

Carolina Abecedarian Project

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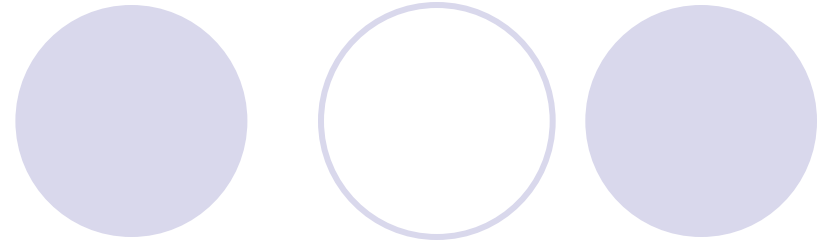
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(Abecedarian)



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Original Investigators

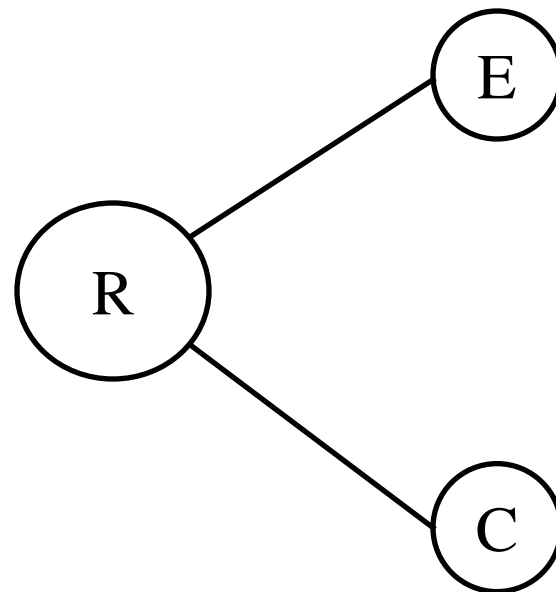
- Craig Ramey, Ph. D., Principal Investigator
- Joseph Sparling, Ph. D., Investigator
- Albert Collier, M. D., Investigator
- Frank Loda, M. D., Investigator
- Floyd Denney, M. D., Investigator

The Abecedarian Project



- A randomized study of early educational intervention conducted at the University of North Carolina during the 1970's and 1980's
 - minimizes self-selection bias
 - permits outcomes to be attributed with more confidence to intervention itself
- Four cohorts of infants admitted between 1972 and 1977
- Enrolled families had to qualify on a High Risk Index containing 13 socio-demographic factors

Preschool Model



Preschool Treatment Ages 0-5

Sample Characteristics



- All children from low-income families
- 98% were African American
- 25% of infants lived in 2-parent households
- Maternal education averaged 10th grade
- Maternal age averaged 20 years
- 28% of mothers were aged 17 years or less

Educational Intervention

- Full day childcare program
- 5 days/week
- Year round
- Began in infancy
 - mean entry age: 4.4 months
 - range: 6 weeks to 6 months
- 5 years, until kindergarten entry
- Good adult : child ratios
 - 1 : 3 infants
 - 1 : 4–5 toddlers
 - 1 : 7 preschoolers
- Medical care on site
- Very stable staff

