

**Symposium Title:** The children of the CSRP go to school: Their social-emotional and academic well-being in Kindergarten

**Symposium Chairperson:** C. Cybele Raver

**Papers included in symposium in presentation order:**

**Paper 1 title:** Predicting children's transitions from Head Start to low-performing schools in Chicago: The roles of exposure to poverty-related risk and to early childhood intervention

**Paper 1 authors:** Fuhua Zhai & C. Cybele Raver

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**Paper 2 title:** Academic Outcomes of the Chicago School Readiness Project in First Grade: Do Children's Approaches to Learning Mediate Treatment Effects on Academic Skills?

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**Paper 3 title:** Long-term impacts of the Chicago School Readiness Project on children's behavior in Kindergarten: The moderating role of child baseline characteristics and kindergarten school quality

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## Abstract 1 Title Page

**Title:** Predicting children's transitions from Head Start to low-performing schools in Chicago:  
The roles of exposure to poverty-related risk and to early childhood intervention

**Choice of Conference Section:** Early Education

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## **Abstract 1 Body**

### **Background/Context:**

Exposed to a wide range of economic and psychosocial stressors, children in low-income families face greater chances of developing emotional and behavioral problems. For instance, it has been reported that the prevalence of oppositional defiant disorder (ODD) and attention deficit hyperactivity disorder (ADHD) is higher among young children from low-income families than their more advantaged peers (Currie, 2005; Reid, Webster-Stratton, & Baydar, 2004). Children's behavior problems, in turn, are strongly associated with a host of subsequent developmental risks such as delinquency, substance abuse, school difficulties and dropout, unemployment, and health problems (Brooks-Gunn, Duncan, & Aber, 1997; Li-Grining, Votruba-Drzal, Bachman, & Chase-Lansdale, 2006; Reid et al., 2004). Poverty rates are high in cities like Chicago, in which 87% of children were eligible for free or reduced-priced lunch and more than 25% of the third graders were not able to pass their school district's gated proficiency standards (Roderick & Nagaoka, 2005).

Moreover, early school years, especially from kindergarten to third grade, are a critical transitional period not only for promoting children's scholastic and psychosocial development but also for helping prevent the dissipating effects of earlier interventions (Reynolds, Magnuson, & Ou, 2006). Research has consistently shown that the benefits gained by participants, especially those in low-income families, from high-quality early interventions, including Head Start, can be sustained to later school years and even adulthood for those who attend continuing enrichment programs in early school years; but tend to fade out by the second or third year of formal schooling for those who attend inferior schools subsequently (Currie, 2001; Currie & Thomas, 1995; Lee & Loeb, 1995; Magnuson, Ruhm, & Waldfogel, 2007; Takanishi & Bogard, 2007). Therefore, it is important to examine the roles of exposure to poverty-related risk and to early childhood intervention in predicting children's transitions from Head Start to low-performing schools, which have been understudied in the literature.

### **Purpose/Objective/Research Question/Focus of Study:**

This paper investigates the socioeconomic contexts navigated by low-income children enrolled in the Chicago School Readiness Project (CSRP), as they made the transition from preschool to elementary school. We focus on the following two questions. First, do families' exposure to poverty-related risks (i.e., low income, maternal education, and employment engagement) change for the better or for the worse, from the fall of preschool to the fall of kindergarten? Second, we examine the share of CSRP-enrolled preschoolers who subsequently attended kindergarten in low-performing elementary schools. We ask whether children's chances of entry into a lower-performing school differ as a function of (a) their current or past exposure to poverty-related risks, (b) having attended a program randomly assigned to treatment versus control group during the intervention year of CSRP, and (c) having attended a Head Start program that was assessed to be lower-quality at pre-treatment baseline.

### **Settings:**

A total of 35 classrooms at 18 Head Start sites located in seven of the most economically disadvantaged neighborhoods in Chicago

### **Population/Participants/Subjects:**

Overall 602 children and 94 teachers participated in CSRP. Children on average were 4 years old and about half were boys. About 66% of participating children were non-Hispanic Black, 26% were Hispanic, and 8% were members of other racial/ethnic groups. Teachers on average were 40 years old and almost all (97%) were female. About 70% of teachers were non-Hispanic Black, 20% were Hispanic, and 10% were non-Hispanic White.

