of individual goals met throughout the program. Because goal setting and acquisition are an integral aspect of federally funded early intervention programs, this is an area where the field is lacking.

The purpose of the current study was to measure the progress of children with various developmental delays as a function of their participation in the early intervention program at Project HELP (Help Educate Little People). Project HELP is an integrated early intervention program for children 15 months to 3 years old. This program serves a diverse group of children, and the program interventionists have been working in their teaching roles consistently throughout the child's time in the program. Therefore, this early intervention program provides a setting for which child outcomes may be generalizable and for which outcomes may not be negatively impacted by staff turnover.

It was hypothesized that children in this program would show growth in cognitive, adaptive, social, and communication measures of functioning. Length of time in the program was predicted to be associated with higher rates of growth. We also predicted that individualized goals for each child would reflect a strong emphasis on language development, particularly in comparison to social and cognitive skills development.

Chapter II

METHOD

Participants

Participants for this study were 45 children at Project HELP at MTSU who

attended the center from January 2012 – present. Children at Project HELP are grouped

into one of two different categories: peers or friends. Both groups are integrated into

classes based on the age of the child, with ages ranging from 15 to 36 months. The

friends group consists of typically developing children who are peer models for the

children in the peers group. The peers group consists of children with, or at risk of,

developmental delays who qualify for early intervention services. For this study, only

children in the peer group were studied ($n = 45$) because systematic assessment data were

available for them but not for the friends group.

Children at Project HELP who attend for early intervention services enter the

program at various ages. Once identified as in need of services, participants are placed

on a waiting list and admitted to the program when an opening becomes available.

Participants exit Project HELP on the day of their third birthday. To qualify for early

intervention services, a child must display 40% delay in one area of development, or 25%

delay in 2 areas of development, or have a diagnosed disorder. The Battelle

Developmental Inventory (BDI; Newborg, Stock, Wnek, Guidubaldi, & Svinicki, 2005)

is used to assess such delays. The BDI assesses development in the following areas:

Adaptive, Personal-Social, Communication, Motor, and Cognitive. Early intervention

services through Project HELP are provided free of charge to children who qualify as

delayed or diagnosed under the Tennessee Early Intervention System (TEIS). Each child/family has an Individual Family Service Plan (IFSP) outlining the goals for that child and family to be addressed through early intervention.

Measures

Demographics. Demographic information was gathered for each child from his/her educational file at Project HELP. A summary of the participants' demographic data is provided in Table 1.

Hawaii Early Learning Profile. At Project HELP, participants are initially assessed using the Hawaii Early Learning Profile (HELP; Furuno et al., 1988). The HELP is a developmental assessment tool used to evaluate skills in the areas of cognition, communication, gross and fine motor, social/emotional, and self-help. It is a curriculum-based measure, and it allows tracking of developmental progress over time by identifying skill mastery upon entry and by age. Additionally, the HELP provides directional suggestions for treatment. HELP assessments were conducted at least every 6 months for each child by classroom teachers at Project HELP. HELP scores for each skill area for each child at time of entry and at subsequent assessment times were gathered for this study as a measure of developmental progress.

Individual goals. Goal attainment is another measure used to assess progress at Project HELP. Children in the peers group have goals included in their IFSPs; however, Project HELP teachers add to these goals based on their assessments of each child. Therefore, each child has overall IFSP goals, and more specific goals that are the focus of

Table 1

Demographic Characteristics of Peers at Project HELP (N = 45)

	n	*Mean (SD)*	%
Gender			
Male	36		80
Female	9		20
Ethnicity			
Caucasian	30		78.9
African American	4		10.5
Other	4		8.8
Unknown	7		15.6
Diagnosis at Intake			
Language Delay	17		37.7
General Developmental Delay	10		22.2
Autism Spectrum Disorder	6		13.3
Other	9		19.8
Reason for Termination			
Aged Out	33		73.3
Transferred/Relocated	7		15.6
Transportation Issues	3		6.7
Unknown	1		2.2
Age at Entry to Project HELP	45	24.02 (5.76)	
Age at Exit from Project HELP	45	33.77 (3.26)	
Months at Project Help	44	9.68 (5.54)	

intervention at Project HELP. The classroom teachers determine when a goal has been mastered, and track goals set and goals mastered; these data are recorded in each child's file. As goals are mastered, new goals are added for the child. Project HELP goals and IFSP goals both were included in this study. Each goal was categorized as focusing on one of the developmental content areas: communication, cognitive, social/emotional, gross motor, fine motor, and self-help.

