Promoting the Social-Emotional and Literacy Development of Low-Income Children: Results from a School Randomized Trial

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- 4Rs: Background, Program, and Study Design
- Sample and Measurement
- Year 1 Program Impacts: Classroom-Level
- Year 1-2 Program Impacts: Child-Level
- Next Steps and Future Directions

- 4Rs Program Implementation Studies, Years 1 and 2
Reading, Writing, Respect and Resolution (4Rs): Background, Program and Study Design
Co-occurrence of social-emotional and behavioral problems with low academic achievement.

Theoretical and initial empirical links between self-regulation and reading/math.

Emphases on standardized testing and instructional improvement have crowded out attention to social-emotional-character development (among other things).
Background (2)

- Early efforts at whole school strategies to prevent behavior problems, violence, and substance use use plagued by intervention design and implementation fidelity problems.
- Early research on whole school strategies plagued by low power, and inappropriate statistical analyses.
- Need to rigorously test promising but unproven approaches to SEL/SACD.
Background (3)

- 7 different interventions in 7 different sites.
- 7 Local Evaluations and 1 National Evaluation (Mathematica Policy Research).
Background (4)

- Prior Quasi-Experimental Study of earlier version of 4Rs: The Resolving Conflict Creatively Program.
- Results
  - Aber et al., 1996
  - Aber et al, 1998
- Evidence suggestive that intervention is promising.
Figure 7. Teacher-reported aggressive behavior: effects of Year 1 and Year 2 classroom instruction and teacher training and coaching. RCCP = Resolving Conflict Creatively Program.
The 4Rs Program

- Universal, school-based intervention in literacy development, conflict resolution, and intergroup understanding.

- 3 Primary components:
  - 7-unit literacy-based curriculum in conflict resolution and social-emotional learning.
    - Each unit organized around grade-appropriate book, includes 2 literacy activities, and 3-5 SEL lessons (21-35 total lessons).
      - Total possible activities per unit = 5-7
      - Total possible activities per year = 35-49
  - Training and ongoing coaching of teachers in the delivery of the 4Rs curriculum.
    - 25 hours introductory training
    - Ongoing classroom coaching, minimum 12 contacts
    - Learning kit
  - Family Connections
    - 1 parent-child “homework” per unit
At the level of individuals:

- **Children’s** exposure to the curriculum (participating in read aloud/book talk, working through applied learning lessons) will directly influence their SEL and academic skills.
  - Changing children’s SEL skills as a result of 4Rs will indirectly influence their academic outcomes.

- **Teacher’s** exposure to the training and ongoing coaching will directly influence (a) their social-emotional skills, beliefs in the value of SEL, levels of exhaustion and burnout, (b) their classroom management, infusion of core 4Rs messages throughout their day and in interaction with children, and (c) the quality of their relationships with the children in their classrooms.
Heuristic Model: 4Rs Child-Level Study

- 4Rs Experimental (classroom and parent) vs. Control
- Teacher Development
- Social-Emotional Skills & Behaviors
- Extended Opportunities & Supports
- Literacy Skills & Academic Achievement
Multi-Level Theory of Change - 2

At the level of the setting:

- By changing (a) teacher beliefs, practices, and relationships, and (b) classroom norms for behavior, 4Rs indirectly influences the overall culture and climate of the classroom.
- By operating as a whole school intervention, the 4Rs indirectly influences the overall culture and climate of the school.

Across levels:

- By changing the classroom system and the overall school culture and climate, 4Rs indirectly influences children’s SEL and academic outcomes.
Heuristic Model: 4Rs Setting-Level Study

- School Culture and Climate
- 4Rs: Instruction, Teacher Training & Coaching
- Child Behavioral Dispositions & Normative Beliefs
- Teacher Affective & Pedagogical Processes & Practices
- The Classroom System: Culture and Climate
- Teacher-Child Relationships
- Classroom Emotional, Instruct. & Org. Climate
- Child Developmental Outcomes: SEL & Academic Achievement
Overall Study Design

- 3-year, 6 wave longitudinal experimental design
- 18 NYC elementary schools matched and randomly assigned to 4Rs and control group (9 assigned to each group)
- Intervention is implemented school-wide, grades K-6 for 3 years
- All 3rd grade children in each school followed over three years through 5th grade
- Schools represent demographic character of NYC public elementary schools
  - Racially/ethnically diverse; School lunch receipt ~70%; Mobility/Stability = ~18%/60%; Suspensions = 23%
Matching and Random Assignment