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

The CSRP intervention included three components of services. The first was a 30-hour teacher training focusing on behavior management strategies, which were adapted from the Incredible Years teacher training module (Webster-Stratton, Reid, & Hammond, 2004). All treatment-assigned teachers were invited to participate in the five 6-hour training sessions held on Saturdays from September to March during the Head Start year. Paired with the training, the second component was the placement of mental health consultants (MHCs) in treated classrooms. MHCs attended classes one morning per week to coach teachers in implementing the behavior management strategies as well as assisting teachers with stress reduction. The third component included individual MHC services for a small number of children (three to four children per class) with high emotional and behavioral problems from March to May in the Head Start year. To ensure that the child-staff ratio was similar across treatment and control classrooms, teachers in the control group were given staffing support by a teacher's aide who only provided an extra pair of hands and eyes during everyday classroom activities for the same amount of time per week as the MHCs in the treatment group.

### **Research Design:**

CSRP randomly assigned a multifaceted classroom-based intervention to two cohorts of Head Start children and teachers in seven of the most economically disadvantaged neighborhoods in Chicago, with Cohort One participating from fall to spring in 2004–05 and Cohort Two from fall to spring in 2005–06. Using a clustered randomized controlled trial (RCT) design and a pairwise matching procedure (Bloom, 2005), we first identified nine pairs of matched sites based on a range of site-level demographic characteristics that were collected by each site and reported annually to the federal government. One site in each matched pair then was randomly assigned to the treatment group and the other to the control group. Two classrooms from each site were initially included. One classroom left after randomization due to Head Start funding cuts. As a result, 35 classrooms (i.e., 18 in the treatment and 17 in the control groups) participated in the CSRP.

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

CSRP-enrolled children were followed from Head Start programs into kindergarten, with follow-up parent and teacher interviews completed in the fall of the follow-up year (92% had follow-up data from one or more reporters). Preliminary analyses of school-based follow-up data suggest that children made the transition from 35 Head Start preschool classrooms to over 170 kindergarten classrooms. Those schools whose percentage of children meeting ISAT testing criteria (as reported by Chicago Public Schools elementary scorecard) fell lower than one standard deviation below the mean of all elementary schools are coded as “low-performing.” Poverty-related risk is measured by three indicators: family income-to-needs ratios (i.e., less than half the federal threshold in the previous year), maternal educational attainment (i.e., less than a high school degree), and mothers' employment (i.e., 10 hours or less of work per week). Data of poverty-related risk were collected in the fall of both years. Other child-level covariates include the child's gender, race/ethnicity, whether Spanish was spoken at home, whether he/she was in a

single-parent family, and his/her behavioral problems in the fall of Head Start. The quality of Head Start programs in which children were initially enrolled at pretreatment baseline was also measured, as indexed by the Early Childhood Environment Rating Scale-R (ECERS-R; Harms, Clifford, & Cryer, 2003). Other classroom-level covariates collected in the fall of Head Start include teacher behavior management skills, classroom emotional climate, class size, and the number of adults in the classroom.

To answer our first question, descriptive analyses of CSRP-enrolled children's exposure to poverty-related stressors are presented. To address the second question, we estimate children's propensity to be enrolled in a low-performing elementary school using a three-level hierarchical logistic regression model with child covariates at Level 1, Head Start classroom covariates at Level 2, and paired Head Start site dummy variables at Level 3.

Following the notations in Raudenbush and Bryk (2002), Level 1 is specified in Equations (1) to (3):

$$\text{Sample model: } Y_{ijk} | \varphi_{ijk} \sim B(1, \varphi_{ijk}) \quad (1)$$

$$\text{Link function: } \eta_{ijk} = \log\left(\frac{\varphi_{ijk}}{1 - \varphi_{ijk}}\right) \quad (2)$$

$$\text{Structural model: } \eta_{ijk} = \pi_{0jk} + \sum_m \pi_{mjk} X_{mijk} \quad (3)$$

where  $Y_{ij}$  is whether child  $i$  in class  $j$  at Head Start site  $k$  attended low-performing schools (1 = yes and 0 = no);  $\varphi_{ijk}$  is the expected probability of attending low-performing schools, which is normally distributed;  $\eta_{ijk}$  is the log of the odds of attending low-performing schools; and  $\sum_m \pi_{mjk} X_{mijk}$  is the vector of the sum of  $m$  child-level covariates.