Service completion. Termination information was gathered to describe why and how the child transitioned out of Project HELP.   Upon terminating services with Project HELP, a termination evaluation is conducted by the teacher. This information includes defining the reason for termination, such as aging out of the program or moving away, and identifying the next level of services available for each child. For this study, the data gathered from the termination report included the number of months the child attended Project HELP and the reason for termination. Table 1 includes a summary of these data for the child peers at Project HELP.

Procedure

After IRB approval was obtained, archival data from the children's files who attended Project HELP throughout the previous year period were collected by the researcher and analyzed.

Chapter III

RESULTS

Based on the literature concerning early intervention programs, it was predicted that the mean number of goals addressing communication would be greater than the mean number of goals addressing social/emotional development or cognitive development. The purpose of this analysis was to determine if the types of goals targeted most frequently were consistent with the skills most frequently measured in other early intervention studies. Table 2 presents the number of goals targeted and mastered in each developmental domain. Paired samples t tests were used to compare the mean number of Project HELP goals addressing each domain per child. As predicted, the mean number of goals addressing communication was significantly greater than the mean number of goals addressing social/emotional development, $t(37) = 2.13$, $p = .04$ and cognitive development, $t(37) = 5.30$, $p < .001$. This same significant pattern was found when comparing means using the IFSP goals. Communication skill development was more frequently targeted than social/emotional, $t(42) = 3.26$, $p = .002$ and cognitive development, $t(42) = 4.84$, $p < .001$.

In each child's file, Project HELP goals also were described as being "mastered" or not; IFSP goals had no such outcome data available. Therefore, using Project HELP goals, additional analyses were conducted to determine if the percentage of communication goals mastered differed significantly from the percentage of social/emotional and cognitive goals mastered by the children. The findings indicate that

Table 2

Number of Goals Targeted and Mastered

	Mean	*SD*
Project HELP Targeted Goals[a]:		
Number of Goals	6.58	2.13
Cognitive Goals	0.74	0.72
Communication Goals	1.89	1.09
Gross Motor Goals	0.61	0.97
Fine Motor Goals	1.29	1.21
Self-Help Goals	0.82	1.06
Social/Emotional Goals	1.24	1.30
Project HELP Mastered Goals[a]:		
Goals Mastered	4.18	2.30
Cognitive Goals Mastered	0.45	0.65
Communication Goals Mastered	1.13	1.07
Gross Motor Goals Mastered	0.37	0.59
Fine Motor Goals Mastered	0.74	0.98
Self-Help Goals Mastered	0.58	0.79
Social/Emotional Goals Mastered	0.89	0.95
IFSP Targeted Goals[b]:		
Cognitive	0.81	0.93
Communication	2.00	1.29
Gross Motor	0.70	1.04
Fine Motor	1.14	1.19
Self-Help	0.98	1.10
Social/Emotional	1.09	1.13

Note. No IFSP goal mastery was documented in Project HELP files.
[a]Number of participants with Project HELP goals = 38.
[b]Number of participants with IFSP goals = 43.

the percentage of communication goals mastered ($M = 56.8\%$; $SD = 43.3\%$) was

significantly lower than the percentage of social/emotional goals mastered ($M = 78\%$, SD

$= 29.9$), $t(23) = -2.73$, $p = .012$. No significant differences were found between the

percentage of communication ($M = 56.8\%$; $SD = 43.3\%$) and cognitive ($M = 63.6\%$, $SD =$

49.2%) goals mastered, $t(21) = .008$, $p = .99$.

Additionally, a Pearson product moment correlation was used to assess the

relationship between the percent of overall Project HELP goals mastered and the time

spent at Project HELP. The number of months spent at Project HELP was not predictive

of overall goal mastery, $r = .23$, $p = .164$.

It also was hypothesized that there would be a significant difference between

HELP scores at Time 1 and Time 2 (with various time frames between assessments),

reflecting an improvement in skills as a function of participation at Project HELP. The

HELP scores provided a range of months within which the participant's ability level falls.

