

Measures of Success

BSTN's Metrics
for Ensuring Quality
Early Development



**Bright
Start
TN**

Powered by **TQEE**

Our Policy and Practice Framework

The first eight years of a child's life are so defining that third grade reading and math outcomes predict future academic, career and life success. Tennesseans for Quality Early Education's policy and practice framework is backed by decades of research that shows exactly what children need to build strong brains and succeed in school. With this research in mind, our policy and practice work are anchored in three domains of care:

High-Quality Birth-Through-Age-Eight Learning Environments

High-quality child care, pre-kindergarten programs, and elementary schools help prepare children for school and life success. Though children from low-income backgrounds benefit the most, children from more economically advantaged backgrounds also benefit.

Economists, including Noble prize-winner James Heckman, have shown that early childhood programs bring impressive returns on investment. Heckman depicts what he calls "the economics of human potential" through his "Heckman Curve." It shows that investments in quality early education are more life- and cost-effective than later remediation. Particularly for disadvantaged children, quality early education can have returns as high as \$7-13 for every \$1 invested.

Physical Health, Mental Health and Development on Track Beginning at Birth

Good physical and mental health help ensure children are successful learners from their earliest years, putting them on the pathway for grade level proficiency. Children who are often sick, have tooth pain, are dealing with chronic unmanaged or undiagnosed physical or mental health conditions, or who struggle with developmental delays and lack supports they need, often fall behind their peers in school. Health in utero, good birth outcomes, developmental screenings, and access to health and mental health services as needed, are all crucial to laying a strong and healthy early learning foundation.

Supported and Supportive Families and Communities

Families play a critical role in building strong foundations for learning. Positive parent and child interactions, such as talking, playing and reading together, helps children grow stronger emotionally, develop larger vocabularies and learn more easily. Parents often need support in order to be able to provide the care and opportunities their children need to thrive. Especially for economically disadvantaged families, or those experiencing other adversity, formal family support services and informal support networks can help mitigate the negative effects of living conditions like poverty and family stress. Mental health and substance abuse services, nutrition supports, access to resources and opportunities otherwise unaffordable for their families, and services that build parents' skills and knowledge of child development are all examples of supports that can improve caregivers' capacity to effectively support their children to thrive and achieve success in school.



Measure of Success:
**High-Quality
Birth-Through
Age-Eight Learning
Environments**





High-Quality Birth-Through-Age-Eight Learning Environments



High-Quality Early Care and Education Settings Ages 0-5

The major indicator for this measure of success is the percent of children birth to age five receiving high-quality early care and education when not with their parents (Head Start, Child Care, Special Needs Care and TN-VPK).

Children who attend high-quality early education programs have better short-, medium- and long-term educational and economic outcomes than those who are not enrolled in high-quality programs. Short-term benefits of attending high-quality preschool include higher math and English language arts proficiency. Research also shows that medium- and long-term benefits of high-quality early childhood education include a decreased likelihood of special education placement and grade retention, more years of education completed, and a higher likelihood of both high school and college graduation. Long-term economic benefits include a higher likelihood of employment later in life among children who receive higher quality education. Targeted programs such as Abecedarian Project also provide evidence that high-quality early education interventions can especially yield both short-term and lifelong benefits for children from disadvantaged backgrounds. Recent studies, including several of Tennessee's VPK program, suggest programs must be high quality in order to have a positive impact.

- [Pearman et al_2019_Teachers Schools and PreK](#): Analysis of 806 Tennessee pre-K students during the 2009-10 and 2010-11 school years. Following the same students over time, the study measured academic performance using standardized test scores on math and English language arts proficiency at third grade. Results showed that pre-K students who went on to attend high-quality early education, as defined as high-quality schools with highly effective teachers, showed significantly higher academic performance by third grade than those who did not receive high-quality early education.
- [McCoy et al_2017_Impact of Early Childhood Education](#): Meta-analysis of 22 experiments measuring the medium- and long-term effects of early childhood education between 1960 and 2016. Outcomes analyzed include high school graduation rates, placement in special education, and grade retention rates. Statistically significant results found that participation in early childhood education decreased rates of special education placement and grade retention, and increased graduation rates.
- [Sparling et al_2012_Adult Outcomes](#): The Abecedarian Project is a program which provides high-quality education to children with low-income or disadvantaged backgrounds. A study of 120 families, who were primarily Black/African American and who reported no income at the time of the study, followed infants from these families between the years of 1972 and 2009. Participants were split into two groups: a control group who did not enroll in the Abecedarian Project, and a treatment group who did enroll. Findings include higher rates of employment, a higher number of years of education completed, and a higher likelihood of college graduation among those who enrolled in the Abecedarian Project at age 30 follow-up.



High-Quality Birth-Through-Age-Eight Learning Environments



Positive Early Care and Education Climate

The major indicator of this measure of success is the percentage of early care and education programs and schools implementing social-emotional development strategies.

Positive early care and education program climates lead to strong academic and life outcomes for children. Several features make up a positive program climate: a supportive and safe learning environment, collaborative and effective educators, rigorous and developmentally appropriate instruction and engaged families. These features align with the definition of quality in K-12 environments, as defined by the [Tennessee School Climate Model](#). Children who attend schools with these elements are up to ten times more likely to experience substantial gains in reading, math and GPA, as well as stronger attendance rates than students in schools without or with weaker evidence of these elements. Longer term outcomes include positive effects on high school measures, including attendance, test scores, GPA and college enrollment.

