

**Symposium Title:** Causal impacts of the 4Rs Program on children, classrooms, and schools: Using dynamic, multilevel analyses to inform theory, practice, and policy.

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### **Paper 1**

**Title:** Three Year Cumulative Impacts of the 4Rs Program on Children's Social-Emotional, Behavioral, and Academic Outcomes.

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## **Abstract Body**

*Limit 5 pages single spaced.*

### **Background/context:**

*Description of prior research, its intellectual context and its policy context.*

Over the last two decades, developmental science has made significant progress in understanding children's trajectories toward social-emotional and academic outcomes (e.g., Duncan et al., 2007; Miles & Stipek, 2006). At the same time, there has been dramatic growth in the design, implementation, and rigorous evaluation of school-based interventions to promote positive social-emotional development and/or academic achievement (e.g., IES, 2003; Embry, 2002; Kellam et al., 2008). The present study contributes to ongoing scholarship in the school-based prevention of social-emotional, behavioral, and academic problems by reporting three-year longitudinal, experimental impacts of a novel social-emotional learning and literacy development intervention (the 4Rs Program, "Reading, Writing, Respect and Resolution") on a cohort of 3rd grade children's social-emotional, behavioral, and academic functioning after three consecutive years of exposure to the intervention. Findings from this work have implications both for basic theory in developmental science and for the continued evolution of school-based strategies to promote children's social-emotional learning and thereby prevent some of the most ubiquitous mental health problems of middle childhood.

Over the past ten years there has been a burgeoning of programs focused on enhancing children's social and emotional skills to reduce aggression and violence and promote positive interaction among youth (Payton et al., 2008; Wilson, Lipsey & Derzon, 2003). This period has also witnessed a growing convergence of developmental science and prevention science in guiding the design and evaluation of interventions aimed at preventing future aggressive and violent behavior in children and youth (Maggs & Schulenberg, 2001). From developmental science, knowledge has grown about the mechanisms by which exposure to violence affects children's risk for such outcomes (Dodge, 2006). Our greater understanding of these causal mechanisms has led to improvements in both the design and evaluation of preventive interventions, which increasingly target these mechanisms as their focus of change (e.g., Dodge, 2001; Hudley & Graham, 1993). Indeed several of these causal mechanisms are central to the 4Rs Program and to the evaluation design of this study (see below).

From prevention science, knowledge has grown about the effectiveness of these intervention strategies at reducing children's risk for future aggressive and violent behavior (Aber et al., 2003; Conduct Problems Prevention Research Group, 1999; 2007; Kellam et al., 1998). Although the literature on school-based preventive interventions is rich with studies of interventions targeted at subgroups of high-risk children (Vitaro, Brendgen, & Tremblay, 2001), with a few exceptions (e.g., the Good Behavior Game; Kellam, et al., 2008), it has only recently expanded in the area of large-scale evaluations of universal interventions implemented with general populations of students (Payton et al., 2008). Furthermore, among the best studies of universal school-based interventions designed to reduce risk for future aggression and violence, a variety of methodological challenges limit the quality and generalizability of the knowledge base. With but a few exceptions to date (e.g., CPPRG, 1999; 2002; 2004; 2007; Kellam et al., 1998), these earlier studies rarely employ both experimental random assignment designs and analytic methods appropriate to the design (e.g., multi-level modeling with intervention status modeled at the relevant level of random assignment, frequently the school-level) that enable one to make definitive causal statements about the impact of the intervention. This study is distinct in

that it provides an experimental test of the causal impact of a universal integrated intervention model in which social-emotional learning and skill building is embedded in a balanced literacy curriculum.

**Purpose / objective / research question / focus of study:**

*Description of what the research focused on and why.*

The present study is the first report of the experimental effects of the 4Rs Program on change over three years using six repeated assessments in children's social-cognitive, social-emotional, behavioral, and academic outcomes. The primary questions addressed in the paper are: (1) What is the experimental impact of the 4Rs Program on three-year change (from 3rd to 5th grade) in children's social-cognitive processes, social-emotional symptomatology, their aggressive and socially competent behavior, and academic functioning, controlling for key demographic covariates? (2) Building on recent findings from intervention studies that demonstrate significantly stronger impacts for families facing a greater versus smaller number of poverty-related risks, is the three-year impact of the 4Rs Program moderated by child-level demographic baseline covariates including child gender, race/ethnic background, family socioeconomic risk, and community risk? (3) Finally, building on evidence from the first year of our 4Rs evaluation (Jones et al., under review) and other experimental evaluations of universal school-based prevention programs (CPPRG, 2007), is the three-year impact of the 4Rs Program moderated by children's baseline behavioral risk?

**Setting:**

*Description of where the research took place.*

This project took place over three consecutive school years in 18 public elementary schools in New York City (in four of the five boroughs).