Control group

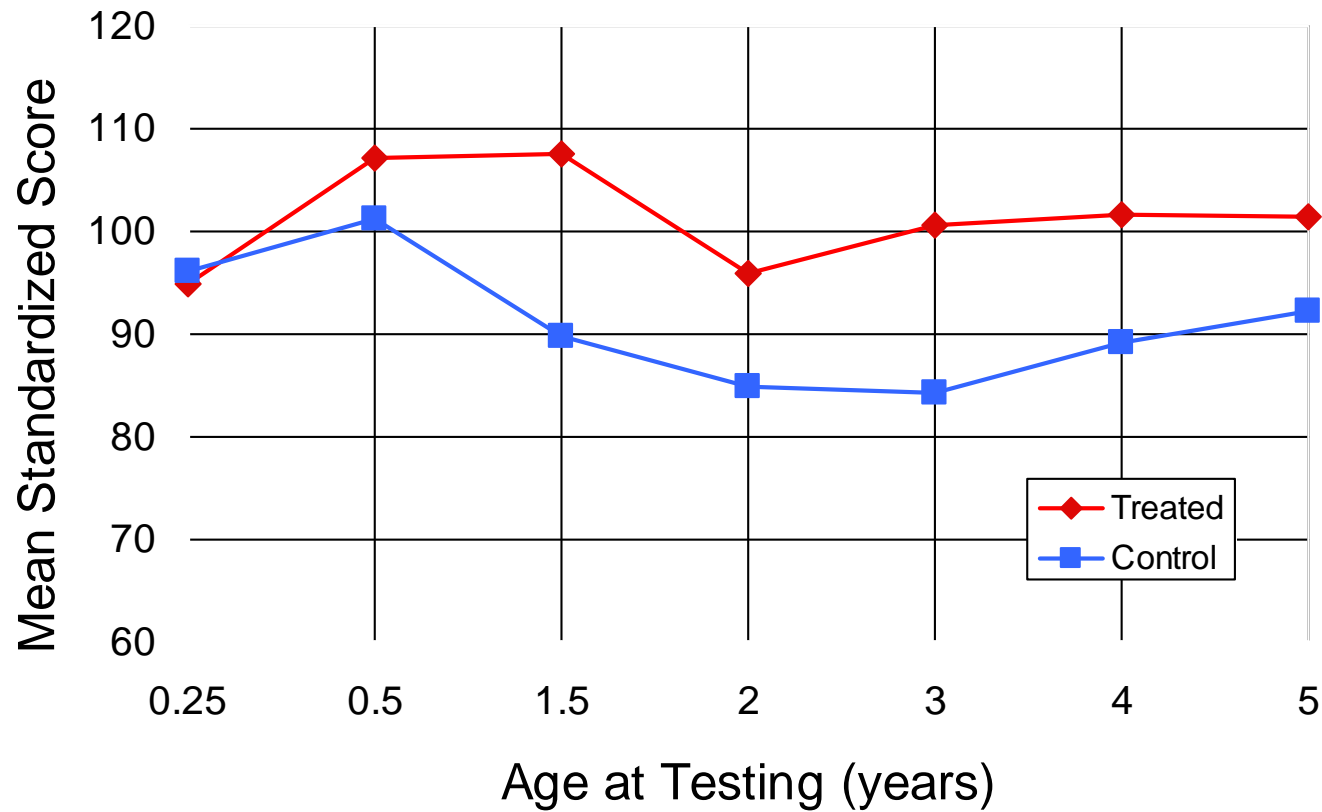


- Infants did not differ on 3-month developmental assessments.
- Free iron-fortified formula for the first 15 months.
- Free disposable diapers until child is trained.
- Child may or may not have had center-based child care during the early years.
- Low-cost medical care in community facilities.
- Identical series of assessments under comparable conditions (parent present).

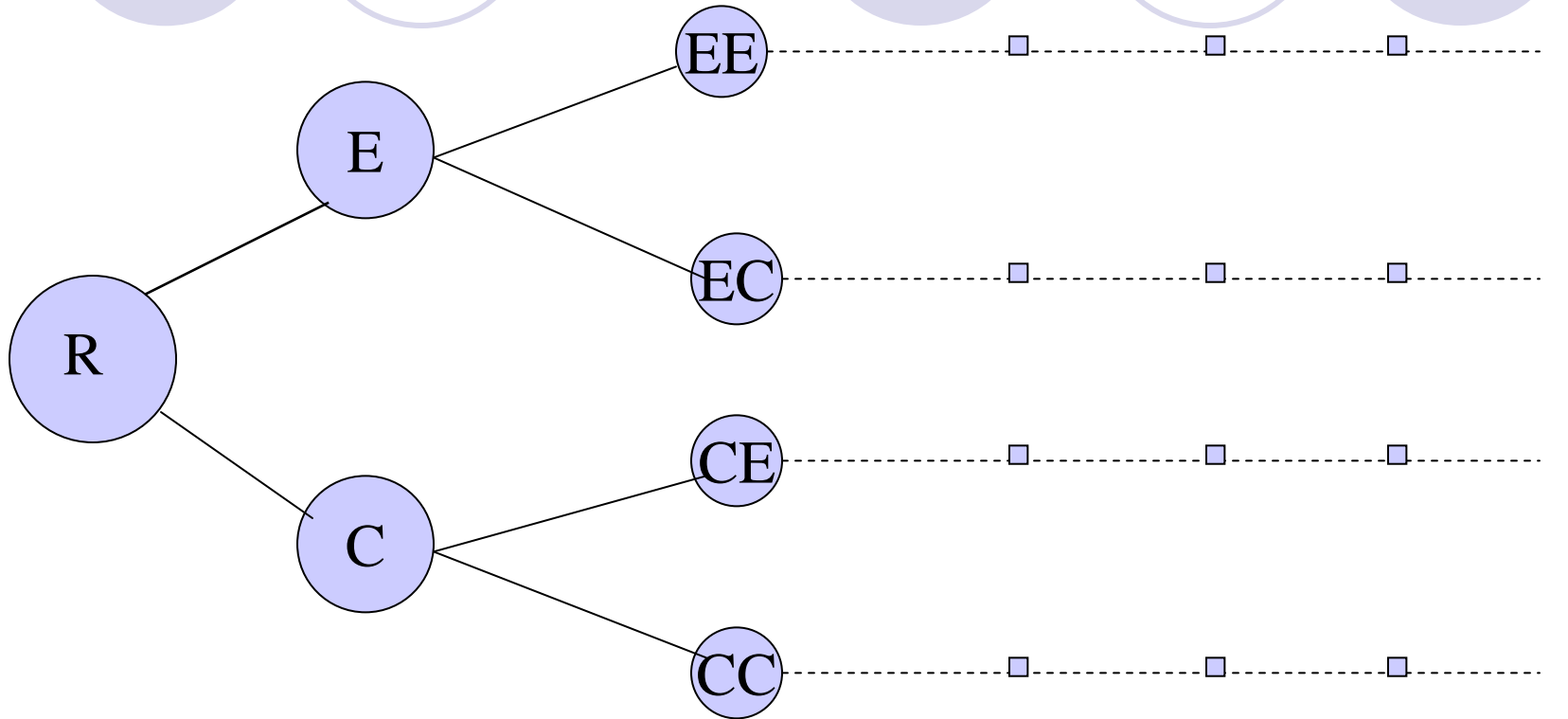
Preschool Assessments

- Cognitive measures
 - Bayley Scales of Infant Development
 - 3–18 months
 - Stanford-Binet Intelligence Scale (Form LM, 1972 norms)
 - 2–4 years
 - Wechsler Preschool & Primary Scale of Intelligence
 - 5 years