- [Byrk et al. 2010. Organizing Schools for Improvement](#): Lessons from Chicago: Analysis of 200 elementary schools in Chicago over seven years, half of which substantially improved during that time period and half of which did not. Examined the comprehensive practices and conditions that were key factors for improvement, including leadership, professional capacity of staff, and a student-centered learning climate. Identified five drivers of school improvement: effective leaders, collaborative teachers, ambitious instruction, supportive environment and involved families.
- [Rohack et al. 2010. Understanding Quality in Context: Child Care Centers, Communities, Markets, and Public Policy](#): Analysis of 38 centers across four study sites in Alabama, California, New Jersey and Washington. Found that director engagement and approach to program leadership affected the quality of the center. Director beliefs about definitions of program quality, expectations for staff, prioritization of wages and professional development, and emphasis on program quality standards outside of licensing minimums were all associated with program quality.
- [Dennis and O'Connor. 2008. Re-examining Quality in Early Childhood](#): Collected data from 37 preschool centers in the US, including 37 teachers and their 3–4-year-old students to analyze the effect of the preschool work environment on classroom quality. Classroom sizes ranged from 9-28 students. Used ECERS to measure classroom quality and ECWES and OCDQ-RE (Organizational Climate Description Questionnaire for Elementary Schools) to measure work environment and organizational climate. Found a significant relationship between organizational climate and classroom quality. Classrooms with better work environments were also found to have better activities and materials available to children. Additionally, found that classrooms which had better (1) opportunities for professional growth, (2) reward systems, (3) physical environments, (4) relationships with colleagues, and (5) supportive leadership, had higher quality classrooms.
- [Lower and Cassidy. 2007. Child Care Work Environments](#): Study of 26 participants in early education centers, including 225 teacher surveys that examined the effects of child care work environments on the quality of the center. Child care global quality was assessed with ECERS-R scores and organizational climate was measured with ECWES (Early Childhood Work Environment Survey) scores. Found that classroom global quality was significantly positively correlated with both organizational climate and program administration. Also found a moderately significant, positive relationship between organizational climate and language/interaction factor, a catch-all measure of staff-child interactions and language used by staff.



High-Quality Birth-Through-Age-Eight Learning Environments



Regular Attendance

The major indicator for this measure of success is the percent of children who are chronically absent during preschool and the early grades (K-3).

Regular attendance in preschool and the early grades promotes higher student achievement, as measured by kindergarten readiness scores, indicators of reading fluency, and performance on standardized assessments in reading and math. Regular attendance in preschool and early grades also supports social-emotional development and educational engagement, including a range of positive approaches to learning, such as independent work ability and persistence in completing tasks. Attendance is further linked with lower rates of grade retention and chronic absenteeism in later grades. Socioeconomically disadvantaged children in particular benefit from regular school attendance.

- [Gottfried, 2014, Chronic Absenteeism and Its Effects](#): Analysis of nationally representative data set of over 10,000 kindergartners in the 2010-11 school year. Assessed the effects of moderate chronic absenteeism (between 2 weeks and 18 days of absence) and strong chronic absenteeism (more than 18 days of absence). Findings show chronic absenteeism reduces math and reading achievement, reduces educational engagement, and decreases social engagement.
- [Erlich, 2013, Pre-K Attendance](#): Analysis of 25,000 Chicago Public Schools children between 2008-2009 and 2011-2012 school years. Assessed effects of attendance rates in preschool. Findings include better preschool attendance has positive effects on kindergarten readiness, including measures of social-emotional development. Chronic absence in preschool is linked to higher likelihood of chronic absence in second grade and chronic absence for multiple years between preschool and second grade is linked to below-grade level reading in third grade.
- [ConnollyOlson, 2012, Early Elementary Performance](#): Analysis of 2,500 Baltimore City Schools children between 2006-2007 and 2010-2011 school years. Assessed effects of chronic absence, defined as missing more than one-ninth of days enrolled, in prekindergarten and kindergarten. Findings include lower math and reading achievement in grades 1-2, grade retention and future chronic absenteeism.
- [Ready, 2010, Socioeconomic Disadvantage, School Attendance, and Early Cognitive Development](#): Analysis of 14,000 kindergarten children who advanced to first grade following kindergarten in the 1998-1999 year. Assessed the relationship between early academic development and school attendance rates, and the extent to which socioeconomic inequalities in academic performance are exacerbated by attendance. Findings suggest that across socioeconomic status, chronic absence in kindergarten is linked to lower kindergarten literacy development. Additionally, socioeconomically disadvantaged children who have good attendance rates gain more literacy skills than their higher SES peers during kindergarten and first grade.



High-Quality Birth-Through-Age-Eight Learning Environments



Grade-Level Proficiency Pre-K to 2nd Grade

The major indicator for this measure of success is the percent of children pre-K through 2nd grade on-track in reading (language and literacy) and math.