**Population / Participants / Subjects:**

*Description of participants in the study: who (or what) how many, key features (or characteristics).*

Participants were 1184 children (49% boys; average age at time 1 = 8.17 yrs, SD = 0.7), and 146 teachers (88% female; average age = 35) in 18 public inner-city elementary schools in a large metropolitan city in the Eastern United States. The children and teachers are part of an ongoing, longitudinal evaluation of a universal, school-wide literacy and social-emotional learning prevention program (4Rs: Reading, Writing, Respect and Resolution) implemented for three consecutive years in 9 intervention (n = 630; 53.2%) and 9 control (n = 554; 46.8%) schools. As noted above, in this paper we describe impacts of 4Rs on children's developmental trajectories across 6 repeated time points, and three consecutive years of exposure. Data were gathered from children and their teachers over six longitudinal waves across 3 school years. Because the 4Rs Program was randomized at the school-level, children who moved out of a participating school were not followed (e.g., 58 children in Wave 2) and consent was requested for new children who moved into a participating school at each follow-up wave (e.g., 124 children at Wave 2). Attrition between waves was minimal (on average 8.6%) and was primarily due to student mobility out of participating schools. Refusals from parents to continue were rare (e.g., n = 1 in Wave 2). According to parent-reports at baseline, 52% (n = 425) of children lived in a single-parent household, 14.5% (n = 119) of parents were unemployed, 29.7% (n = 243) of parents had less than a high school diploma or GED, and 60.9% (n = 498) of households were at or below 100%

of the federal poverty level. Based on parent-reports at baseline and NYC Department of Education records when parent-reports were missing, children represented diverse racial/ethnic groups; 45.3% (n = 368) were Hispanic/Latino, 41.1% (n = 334) Black/African American, 5% (n = 41) non-Hispanic White, and 8.6% (n = 70) represented other racial/ethnic groups (e.g., Asian, Pacific Islander, Native American).

### **Intervention / Program / Practice:**

*Description of the intervention, program or practice, including details of administration and duration.*

The 4Rs Program (Reading, Writing, Respect and Resolution) is a universal, school-based intervention in literacy development and social-emotional learning that integrates a focus on social and emotional development into the language arts curriculum for children in grades K-5. In this evaluation, Developed and run by a community-based non-profit organization called the Morningside Center for Teaching Social Responsibility, the 4Rs Program uses high quality children's literature as a springboard for helping students gain skills and understanding in the areas of handling anger, listening, assertiveness, cooperation, negotiation, mediation, building community, celebrating differences, and countering bias. By highlighting universal themes of conflict, feelings, relationships, and community, the 4Rs curriculum adds social and emotional meaning and skill building to rigorous literacy instruction. The 4Rs Program has two primary components: (1) a comprehensive 7-unit, 21-35 lesson, literacy-based curriculum in social-emotional learning and (2) 25 hours of training followed by ongoing coaching of teachers to support them in teaching the 4Rs curriculum with a minimum of 12 contacts in one school year.

### **Research Design:**

*Description of research design (e.g., qualitative case study, quasi-experimental design, secondary analysis, analytic essay, randomized field trial).*

Forty-one schools representative of the population of NYC elementary schools were originally identified as potential participants in the 4Rs evaluation. Of these 41, 24 agreed to the process of matching and randomization. Prior to randomization, a pairwise matching procedure was used to maximize demographic similarity of intervention and control groups. An algorithm was used to compute the distance from each school to every other school along 20 demographic and school characteristics. These variables were drawn primarily from the 2001-2002 administrative databases kept by the city's Department of Education and were selected to represent a number of important dimensions related to the criterion outcomes. To conduct random assignment of matched pairs to 4Rs intervention and control groups, a MatLab uniform random numbers generator was employed to generate, in sequence, 12 random numbers ranging from 0-1 that were assigned to the first school in each of the 12 pairs (note, a total of 24 schools were recruited to participate in this study and were matched into 12 pairs, the 9 best matching pairs were kept as study schools and 3 pairs were kept as back-ups). The first school in each pair was assigned to the intervention or control group based on the randomly generated number, and the second school in the pair was, therefore, assigned to the other group. After random assignment, the two groups were compared across the 20 demographic characteristics employed in the matching procedures. As expected the two groups did not differ significantly on any of these characteristics and eta<sup>2</sup> values (the proportion of variance in the demographic characteristic explained by differences between the two groups) were minimal. Based on these statistics, the schools can be described as racially and ethnically diverse, composed primarily of students who

receive a free school lunch, and characterized by attendance rates over 89% and one-year stability rates that range from 86% to 95%.

