2014

The Role of Early Intervention Programs on Reducing the Negative Effects of Poverty

Jenna Kanegawa
Claremont McKenna College

CLAREMONT McKENNA COLLEGE

THE ROLE OF EARLY INTERVENTION PROGRAMS ON REDUCING THE NEGATIVE EFFECTS OF POVERTY

SUBMITTED TO

PROFESSOR TOMOE KANAYA

AND

DEAN NICHOLAS WARNER

BY

JENNA KANEGAWA

FOR

SENIOR THESIS

SPRING 2014

APRIL 28, 2014

The Role of Early Intervention Programs on Reducing the Negative Effects of Poverty

Jenna Kanegawa

Claremont McKenna College

Table of Contents

Abstract.....3

Introduction.....4

Effects of Poverty.....5

Risk Factors of Poverty.....8

Early Intervention Programs.....13

Benefit-cost Analyses of Early Intervention Programs.....28

Conclusion.....33

References.....36

Abstract

Children under the age of 18 are the largest age group of people who live in poverty in America. This paper focuses on early intervention programs and how they can help ameliorate the negative effects of poverty. Previous research has demonstrated the negative effects of poverty, such as lower academic performance and achievement and more behavioral problems. Various risk factors for poverty, such as single parents, low maternal education, and lack of resources, and their role in the design of early intervention programs will be explained. The Perry Preschool Project (PPP), Head Start, the Chicago Child-Parent Center (CPC) Program, and the Carolina Abecedarian Project and their effects on child outcomes will be analyzed. Cost-benefit analyses for each early intervention program, as well as future considerations for public policy, will be discussed in this paper.

Keywords: poverty, children, early intervention program, cost-benefit

The Role of Early Intervention Programs on Reducing the Negative Effects of Poverty

Introduction

Poverty was brought to the front of America's attention when Lyndon B. Johnson highlighted it in his 1964 State of the Union Address. He declared "an unconditional war on poverty," and it became his top domestic priority (Bailey & Danziger, 2013). Johnson acknowledged that the fight against poverty would be long and complicated and said, "we shall not rest until the war is won" (Bailey & Danziger, 2013). Indeed, the war is not over because the United States had an official poverty rate of 15 percent in 2012, which means over 46.5 million people were living in poverty (United States Census Bureau, *Highlights*). America has continued to fight poverty and its negative effects with various social programs like Head Start, a publicly funded preschool program targeted at low-income and disadvantaged children that began in 1965 (Johnson & Brooks-Gunn, 2012). Head Start was the first early education program to be federally organized and funded, but other public and private early intervention programs have been created to help improve the outcomes of disadvantaged children who live in poverty.

While poverty affects people of all ages, children are especially vulnerable because they have a higher probability of being poor than any other age group in the United States. Reports demonstrate that almost 22 percent of people living in poverty are under the age of 18, while poverty rates for people 65 and older and people between 18 and 65 are over 13 percent and nine percent, respectively (DeNavas-Walt, Proctor, & Smith, 2013). When taking a closer look at the breakdown of poverty for people under 18, children under the age of six account for over 24 percent of those living in poverty (DeNavas-Walt et al., 2013; Ryan, Fauth, & Brooks-Gunn, 2006). Children at these

young ages are helpless to overcoming poverty because they do not have the abilities or resources to improve their situations. For example, young children cannot work nor can they earn money in traditional jobs, which means they cannot help improve the financial situation of their own families. Thus, children may need some extra help to overcome the effects of poverty.

How Poverty is Measured

Poverty is measured by using poverty thresholds, which are determined by the U.S. Census Bureau. Poverty thresholds are minimum levels of income that vary according to family size and age of family members. A family and all of the individuals in that family are considered to be in poverty when the family income is less than the specific income threshold for their family type (United States Census Bureau, *How the Census Bureau measures poverty*). For example, a four-person family that includes two related children under the age of 18 is considered to be in poverty if their income is below $23,624 (United States Census Bureau, 2013).

Effects of poverty

Poverty has various effects on young children's cognitive and behavioral outcomes and has been shown to be associated with school readiness of young children. School readiness is how prepared children are when they enter kindergarten and elementary school (Ryan et al., 2006). Findings have indicated that poor children enter kindergarten behind their peers from higher-income families and have lower reading and math skills, which suggest lower school readiness, (Duncan, Magnuson, Kalil, & Ziol-Guest, 2011). In fact, children whose families do not meet the poverty threshold are 1.3 times more likely to have a learning disability and experience other developmental delays

than children in families above the poverty threshold (Brooks-Gunn & Duncan, 1997). The negative effects of poverty are evident even by the age of two, with income and family risk predicting lower IQ scores, and these differences continue to persist for children between the ages of three and eight (Brooks-Duncan, 1997; Ryan et al., 2006). Thus, children who are born into poverty or are exposed to poverty at a young age are already at a disadvantage compared to their peers with higher family incomes. They may struggle to overcome the effects of early poverty, which will negatively influence their future outcomes.

Certain characteristics of poverty, like depth, persistence, and timing, influence the cognitive outcomes of children who live in poverty. Children who live in a greater level of poverty, defined as lower income, are more disadvantaged than children whose families have higher incomes (Ryan et al., 2006). For example, children score six to 13 points lower on IQ and other achievement tests when their families have incomes less than half the poverty threshold compared to children in families with incomes 1.5 to twice the poverty threshold (Brooks-Gunn & Duncan, 1997). Brooks-Gunn and Duncan (1997) noted that children who were closer to, but still below, the poverty threshold performed worse than their peers above the poverty threshold, but the differences were not as large. Thus, depth of poverty hinders the cognitive outcomes of young children.

The persistence of poverty also influences children's cognitive outcomes; the longer children live in poverty, the worse their cognitive outcomes are compared to the outcomes of their more well-off peers (Brooks-Gunn & Duncan, 1997; Ryan et al., 2006). In other words, the more chronic the poverty, the greater the negative effects on cognitive outcomes. For example, children who were poor during a four-year time period scored

six to nine points lower than their non-poor counterparts on various tests of cognitive abilities (Brooks-Gunn & Duncan, 1997). Therefore, the cognitive outcomes of children who experience more poverty are likely to be more negatively affected. Other findings have demonstrated that childhood poverty is the most important factor that influences high school graduation rates and years of education (Ryan et al., 2006). However, other findings suggest that income has little effect on the number of school years students complete (Brooks-Gunn & Duncan, 1997). Despite the conflicting findings about effect size, low income still exhibits a negative effect on high school graduation rates and years of schooling obtained.

Poverty also affects children's behavioral and emotional outcomes, which can be divided into two categories, externalizing behaviors and internalizing behaviors. Externalizing behaviors include aggression and fighting, while internalizing behaviors can refer to being socially withdrawn or depressed (Brooks-Gunn & Duncan, 1997; Dearing, McCartner, & Beck, 2001; Ryan et al., 2006). Children who live in poverty have more reports of emotional or behavioral problems through adolescence (Brooks-Gunn & Duncan, 1997; Duncan, Brooks-Gunn, & Klebanov, 1994; Ryan et al., 2006). For example, poor children had significantly higher scores for internalizing behaviors compared to children from middle-income families (Duncan et al., 1994). Thus, poverty can negatively influence the social outcomes and mental health of children. While income has been proven to influence internalizing and externalizing behaviors, the effects are more modest than the effect of income on IQ (Dearing et al., 2001; Duncan et al., 1994).