Early academic skills related to literacy and math are the most significant predictors of future academic achievement. Key early literacy predictors for reading and school success include alphabet knowledge, phonological awareness, rapid automatic naming of letters or numbers, rapid automatic naming of objects or colors, writing and phonological memory. Early math skills, such as counting and number sense, predict reading, math and science achievement in later years.

- [Hernandez_2012_Double Jeopardy: How Third-Grade Reading Skills](#): Longitudinal analysis of 3,975 children in the United States between 1979 and 1989. Explored the effects of both reading proficiency levels in third grade and poverty on high school graduation rates. Found that students who did not read proficiently in third grade were four times as likely to not graduate high school than those who were reading proficiently. Living in poverty exacerbated these effects. Black and Hispanic children who were not reading proficiently in third grade were about twice as likely as similarly situated white children to not graduate high school.
- [Lesnik et al_2010_A Longitudinal Analysis of Third-Grade Students](#): Longitudinal study of 26,000 children in the Chicago Public School system who were monitored from third grade (in the 1997-98 school year) through college. Participants were stratified by grade reading level (below-level, at-level, and above-level) based on their percentile ranking of reading scores on the Iowa Tests of Basic Skills. Results found that a student's reading level at third grade significantly predicted their reading level at 8th grade. Results showed that students who were above-grade level in reading in 3rd grade were more likely to enroll in and graduate from college than those who were below-grade level.
- [Duncan et al_2007_School readiness and later achievement](#): Meta-analysis of six longitudinal datasets examining the relationship between school-entry academic, attention, and socioemotional skills and later school reading and math achievement. The strongest predictors of later achievement are school entry math, reading and attention skills.
- [McClelland et al_2006_The impact of kindergarten learning-related skills](#): Analysis of 260 children in Greensboro, NC who entered kindergarten between the ages of 48 to 71 months. Participants were monitored from kindergarten through sixth grade. Measured effect of kindergarten-related skills, including self-regulation, responsibility, independence, and cooperation, on child academic achievement, as measured by reading and math proficiency. Found that a child's kindergarten-related skills was predictive of their reading and math achievement and growth trajectory by second grade. Children with low levels of kindergarten-related learning skills were more likely to fall behind on reading and math proficiency by second grade than those with high levels of learning skills.



High-Quality Birth-Through-Age-Eight Learning Environments



Summer Learning

The major indicator for this measure of success is the percent of children who maintain reading and math gains over the summer.

As much as two-thirds of the achievement gap between students with lower and higher socioeconomic status in 9th grade can be explained by summer learning loss in early elementary school, specifically in reading and math comprehension. Summer learning loss has been found to predict high school dropout rates, high school track placement, and enrollment in four-year colleges later in a student's life. Children living in high poverty are significantly more likely to experience summer learning loss by late elementary and middle school.

- [Kuhfield, 2019, Surprising New Evidence on Summer Learning Loss](#): National analysis of 3.4 million K-8 students during the 2016-17 and 2017-18 school years. Measured summer learning loss as defined by reading and math achievement. Found that the strongest predictor of summer learning gains or losses was how much learning a student gained during the previous academic school year. Students living in high poverty had significantly more summer learning loss by later elementary and middle school than those not living in poverty.
- [Kim and Quinn, 2013, SummerReadingMetaAnalysis](#): Meta-analysis of 41 summer-based reading interventions between 1998 and 2011, spanning children in grades kindergarten through 8, in both the United States and Canada. Findings include improved reading comprehension, fluency and decoding among students who participated in a summer reading program. Summer reading programs had larger positive effects on children with lower incomes.
- [Olson et al, 2007, Lasting Consequences of the Summer Learning Gap](#): Study of 326 first grade children enrolled in Baltimore public school in 1982 who were monitored until the age of 22. Data was stratified by socioeconomic status (SES) and racial composition. Analyzed out of school summer learning in academic achievement (student reading and math comprehension). Compared academic gains of school-year learning to those of out-of-school summer learning to measure the effect of summer slide. Results showed that about two-thirds of the achievement gap between low and high SES students in 9th grade could be explained by summer learning loss in elementary school. Out-of-school summer learning differences in elementary school also predicted high school dropout rates, high school track placement, and enrollment in four-year colleges later in life.



Measure of Success:

**Physical Health,
Mental Health,
and Development
On Track
from Birth**





Physical Health, Mental Health, and Development On Track from Birth



Healthy Birth Weight

The major indicator for this measure of success is the percent of babies born weighing less than 2,500 grams (5.5 pounds).

A healthy birth weight can have short- and long-term implications for a babies' physical, cognitive, and neurological development, as well as their educational outcomes. Children born weighing less than 2,500 grams/5.5 lbs (also known as low birth weight) are more likely to experience neurodevelopmental delays, lower levels of neurodevelopment, and a higher likelihood of grade retention in elementary school. Low birth weight may lead to lower levels of intelligence that can span a person's life, from young adulthood into midlife.

