Early Intervention, Intelligence and Academic Achievement: Empirical Evidence for Successful Outcomes

Craig T. Ramey, Ph.D.
Sharon L. Ramey, Ph.D.
Directors, Georgetown Center on Health and Education

New Orleans School System
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A Commitment to Improving K-12 Educational Achievement Begins in the First 5 Years of Life.
Synaptogenesis by Brain Region

Adapted from Huttenlocher in Ramey & Ramey Right from Birth (1999)

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Seven Essential Transactions For Caregivers with Young Children

1. Encourage exploration.
2. Mentor in basic skills.
3. Celebrate developmental advances.
4. Rehearse and extend new skills.
5. Protect from inappropriate disapproval, teasing, and punishment.
6. Communicate richly and responsively.
Effects of Mothers’ Speech on Infant Vocabulary

Level of Mothers’ Speech To Their Infants
- High
- Medium
- Low

Huttenlocher et al, Developmental Psychology. (1991)
Evidence-based Skills for Learning to Read

- Oral Language Comprehension
- Phonological Awareness
- Letter Name Knowledge
- Concepts about Print
The Impact of Early Environments on Children’s Developmental Competence
The Importance of Good Schools and Summer Programs

- Typical Environments
- High-Risk Environments

Developmental Age

Grade in School

Summer Period

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It is the totality of a child’s experience that lays the foundation for a lifetime of greater or lesser competency.

Ramey & Ramey, 2000
Some Developmental Disabilities Facts

- Majority of children with “intellectual disabilities” or “mental retardation” are born healthy.
- Biological risk conditions (e.g., LBW, prematurity) result in different outcomes, depending on SES.
- Maternal education is the most powerful predictor of child competence.
- About 11% of children are in special education.
- Ethnic and regional differences in MR/ID.
Principles of Effective Early Intervention

- Timing (onset, duration, offset)
- Intensity (per day/week/month/year[s])
- Direct learning experiences
- Breadth of services/supports
- Individual differences
- Environmental maintenance
Key Research Question for Abecedarian (ABC) Project

Can the cumulative developmental toll experienced by high-risk children be prevented or reduced significantly by providing systematic, high-quality, early childhood education from birth through kindergarten entry?
The Abecedarian Project

(“Abecedarian” ...one who learns the basics such as the alphabet)

The Abecedarian Project is a randomized controlled trial (RCT) that tests the efficacy of early childhood education for high-risk children and their families.
Abecedarian Preschool Project

Treatment Group
- Adequate nutrition
- Supportive social services
- Free primary health care
- Preschool treatment: Intensive (full day, 5 days/wk, 50 wks/yr, 5 yrs) “Learningames” Curriculum
  - Cognitive / Fine Motor
  - Social / Self Motor
  - Language
  - Individualized pace

Control Group
- Adequate nutrition
- Supportive social services
- Low-cost or free primary health care
Preschool Results

(Birth to 5)
Mean Z Standardized Scores
Abecedarian Preschool Children

Ramey et al, 2000 Applied Developmental Science
Percent of Abecedarian Sample in Normal IQ Range (>84) by Age (longitudinal analysis)

Martin, Ramey, & Ramey, 1990
American Journal of Public Health
Verbal Scale Scores (McCarthy) for Abecedarian (ABC) Project

Ramey & Campbell, 1979
American Journal of Mental Deficiency
Active Mother-Child Involvement (such as talking, touching, playing with toys/game, reading)

Farran & Ramey, 1980 Child Development
Abecedarian Project Post-High School Education for Teen Mothers

Ramey et al, 2000
Applied Developmental Science
Infant Health and Development Program
Maternal Education X Treatment Group

Ramey & Ramey, 1998 Preventive Medicine
# Brief Summary of Abecedarian Results During Preschool Period

## Positive Effects on:
- IQ Performance
- Learning & cognitive performance
- Language development
- Resilience to non-optimal biological & behavioral conditions
- Social responsiveness
- Academic locus of control
- Maternal education
- Maternal employment

## No Effects on:
- Maternal attachment
- Parenting child rearing attitude
- Home environments

## Decreased Effects:
- Incidence of intellectual subnormality

*Ramey & Ramey, 1999*
School Results
Reading Achievement Over Time

Campbell & Ramey, 2001 Developmental Psychology
Math Achievement Over Time

- **TREATMENT**
- **CONTROL**

![Graph showing Math Achievement Over Time with TREATMENT and CONTROL groups.](http://che.georgetown.edu)
Abecedarian Project