Like with cognitive outcomes, depth and persistence of poverty also influence behavioral outcomes. The greater the depth of poverty a child experiences, the greater the negative impacts on behavioral outcomes (Ryan et al., 2006). Duncan et al. (1994) found that children from families living in chronic poverty, defined as having income below the poverty threshold for four years in a row, scored four and 3.3 points worse on the internalizing behavior and externalizing behavior, respectively, than children who never experienced poverty. Children from families who lived below the poverty threshold for at least one of the four years still displayed behavior problems (Duncan et al., 1994). However, they displayed fewer problems than children in long-term poverty, which suggests that the greater the amount of time spent in poverty is associated with worse behavioral outcomes.

Thus, the negative effects of poverty on children's outcomes have been documented in various studies. Children's cognitive outcomes are especially vulnerable to the effects of poverty, but behavioral outcomes are still susceptible to the negative effects. Now the question remains of whether certain characteristics make some children more prone to the negative effects of poverty than others.

Risk factors for poverty

Poverty is generally associated with low-income, which might be due to the use of poverty thresholds for determining whether people live in poverty. However, there are many factors besides income that make children more susceptible to the negative effects of poverty, and the risk factors are often interrelated. Potential risk factors include single parents, low family resources, low maternal education, maternal mental health, neighborhoods, and health

Single Parents

Children who come from single parent homes have a higher exposure to poverty because there is only one parent who can provide financial resources and support in contrast with two-parent families who have two incomes if both parents work (Lamy, 2013). Even if only one parent works in a two-parent family, the non-working parent can take care of the children, which would be less stressful than single parents raising children on their own (Duncan & Magnuson, 2005). Single parents are more likely to be mothers who are raising children by themselves, and families with a single mother are five times more likely to live in poverty than families with two parents (DeNavas-Walt et al., 2013; Duncan & Magunson, 2005; Lamy, 2013). Teens account for a fair amount of single mothers, and they are more likely to come from low-income families and to have low levels of education (Argys & Averett, 2013). In summary, children from single parent families, especially single mother families, are especially vulnerable to the negative effects of poverty.

Single parents are under stress as they try to raise their children on their own. Findings show that single parents often have insufficient resources, time, and attention to spend on their children due to the stresses of providing for their children (Lamy, 2013). Single working parents also have less emotional and physical energy to spend on their children because of the energy that goes to maintaining employment (Lamy, 2013). Additionally, the draining nature and stress of living in poverty would leave parents with less emotional and physical energy. Findings show that children raised by single parents have lower social and academic outcomes than children who are raised by two parents, on average (Duncan & Magnuson, 2005). Children from single-parent households are

more likely to have poor health, low cognitive performance, and low educational attainment (Argys & Averett, 2013). Thus, single-parent households are associated with higher risk of poverty, as well as the negative outcomes of poverty.

Lack of Resources

Family resources can be separated into one of four categories, basic needs, money, time for self, and time for family (Van Horn, Bellis, & Snyder, 2001). A lack of resources for families in poverty can refer to lower income, which has found to be associated with poor cognitive and behavioral outcomes, as well as poor future academic performance (Lamy, 2013). A lack of resources may prevent parents from providing books and toys that help improve their children's cognitive development (Dearing et al., 2001). Thus, children may experiences less cognitively stimulating home environments, which could hinder their cognitive development and academic performance. Lack of resources can also refer to the lack of time and energy that parents may struggle to provide for their children (Lamy, 2013). Overall, it is important to remember that there are various types of insufficient resources that are associated with higher risk of poverty, and the lack of resources can hinder children's various developmental outcomes.

Low Maternal Education

Another potential risk factor of poverty is maternal education, which is highly correlated with family income (Lamy, 2013). Higher maternal education would likely correlate with higher income, which means there would be a decreased chance of living in poverty. Maternal education has been found to be one of the biggest indicators of the outcomes of children, even after accounting for the effect of family income (Lamy, 2013). Children who have mothers with higher levels of education are more likely to

perform higher than children whose mothers have less education (West, Denton, & Germino-Hausken, 2000). Therefore, children whose mothers have low maternal education would be more susceptible to the negative effects of poverty, especially lower cognitive performances.

Maternal Mental Health

Poverty has been associated with a higher risk of mental health problems for all people (DeCarlo Santiago, Kaltman, & Miranda, 2013). However, poor mothers have a higher risk of developing depression than any other mental health disorder (Lamy, 2013). Prevalence rates of depression in poor mothers have been estimated to be over 50 percent, which is higher than the lifetime prevalence and 12-month prevalence of depression (16.5 and 6.7 percent, respectively) (Lamy, 2013; National Institute of Mental Health, 2014). Depression in mothers may hurt their relationships with their children, especially if they become less responsive or more hostile (Lamy, 2013). Consequently, maternal mental health status correlates with child outcomes.

Ensminger, Hanson, Riley, and Juon (2003) found that mothers who were depressed while raising their children influenced their children's outcomes, specifically that their daughters were two and a half times more likely to have depression and their sons had lower educational attainment. Research has suggested that living in poverty can increase the risk for psychological disorders and that mental illness can increase the chances of living in poverty (DeCarlo Santiago et al., 2013). Consequently, children with higher chances of developing depression would be more vulnerable to poverty when they are older, which would continue the cycle of poverty. All of these findings suggest that

children whose mothers suffer from mental health problems may be more likely to live in poverty, if they were not already living in poverty.

Neighborhoods

Families with lower incomes have less money, and thus fewer choices, when choosing neighborhoods to live in. Poor families are twice as likely to live in neighborhoods where they are afraid to go out because of safety concerns (Brooks-Gunn & Duncan, 1997). Poor families may live in neighborhoods that have higher levels of crime and fewer playgrounds and after-school programs, which offer children fewer opportunities to develop cognitively and behaviorally (Duncan & Brooks-Gunn, 2000). Children who live in poor and unsafe neighborhoods would be limited to spending time inside of their home, which may offer less cognitively enriched resources due to lower incomes. Poor neighborhoods may also be associated with lower high school graduation rates and lower cognitive outcomes (Brooks-Gunn & Duncan, 1997). Overall, poor neighborhoods may create environments that encourage less cognitive stimulation and less social interactions, which could hurt children's future developmental outcomes.

Health

Poor health is another risk factor for poverty. Examples of poor health include low birth weight and higher levels of lead in blood, which are more frequent in poor children than nonpoor children (Brooks-Gunn & Duncan, 1997). Health risk factors have been associated with lower IQ when children are young, and low birth rate has also been associated with negative academic outcomes, like higher grade retention and school dropout rates (Brooks-Gunn & Duncan, 1997). Malnutrition is also associated with negative cognitive outcomes, especially with children living in poverty. For example,

short-term memory for children in chronic poverty who likely experience malnutrition is worse than children who did not live in poverty (Brooks-Gunn & Duncan, 1997). Thus, better health could help reduce a child's exposure to poverty.