- [Zhang et al. 2019. Birthweight and DQ](#): Study of 4,026 infants aged 1-6 months in Wuhan, China between October 2012 and September 2013. Measured development quotient (DQ), a metric of neurodevelopment, as well as neurodevelopmental delays, as diagnosed by a clinician. Findings showed that low birth weight resulted in a higher likelihood of having a lower DQ, as defined by gross and fine motor skills, and adaptability. The study also found that low birth weight increased the risk of having neurodevelopmental delays across the same measures (gross and fine motor skills and adaptability).
- [Mortensen and Flensborg-Madsen, 2017. Birth weight and intelligence](#): Study of 4,696 children born in Copenhagen between 1959 and 1961, followed into their adult lives. Analyzed the relationship between low birth weight and intelligence later in life, as measured by various intelligence scales. Results showed that a higher birth weight was associated with higher intelligence scores, an association that remained stable from young adulthood (ages 19 to 28) into midlife (age 50).
- [Temple et al. 2010. LBW Preschool Remedial](#): Study of 1,300 children in Chicago who are primarily low-income and Black/African American. Results found that low birth weight predicted grade retention, particularly for boys.





Physical Health, Mental Health, and Development On Track from Birth



Physical Health

The major indicator for this measure of success is the percent of parents reporting their child's health is excellent or good.

Being in good physical health in early years of childhood has several positive educational and health outcomes for children. Good health in preschool and early childhood has been linked to good health later in life, as measured by tobacco exposure, unintentional injury, obesity and mental health. Educational benefits of good health in the early years include increased academic achievement. Poor health is associated with lower math and reading test scores in kindergarten entry through third grade, with negative effects compounding over time. Specific health conditions, such as having ADHD, being overweight or underweight, or having a speech impairment, can also result in lower reading or math achievement among children.

- [Guyer et al. 2009. Early childhood health promotion](#): Analysis of effects of tobacco exposure, unintentional injury, obesity, and mental health problems during preschool years. Assessed health promotion and disease prevention among children from before birth through 5-years-old. Analysis determined that all four measures were significant predictors of health problems throughout a person's life span. This was especially true for tobacco exposure.
- [Eide et al. 2010. The relation between children's health](#): Analysis of 2,394 families who participated in the Child Development Supplement portion of the Panel Study of Income Dynamics, a nationally representative sample of families that has collected information from the same individuals over time since 1997. Researchers used math and reading test scores from the Woodcock-Johnson evaluation tool to measure academic achievement. Health conditions considered in the analysis included ADHD, asthma, vision, hearing and speech impairment, and being underweight or overweight. Results found that having a speech impairment, ADHD, and hearing and vision impairments were associated with lower reading scores.
- [Spernack et al. 2006. child health and academic achievement](#): Analysis of 7,515 children from the National Head Start-Public School Early Childhood Transition Demonstration study, which collected data from children enrolled in Head Start through third grade between the years of 1992 and 1998. Comparing academic achievement (math and reading test scores) between children categorized as having "poor" and "good" health according to parent ratings, this study found that children with poor health exhibited lower academic achievement than those with good health. Also found that negative effects of poor health on achievement were stronger in third grade than in kindergarten, especially for reading scores.





Physical Health, Mental Health, and Development On Track from Birth



Social emotional health

The major indicator for this measure of success is the percent of children exhibiting self-regulation and good interpersonal skills.

There is abundant evidence that social emotional health in children can have holistic, long-lasting benefits that persist throughout their lives. Notably, developing social emotional skills in the early years can improve an individual's academic success and performance. Exhibiting prosocial behavior in kindergarten can increase a child's likelihood of graduating both high and college, as well as obtaining stable, full-time employment by young adulthood. Children who are taught social emotional skills in early years are more likely to succeed academically. Specific social emotional skills such as attention and self-regulation also have shown to impact a child's academic achievement. Studies show that inattention, hyperactivity, and low levels of self-regulation may result in lower math and English achievement in later years.

Children who demonstrate strong self-regulation skills between preschool and 2nd grade are more likely to have positive health and financial outcomes and less likely to have substance abuse problems later in life. Children with lower socioemotional competence in the early grades, including prior to kindergarten entry, are more likely to experience peer rejection, declining enjoyment and engagement in school, and poor academic outcomes.

- [Jones et al_2015_Early Social Emotional Functioning](#): Longitudinal study of 753 kindergarteners in 1991, who were a subsample of the Fast Track Study, an intervention study which aims to reduce aggression among children identified as being at risk for behavioral disorders. Outcomes were recorded by the same individuals 13 to 19 years later, between 2004 and 2010. Indicators of prosocial behavior included teacher ratings of prosocial communication skills, teacher ratings of authority acceptance, and primary caregiver child behavior checklist scores. Found that prosocial behavior in kindergarten significantly increased a child's likelihood of high school graduation, college graduation, stable employment in young adulthood, and full-time employment in young adulthood.
- [Duckworth and Schoon_2010_Progress and Attainment During Primary School](#): Longitudinal analysis of 14,062 children from birth through middle childhood in the United Kingdom between 1991-1992. Measured the effects of a child's attention, self-regulation, and self-esteem at ages 6 and 7 on their academic achievement in later years, at ages 10 to 11. Results show that higher levels of inattention and hyperactivity, and low levels of self-regulation, at ages 6 and 7 were associated with lower achievement in later years, as measured by math and English test scores.
- [Durlak et al_2011_The Impact of Enhancing Students' Social and Emotional Learning](#): Large-scale meta-analysis of 213 school-based social emotional learning interventions, including 270,034 youth ages 5 through 18. Measured the impact of social emotional learning interventions across various child outcomes in later years, such as child behavior and attitudes. Findings include significant increases in social and emotional skills later in life among children who received social emotional learning interventions in school. Also found that social emotional learning interventions were associated with an 11 percentile point increase in academic achievement later in later grades.