Process:
1. 41 schools identified
2. 24 schools agreed to random assignment
3. 24 schools were pairwise matched on 20 key characteristics → 12 pairs
4. 1 school in each pair was assigned to intervention, 1 to control
5. 9 best matching pairs were kept, 3 pairs back-ups

20 School Characteristics Include:
- Size (total N, and numbers of target classrooms)
- Race/ethnic composition
- School lunch receipt
- Attendance
- Reading achievement
- % within year mobility/two-year stability
- Expenditures
- Organizational Readiness
Data Collection Overview

- Classroom-based administration of surveys to children (2 50-minute classroom periods)
- Teacher reports on children and on teachers
- Parent reports on children
- School records
- Classroom Observations
- Staff/Teacher rating of school climate
- Principal Interview
- 4Rs Implementation

<table>
<thead>
<tr>
<th>Grade</th>
<th>Year</th>
<th>Fall</th>
<th>Spring</th>
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<td>2005-2006</td>
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<td>5th</td>
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Design Challenges: Estimating Power in Cluster-Randomized Trials

- CRT means random assignment of clusters, or groups of individuals (e.g., schools, classrooms) to treatment and control conditions.
- Power is calculated at the level of random-assignment (schools).
- Need adequate statistical power to detect expected Treatment/Control differences.
- Power to detect differences between groups depends on:
  - cluster size (# kids)
  - number of clusters (# schools)
  - anticipated intra-class correlations (variation in the outcomes between clusters)
  - expected effect size (magnitude of the difference between groups)
  - blocking/matching
- Additional factors that make a difference:
  - Baseline covariates (help)
  - Longitudinal data (helps)
  - Treatment effect variability (heterogeneity of the treatment effect across blocks, can hurt...a lot)
Key Design Issues

- The biggest challenge is including enough schools to detect expected effects.
  - Need 18 (actually more) schools
  - With 10 schools have power of ~.5 to detect small effects (.3); and ~.75 to detect effect sizes of .4.
  - With 18 schools have power of >.8 to detect effect sizes of .3 & .4
  - Dramatic influence of:
    - Expected intraclass correlations (differ by outcome)
    - Pairwise matching

- Consider tradeoffs carefully:
  - The visibility of a bad draw, likely with small # of schools.
  - Value and implications of matching
    - How many units per block?

- Evaluating the results with 18 schools
  - Use a 1-tailed test?
  - Alpha level?
  - Confidence intervals
  - Size of the effect

- Strategic use of covariates (collect baseline data)

- Increasing the experimental contrast (techniques to account for low-dosage AND/OR take-up in the control schools)
Data Analytic Challenges

- **Nesting:**
  - time nested in children, children nested in classrooms, classrooms nested in schools
  - How to track the longitudinal impact on children as they change classrooms across 3 years?

- **Mobility:**
  - How to account for within- and between-year year child and teacher mobility in such a longitudinal design?
Sample and Measurement
Sample: Year 1 Children

Total N = 942 children (in 18 schools)
2 waves: Fall & Spring 3rd grade

- Gender:
  - Girls 51%
  - Boys 49%

- Race/Ethnicity:
  - Non-Hispanic White 5%
  - Hispanic & Hispanic Bi-Racial 45%
  - Black or African American 41%
  - Other 9%

- Poverty:
  - Poor 45%
  - Not Poor 55%
Sample: Year 1
Teachers/Classrooms

Total N = ~85 Teachers/Classrooms (18 schools)
2 waves: Fall & Spring 3rd grade

- Gender:
  - Female 94%
  - Male 6%

- Age 37.0(10.0) yrs.

- Race/Ethnicity:
  - Non-Hispanic White 56%
  - Hispanic & Hispanic Bi-Racial 14%
  - Black or African American 26%
  - Other 4%

- Background:
  - Education/Training 70% MA degree
  - Years Teaching 7.0(5.0) yrs.
  - Years Teaching (this school) 5.0(4.0) yrs.
Measures Overview

- Implementation
  - Ongoing Training & Coaching
  - Quality & Quantity of Classroom Instruction
- Teacher Development
- Parent and Family Processes
- Extended Opportunities and Supports
- Classroom Culture and Climate
- Social Emotional Skills and Behaviors
- Academic Achievement and School Records
Measurement Modeling: First-Order CFA, 18 schools
Child-Report