The various risk factors of poverty all have their own effects on children's developmental outcomes. However, reducing a child's exposure to the various risk factors may help decrease the negative effects of poverty. Some early intervention programs are designed to help reduce the effects of poverty by reducing children's exposure to risk factors. The different intervention programs have had varying success in improving children's outcomes.

Early intervention programs

Early childhood programs aim to prepare children to enter preschool and kindergarten, and they are growing in importance as children are expected to know more when they enter kindergarten (Chambers, Cheung, & Slavin, 2006; Ryan et al., 2006). Early childhood programs can focus on various stages of child development, ranging from prenatal development to early elementary school. However, this paper will focus on early intervention programs for at-risk children and their effects on children development.

Early intervention programs are designed to help young children and their families flourish and are often targeted for low-income families (Halpern, 2000; Meisels & Shonkoff, 2000). The focus on low-income families is because poor children may benefit from high quality early childhood programs than their less poor counterparts (Johnson & Brooks-Gunn, 2012). Knudsen, Heckman, Cameron, and Shonkoff (2006) also argue for the benefits of early intervention programs, like the Perry Preschool Project and the Carolina Abecedarian Project, because disadvantaged early environments can

negatively influence performance in the workforce. Knudsen et al. (2006) also stress that prevention produces better results and costs less than remediation. An emphasis on prevention supports the implementation of early intervention programs, which can be seen as prevention programs.

The goals of early childhood education can be divided into three sections, cognitive skills, school readiness, and social and emotional development (Currie, 2001). However, many studies focus on cognitive skills, which may be due to the fact that IQ tests and other assessments are easier to define and test than school readiness and social and emotional development. Despite the emphasis on increasing cognitive skills, early intervention programs have also demonstrated success in non-academic outcomes, which will be examined for individual intervention programs.

It is also important to note that there are different types of intervention programs that exist. Funding can be various combinations of public, private, and federal, and program size can range from small to large (Currie, 2001). Large-scale programs are thought of as being lower quality than small-model programs because they serve a greater number of people. The various types of intervention programs help discover what type of program is beneficial for improving child outcomes. The Perry Preschool Project (PPP), Head Start, Chicago Child-Parent Center Program (CPC), and the Carolina Abecedarian Project are all examples of early intervention programs. The PPP and the Carolina Abecedarian Project are considered to be small-model programs, while Head Start and the CPC program are examples of large-scale programs. While each of these programs has a different program design and curriculum, they all affect the developmental outcomes of children who participate.

Perry Preschool Project

The Perry Preschool Project (PPP) was an early intervention program conducted from 1962 to 1967 in Ypsilanti, Michigan. The initial goals of the program were to help young children between the ages of three and four avoid school failure and related problems. One hundred twenty three African American children participated in the study and were recruited using school data, neighborhood referrals and door-to-door-canvassing (Schweinhart, 2010). The participants were selected using socioeconomic status (SES) and children's intelligence levels as criteria, specifically low-SES and low IQ scores, ranging between 70 and 85 on the Stanford-Binet Intelligence Test, which is just above the cut off for mental impairment (Park, 2000; Schweinhart, 2010).

The Perry Preschool study is often cited for using random assignment to determine the treatment and control groups. Children were matched based on their initial Stanford-Binet IQ scores and then split up each pair into different undesignated groups (Schweinhart, 2010). However, some pair members were switched in order to balance for gender and mean SES (Heckman, Moon, Pinto, Savelyev, & Yavitz, 2010a; Schweinhart, 2010). After switching a few children between groups, a coin toss was used to assign one group to the treatment and the other to the control. Random assignment was further compromised when some children with employed mothers in the treatment group were switched with children with unemployed mothers in the control group. This adjustment was made because the weekly home visits would be difficult to carry out with mothers who were working (Heckman et al., 2010a; Schweinhart, 2010). The potential effects of this compromised randomization will be further analyzed in the benefit-cost analyses chapter.

The structure of the PPP was two and a half hours of preschool every weekday morning for 30 weeks of the year. Perry Preschool teachers would also visit the families of the children in their homes for one and a half hours a week (Schweinhart, 2010). Another important characteristic of the program was the low child-to-teacher ratio, which was about five or six children per teacher. The child to teacher ratio was low to make it possible for the teachers to visit all of the families during the week for home visits (Schweinhart, 2010). The low child-to-teacher ratio helped ensure that participants received individual attention. The participants' parents had to participate in the weekly home visits, as well as monthly meetings with other parents in the program (Park, 2000). The design of the Perry Preschool had some similarities to constructivism because children are active learners and benefit from planning, carrying out, and reviewing activities and ideas (Schweinhart, 2010). In this active learning model, children's intellectual and social development is encouraged and emphasized (Park, 2000). Teachers and parents play a more observational role and serve as a moderator of student behavior.

Multiple follow-up studies have been conducted over the years to determine the short- and long-term effects of the PPP. Data was collected on both the treatment and control group from ages three through eleven. Additional data was collected when participants were 14, 15, 19, 27, and 40 years old (Schweinhart, 2010).

Effects. The Perry Preschool Project was designed to improve the academic outcomes of disadvantaged children, and the program successfully met that goal. The study found that a lower percentage of children in the treatment group were later placed into special education for mental impairment compared to children in the control group, 15 and 34 percent, respectively (Park, 2000; Schweinhart, 2010). Children in the control

group performed worse on language tests between preschool and the age of 7, which suggests that the treatment was successful (Schweinhart, 2010). Children who received the preschool intervention scored higher on school achievement tests when they were nine, 10, and 14 years old, which provides additional support for the benefits of treatment (Park, 2000; Schweinhart, 2010). Children in the program also had higher grade point averages and higher high school graduation rates than children in the control group (65 and 45 percent, respectively) (Park, 2000; Schweinhart, 2010). All of these examples of improved academic outcomes support the use the PPP to help reduce the negative effects of poverty.

Despite the PPP's primary goal to improve academic outcomes, the program also found improvements to social and socioeconomic outcomes of disadvantaged children. One of the outcomes that unexpectedly benefitted from the PPP was delinquency. Juvenile delinquency was significantly lower for children in the treatment group (Park, 2000). Participants in the preschool group had lower total misconduct between the ages of 15 and 19 (Park, 2000). At the age 40 follow-up, children who participated in the preschool program were arrested fewer times for violent crimes, property crimes, and drug crimes (Schweinhart, 2010). More participants in the control group were more frequently arrested for five or more times than participants in the preschool group (Park, 2000; Schweinhart, 2010). Thus, delinquency was lower for PPP participants in multiple contexts, not just juvenile delinquency. The lower rates of delinquency may be associated with the higher graduation rates. Another social outcome was the lower rate of out of wedlock births for participants in the preschool group than that of participants in the control group (57 and 83 percent, respectively) (Park, 2000). The reduced number of out

of wedlock births could suggest that participants were less likely to be single parents, which reduces their risk for poverty.