Physical Health, Mental Health, and Development On Track from Birth



Oral health

The major indicator for this measure of success is the percent of children without untreated tooth decay.

Maintaining good oral health is crucial to a child's overall well-being as well as their ability to succeed in school. Children with untreated dental problems are more likely to have trouble performing everyday activities necessary to their overall health, including difficulties with sleeping, chewing and eating. Dental health problems are associated with an increased risk of shyness, unfriendliness, feelings of unworthiness, and overall unhappiness among young children and adolescents.

Dental problems and lack of access to dental care are also connected to lower school performance, including higher rates of school absenteeism, difficulties completing required homework, difficulties paying attention at school and lower grade point average. Children in families with low incomes may have an increased risk of developing dental issues.

- [Guarnizo-Herreno and Wehby_2012_Children's Dental Health School Performance:](#) Analysis of 41,988 children between the ages of 6 and 17 as part of the 2007 National Survey of Child's Health, a nationally representative sample of children in the United States and their health characteristics. Looked at effects of children's dental problems on their school performance and psychological well-being. Found that having dental problems was a significant predictor of having more problems at school, having lower school attendance, and struggling to complete required homework. Also found that dental problems were associated with increased risk of shyness, unfriendliness, feelings of unworthiness, and overall unhappiness.
- [Mulligan et al_2012_Impact of Oral Health on Academic Performance:](#) Study of 1,495 elementary and high school-aged children with disadvantaged backgrounds in the Los Angeles public school system. Measured effects of having poor oral health, as determined by whether or not the child had toothaches, access to dental care when needed, urgent dental needs, cavitated or non-cavitated caries, and school absence due to dental problems. Found that students who reported having toothaches were four times more likely to have a low grade point average (GPA) than those who did not have toothaches. Also, students who needed dental care but were unable to access it were more likely to miss school than those who did have access.
- [Luciana de Andrade Lima_2018_Impact of Untreated Dental Caries:](#) Cross-sectional analysis of 647 Brazilian children ages 6 to 10 in 2016. Measures the impact of having untreated dental caries on various quality of life measures. Found that having untreated dental caries was a significant predictor of both health quality of life outcomes (including having oral pain and difficulty chewing, eating and sleeping) and school performance outcomes (lower school attendance and difficulty completing homework and paying attention in school). Children with untreated dental caries were also more likely to come from families with low incomes.



Physical Health, Mental Health, and Development On Track from Birth



Early intervention

The major indicator for this measure of success is the percent of children with special needs who receive and improve with early intervention services.

Early intervention programs support positive development and long-term outcomes for children with special needs. Children with disabilities who participate in early intervention programs have been found to experience significant development gains after completing a program. Studies show that early intervention can help children with disabilities improve their abilities in social, adaptive, motor, communication and cognitive development. Children with autism spectrum disorder who receive early intervention from birth to age 5 may exhibit higher levels of cognitive functioning, adaptive functioning and social engagement. These cognitive, adaptive and social gains have been found to persist for years following the intervention. Children with autism spectrum disorder who receive early intervention may also experience reduced symptom severity following the intervention.

Benefits of early intervention are more pronounced for children who enroll in early intervention at earlier ages or grades than those who enroll later in life. Research shows that students with reading disorders who entered early intervention services in first or second grade had higher gains in reading scores by fourth and fifth grade than those who entered in third grade. Similarly, children with autism spectrum disorder who enrolled in early intervention services at a younger age exhibited higher IQ scores and adaptive behaviors, and lower ASD severity and reciprocal social interaction-communication disturbances.

- [Landa_2018_Efficacy of Early Interventions for Infants](#): Review of multiple studies evaluating efficacy of early intervention programs for children under the age of five. Parent-mediated early intervention strategies were found to improve child vocabulary comprehension, as well as reduce autism spectrum disorder (ASD) symptom severity. This was especially true when parent-child engagement was high (i.e., shared attention, parent synchrony in parent-child interactions). Early intensive behavioral interventions were found to improve cognitive abilities, as measured by IQ scores.
- [Dawson et al_2015_Long-Term Outcomes of Early Intervention in 6-Year-Old Children With Autism Spectrum Disorder](#): Randomized control trial of 39 6-year-old children who were diagnosed with ASD at age 18-30 months and who received the Early Start Denver Model (ESDM) early intervention. ESDM is a high-intensity, in-home intervention. Found that those who received the intervention had improved intellectual and adaptive functioning, socialization, and in some measures, reduced severity of core symptoms and challenging behaviors. These gains were maintained two years after the ESDM intervention. Evidence of reduced severity of core symptoms was not found immediately after the intervention, but was found at two-year follow-up.
- [Smith et al_2015_Predicting Outcome of Community-Based](#): Analysis of 71 children aged 20-59 months old who were diagnosed with ASD and who received community-based early intensive behavioral interventions (EIBIs). Outcomes were recorded at both 12- and 24-month follow-up post-intervention. Measured cognitive skills, adaptive behavior, ASD severity and social engagement. Results showed that children who received EIBI at a younger age exhibited higher IQ scores and adaptive behaviors, and lower ASD severity and reciprocal social interaction-communication disturbances. Also found evidence that receiving EIBI at a later age may lead to less successful therapeutic treatment later in life.