Preschool Test Scores



Abecedarian Later Design



Treatment Time Points

Follow-up Time Points

Preschool

School-age

Birth

Ages 0-5

Ages 5-8

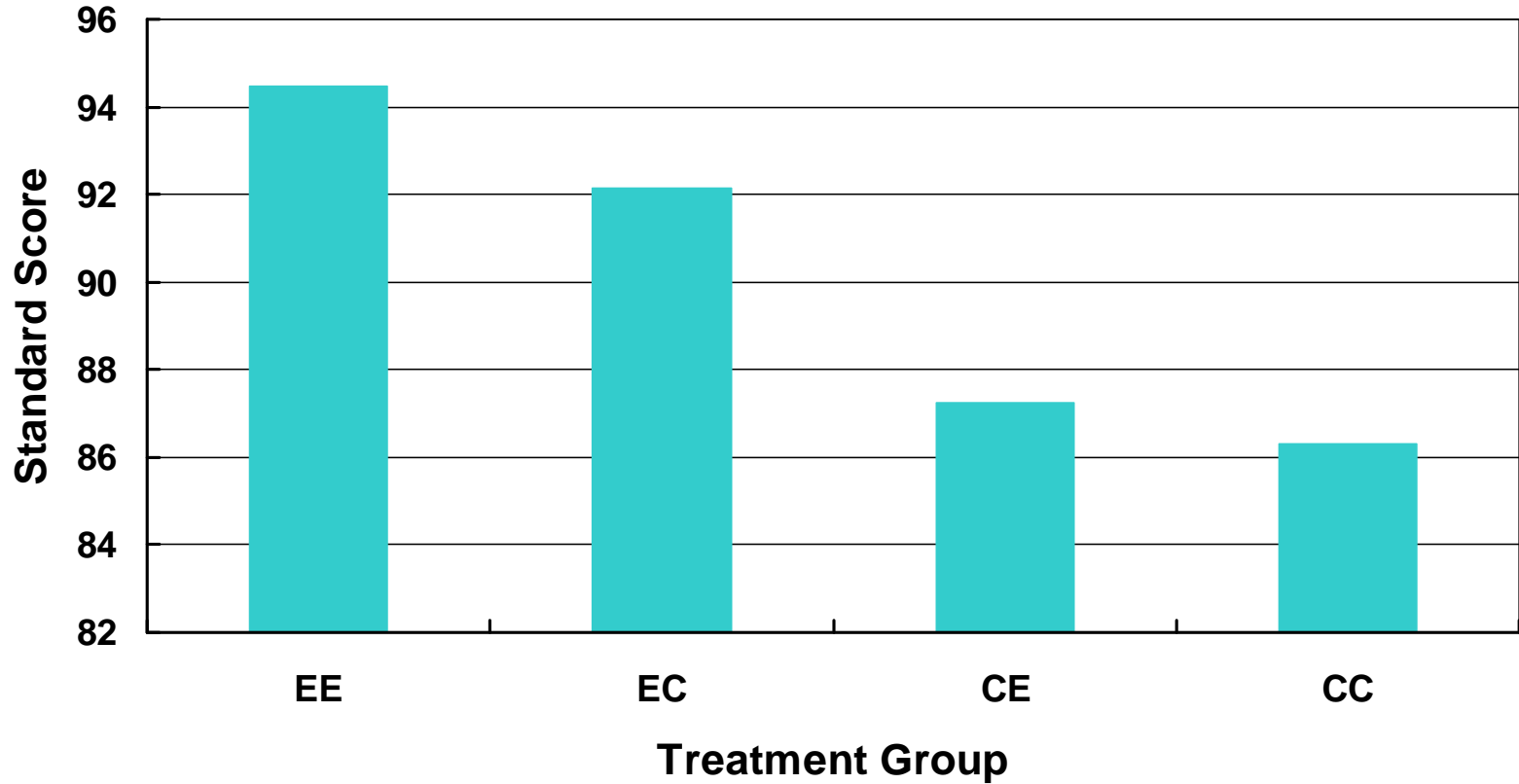
Age 12

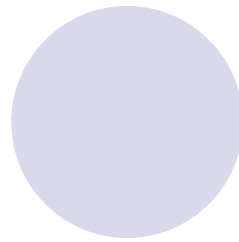
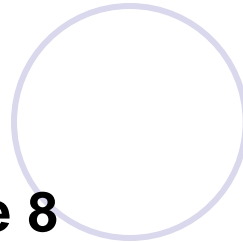
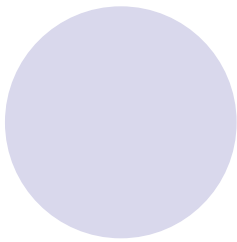
Age 15