There were also various socioeconomic benefits from the PPP. Fewer participants in the treatment program received welfare than the control group, 18 and 32 percent, respectively (Park, 2000). The lower rates of welfare receipt may be related to the higher median annual incomes of the program group; the program group had a median annual income of $20,800, which was higher than the $15,300 that the control group earned (Schweinhart, 2010). Higher income of the preschool group may be related to their higher employment rates (76 percent) compared to the employment rate of the control group (62 percent) when they were 40 years old (Schweinhart, 2010). Preschool participants were also more likely to own their own home according to data from the age-40 follow up; thirty-seven percent of the program group owned their own home, compared to the 28 percent of the control group (Park, 2000; Schweinhart, 2010). These benefits are just some of the numerous improvements to the developmental outcomes of the preschool group that PPP has demonstrated over the years.

Head Start

Head Start is a preschool program that attempts to improve the emotional and social development of disadvantaged children (Currie, 2001; Perkins-Gough, 2007). It was developed as a part of President Johnson's War on Poverty and started in 1965, which makes it the oldest publically funded program. Head Start started as a summer program, but it expanded to become a half-day program after two summers and is currently a full-day program (Halpern, 2000; Resnick, 2010). The program has endured the various changes in political power and is still running today. Head Start has served

over 30 million children since its inception, but there are many eligible children who are unable to participate in the program because of insufficient funding (Gibbs, Ludwig, & Miller, 2013; Office of Head Start, 2014b). Early Head Start is a program focused on the development of low-income children under three years old, but that goes beyond the scope of this analysis.

Head Start is a comprehensive program that includes health services, nutrition, family services, and a preschool program to serve poor children between the ages of three and four (Gibbs et al., 2013; Halpern, 2000). The health component of Head Start includes, but is not limited to, vaccinations, blood tests, and dental examination, which are supposed to help improve children's outcomes and reduce childhood mortality rates (Gibbs et al., 2013). Given that children's health is a risk factor for poverty, children's outcome should not be as negatively affected because of the health services. Another component of the Head Start program is the availability of family services. Head Start tries to compensate for inadequate parenting in early childhood by providing parenting classes and assistance with GED classes. (Halpern, 2000; Resnick, 2010). Thus, the various aspects of the program try to target potential risk factors of poverty in hopes of improving child outcomes.

Head Start is a federally funded program, with the money directly given to thousands of local Head Start programs (Gibbs et al., 2013; Resnick, 2010). Local Head Start programs receive additional funding from local contributions and matching (Resnick, 2010). The preschool aspect of Head Start was initially focused on instructional teaching, but has begun to use learning approaches that encourage discovery (Resnick, 2010). However, Congress now requires children to meet a set of skills that includes

things like identifying 10 letters of the alphabet, which puts pressure on children to learn (Resnick, 2010). The requirement of preliteracy skills was necessary to receive funding, but it puts an emphasis on obtaining results and deemphasizes the learning process.

Effects. Congress initially evaluated Head Start in terms of IQ effects because IQ was associated with school readiness (Halpern, 2000; Perkins-Gough, 2007). While Head Start showed short-term improvements of cognitive skills, the effects did not continue past the first grade (Gibbs et al., 2013). Head Start's lack of long-term effects on cognitive outcomes has made the program subject to critiques and questions of its effectiveness (Gibbs et al., 2013; Halpern, 2000). A few studies, like the Head Start Child and Family Experiences Survey (FACES) and the Head Start Impact Study (HSIS) have taken a look at Head Start to determine its impacts on the outcomes of children.

Head Start Child and Family Experiences Survey (FACES). The Head Start Child and Family Experiences Survey (FACES) was created in 1997 to help publish information about Head Start. It was the first national longitudinal evaluation of Head Start and looked at the participants, the quality of Head Start programs, and various outcomes of children in Head Start (Resnick, 2010). Local Head Start programs can vary depending on the location, which has created questions about the effectiveness of the programs overall. Head Start teachers are not required to have bachelor's degrees, which means they may not be as effective as other teachers with more educational training (Gibbs et al., 2013). However, FACES found that teachers' education did not significantly predict the quality of Head Start programs (Resnick, 2010).

FACES found that Head Start children are ahead when they get to kindergarten (Perkins-Gough, 2007). Head Start participants increased scores in vocabulary, early

math, early writing, and early reading during the course of the program year; the largest gains were found for early reading, with a 4.2 point increase (Resnick, 2010). Vocabulary and early math abilities also benefited from Head Start as scores increased by 3.3 points and 1.8 points, respectively (Resnick, 2010). Even though Head Start participants demonstrated short-term improvements, it is important to note that FACES did not include a control group (Currie, 2001). The lack of a control group means that it is unclear if all Head Start participants benefited more than children who did not participate in Head Start.

Head Start Impact Study (HSIS). The Head Start Impact Study (HSIS) was carried out because Congress wanted to understand the program's impact (Administration of Children and Families, 2010). HSIS used three- and four-year-olds that were just entering Head Start, and the children were randomly assigned to receive Head Start treatment or to be in a control group (Gibbs et al., 2013). Overall, the HSIS found that children benefited from attending Head Start. Children who attended Head Start for one year benefitted from the program's design with the lower child-teacher ratios, higher teacher qualification, and more time spent on early reading and math activities.

The HSIS found positive academic and behavioral findings for children who participated in Head Start. Three-year-old Head Start participants were better at various alphabet related tasks, like letter naming and word-letter identification, as well as preacademic skill (Resnick, 2010). They also had better perceptual motor skills and health status (Administration of Children and Families, 2010). Improved health status was likely related to the various health services provided to the Head Start children. Four-year-old Head Start participants showed improved outcomes in terms of language and

literary skills, like vocabulary, spelling, color identification, and prewriting skills (Administration of Children and Families, 2010; Resnick, 2010). Participants who were four did not show improvements on a few categories, like oral comprehension and math skills measures (Resnick, 2010). In terms of behavioral outcomes, three-year-olds, but not four-year-olds, had lower levels of hyperactive behavior and fewer behavioral problems overall (Resnick, 2010). Three-year-olds who received two years of Head Start demonstrated even more improvements than the four-year-old children who only received one year of Head Start, which suggests that children should participate in Head Start for two years. Despite the mixed findings from Head Start assessments, children still benefit from participating in a Head Start program.

Chicago Child-Parent Center Program

The Chicago Child-Parent Center (CPC) program is an example of a large-scale public early intervention program. The CPC program began in 1967 and received funding from Title I of the Elementary and Secondary Education Act of 1965[1], which makes it the second oldest federally funded preschool program (Department of Early Childhood Education; Reynolds, Temple, & Ou, 2010). The program emphasized reading and language skills, parental involvement, and comprehensive services as it tried to encourage academic success, increase parental involvement, and provide a stable learning environment (Department of Early Childhood Education; Reynolds et al., 2010; Waisman Center, 2000). The child-staff ratio is about 8.5, which is low for public schools and helps provide individualized learning (Chicago Longitudinal Study, 2004).