### **Data Collection and Analysis:**

*Description of the methods for collecting and analyzing data.*

Consent packages (in English and Spanish) were sent home to all parents of third grade children in the 18 participating schools informing them of the study and seeking consent for their child to participate. The overall consent rate was 64.54% across schools (range = 44% to 79%); consent rates did not differ between treatment (65.2%) and control (63.7%) schools. Non-participants included children whose parents did not speak English or Spanish well-enough to consent to participate and special needs children who could not be interviewed even on an individual basis (e.g., due to autism). At each wave teachers completed questionnaires rating the language and literacy skills, as well as social competence and externalizing problems of each child in their class with consent to participate. Teachers were paid at the union wage of \$36.50/per hour for completion of the surveys at each assessment. At each wave, children also completed questionnaires rating their aggressive social-cognitions, pro-social-cognitions, and internalizing symptoms. Data were collected from the children in small class groups (n = 5 to 20). All questions were read out loud by a research assistant while a second research assistant circulated to monitor children's placement of responses and to answer the children's questions. Children who did not have consent to participate or who refused assent worked on an alternative activity with their classroom teacher.

To accommodate the nested nature of the design, estimates of intervention impact on change in the primary child outcomes from pre-intervention baseline (Wave 1, Fall 2004) to the 6th time point (Wave 6, Spring 2007) were calculated using a series of 3-level hierarchical linear growth models with school fixed effects in HLM 6.02. In these models, Level 1 represents time (i.e., the 6 repeated assessments of the constructs of interest for each child), Level 2 represents the child, and Level 3 represents schools. All child- and classroom-level covariates were included at Level 2. Level 3 included a treatment dummy as well as 8 school pair dummies to represent the school matches (the worst matching pair, #9, served as the referent). In addition, as indicated above, we examined a number of cross-level treatment by baseline covariate interactions.

### **Findings / Results:**

*Description of main findings with specific details*

Findings to date through the second year of the intervention are summarized below. Analyses examining intervention effects through the end of the third year will be complete by December 1, 2009. Findings are presented below by broad outcome domain.

Social Cognitive Processes and Social-Emotional Symptomatology. Over two consecutive years, children in 4Rs schools self-reported slower rates of increase in hostile attributional bias, a slowed rate of growth in aggressive interpersonal negotiation strategies that appears to begin toward the outset of the second year of exposure to intervention, and a steeper rate of decline in depressive and ADHD symptoms compared to children in the control schools.

Aggressive and Socially Competent Behavior. Teachers in 4Rs schools reported slower growth in children's aggressive behavior (compared to increases in control schools), and increases in social competence (compared to declines in control schools) over two school years.

Academic Functioning. While there were no main effects of treatment on teacher reports of

children's academic skills or on the three school records outcomes examined, there were treatment by baseline behavioral risk interactions for standardized math and reading achievement and for teacher reported academic skills. In short, children identified by teachers at greatest behavioral risk at baseline showed greater improvements as a result of exposure to 4Rs in their math and reading achievement and in teacher reports of their academic skills (see Figure 1 in Appendix B). Importantly, this set of treatment by baseline behavioral risk interactions were not evident for the social-emotional outcomes, regardless of the type of model examined (i.e., as a growth model estimating treatment effects on growth parameters, or a basic point-in-time model estimating treatment effects on Wave 4, controlling for baseline levels). This suggests that these treatment by risk interactions are not an artifact of the form of model applied, but instead are tied to the developmental domain examined: children's academic functioning and not, in this case, their social-emotional skills.

Over all, the treatment main effects reported after two years are small to moderate in size (ranging in size from .05 for the teacher-reported aggression slope to .22 for the depressive symptoms slope). In contrast, the interactions of treatment with baseline behavioral risk are represented by treatment effects for the highest risk group of moderate size (ranging from .56 for math achievement and academic skills to .60 for reading achievement).

### **Conclusions:**

*Description of conclusions and recommendations based on findings and overall study.*

Our findings to date on the impacts of an integrated, social-emotional and literacy program provides clear evidence that this universal intervention has both broad impacts on social-cognitive processes and behaviors in the social-emotional domain, and targeted impacts in the academic domain. This study provides good evidence that universal school-based interventions, delivered to whole populations of children, can result in substantial impacts on children's developmental health and well-being.

From the standpoint of practice, our current evidence suggests that integrating pedagogical attention to building social-emotional skills through simultaneously enriching literacy practices, as instantiated by the 4Rs Program, can promote positive development in both social-emotional and academic domains. These findings challenge schools and school-based program practitioners to continue to conceptualize and operationalize a variety of practice models in which social-emotional and academic development can be fostered both in the classroom and in the school as a whole. While the 4Rs has demonstrated some success towards this goal, developing and testing integrated models that may be more appropriate for other geographic locations and student and teacher populations will require considerable attention and resources. From the standpoint of policy, findings from the present study highlight the short-sightedness of educational policies that privilege and reward school and teacher attention to narrowly defined domains of development such as academic performance at the exclusion of attention to children's social-emotional development. A growing theoretical and empirical literature supports the inextricably connected links between development in these domains and so we must now face the challenge of developing and adopting educational policies that both acknowledge and support this reality.

## Appendices

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### Appendix A. References

*References are to be in APA version 6 format.*

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**Appendix B. Tables and Figures**  
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Figure 1. Interaction of treatment and baseline behavioral risk on Year 2 math achievement