- **Child-report: Multisite**
  - Positive School (n=10 items)
  - Aggression (n=6)
  - Delinquency (n=6)*
  - Altruism (n=8)
  - Self-Efficacy, non conflict (n=4)
  - Self-Efficacy, conflict (n=8)
  - Empathy (n=11)
  - Victimization (n=6)
  - Normative Beliefs About Aggression (n=8)
  - Positive Engagement (n=5)
  - Negative Engagement (n=4)
  - School Afraid (n=4)
  - Negative School (n=4)*

- **Child-report: Local**
  - Hostile Attributional Biases (n=6)
  - Aggressive INS (n=6)
  - Aggressive Fantasies (n=4)
  - Prosocial Fantasies (n=6)
  - Internalizing (n=10)*
    - Anxiety (n=4)
    - Depression (n=6)

- Fit: CFI .863-.989; RMSEA .025-.060
- Alphas: W1 .59-.89; W2 .60-.90

Note: 1. Underlined factors indicate slight differences in items between NYU and MS factor construction.
2. Asterisks indicate factors with the lowest fit statistics.
Measurement Modeling: First-Order CFA, 18 schools
Teacher-Report on Child

- Teacher-report: Multisite
  - Responsibility (n=8 items)*
  - Prosocial Behavior (n=11)
  - Emotion Regulation (n=8)
  - Aggression (n=14)
  - Conduct Problems (n=10)
  - Altruism (n=8)
  - Academic Competence (n=4)
  - Hyperactivity (n=6)
  - Inattentiveness (n=4)
- Fit: CFI .889-.991; RMSEA .046-.105
- Alphas: W1 .76-.95; W2 .83-.96

- Teacher-report: Local
  - Literacy Skills (n=9)
- Fit: CFI .844; RMSEA .168
- Alphas: W1, W2 .97

Note: 1. Underlined factors indicate slight differences in items between NYU and MS factor construction.
2. Asterisks indicate factors with the lowest fit statistics.
Measures/Constructs: Teachers

Teacher Processes & Practices
(Teacher Self-Report)
- Teacher Burnout
- Teacher Role in Social-Emotional Learning
- Teacher Emotional Ability
- Classroom Management Strategies
- Social Networks

Teacher-Child Relationships
(Teacher-Report on each child)
- Teacher-Child Closeness
- Teacher-Child Conflict
- Teacher-Child Dependency
- Stress Associated with Child Behavior
Measures/Constructs: Classrooms

CLASS: Classroom Observation Scoring System
(Pianta, La Paro, & Hamre, 2005)

- Three primary dimensions (low=1, high=7)
  - Instructional Support, e.g.:
    - Concept Development
    - Quality of Feedback
    - Language Modeling
  - Emotional Support, e.g.:
    - Positive Climate
    - Negative Climate
    - Teacher Sensitivity
  - Organizational Climate, e.g.:
    - Productivity
    - Behavior Management

- Observations are 2 hours and include 4 20 min. segments.
Baseline Subgroup Differences

- Gender, Race/Ethnicity, Family Income, Treatment
  - Many gender differences in child, teacher, and parent report scales
    - (e.g., Competent and prosocial cognitions and behaviors, B<G; aggressive/externalizing cognitions and behaviors, B>G)
  - Many race/ethnic differences in child, teacher, and parent report scales
  - Poor children look worse than non-poor children
  - Few (almost none) significant Treatment/Control differences in Fall 2004
Year 1 Program Impacts: Classroom-Level

Analytic Strategy: Classroom-Level

- Focus on 3 classroom climate constructs (CLASS)
  - Emotional, Instructional, Organizational
- 2-Level Hierarchical Linear Model using HLM 6.02
  - Level 1: Classroom level
    - Covariates:
      - Class size, Special Ed., T. Age, T. Race/Ethnicity, Yrs. Teaching Exp.
      - Baseline: T. Burnout Constructs, T. Emotional Ability Constructs
  - Level 2: School Level
    - TX/Control dummy; 8 school match dummies
- Estimate TX impact on W2 (note, no baseline control)
Classroom-Level Tx Impacts in Effect Sizes

- Classrooms in the Tx group had higher mean Overall Classroom Quality scores, accounted for by higher mean Emotional Support and Instructional Support scores, than the control group.
Year 1-2 Program Impacts
Child-Level