[1] Title I of the Elementary and Secondary Education Act of 1965 focused on improving the academic achievement of the disadvantaged and advocated for the equal opportunity for children to receive a high-quality education. See http://www2.ed.gov/policy/elsec/leg/esea02/pg1.html for more information.

The CPC program was targeted at low-income three- and four-year-olds and their families (Reynolds, Temple, Robertson, & Mann, 2001). The program provided children with preschool, as well as kindergarten and school-age interventions. Children were able to attend the CPC program as long as they resided in school neighborhoods that were eligible for Title I funding and attended Chicago Public Schools (Chicago Longitudinal Study, 2004; Department of Early Childhood Education). Children's parents needed to agree to participate in order for children to attend the CPC program because of the emphasis of parent involvement (Department of Early Childhood Education). The program required parents to be involved for a minimum of one half-day per week (Chicago Longitudinal Study, 2004).

Effects. The Chicago Longitudinal Study (CLS) was carried out to investigate the cognitive and social development of 1,539 low-income children from high-poverty neighborhoods of Chicago. A further breakdown of participants was 989 children who participated in the CPC program and 550 children who did not participate in the CPC program. While the CPC program was large-scale, there was no random assignment because children went to their neighborhood schools (Reynolds et al., 2001). Despite the lack of random assignment, the CLS potentially has higher external validity because of the larger and more representative sample of participants than the participants of small model programs, like the PPP.

Data from the CLS was used to evaluate the various effects of the CPC program on child outcomes, such as educational attainment and juvenile arrests. CPC program participants completed more school by the time they were 20 years old and were less likely to drop out than children who did not participate in the CPC program (Reynolds et

al., 2001). School dropout rates were significantly lower for boys who participated in the preschool program, but the difference was not statistically significant for girls (Reynolds et al., 2001). Boys in the CPC program were also significantly more likely to complete high school than boys who were not in the program, while there was no significant difference between girls (Reynolds et al., 2001). However, the higher high school graduation rate for male participants is not surprising given that they had lower dropout rates. Other school-related outcomes were similar to the outcomes found in other intervention programs, specifically that those who participated in preschool were less likely to be held back (23 versus 38.4 percent) and less likely to be placed in special education (14.4 versus 24.6 percent), which were similar to findings from the PPP (Reynolds et al., 2001). If children were placed in special education, those in the preschool treatment group were in special education for, on average, half the time of the participants who were in the control group (Reynolds et al., 2001). The finding that participants spent less time in special education suggests that CPC participants were better equipped and cognitively developed.

Similar to the findings of the PPP, the CPC program found that preschool participants had lower rates of delinquency. Children who attended a CPC program had lower rates of juvenile arrests than non-CPC participants (16.9 versus 25.1 percent) (Reynolds et al., 2001). CPC children were arrested fewer times and less likely to have multiple arrests (9.5 percent versus 12.8 percent) and violence arrests (9 versus 15.3 percent) than non-CPC participants (Reynolds et al., 2001). Once again, the program participants had lower levels of various types of delinquency. The lower rates of delinquency may be related to the higher educational attainment of CPC participants.

The Carolina Abecedarian Project

The Carolina Abecedarian Project was an intensive early intervention program for high-risk children born between 1972 and 1977. The early intervention program took place in Chapel Hill, North Carolina. The Abecedarian Project is viewed as an intensive program for a few reasons. One reason for its intensive reputation is because children were able to attend the program starting at a young age. Children were able to enter the program when they were six-weeks old, and the average age of entrance was 4.4 months old (Campbell & Ramey, 1991; Campbell & Ramey, 2010). The entry age for the Abecedarian Project was much lower than the entry age for programs like the PPP, Head Start, and the CPC, which were all around three or four years. The duration and length of the program also add to the program's intensive reputation. The Abecedarian Project was eight hours a day for five days a week, and children attended for fifty weeks of the year (Campbell & Ramey, 2010; Currie, 2001). The length and duration of the program was also much larger than that of the PPP, Head Start, and the CPC.

Participants were screened for 13 different risk factors, including maternal and paternal educational level, family income, and parental IQ scores lower than 90 (Campbell & Ramey, 1991; Ramey et al., 2000). The majority of participants were African American (98%). Out of the 111 children who participated, 57 were randomly assigned to the treatment group and 54 were assigned to the control group (Currie, 2001; Ramey et al., 2000). Both the treatment and control group received nutritional supplements, family support social services, and pediatric care and referral, which should have reduced the negative effects of poor health. However, the preschool treatment participants received the preschool intervention for full days. Low child-teacher ratios,

which ranged from three to six children per teacher, were an important characteristic of the Abecedarian Project because it highlighted the program's intensive nature (Campbell & Ramey, 1991; Currie, 2001). Daily transportation was provided for the children.

The preschool phase aimed to improve school readiness and help ease the transition for children between preschool and kindergarten. The program was designed to provide a responsive and stimulating social environment to aid the learning process. The program framework was termed "Biosocial Developmental Contextualism," and also emphasized language and high quality adult-child interactions to develop early brain and behavioral development (Ramey et al., 2000). The Abecedarian Project consisted of a preschool intervention (Phase I) and a kindergarten through second grade intervention (Phase II). Participants were randomly put into the Phase I treatment or control group. Random assignment within the Phase I treatment group and the Phase I control group was also used to determine who was in the Phase II treatment and control groups.

Effects. Follow-up data has been collected when the children were eight, 12, and 15 years old. Data collected at age eight when Phase II ended indicated that the longer a child was enrolled in a program, the larger the improvement on reading and math scores. Findings specifically showed that participating in the preschool and kindergarten through second grade interventions had the highest scores. Participating in the preschool treatment group had the second highest scores, with the kindergarten through second grade treatment group having scores greater than the control group (Ramey et al., 2000). There were similar patterns when academic achievement was assessed once the children were 12 years old. Another follow-up study was conducted when participants were 15 years old, and effects were found for participants who were in the treatment groups for

one or both phases (Currie, 2001). Interestingly, participants who received no preschool treatment, but received Phase II treatment did not demonstrate higher scores than the control group (Ramey et al., 2000). Thus, it is suggested that early intensive programs, like preschool programs, are more effective than trying to improve outcomes when the children are older, which agrees with Knudsen et al.'s (2006) view that prevention is easier than remediation. However, the findings from the Abecedarian Project suggest that high-quality programs need to be continued through kindergarten and beyond.

Similar to other programs, grade retention through age 15 was lower for participants in the Abecedarian preschool program. The grade retention rate decreased 25 percent (from 55 to 30 percent) (Currie, 2001; Ramey et al., 2000). Special education placement rates for the preschool treatment group were lower than the control group (12 versus 48 percent) (Currie, 2001; Ramey et al., 2000). A follow-up study that was conducted when participants were 21 years old indicated that children in the treatment group for Phase I performed better on test scores on average; they were also more likely to have continued their education past high school or to still be enrolled in school (Currie, 2001). Again, these findings support the idea proposed by Knudsen et al. (2006) that prevention produces better results that mediation.