Physical Health, Mental Health, and Development On Track from Birth

- [Ehrhardt et al. 2013. Special Education and Later Academic Achievement](#): Data collected from the Early Childhood Longitudinal Study-Kindergarten Cohort, study which followed participants from kindergarten through eighth grade during 1998-2007. The study evaluated a total of 470 children who were identified as having a reading disorder to analyze whether the grade at which they received special education impacted their reading scores. Found that children who entered special needs education in first grade had higher gains in reading achievement scores by fourth and fifth grade than children who didn't enter special needs education until second or third grade.
- [Bruder. 1993. The Provision of Early Intervention and Early Childhood](#): Evaluation of 30 infant and preschool-aged children with disabilities who received community-based early intervention services. Disabilities of the participants included Down Syndrome, cerebral palsy, and developmental, language, motor and speech delays, among other disabilities. Measured the effect of the early interventions on various domains, such as social, adaptive, motor, communication and cognitive development. Found that children showed significant gains in all developmental domains by the conclusion of the intervention. Also, results showed increased engagement among participants after receiving the intervention.



Measure of Success:

**Supported,
and Supportive,
Families and
Communities**





Supported, and Supportive, Families and Communities



Safe at Home

The major indicator for this measure of success is the rate of investigated/assessed child abuse or neglect.

Abuse, neglect, and maltreatment in childhood can negatively impact cognitive, language, behavioral and psychological functioning and development. Instances of substantiated child abuse or neglect are associated with decreased aptitudes in vocabulary, reading ability, perceptual reasoning, verbal and nonverbal abilities, and language proficiency in adolescence and middle- to late- adulthood. Children who experience abuse or neglect are particularly at risk of having executive dysfunction and lower levels of nonverbal reasoning later in life.

Victims of childhood maltreatment are less likely to graduate high school, less likely to be employed by age 21, and are at a greater risk of exhibiting externalizing behaviors, internalizing behaviors, and aggression than those who did not experience abuse or neglect. Abuse and neglect are also linked to several psychological disorders, such as anxiety and depression.

- [Strathearn et al. 2020. Long-Term Cognitive, Psychological, and Health Outcomes:](#) Systematic review of studies which analyze child maltreatment using the Mater-University of Queensland Study of Pregnancy (MUSP), a longitudinal study which has collected prenatal data from women and their children for over 40 years. Evaluated 19 articles, including 7,214 children, which measured the effects of substantiated child abuse or neglect on over 46 types of outcomes related to cognitive, psychological, health or behavioral functioning. Outcomes were evaluated for children at both age 14 and 21 follow-up. Findings include lower vocabulary scores, reading ability, and perceptual reasoning at age 14 and 21 follow-up among children who experienced maltreatment. Children who did not experience maltreatment were also three to four times more likely to graduate high school, and were two to three times more likely to be unemployed by age 21. Child abuse and neglect was also significantly associated with internalizing and externalizing behavioral problems, as well as psychological conditions such as anxiety and depression.
- [Spratt et al. 2013. Effects of Early Neglect on Cognitive:](#) Study of 60 children ages 3 to 10 from the United States. Compared children who had experienced substantiated neglect to those who had not experienced neglect across measures of cognitive, language and behavioral functioning using standardized test scores. Specific measures analyzed include attention, aggression, anxiety and depression, externalizing and internalizing behaviors, verbal and nonverbal abilities, and language proficiency. Found that children who had not experienced child neglect scored significantly higher in these areas (cognitive, language and behavior functioning) than those who had experienced neglect as a child.
- [Nikolina and Spatz Widom. 2013. Child Maltreatment and Executive Functioning:](#) Analysis of 792 cases of court-substantiated child abuse and neglect among children ages 0 through 11. Followed children into adulthood, at age 41-years-old. Outcome measures were collected in middle adulthood at age 29-years-old. Evaluated executive functioning and nonverbal reasoning using test scores. Results showed that child abuse and neglect was a significant predictor of poor executive functioning and nonverbal reasoning skills at age 41. Compared to children who experienced physical and sexual abuse, children who experienced maltreatment or neglect were even more likely to have long-term consequences on neuropsychological functioning by age 41.



Supported, and Supportive, Families and Communities



Positive Parent/Child Interaction

The major indicator for this measure of success is the average number of minutes per day that parents talk or play with their children.

Positive parent/child interaction enhances a child's cognitive, behavioral and social emotional development. Talking and reading to young children and physically interacting with them in a positive manner enhances a child's cognitive and behavioral development trajectory. The effect of positive interaction with children on cognitive and behavioral development is even greater when parents engage in play and support their children with exploration, communication and problem-solving. Cognitive stimulated play with children as young as 2-years-old can lead to higher math, reading and vocabulary competency that is maintained for at least 10 years.