Age 21

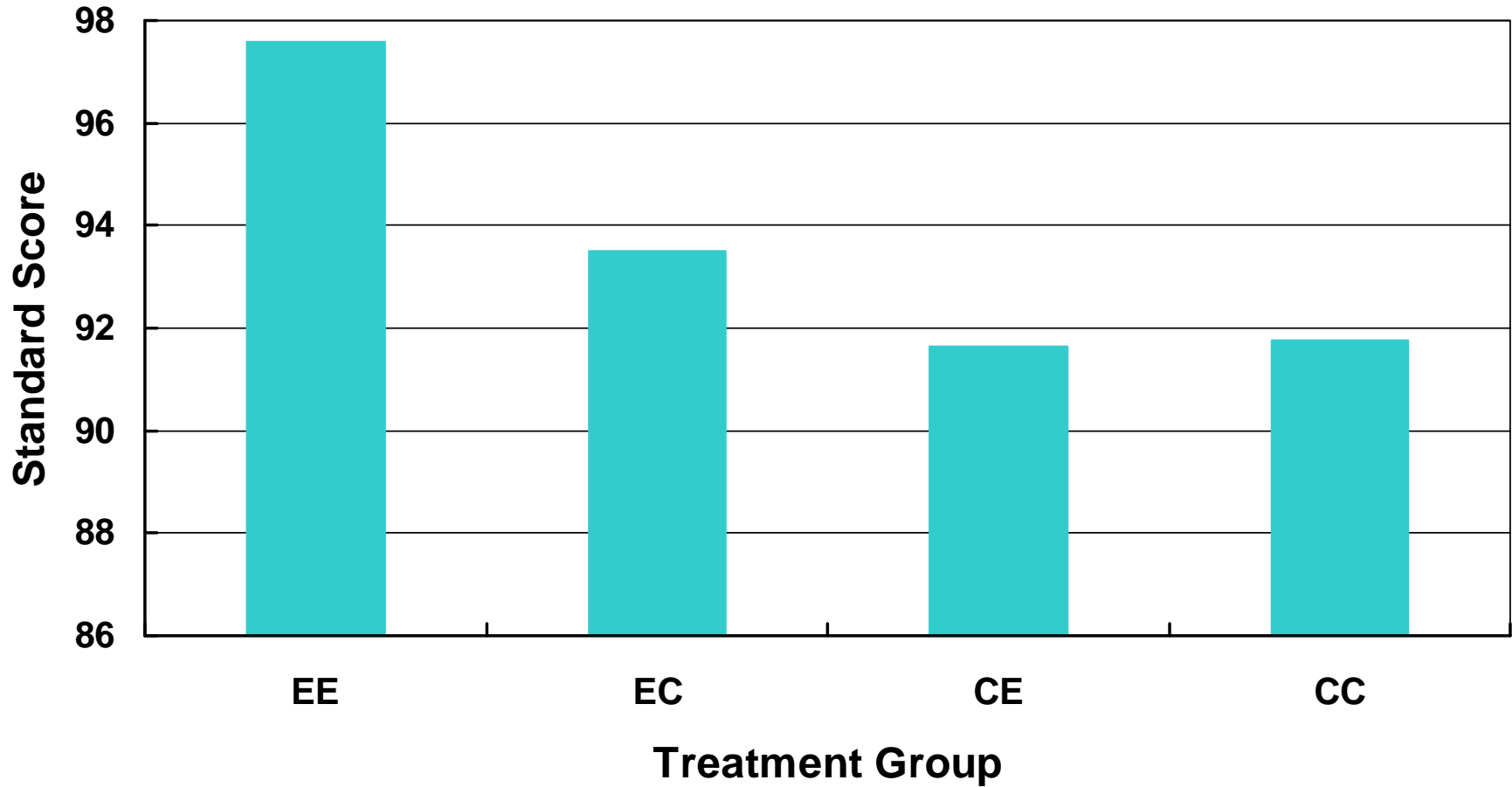


Four-Group Reading Scores at Age 8



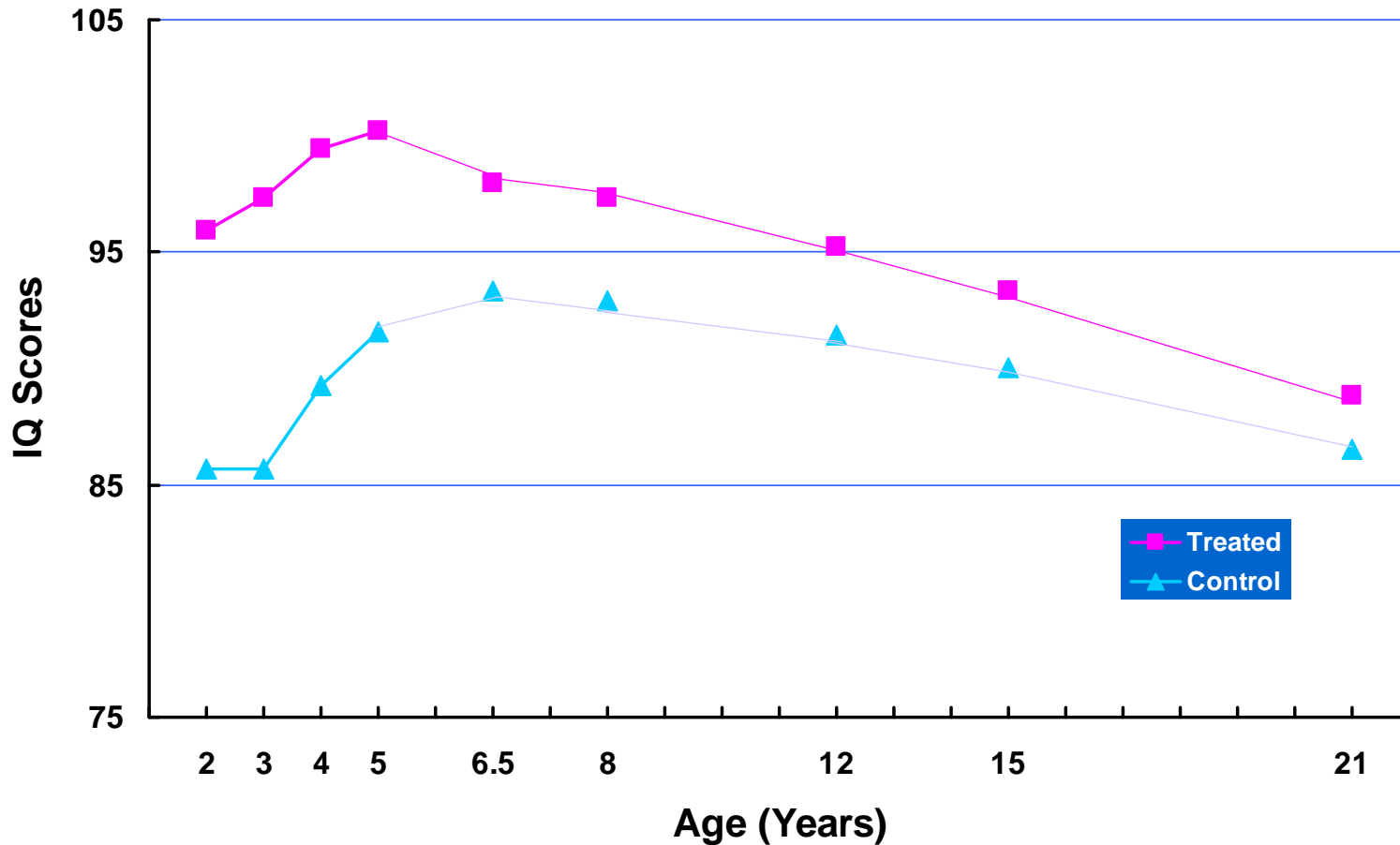


Four-Group Math Scores at Age 8



Long-Term Effects on intellectual development

Adjusted IQ Trajectory, Ages 2 to 21 Years



Important points about longitudinal cognitive development

- Treated children earned higher scores across time
- Treatment/control group difference was greater during the early, treatment years