Although the Abecedarian program was an early childhood intervention program, mothers also benefited from the program in terms of maternal education change and employment (Ramey et al., 2000). The benefits in maternal education and employment were likely due to the fact that the program provided them with full-time childcare at no cost. Mothers of children in the preschool intervention would have more time to go back to school or to seek employment because of the year-round, full-day preschool. Ramey et

al. (2000) found that 80 percent of mothers who gave birth to their child before they were 18 were associated with most post-high school educational attainment by the time their children were 15 years old, whereas mothers with children in the control group were only 28 percent likely to have post high school education. Teen mothers in the treatment group were also more likely to be employed compared to teen mothers in the control group (92 versus 66 percent) (Ramey et al., 2000). The additional benefits to the mothers may be associated with the long-term benefits to the children since maternal education is one of the risk factors for childhood poverty.

Despite the differences in program design, the PPP, Head Start, the CPC program, and the Abecedarian Project all helped improve the outcomes of their participants. The PPP and the CPC program both demonstrated reduced delinquency in their participants. All of the programs demonstrated benefits to academic and cognitive outcomes. The Abecedarian Project, the PPP, and the CPC program were all related to lower grade retention, higher graduation rates, and less special education placement. Overall, intervention programs have demonstrated their benefits to child developmental outcomes.

Benefit-cost analyses of early intervention programs

Early intervention programs have been shown to improve various outcomes of children, like increased high school graduation rates and decreased delinquency. However, the question remains about whether early intervention programs are worth the initial investment. Researchers have begun to take a more economic approach of evaluating the effectiveness of intervention programs by looking at benefit-cost analyses to answer the question of whether public policy should have early intervention programs (Barnett, 2000; Levin, 1991). Benefit-cost analyses look at the program's cost and

outcomes to determine if such investments are worthwhile. Policy makers can use findings from benefit-cost analyses to determine the amount of funding they should provide and what types of programs they should fund (Barnett, 2000).

Determining the cost of an early intervention program requires all of the resources in a program, like salaries and rent, to be given a monetary value, while calculating program benefits uses estimates of the monetary value of program outcomes (Barnett, 2000; Levin, 1991). It can be difficult to assign monetary values to program outcomes, but people have to make their best estimates. Barnett (2000) notes that economic analyses, like benefit-cost ratios, are concerned with all costs and effects of a program, regardless of who receives the program's benefits and if the results were intended or not. When looking at Barnett's statement while considering intervention programs, people must also consider benefits to society, like the decreased use of welfare or even the benefits to mothers in the Abecedarian Project. People also need to consider the unexpected effects of some intervention programs, like the decrease in delinquency.

Perry Preschool Project

The Perry Preschool Project (PPP) is one of the more well-known, small model programs for early intervention. Various benefit-cost evaluations have been calculated for the PPP, which President Obama cited when arguing for universal preschool in his 2013 State of the Union Address (Farley, 2013). However, the evaluations of the PPP's effectiveness have varied depending on who conducted the analyses and how the outcomes were defined. For example, Rolnick and Grunewald (2003) calculated a 16 percent rate of return when using data from the age-27 follow-up, which was the most recent data at the time. They estimated the total estimate of $8.74 returns for every $1

invested in the PPP. Belfield, Nores, Barnett, and Schweinhart (2006) estimate $12.90 for every $1 invested, but they used data from the age-40 follow up. The increased benefit-cost ratio between the ages of 27 and 40 could imply that the PPP produces more benefits as time goes on.

James Heckman, an economist and Nobel laureate, took an interest in the benefits of the PPP and conducted economic analyses of the program. Heckman et al. (2010b) used the data from the age-40 follow-up data to make more rigorous estimates of the benefit-cost ratio. Heckman et al. (2010b) accounted for the compromised randomization that may have resulted from switching participants between the treatment and control groups (see Perry Preschool Project section of Early Intervention Programs chapter). Heckman et al. (2010b) also account for missing data and use local instead of national costs when possible in hopes of findings more accurate estimates of benefits. Ultimately, Heckman et al. (2010b) found a benefit-cost ratio of $8.60, which is very similar to that of Rolnick and Grunewald (2003).

Although the PPP cost had a high per child cost ($17,759), the benefits were still were still large enough to produce positive returns (Heckman et al., 2010b). The reduced delinquency, higher graduation rates, higher incomes, and reduced use of welfare are likely to all contributed to the program high benefits. However, there is some concern about the external validity of the study because of the demographics of the participants. The majority of participants were African Americans with low IQ scores from low-income families. Thus, the results may not be as generalizable to the overall population. However, the findings still argue that early intervention programs benefit at-risk children living in poverty.

Head Start

Head Start is a publically funded large-scale program that provides services for many children. In 1998, a part-day Head Start program would cost $5,021 for the child to attend for 34 weeks (Currie, 2001). The estimated cost per child for one year of Head Start is $7,000, which is lower than the PPP cost per child, which was $17,759 (Currie, 2001; Heckman et al., 2010b). An estimate of the cost for a child to attend a full-day Head Start program for a full year is about $9,000 per child (Currie, 2001). A more recent estimate of cost per child can be calculated using data from the Office of Head Start. In 2013, Head Start had $7,573,095 of federal funding and a funded enrollment of 903,679 (Office of Head Start, 2014a). Even with data on the estimated cost per child in Head Start, it is difficult to estimate the total benefits because of the variation between local Head Start centers. The benefits of Head Start may be easier to estimate once there is sufficient data on the long-term outcomes of Head Start, which would help provide a benefit-cost ratio.

Chicago Child-Parent Center Program

The Chicago Child-Parent Center Program (CPC) is a large-scale program with a small cost per child compared to small, model programs. The average cost for the CPC program per participant is $7,384 (Temple & Reynolds, 2007). A few factors may influence the lower cost per child. For example, the child-staff ratio (8.5 to 1) was larger than the other programs (3 or 6 to 1, depending on the program) (Temple & Reynolds, 2007). The CPC program was not a full day program, which should lead to lower costs. Temple and Reynolds (2007) estimate a public benefit-cost ratio to be $6.87 for every dollar invested in the CPC program, which is lower than the various benefit-cost ratios

for the PPP. However, the benefit-cost ratio still indicates the value and effectiveness of the CPC program.

Despite having a lower benefit-cost ratio than the PPP, the CPC program serves a large number of children at a lower cost per child. Additionally, the CPC program also provides parenting components, which could help improve child outcomes. Participants from the CPC program may experience benefits because of the availability of kindergarten and school-age interventions, which help maintain consistency as children advance in their education. Thus, some aspects of the CPC program should be considered for early education programs because of their contributions to positive benefit-cost ratios.

The Abecedarian Project

The cost of the Abecedarian project was high per child, which is due to the highly intensive nature of the program. The low teacher-child ratio would mean that more teachers would need to be employed and the long school day means teachers and staff would require more pay (Barnett & Masse, 2007). The Abecedarian program was conducted year-round, which would also add to the high costs (Temple & Reynolds, 2007). The total cost per child was estimated to be $67,000 in 2002 dollars. However, there are high estimates for the total benefits per child, totaling to $158,278. Thus, the benefit-cost ratio is 2.5 to 1, which is lower than estimates found for the Perry Preschool Project (Barnett & Masse, 2007). Another estimate lists $2.69 in benefits for every $1 invested, which is still relatively close to the estimate of $2.50 (Temple & Reynolds, 2007).