Equation (4) shows the specification of Level 2:

$$\pi_{mjk} = \beta_{m0k} + \sum_n \beta_{mnk} C_{nj} + r_{mjk} \quad (4)$$

where  $\sum_n \beta_{mnk} C_{nj}$  represents the sum of  $n$  Head Start classroom-level covariates; and  $r_{pij}$  is the random effect with mean of 0.

Level 3 is specified in Equation (5):

$$\beta_{mnk} = \gamma_{mn0} + \gamma_{001} T_k + \sum_p \gamma_{mnp} S_{pk} + u_{mnk} \quad (5)$$

where  $\gamma_{001} T$  is the treatment assignment at Head Start site level (i.e., 1 = treatment, 0 = control);

$\sum_p \gamma_{mnp} S_{pk}$  denotes the sum of  $p$  paired Head Start site-level dummy variables; and  $u_{pqj}$  is the random effect representing deviation of site  $k$ 's coefficient ( $\beta_{mnk}$ ) from its predicted value. Since the treatment assignment was conducted among paired Head Start sites, including site-level dummy variables at Level 3 is able to control for the fixed effects of paired Head Start sites.

### Findings/Results:

(Please insert table 1 here) Table 1 presents the descriptive statistics of children in the sample by their treatment status in the fall of Head Start year. Overall children in the CSRP control group were more likely to attend low-performing schools in the fall of kindergarten (i.e., 73%) compared to children in the treatment group (i.e., 60%). The measures of child and

classroom characteristics overall were balanced across the treatment and control groups.

(Please insert table 2 here) Table 2 shows the distribution of poverty-related risk (i.e., low income, maternal education, and employment engagement) in the fall of both Head Start and kindergarten. Overall children's exposure to poverty-related risk remained highly stable from Head Start to kindergarten, with a correlation coefficient of 0.83. In both years, approximately 9% of CSRP-enrolled children had three risks, one quarter had two risks, close to 30% had one risk, and about 35% had no risk.

Our preliminary analyses find that overall 338 CSRP-enrolled children attended kindergarten at the time of data collection and had valid information on the covariates. To examine the roles of exposure to poverty-related risk and to the CSRP intervention in their enrollment of low-performing schools in kindergarten, we conduct preliminary analyses using the three-level hierarchical logistic regression model specified above and present the results in Table 3. In Model 1 we only include the variable of treatment assignment. Model 2 further includes the paired Head Start site dummy variables. We include child-level covariates in Model 3 and classroom covariates in Model 4.

(Please insert table 3 here) As shown in Table 3, overall we find that children who were in the CSRP treatment were less likely to attend low-performing schools compared to their peers who were in the control group in the Head Start year (with an odds ratio of 0.35 in Model 4). The finding is significant in Models 2 to 4 after controlling for the fixed effects of paired Head Start sites. Children who had more poverty-related risks in the fall of Head Start were more likely to attend low-performing schools in kindergarten (with an odds ratio of 6.89 in Model 4). In addition, the results in Table 3 also suggest that African American children were more likely to attend low-performing schools than Hispanic children. We do not find the significant effects of attending low-quality Head Start classrooms (measured by one standard deviation below the mean of ECERS-R scores in the fall of Head Start) on children's odds of enrollment in low-performing schools in kindergarten.

Based on these preliminary findings, we will conduct further analyses to examine the effects of children's current exposure to poverty-related risks on children's entry to low-performing schools. In addition, we will also conduct sensitivity tests to examine whether the findings are robust when using different cut-off points (e.g., below the medians or a half of standard deviations) for the definitions of low-performing schools in kindergarten and low-quality Head Start program at pre-treatment baseline.

### **Conclusion:**

Previous research has found that the CSRP intervention had significant effects on improving classroom processes as well as children's social-emotional skills, self-regulation, and pre-academic skills, and reducing their behavior problems (Raver et al., 2008; Raver et al., 2009; Raver et al., in press). In this study we find that even in the period prior to the economic recession (2004-2006), families with young children in Chicago were facing high levels of poverty-related risk. On average, the CSRP-enrolled children had high rates of attending low-performing schools in the transition from Head Start to kindergarten. Our preliminary evidence shows that the CSRP intervention may set children on more positive educational trajectory since children in the treatment group were less likely to attend low-performing schools compared to their peers in the control group. To sustain the benefits of the CSRP intervention as well as those of Head Start, more help should be provided to these disadvantaged children throughout their subsequent school years.