- Slopes differ in treatment/post-treatment phases
- Treated children differed from control children in rates of change during treatment years but *not* during post-treatment years
- Both groups showed upward trends during the early years and declines in post-treatment years
- Up to young adulthood, the group with early treatment maintained an advantage over controls

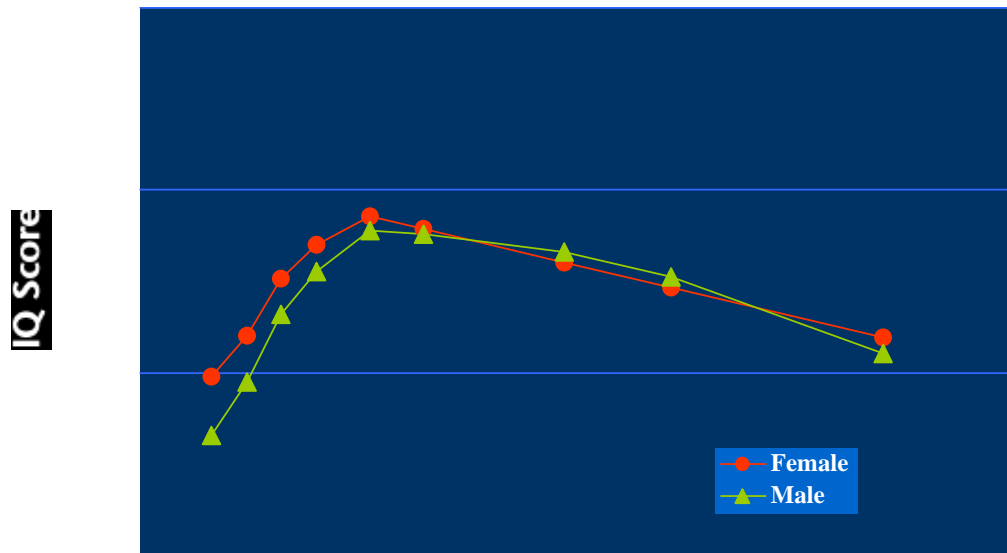
Moderators of long-term effects: Child gender