Within this range, each participant was assessed on numerous tasks, and a percentage of

tasks completed were calculated. Individuals who completed 75-100% of the tasks

within the range were noted as functioning at the highest month level in that range; those

completing 25-74% of the tasks were coded as functioning at the mean age, and those

completing less than 25% were coded as functioning at the lowest age in the range

assessed.

To assess progress of each child between HELP assessments, the number of

chronological months between assessments was compared to the amount of improvement

in months as indicated on HELP domain scores. The number of chronological months

between assessments was calculated by subtracting each participant's age at the time of the first HELP from their age at the time of the second HELP. Amount of improvement was calculated by subtracting the participant's ability level in months at the time of the first HELP from their ability level in months at the time of the second HELP for each category. Descriptive statistics are provided in Table 3.

Paired samples *t* tests were used in these analyses, showing that communication and gross motor skills progressed similarly with chronological age. The remaining skills (i.e., cognitive, fine motor, social/emotional, and self-help) did not progress similarly with age. The child's developmental progress in each of these domains (as measured by the HELP) lagged behind his/her chronological age development. Table 4 shows the *t* scores for each domain analyzed.

Another method of analyzing HELP scores was applied to describe this assessment in terms of percent of delay in each developmental area at Time 1 and Time 2, because diagnosis of developmental delay and qualifying for early intervention services is a function of this type of descriptive data. Percentage of delay was calculated using the Time 1 and Time 2 HELP scores by dividing each participant's chronological age by his/her ability level in months (see Table 5). The percentage of delay at Time 1 was compared to the percentage of delay at Time 2 using paired samples *t* tests for each domain. These analyses show significant decreases in percentage of delay were seen in cognitive, fine motor, social/emotional, and self-help skills, but not for communication or fine motor domains (see Tables 5 and 6 for descriptives and *t* values).

Table 3

Descriptive Statistics for Chronological Age Differences and Ability Level Differences in Months between First and Second HELP Assessments

	n	Mean	SD
Age Difference	17	6.24	1.79
Cognitive Scale Age Difference		1.74	4.64
Age Difference	17	6.24	1.79
Communication Scale Age Difference		3.60	5.69
Age Difference	17	6.24	1.79
Gross Motor Scale Age Difference		4.96	6.08
Age Difference	17	6.24	1.79
Fine Motor Scale Age Difference		1.50	5.37
Age Difference	15	6.13	1.73
Social/Emotional Scale Age Difference		1.80	4.15
Age Difference	16	6.06	1.69
Self-Help Scale Age Difference		-2.44	4.53

Table 4

Differences between Chronological Age Differences and Ability Level Differences in Months between First and Second HELP Assessments

	t	df	p
Cognitive	4.41	16	.000
Communication	5.66	16	.084
Gross Motor	.816	16	.427
Fine Motor	3.17	16	.006
Social/Emotional	3.96	14	.001
Self-Help	6.95	15	.000

Table 5

Descriptive Statistics for the Percentage of Delay on HELP Assessments at Time 1 and Time 2

	Mean	*SD*
HELP Time 1		
Cognitive	.77	.24
Communication	.70	.28
Gross Motor	.77	.19
Fine Motor	.79	.32
Social/Emotional	.80	.37
Self-Help	.94	.25
HELP Time 2		
Cognitive	.65	.23
Communication	.67	.30
Gross Motor	.78	.30
Fine Motor	.67	.22
Social/Emotional	.70	.30
Self-Help	.64	.20

Table 6

Differences in Percent of Delay between Time 1 and Time 2 HELP Assessments

	t	df	p
Cognitive	2.77	16	.014
Communication	.38	16	.710
Gross Motor	-.40	16	.695
Fine Motor	2.31	16	.034
Social/Emotional	2.33	14	.036
Self-Help	6.17	15	.000

Finally, it was hypothesized that the number of goals that a child mastered while at Project HELP would be a significant predictor of the amount of change between pre- and post-test HELP scores. A Pearson product moment correlation was used to assess correlations between the difference in developmental ability level in months as measured by the HELP at Time 1 and Time 2 and the percent of goals mastered in each skill set. No significant correlations were found in cognitive, communication, or social/emotional abilities (see Table 7).