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## Appendix B. Tables and Figures

**Table 1. Descriptive Statistics by Sample**

	Full Sample (n = 536)	Treatment Group (n = 279)	Control Group (n = 257)
<i>Outcome Variables</i>			
Attending low-performing schools	0.66 (0.47)	0.60 (0.49)	0.73 (0.45)
<i>Child Covariates</i>			
Boy	0.47 (0.50)	0.51 (0.50)	0.42 (0.50)
African American	0.67 (0.47)	0.68 (0.47)	0.67 (0.47)
Poverty-related risk	1.09 (0.99)	1.15 (1.00)	1.03 (0.99)
Spanish-speaking	0.18 (0.39)	0.17 (0.38)	0.19 (0.39)
Single-parent family	0.70 (0.46)	0.72 (0.45)	0.68 (0.47)
<i>Classroom Covariates</i>			
Classroom overall quality (ECERS)	4.71 (0.79)	4.45 (0.73)	4.98 (0.75)
Teacher behavior management	4.88 (1.03)	4.60 (1.06)	5.18 (0.91)
Classroom emotional climate	16.08 (2.75)	15.42 (2.77)	16.81 (2.53)
Class size	16.42 (2.66)	16.55 (2.63)	16.27 (2.68)
Number of adults in classroom	2.40 (0.69)	2.51 (0.77)	2.28 (0.56)

Note: means with standard deviations in parentheses

**Table 2. Distribution of Poverty-related Risk**

Number of Risks	% children in fall Head Start (n = 537)	% children in fall kindergarten (n = 481)
0	35.38	38.67
1	29.98	28.07
2	24.95	24.74
3	9.68	8.52
	100.00	100.00

**Table 3. Preliminary Results: Attending Low-performing Schools in K (n = 338)**

	M1	M2	M3	M4
Treatment	0.45 (-1.05)	0.35* (-3.04)	0.29** (-3.32)	0.35* (-2.37)
<i>Level 1 Covariates</i>				
Boy			0.78 (-0.71)	0.78 (-0.73)
Race/ethnicity (Hispanic omitted)				
African American			5.74* (2.41)	6.89* (2.51)
Other race/ethnicity			1.22 (0.25)	1.31 (0.34)
Poverty-related risk			1.42* (2.03)	1.43* (1.99)
Spanish-speaking			1.32 (0.50)	1.24 (0.38)
Single-parent family			1.29 (0.70)	1.26 (0.63)
Total behavioral problems HS fall			1.06+ (1.64)	1.06 (1.55)
<i>Level 2 Covariates</i>				
Low classroom quality (ECERS-R)				0.57 (-1.04)
Teacher behavior management				0.89 (-0.22)
Classroom emotional climate				1.00 (-0.00)
Class size				0.89 (-0.97)
Number of adults in classroom				1.60 (0.75)
<i>Level 3 Site Dummy Variables</i>				
	<i>No</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
<i>Intercept</i>	3.35* (2.26)	2.64+ (1.83)	0.50 (-0.87)	1.44 (0.13)

Notes: odds ratios with t-statistics in parentheses; \*\* p<0.01, \* p<0.05, + p<0.10

## Abstract 2 Title Page

**Title:** Academic Outcomes of the Chicago School Readiness Project in First Grade: Do Children's Approaches to Learning Mediate Treatment Effects on Academic Skills?

**Choice of Conference Section:** Early Education

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## Abstract 2 Body

### **Background/context:**

When children enter kindergarten, they encounter many first-time expectations, such as completing independent work, adhering to strict time schedules, and following greater amounts of teacher-directed instruction. Children may find this transition daunting, especially if their home environments stand in stark contrast to their school settings (Entwisle, Alexander, & Olson, 2003; Pianta, Kraft-Sayre, Rimm Kaufman, Gercke, & Higgins, 2001). Meeting these expectations depends on children's approaches to learning (ATL), which are defined as characteristics and behaviors that children show while engaging in learning activities (Kenney-Benson, Pomerantz, Ryan, & Patrick; McClelland, Acock, & Morrison, 2006). Children's ATL include persistence and attentiveness, which largely reflect children's self-regulation. Aspects of executive functioning, such as attention, memory, and inhibitory control, underpin these skills (McClelland et al., 2006), which are more specific to learning than are skills used in social interactions with peers and teachers (e.g., positive peer interaction, cooperative play, sharing, and respect; Cooper & Farran, 1988; Ladd, Birch, & Buhs, 1999).