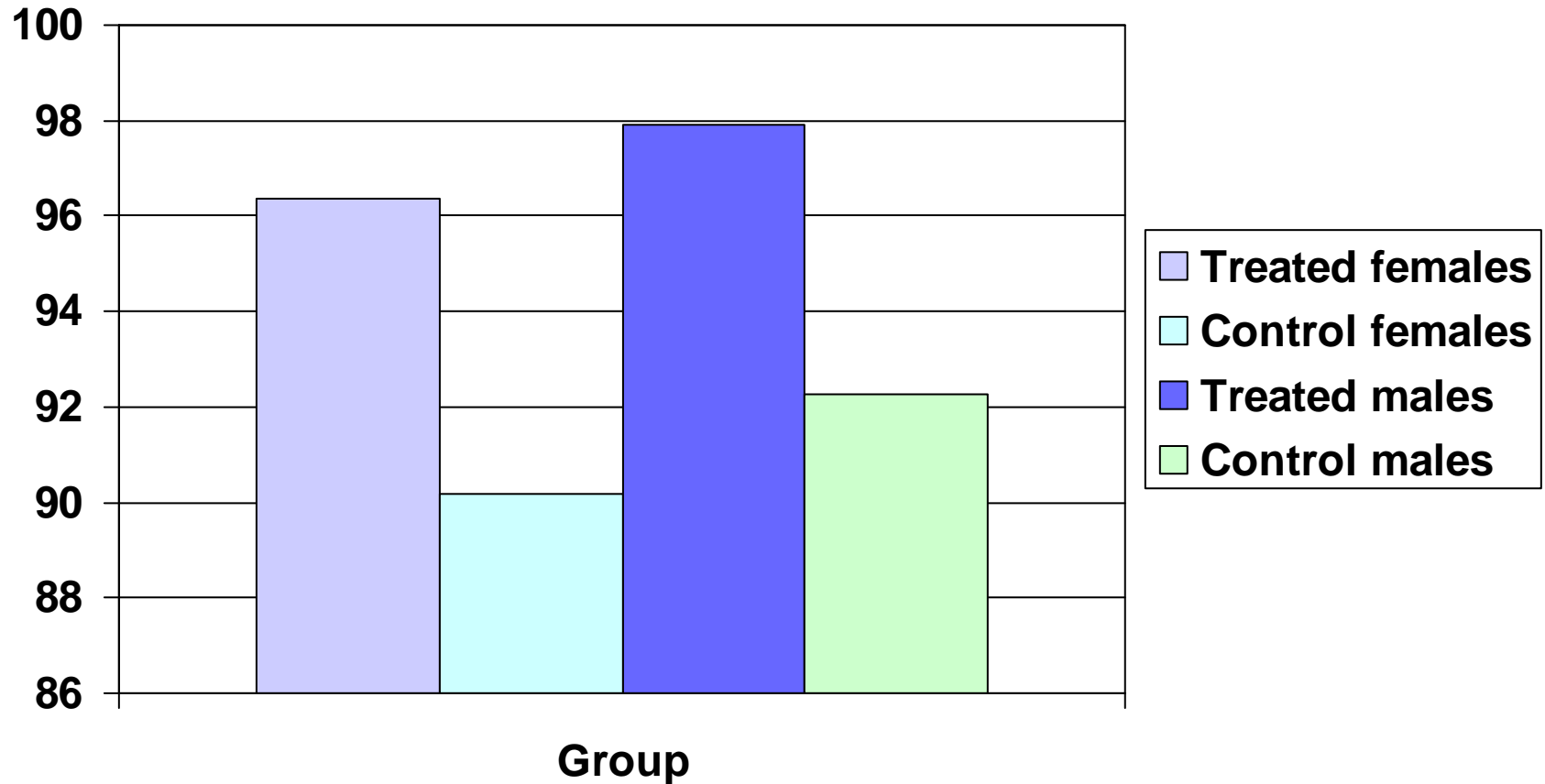
- Adding child and family characteristics to the prediction model
 - No significant main effect for child gender
 - No significant treatment x gender interaction
 - Gender x time² interaction reflects complex pattern of change in intellectual test performance of males and females over time

Age² x Gender Interaction

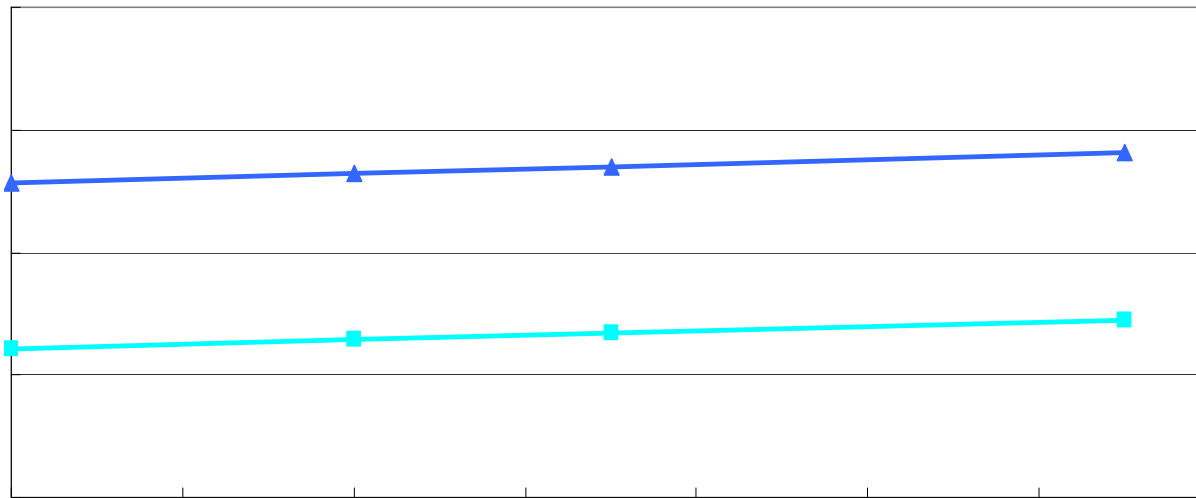
- Females change more rapidly in early childhood
- Females decline more sharply than males in early adolescence
- Males decline more sharply than females in later adolescence



Intercepts for IQ growth parameters by treatment group and gender (centered about age 8)