- [Nandy et al. 2020. Parental toy play and toddlers' socio-emotional development](#): Study of parent-child toy play interactions among 77 parent-child dyads, with a specific focus on coparenting dynamics. Children were toddlers ages 21-27 months. Measures of parent-child play included parents' engagement, observation of and verbal facilitation of toy play. Social emotional development was measured using a scale that captured several metrics including self-regulation, ability to communicate needs, and using emotions in an interactive manner. Found that maternal toy play was positively associated with a child's social emotional development, but only when there was a supportive co-parenting dynamic present. Weak evidence (not statistically significant) of maternal model play strategies improving social emotional development.
- [Hernandez-Alava and Popli. 2017. Children's Development and Parental Input](#): Longitudinal analysis of 9,602 9-month-old babies in the Millennium Cohort Study in the United Kingdom measuring impact of parent investment on child cognitive and non-cognitive development by age 7. Cognitive measures included motor and communicative gestures; non-cognitive (behavioral) measures included distress, withdrawal and regularity. Results showed that parent investment, as measured by talking with the baby and other physical interactions such as cuddling, significantly improved the trajectory of a child's cognitive and non-cognitive development. Reading to children was especially predictive of their developmental outcomes.
- [Weisleder et al. 2019. Links between Shared Reading and Play](#): Randomized control trial of 362 mother-child dyads with low incomes who participated in parent-child interaction interventions between 2005 and 2008. Interventions promoted reading aloud and play between parents and children. Children were assessed at 6 and 36 months old. Analyzed the effects of the intervention on child behavioral outcomes. Found that the interventions improved child behavioral outcomes and were especially effective when parental cognitive stimulation and psychosocial functioning was higher.
- [Cook et al. 2011. Fathers' and Mothers' Cognitive Stimulation in Early Play with Toddlers](#): Analysis of parent-child interactions among 229 Early Head Start children and their parents. Interactions were observed when children were 2-years-old and cognitive outcomes such as math, reading and vocabulary proficiency were assessed both at age 3 and in 5th grade. Results indicated that cognitive stimulated play, as defined by parents' engagement in play and if parents supported their children with exploration, communication and problem-solving, predicted a child's academic outcomes up to 10 years later.



Supported, and Supportive, Families and Communities



Reading with children

The major indicator for this measure of success is the percent of families that reported reading to their children every day during a typical week.

Reading to children at a young age can significantly improve a child's reading, linguistic and cognitive abilities in later years, including performance in reading comprehension, vocabulary, and numeracy and math, as well as their internal motivation to read. Parent-child shared reading experiences are associated with the child having higher engagement with their parent, being more attentive during play, and having less negativity towards their parent at preschool age. Parent-child reading may also enhance a child's social emotional development.

- [Niklas et al. 2016. The Sooner the Better: Early Reading to Children](#): Study of 104 preschool children in Australia. Followed up with linguistic cognitive assessments at kindergarten entry in 2014. Examined how the age at which parent(s) began reading to their children affected the child's cognitive skills in later years. Cognitive and linguistic measures included verbal comprehension, rhyming, concept formation, concentration and numeracy. Findings showed that children who were read to at an earlier age displayed significantly higher abilities in rhyming, verbal comprehension and concept formation.
- [Demir-Lira, 2019. Parents' Early Book Reading to Children](#): Analysis of 55 parent-child dyads in Chicago. Parent-child interaction was observed when children were ages 14-58 months old and outcomes were measured when children were in 2nd through 4th grade. Found that parent book utterance with children in their early years significantly predicted a child's performance in reading comprehension, vocabulary, math problems, as well as their internal motivation to read later in elementary school. However, the study did not find that parent-child reading predicted external motivation to read, math calculation abilities or reading decoding abilities.
- [Kalb and Ours, 2013. Reading to Young Children: A Head-Start in Life?](#): Longitudinal Australian study of over 4,000 children ages 4-5, followed through age 10-11 from 2003 to 2004. Compares children who were read to 0-5 days per week to children who were read to 6-7 days per week. Studied effect of parent-child reading on children's cognitive, physical and social-emotional skills. Specifically measures competencies in language, reading and numeracy. Results showed that reading to children at ages 4 and 5 has significant, positive effects for children's cognitive and reading competencies by ages 10 and 11. Reading more frequently per week had similar effects on reading and cognitive outcomes as being older in age.
- [Baker, 2013. Fathers' and Mothers' Home Literacy Involvement](#): Longitudinal analysis of 5,190 children aged 24 months through preschool using data from the Early Childhood Longitudinal Study-Birth Cohort. Evaluated the role of parent home literacy involvement (i.e., activities such as shared book reading and number of books at home) when the child was 24 months old across measures of cognitive and social emotional development when the child was in preschool. Specifically, math and reading test scores were used to assess cognitive skills. Social emotional development was assessed by a child's engagement of their parent(s), child's sustained attention during play, and child's negativity towards their parent(s). Found that children whose parents had more frequent home literacy involvement scored higher in reading and math than children whose parents who had less frequent home literacy involvement. Finally, found that children whose parents had higher home literacy involvement were significantly more likely to exhibit engagement and attention with their parents during play, and were significantly less likely to show negativity towards their parents.



Supported, and Supportive, Families and Communities



Supports for Families

The major indicator for this measure of success is the percent of parents/caregivers reporting access to sufficient social supports and no difficulty paying for usual household expenses.