The Abecedarian Project may not be the best design for an intervention program despite its large benefits because of the high costs, which ultimately lowers the benefit-

cost ratio. The program would need to produce even higher benefits to offset the large costs. Despite the benefits of the intensive Abecedarian Project, it appears that investing in a program with a similar design may require some more consideration. Policy makers would likely chose a program design that yields a higher benefits-cost ratio.

Conclusion

Childhood poverty is an issue that America is still battling today, with children under 18 comprising almost 22 percent of the population living in poverty. Poverty has been found to negatively affect the cognitive and behavioral outcomes of children, which may put them at a disadvantage as they grow up. For example, children who live in poverty are more likely to have lower performance in school, such as lower test scores and lower high school graduation rates. They also struggle with more behavioral and emotional problems, such as problems with aggression and depression.

Risk factors may put children at even higher risks of living in poverty, such as living with a single parent, low family resources, and low maternal education. All of these risk factors make children more susceptible to the negative effects of poverty, and the various risk factors can often be related to one another. For example, single mothers are more likely to have less education and fewer resources than other parents. Early intervention programs have used some of these risk factors when designing an intervention to help aid children in poverty.

Early intervention programs often help at-risk children because of the multitude of disadvantages that they face compared to their lower-risk peers. Intervention programs often focus on improving cognitive outcomes while targeting some of the risk factors of poverty. For example, the Perry Preschool Project (PPP) looked for low-income families

with children who had low-IQ scores. Low-income families face a lack of resources, one of the risk factor of poverty, which is why PPP tried help out them ameliorate the negative effect of poverty. Other programs, such as Head Start, the Chicago Child-Parent Center (CPC) program, and the Abecedarian Project also target low-income families because they may lack the resources to provide enriching opportunities for their children.

The PPP provided a high-quality program, which some student may not have access to depending on things like what neighborhood they live in. Other intervention programs like Head Start have provided their participants with health services and nutrition in order to help improve the health of poor children. Parental involvement, which is featured in the PPP, Head Start, and the CPC program, tries to keep parents engaged with the lives of their children and encourages interaction. The designs of early intervention programs help provide children with the cognitive stimulation and social experiences to help them have better developmental outcomes.

Indeed, the programs, like the PPP, Head Start, the CPC program, and the Abecedarian Project, have all demonstrate improvements to the developmental outcomes of program participants. The benefits of these programs have included higher graduation rates, lower delinquency, lower rates of welfare receipt, and higher income. Children clearly benefit from participating in early intervention programs. However, benefit-cost ratios need to be calculated to determine whether early intervention programs are worth the investment.

Benefit-cost ratios have demonstrated the value of the PPP, the CPC program, and the Abecedarian Project, but the PPP and the CPC have found higher returns than the Abecedarian Project. Policy makers should look at the various benefits of each program

and identify program characteristics that help produce the most benefits. Hopefully policy makers will be able to develop a program that helps produce the best child outcomes. However, policy makers may face the question of whether it would be better to have a program that serves children in poverty or a program, like universal prekindergarten, that serves all children would be the best investment for America. Regardless of whether the program serves children in poverty or all children, it is clear that some sort of early childhood education program should be developed after seeing all of the benefits that early intervention programs have produced for their participants. It is in America's best interest to improve the developmental outcomes of its children because these children will shape the future of America, and early intervention programs are a good way to start improving their outcomes.

References

Administration for Children and Families. (2010). Head Start Impact Study final report: Executive summary. Washington, DC: U.S. Department of Health and Human Services, Administration for Children and Families.

Argys, L., & Averett, S. (2013). The link between nonmarital births and poverty. In Rycroft, R. S. (Ed.), *The economics of inequality, poverty, and discrimination in the 21st century* (Vol. 2) (pp. 415-433). Santa Barbara, CA: Praeger.

Bailey, M. J., & Danziger, S. (2013). Legacies of the war on poverty. In Bailey, M. J., & Danziger, S. (Eds.), *Legacies of the war on poverty* (pp. 1-36). New York: Russell Sage Foundation.

Barnett, W.S. (2000). Economics of early childhood intervention. In J. P. Shonkoff & S. J. Meisels (Eds.), *Handbook of early childhood intervention* (2nd ed.) (pp. 589-610). New York, NY: Cambridge University Press.

Barnett, W. S., & Masse, L. N. (2007). Comparative benefit-cost analysis of the Abecedarian program and its policy implications. *Economics of Education Review, 27,* 113-125.

Belfield, C. R., Nores, M., Barnett, S., & Schweinhart, L. (2006). The High/Scope Perry Preschool Program: Cost-benefit analysis using data from the age-40 followup. *The Journal of Human Resources, 41*(1), 162-190.

Brooks-Gun, J., & Duncan, G. J. (1997). The effects of poverty on children. *The Future of Children, 7*(2), 55-71.

Campbell, F. A., & Ramey, C. T. (2010). Carolina Abecedarian project. In A. J. Reynolds, A. J. Rolnick, M. M. Englund, & J. A. Temple (Eds.), *Childhood programs and practices in the first decade of life: A human capital integration* (pp. 76-98). Cambridge: Cambridge University Press.

Chambers, B., Cheung, A. C. K., Slavin, R. E. (2006). Effective preschool program for children at risk of school failure: A best-evidence synthesis. In B. Spodek & O. N. Saracho (Eds.), *Handbook of research on the education of young children* (2nd ed.) (pp. 347-359). New Jersey: Lawrence Erlbaum Associates, Publishers.

Chicago Longitudinal Study (2004, Aug 11). Chicago Longitudinal Study. Retrieved from http://www.waisman.wisc.edu/cls/

Currie, J. (2001). Early childhood education programs. *Journal of Economic Perspectives, 15*(2), 213-238.

Dearing, E., McCartney, K., & Taylor, B. A. (2001). Change in family income-to-needs matter more for children with less. *Child Development, 72*(6), 1779-1793.

DeCarlo Santiago, C., Kaltman, S., & Miranda, J. (2012). Poverty and mental health: How do low-income adults fair in psychotherapy?. *Journal of Clinical Psychology: In Session, 69*(2), 115-126.

DeNavas-Walt, C., Proctor, B. D., & Smith, J. C. (Sep 2013) *Income, poverty, and health insurance coverage in the United States: 2012*. Retrieved from http://www.census.gov/prod/2013pubs/p60-245.pdf

Department of Early Childhood Education, Chicago Public Schools. Program overview and history. Retrieved from http://www.waisman.wisc.edu/cls/History.htm

Duncan, G. J., Brooks-Gunn, J., & Klebanov, P. K. (1994). Economic deprivation and early childhood development. *Child Development, 65*, 296-318.

Duncan, G. J., & Magnuson, K. (2005). Can family socioeconomic resources account for racial and ethnic test score gaps? *The Future of Children, 15*(1), 35-54.