Retention in Grade by Age 15

- Control: 56%
- Preschool: 30%

Placement in Special Education by Age 15

- Control: 48%
- Preschool: 12%

Ramey & Ramey, 1999 MR/DD Research Review
Early Adult Results
Percent in Skilled Job or Higher Education

Group

$X^2 (1) = 6.72, p \leq .01$
Age at Birth of First Child

Control

Treated

Group

F (1, 44) = 6.38, p < .05
Key Findings from Abecedarian Project

- Intelligence (IQ)
- Reading & math skills
- Academic locus-of-control
- Social Competence
- Years in school, including college
- Full-time employment
- Grade Retention
- Special Education placement
- Teen Pregnancies
- Smoking & drug use
Quality of Care Influences Outcomes

FAVORABLE POLITICAL AND ECONOMIC CLIMATE
Legislative initiatives to improve child care quality, availability, affordability

SUPPORTIVE CHILD CARE CONTEXT
- Strong state economy
- Visionary leadership for child and family issues
- Business and philanthropic support for child care, early education and family-friendly work places
- Acceptance of diverse needs of families for child care

HEALTH & SAFETY PRACTICES
- Individualized learning & language activities
- Developmentally appropriate, frequent
- Frequent, warm, responsive
- Respective caregiver-parent relationship
- Frequent, supportive, informative

ADULT-CHILD INTERACTIONS
- Wages & benefits
- Strong effective leadership
- Group size
- Active support for welfare to work transitions

QUALITY OF CHILD CARE
- Staff education & experience
- Adult/child ratios
- Technical Assistance
- Training & support
- Supports diversity
- Good management
- Educational resources, curriculum, equipment
- Physical environment
- Family-friendly workplaces and environments

GOOD ADMINISTRATIVE, FISCAL, AND POLICY SUPPORTS
- High standards, supportive policies, interagency coordination and collaboration, financial incentives, constructive monitoring, useful information systems and active research and evaluation, lack of contradictory duplicative or unnecessary procedures and paperwork

POSITIVE FAMILY ENVIRONMENT
- Adequate income and employment
- Safe home environment
- Good health and safety practices
- Social-emotional skills

POSITIVE CHILD OUTCOMES
- School readiness
- Positive self image
- Learning, language, & literacy activities
- Effective disciplinary practices
- Warm, responsive care
- Social support for family
- Good Health (physical and mental)
Quality of Care Is Multi-faceted

- Individualized Learning & Language Activities
  - Developmentally appropriate, frequent

- Adult-Child Interactions
  - Frequent, warm, responsive

- Respectful Caregiver-Parent Relationship
  - Frequent, supportive, informative

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Why Some Well-Intended Preschool Programs Have Failed to Close the Achievement Gap

- Poorly prepared teachers
- Educational programs not intensive enough
- Remedial rather than preventive focus
- No direct teaching of important cognitive and linguistic concepts & vocabulary
- Redundant or poorly coordinated family and early childhood services
Recommendations

Provide strong leadership for a comprehensive early childhood educational initiative that is linked explicitly to K-12 learning and achievement

- targeted for high risk children
- grounded in scientific evidence
- builds upon existing resources
Recommendations

Combine funding streams, promote innovative partnerships, and strengthen existing programs that serve children from prenatal care through age 5.

- offer strong incentives for collaboration
- eliminate duplicative and ineffective programs
- link future funding to performance
Sources of Available Early Childhood Education Funding Include:

- Elementary and Secondary Education Act:
  - Title I: Disadvantaged Children
  - Title IV: 21st Century School – After School
  - Title V: Innovative Block Grant
- Early Head Start
- Head Start
- Child Care Development Fund (CCDF)
- Temporary Assistance for Needy Families (TANF)
- Early Reading First
- Social Services Block Grant
- Even Start
- Early Intervention (0-2 yrs; 3-5 yrs)
Recommendations

Design and implement a strong accountability system that continuously monitors program quality and documents child progress and outcomes

– To inform quality improvements
– To strengthen training and technical assistance
– To reward performance
Major Conclusions

• Scientists and professionals consistently underestimate human potential change/achievement

• Usually a little bit is not better than nothing when it comes to treatment

• Individual differences in response to treatment are the norm (but far from random)

• Behavioral and neurobiological development appear co-dependent

• Child development and family functioning are intertwined
Although all children can learn when exposed to good teaching, extremely low levels of academic readiness among children from very low resource families will not change without vigorous investment in their early experiences, and continued support for later learning.