Consistent access to social and concrete supports can have positive, long-term effects on children and families. Maternal social supports, such as extended social networks, can enhance children's cognitive abilities and language skills, particularly vocabulary. A lack of maternal social support is associated with decreased child intelligence scores. Mothers with established social supports benefit from improved psychological well-being, leading to better home learning environments and higher cognitive outcomes among children.

Concrete supports are the tangible resources necessary to ensure safety and well-being of children, including food, safe housing, and health care. Access to concrete supports is negatively correlated with risk for child abuse, stress and depression.

- [Kyong Shin et al_2019_Association of Maternal Social Relationships With Cognitive Development](#): Study of 1,082 mother-child dyads in Tennessee from 2006 to 2014. Assessed effects of parental social networks and child cognitive outcomes at age 2. Social networks considered in the study include triad, family and neighborhood networks. Cognitive development was measured using the Bayley Scales of Infant Development (BSID). Found that the size of the mother's social network was positively associated with a child's early cognitive development.
- [Rostad et al 2018 The Influence of Concrete Support on Child Welfare Program Engagement, Progress, and Recurrence](#): Analysis of a survey of 1,754 parents or caregivers enrolled in home-based services under contract with the child welfare system in one Southern state. The study examined the influence of concrete supports on parenting outcomes and family engagement, retention and satisfaction with the support services. Results show that additional concrete support such as money for rent, food, or clothing, can be a beneficial strategy in increasing short-term child safety and service engagement and satisfaction.
- [Chang_2015_Pathways from mothers' early social support](#): Analysis of 1,725 Korean children, followed from birth to age 3, and their mothers, from 2008 to 2011. Examined the effect of maternal supports on outcomes such as child language development, mothers' psychological well-being and the home learning environment. Results showed that social supports led to a better home learning environment, which in turn, improved child language development, as measured by vocabulary skills. Similarly, the study found that social supports led to better psychological well-being among the children's mothers, which in turn led to a better home learning environment, and this improved language development.
- [Slykerman et al_2005_Maternal stress, social support and preschool](#): Analysis of 550 European mother-child dyads, following participants over three years, from the child's birth until age 3. Measured social support using a family support scale, and child cognitive ability was measured using an intelligence scale. Results showed a significant association between the lack of a mother's social supports and lower child intelligence scores.



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- [Burchinal et al. 1996. The Relations of Maternal Social Support and Family Structure:](#) Longitudinal study of 62 Black/African American mother-child dyads with low incomes. Examined the relationship between maternal social supports and child behavioral and cognitive development. Social supports in this study were defined as the mother's social network size, number of individuals with varying types of relationships to the mother, number of individuals assisting with child care, and network density. Child behavior and cognitive measures were assessed with behavior and intelligence scales. Found that mothers with larger social support networks were more likely to have stimulating home environments and were more responsive to their interactions with their children. A larger social network was also associated with higher child activity levels.





Supported, and Supportive, Families and Communities



Skilled and knowledgeable parents

The major indicator for this measure of success is percent of parents reporting frequent knowledge of child development and parenting skills.

Depth of maternal knowledge of child development can predict a child's disruptive behavior, child negative affect, the home environment quality and their IQ score. Positive parenting practices (e.g., parental warmth, lack of hostility, learning and literacy, and developmental advance) in the early years of a child's life are associated with less shyness, fewer problems with concentration and less peer rejection. Evidence also suggests that strong parenting practices have a positive effect on children's cognitive development, especially in families with a lower socioeconomic status.

- [Sullivan et al. 2021, Knowledge of Infant Development](#): Cross-sectional analysis of 300 caregiver-child dyads in Ohio in 2018 and 2019. Evaluated effects of parental knowledge of infant development on parent well-being and child temperament (child negative affect). Parental knowledge of infant development was assessed using an index. Found that lower parental knowledge of child development was associated with higher levels of negative child affect and lower levels of parental well-being.
- [McFarlane, 2010, The Importance of Early Parenting in At-Risk Families](#): Study of 318 families with children who were at risk of child maltreatment enrolled in Hawaii's Health Start Program, a home visiting program. Children involved in the study were one year old at the start of the study and in first grade at the conclusion. Examined quality of early parenting on children's behavioral and social emotional development. Measures of parenting quality included parental warmth, verbal skills, lack of hostility, learning and literacy, and developmental advance. Found that parental warmth was significantly associated with less shyness, fewer problems with concentration, and less peer rejection among children. Lack of hostility was also significantly associated with fewer problems with concentration. Encouragement of developmental advance associated with less peer rejection, and promotion of literacy and learning was associated with fewer concentration problems.
- [Benasich and Brooks-Gunn, 1996, Maternal Attitudes and Knowledge of Child-Rearing](#): Study of 608 low-birth weight children from the Infant Health and Development Program, a randomized control trial evaluating the effects of a child development intervention for low-birth weight infants. Followed the same children from birth to 36-months-old. Measured maternal knowledge of infant development and concepts of child-rearing practices. Found that maternal knowledge predicted home environment quality, child behavior problems, and a child's IQ score. Home environmental quality may be an indirect pathway by which maternal knowledge influences child cognitive outcomes.



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