Table 7

Correlations between Difference in Ability Level in Months as Measured by the HELP and Percent of Goals Mastered

	Cognitive Goals	Communication Goals	Social/Emotional Goals
Cognitive HELP	$r = .11$ $p = .78$ $n = 9$		
Communication HELP		$r = .19$ $p = .47$ $n = 17$	
Social/Emotional HELP			$r = .00$ $p = 1.00$ $n = 11$

Chapter IV

DISCUSSION

Project HELP, a center-based early intervention program, provides services for children ages 15 months to 3 years with developmental delays. Throughout each child's time at Project HELP, progress was measured using the HELP assessment of development and goal mastery. In this study, the outcomes of these measurements were used to assess the efficacy of center-based early intervention programs, and to address questions in the literature concerning the types of skills measured most frequently.

The findings of this study concerning the frequency at which certain skill sets are assessed support the prediction that communication skills were more frequently targeted as goals than cognitive or social/emotional skills. Although communication skills were more frequently targeted than social/emotional skills were, such skills were not more frequently mastered. The percentage of social/emotional goals mastered was significantly greater than the percentage of communication goals mastered, suggesting that children in this early intervention program were acquiring social/emotional skills that were targeted more quickly than they were acquiring communication skills during their time spent at Project HELP. Although the lack of progress in targeted communication skills is perplexing, the advances made in social/emotional skills touches on a cornerstone of center-based early intervention programs. Providing services in a center-based environment promotes peer interaction and socialization, allowing for many learning opportunities and greater improvement in this area. Interestingly, cognitive and communication skills were similarly mastered by the peers in this study. These findings

are inconsistent with expected growth in cognitive skills as a function of early intervention, as suggested by outcomes from previous research (e.g., Bailey & Bricker, 1985; Claussen et al., 2004; Remington et al., 2007). These results may be a function of the developmental assessment tool used in the current study, as it is not as psychometrically sound as some tools used in the previous research. Finally, cognitive skill development also was an outcome area frequently targeted for growth in previous early intervention studies, yet it was not an area targeted for individual goals for the children in this study, especially as compared to communication skills.

Contradictory to what was hypothesized, the number of months a child spent at Project HELP was not predictive of the percent of overall goals mastered. This finding suggests that attending Project HELP for longer periods of time is not associated with goal mastery. One factor potentially limiting the interpretability of this finding is the limited range of scores for this assessment, particularly the limited range of targeted skills. The average number of goals even targeted for these children was only 6.58 (SD = 2.13), restricting the range of potential mastered goals.

In comparing progress across HELP assessments, communication and gross motor skills were shown to progress similarly with age. For instance, if a child aged 6 months between assessments, approximately 6 months of developmental progress was demonstrated on HELP scores. Cognitive, fine motor, and social/emotional skills progressed marginally between assessments, and self-help skills were shown to decrease from Time 1 to Time 2. These findings are inconsistent with previous studies showing improvement in each of these areas as a result of early intervention programs, especially

center-based programs similar to Project HELP (e.g., Bailey & Bricker, 1985; McGee et al., 1999; Paynter et al., 2012; Remington et al., 2007). These inconsistencies, in addition to the basic lack of developmental progress shown in these analyses highlight a major limitation of this study. One possible conclusion is that these findings actually accurately depict developmental progression (or lack thereof) across time for children at Project HELP. Another conclusion, however, is that the administration and utilization of assessment tools is failing to accurately capture the developmental skills of each child. The former explanation seems unlikely, particularly considering the efficacy demonstrated in the previous early intervention studies. The latter explanation seems to be the more likely cause for these findings due to the nature of the HELP assessment. This issue will be explored further later in this discussion.

To qualify for services at Project HELP, one must have a certain percentage of developmental delay. Because of this requirement, measuring the change in percentage of delay between HELP assessments was an additional way in which HELP scores were analyzed in the current study. Significant decreases in percentage of delay were seen in cognitive, fine motor, social/emotional, and self-help skills, but were not shown for communication or gross motor skills. The goal of early intervention services, and the justification for these government-funded programs is to decrease the need for assistive services later in life (U.S. Department of Education, 2010). Decreases in developmental delays such as these are meaningful findings in the field of early intervention because they demonstrate that programs such as Project HELP are fulfilling the intended purpose. In fact, in this study, about a 10% drop in delay percentage was found for three of the

areas (cognitive, fine motor and social/emotional), and a roughly 30% drop in delay percentage was indicated for self-help skills. These improvements were indicated after on average a 9 month intervention, which is quite impressive. Given the limitations of the assessment tool used for these outcome data, it begs the question of if a more psychometrically sound instrument was used, would the outcomes show even more improvement?