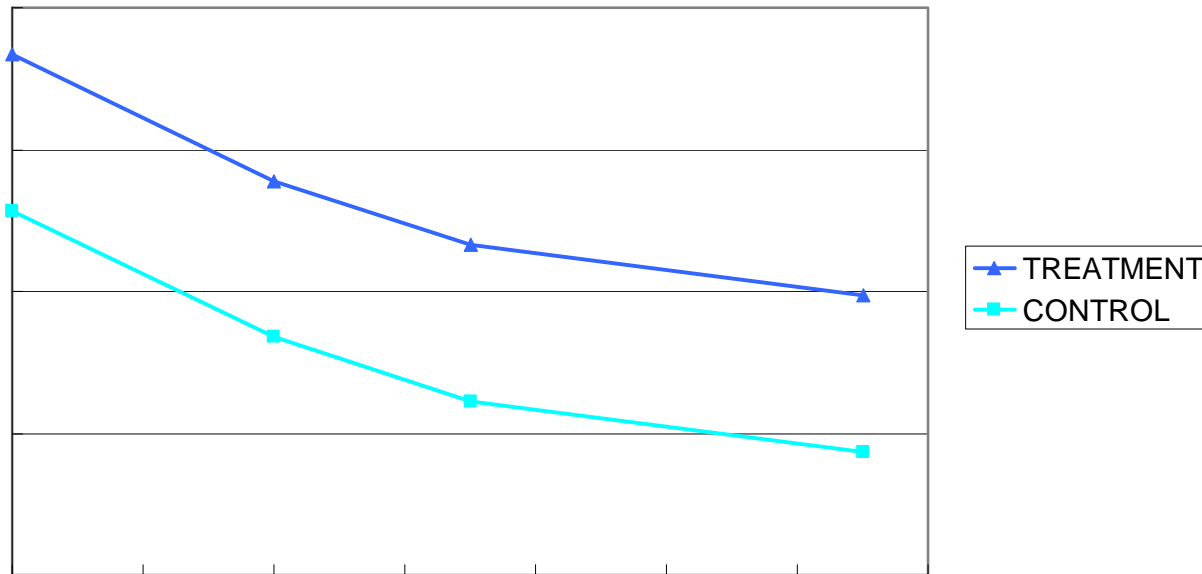


Longitudinal scores for reading age 8-12 years

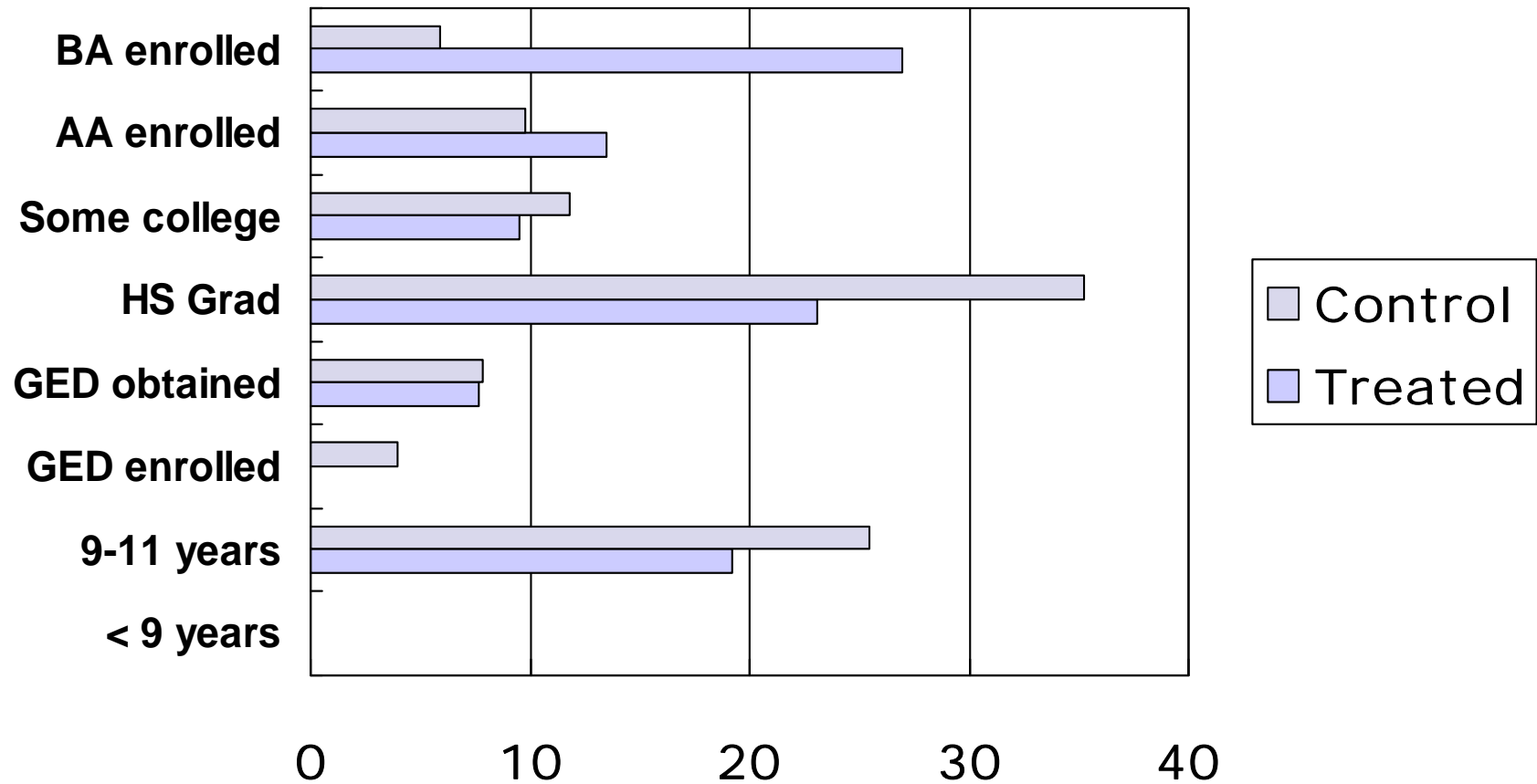


▲ TREATMENT ■ CONTROL

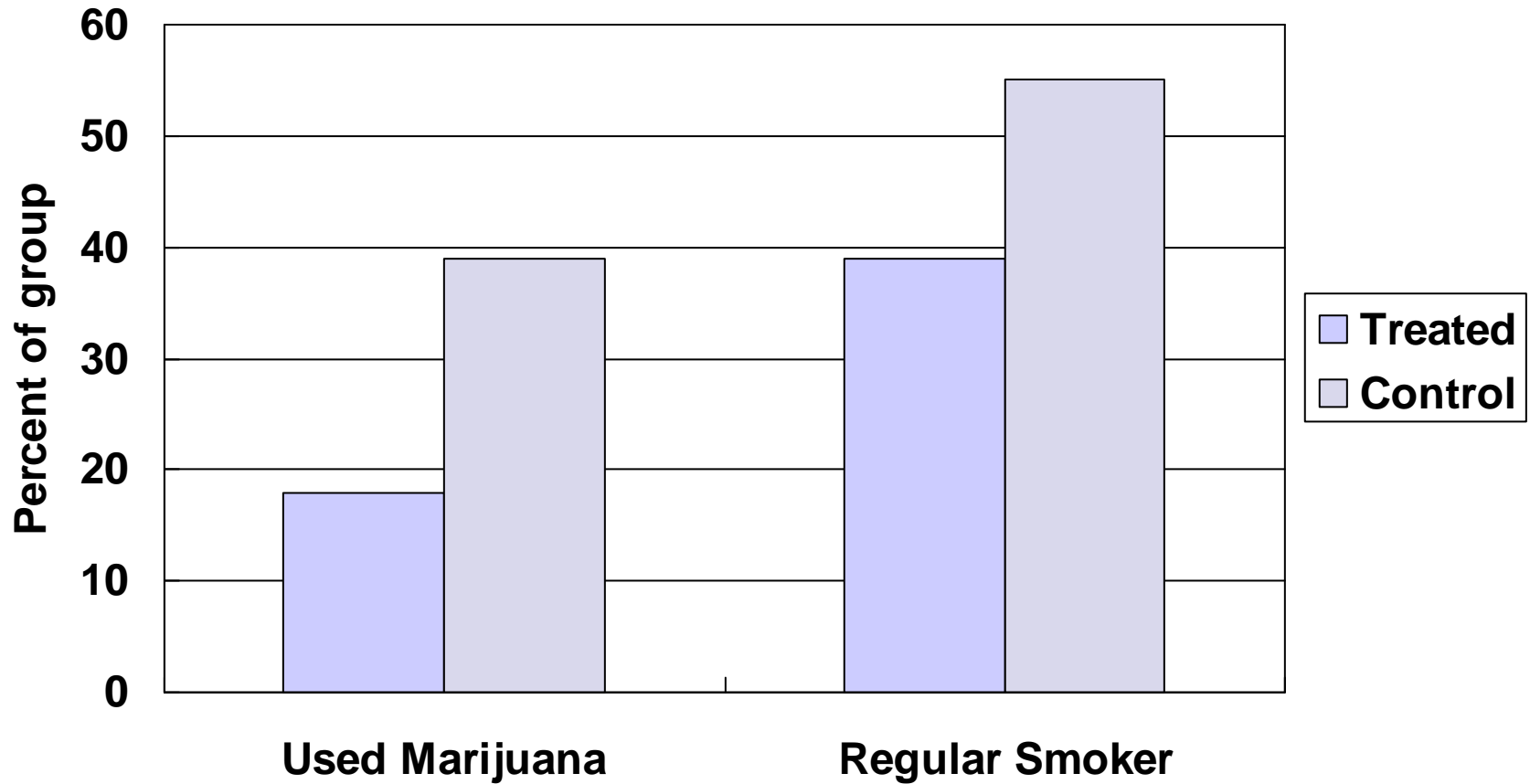
Longitudinal scores for math age 8-21 years



Educational attainment by treated and control groups (%)



Substance Use in Abecedarian Young Adults





Ratio of Costs to Benefits

- NIEER researchers estimated that the Abecedarian program will save society, on average, \$3.66 for every dollar spent.

Why would it save money?

- Treated individuals are projected to earn roughly \$143,000 more over their lifetimes than controls.
- Mothers whose children had free childcare are expected to earn about \$133,000 more over their lifetimes.
- School districts save about \$11,000 per child because of reductions in special education services.
- Reduced smoking among treated individuals may save approximately \$164,000 per person.

Why Did The Abecedarian Program Have These Effects?

Early treatment effects mediated by greater orientation toward tasks and persons

Later effects on academic achievement mediated by cognitive development

Later cognitive development mediation by increased verbal skill

Theoretical Background

- For a variety of reasons, the early years are believed to be the most efficacious period to intervene in the lives of poor children.
 - Development appears to be more malleable in the early years.
 - Animal models indicated that some sensory-motor functions might be irrecoverable if early experience was lacking.