Duncan, G. J., Magnuson, K., Kalil, A., & Ziol-Guest, K. (2011). The importance of early childhood poverty. *Social Indicators Research, 108*(1), Aug, 2012: 87-98.

Ensminger, M. E., Hanson, S. G., Riley, A. W., & Juon, H. (2003). Maternal psychological distress: Adults sons' and daughters' mental health and educational attainment. *Journal of the American Academy of Child & Adolescent Psychiatry, 42*(9), 1108-1115.

Farley, R. (2013, Feb 20). *Obama's Preschool Stretch.* Retrieved from http://www.factcheck.org/2013/02/obamas-preschool-stretch/

Gibbs, C., Ludwig, J., & Miller, D. L. (2013) Head Start origins and impacts. In Bailey, M. J., & Danziger, S. (Eds.), *Legacies of the war on poverty* (pp. 39-65). New York: Russell Sage Foundation.

Halpern, R. (2000). Early childhood intervention for low-income children and families. In J. P. Shonkoff & S. J. Meisels (Eds.), *Handbook of early childhood intervention* (2nd ed.) (pp.. 361-386). New York, NY: Cambridge University Press.

Heckman, J., Moon, S. H., Pinto, R., Savelyev, P., & Yavitz, A. (2010a). A reanalysis of the High/Scope Perry Preschool Program. Chicago: University of Chicago.

Heckman, J. J. , Moon, S. H., Pinto, R. Savelyev, P. A., & Yavitz, A. (2010b). The rate of return for the HighScope Perry Preschool Program. *Journal of Public Economics, 94*, 114-128. doi:10.1016/j.jpubeco.2009.11.001

Johnson, A. D., & Brooks-Gunn, J. (2012). Child care and early education for low income families: Choices and consequences. In Maholmes, E., & King, R. B. (Eds.). The Oxford handbook of poverty and child development (pp. 354-371). New York, NY: Oxford University Press.

Knudsen, E. I., Heckman, J. J., Cameron, J. L, & Shonkoff, J. P. (2006). Economic, neurobiological, and behavioral perspectives on building America's future workforce. *PNAS, 103*(27), 10155-10162.

Lamy, C. E. (2013). *American children in chronic poverty: Complex risks, benefits-cost analyses, and untangling the knot*. Lanham, MD: Lexington Books.

Levin, H. M. (1991). Cost-benefit and cost-effectiveness analyses of interventions for children in poverty. In Huston, A. C. (Ed), *Children in poverty: Child*

development and public policy (pp. 241-259) Canada: Cambridge University Press.

Meisels, S. J., & Shonkoff, J. P. (2000). Early childhood intervention: A continuing evolution. In J. P. Shonkoff & S. J. Meisels (Eds.), *Handbook of early childhood intervention* (2nd ed.) (pp. 3-31). New York, NY: Cambridge University Press.

National Institute of Mental Health (2014). *Major depressive disorder among adults*. Retrieved from http://www.nimh.nih.gov/statistics/1MDD_ADULT.shtml

Office of Head Start (2014a). *Head Start program facts fiscal year 2013*. Retrieved from http://eclkc.ohs.acf.hhs.gov/hslc/mr/factsheets

Office of Head Start (2014b). *History of Head Start*. Retrieved from http://www.acf.hhs.gov/programs/ohs/about/history-of-head-start

Parks, G. (2000). The High/Scope Perry Preschool Project. *Juvenile Justice Bulletin, October 2000*, 1-7.

Perkins-Gough, D. (2007). Giving intervention a Head Start: A conversation with Edward Zigler. *Educational Leadership*, 8-14.

Ramey, C. T., & Campbell, F. A. (1991). Poverty, early childhood education, and academic competence: The Abecedarian experiment. In A. C. Huston (Ed.), *Children in poverty: Child development and public policy* (pp. 190-221). New York, NY: Cambridge University Press.

Ramey, C. T., Campbell, F. A., Burchinal, M., Skinner, M. L., Gardner, D. M., & Ramey, S. L. (2000). Persistent effects of early childhood education on high-risk children and their mothers. *Applied Developmental Science, 4*(1), 2-14.

Resnick, G. (2010). Project Head Start: Quality and links to child outcomes. In A. J. Reynolds, A. J. Rolnick, M. M. Englund, & J. A. Temple (Eds.), *Childhood programs and practices in the first decade of life: A human capital integration* (pp. 121-167). Cambridge: Cambridge University Press.

Reynolds, A. J., Temple, J. A., & Ou, S. (2010). Impacts and implications of the Child Parent Center Preschool Program. In A. J. Reynolds, A. J. Rolnick, M. M. Englund, & J. A. Temple (Eds.), *Childhood programs and practices in the first decade of life: A human capital integration* (pp. 168-187). Cambridge: Cambridge University Press.

Reynolds, A. J., Temple, J. A., Robertson, D. L., & Mann, E. A. (2001). Long-term effects of an early childhood intervention on educational achievement and juvenile arrest: A 15-year follow-up of low-income children in public schools. *Journal of the American Medical Association, 285*(18), 2339-1026.

Rolnick, A., & Grunewald, R. (2003). Early childhood development: Economic development with a high public return. *The Region*, 1-12.

Ryan, R. M., Fauth, R. C., & Brooks-Gunn, J. (2006). Childhood poverty: Implications for school readiness and early childhood education. In B. Spodek & O. N. Saracho (Eds.), *Handbook of research on the education of young children* (2nd ed.) (pp. 323-346). New Jersey: Lawrence Erlbaum Associates, Publishers.

Schweinhart, L. J. (2010). The challenge of the HighScope Perry Preschool Study. In A. J. Reynolds, A. J. Rolnick, M. M. Englund, & J. A. Temple (Eds.), *Childhood programs and practices in the first decade of life: A human capital integration* (pp. 157-167). Cambridge: Cambridge University Press.

Temple, J. A., & Reynolds, A. J. (2007). Benefits and costs of investments in preschool education: Evidence from the Child-Parent Centers and related programs. *Economics of Education Review, 26*, 126-144.

United States Census Bureau. How the Census Bureau measures poverty. Retrieved from https://www.census.gov/hhes/www/poverty/about/overview/measure.html

United States Census Bureau. Highlights. Retrieved from https://www.census.gov/hhes/www/poverty/about/overview/index.html

United States Census Bureau. (2013). Poverty thresholds for 2013 by size of family and number of related children under 18 years. Poverty thresholds. Retrieved from https://www.census.gov/hhes/www/poverty/data/threshld/

Van Horn, M. L., Bellis, J. M., & Snyder, S. W. (2001). Family Resource Scale – revised: Psychometrics and validation of a measure of family resources in a sample of low-income families. *Journal of Psychoeducational Assessment, 19*(1), 54-68.

Waisman Center (2000). Chicago Longitudinal Study. Retrieved from http://www.waisman.wisc.edu/cls/NEWSLETN.PDF

West, J., Denton, K., & Germino-Hausken, E. (2000). *American's kindergartners: Findings from the Early Childhood Longitudinal Study – Kindergarten Class of 1009-99, Fall 1998*. Washington, DC: Nation Center for Education Statistics, U.S. Department of Education and the Institute for Educational Sciences.