Lastly, it was determined that goal mastery was not predictive of the amount of progress made on the HELP assessment, which highlights a prominent limitation of this study. Ideally, these two forms of progress measurement would correlate highly with one another, suggesting that both forms of assessment are assessing similar behaviors (i.e., showing concurrent validity). However, goal mastery and HELP assessments appear to be measuring different constructs. An explanation for this finding is that the HELP assessment was not measuring the same types of behaviors that were being targeted with goals, and the progress made by the participants was not reflected in the HELP assessment outcomes.

Another possible explanation for this finding, and a general limitation of this study, is the unstandardized nature of the assessments at Project HELP. Because the data used for this study were archival, the researcher had no control over the administration and scoring of the HELP assessments or measurement of goal mastery. Standardized scores were not calculated for the HELP assessments, and it is unknown if standardized testing procedures were followed. Criteria for goal mastery are unknown as well. No formal documentation or data were taken on goal performance throughout each child's

time at Project HELP. The influence of these factors is thought to have underestimated the progress made by the children while at Project HELP.

It is the belief of the researcher that the findings of this study do not accurately depict the progress made by children at Project HELP as a function of early intervention. For example, it is unlikely that only 7 target goals were the focus of intervention for these children over the course of a 9 month participation at Project HELP. More likey, more skills were targeted and mastered than what is documented in each child's termination summary in his/her file. Documenting all goals targeted and the time frame in which the goals were targeted and mastered would provide a more comprehensive measurement of actual child outcomes. Additionally, the HELP may not be the ideal developmental assessment tool for use in this situation, as the outcome data reported do not reflect standardized use of the tool. Fortunately, these are areas in which improvement is possible with minimal instruction to the staff.

Future directions for early intervention research include finding or developing an assessment tool that reliably and validly measures the skills taught in early intervention programs so that progress and development are accurately measured. A measure such as Bayley Scales of Infant Development or a less time-consuming tool such as the DAY-C might provide more meaningful data for interpretation. Finally, training and support for staff to learn how to conduct more standardized assessments is necessary, as are resources to take the time to conduct such assessments in an already very busy work environment. Although resource intensive, such improvements in the assessment process

may provide more accurate efficacy data and may lead to increased funding opportunities

and further benefits for programs such as Project HELP.

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APPENDIX

Appendix A

MTSU Institutional Review Board Approval Form

February 15, 2013
Anna Cantrell, Dr. Kim Ujcich-Ward
Department of Psychology
akc2p@mtmail.mtsu.edu, Kimberly.Ward@mtsu.edu

Protocol Title: "Evaluation of the Efficacy of a Center-Based Early Intervention Program"
Protocol Number: 13-208

Dear Investigator(s),

The exemption is pursuant to 45 CFR 46.101(b) (4). This is because the research being conducted involves the collection of existing data that is de-identified.

You will need to submit an end-of-project report to the Compliance Office upon completion of your research. Complete research means that you have finished collecting data and you are ready to submit your thesis and/or publish your findings. Should you not finish your research within the three (3) year period, you must submit a Progress Report and request a continuation prior to the expiration date. Please allow time for review and requested revisions. Your study expires on **February 15, 2016.**

Any change to the protocol must be submitted to the IRB before implementing this change. According to MTSU Policy, a researcher is defined as anyone who works with data or has contact with participants. Anyone meeting this definition needs to be listed on the protocol and needs to provide a certificate of training to the Office of Compliance. **If you add researchers to an approved project, please forward an updated list of researchers and their certificates of training to the Office of Compliance before they begin to work on the project.** Once your research is completed, please send us a copy of the final report questionnaire to the Office of Compliance. This form can be located at www.mtsu.edu/irb on the forms page.

Also, all research materials must be retained by the PI or **faculty advisor (if the PI is a student)** for at least three (3) years after study completion. Should you have any questions or need additional information, please do not hesitate to contact me.

Sincerely,
Andrew W. Jones
Compliance Office
615-494-8918
Compliance@mtsu.edu