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

The Chicago School Readiness Project (CSRP), a randomized, classroom-based mental health intervention, aimed to improve teachers' behavior management of preschoolers' dysregulated behavior. The current follow-up study examines potential impacts on academic skills of first graders by enhancing their ATL. This investigation seeks to answer three research questions: (1) Did children in the CSRP control group have lower academic ratings in first grade, when compared to the children who were randomly assigned to receive the CSRP intervention? (2) Were potential treatment impacts on first graders' academic skills dampened when children's ATL were added as a covariate? (3) Was there a direct impact on first graders' ATL? We will estimate hierarchical linear models (HLM) to take into account the nested design of CSRP, as well as structural equation modeling (SEM) to test for mediation.

### **Setting:**

In an effort to balance generalizability and feasibility, we selected preschool sites on the basis of (a) receipt of Head Start funding, (b) having two or more classrooms that offered "full day" programming, and (c) location in one of seven high-poverty neighborhoods (see Raver et al., 2008, for a detailed discussion of exclusionary criteria). CSRP staff completed block-by-block surveys of all seven neighborhoods, in which all child-serving agencies were identified and screened to determine whether they met site selection criteria (including receipt of Head Start funding). Eligible sites were then invited to self-nominate for participation in the research project. Eighteen sites across seven neighborhoods completed the process and were included as CSRP sites, and two classrooms within each site were randomly selected for participation. Research staff successfully recruited 83% of the children enrolled in classrooms between Labor Day and the assigned enrollment cutoff date in mid-October of the school year.

### **Population / Participants / Subjects:**

The CSRP sample consists of 602 children enrolled in 35 classrooms nested within 18 Head Start sites. Enrolled children ranged from ages 3 to 5 (29% identified as Latino/a, and 64% identified as African American). In our first set of models, our analytic sample included 356

children, where 108 children stayed with same teacher and 248 had a different teacher at kindergarten. In our second set of more conservative models predicting outcomes in kindergarten from child, classroom, and site characteristics in preschool, including literacy, math, self-regulatory, and social skills, our analytic sample included 280 children. Here, 76 children stayed with same teacher and 204 had a different teacher in kindergarten.

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

The principal aim of the CSRP intervention was to marshal several primary programmatic components to improve low-income preschool-aged children's school readiness by increasing their emotional and behavioral adjustment. The first programmatic component emphasized workforce development, where CSRP provided teachers with 30 hours of training in strategies (e.g., rewarding positive behavior, redirecting negative behavior) that they could employ to provide their classrooms with more effective regulatory support and better management (Raver et al., 2008; Webster-Stratton et al., 2001; Webster-Stratton, Reid, & Stoolmiller, 2008). A second key component was to provide weekly "coaching" through classroom-based consultation provided by a mental health consultant (MHC) who supported teachers while they tried new techniques learned in the teacher training (Donohue, Falk, & Provet, 2000; Gorman-Smith et al., 2003). As an additional component, MHCs spent a significant portion of the school year conducting stress reduction workshops to help teachers to limit burnout. This was based on the premise that adults might have a difficult time implementing new strategies of building positive relationships with children who demonstrate especially challenging behaviors when the adults themselves may feel less well supported. Finally, MHCs provided direct child-focused consultation, working one-on-one with three to five children who exhibited the most challenging behavioral problems, with the view that these children might benefit from access to clinical psychological services that could be delivered through the Head Start setting (Perry, Dunne, McFadden, & Campbell, 2008).

### **Research Design:**

To test the efficacy of this model, our research team conducted a cluster-randomized trial in Chicago, IL. Through extensive collaboration with community-based Head Start programs in seven of Chicago's most economically disadvantaged neighborhoods, CSRP was able to randomly assign nine Head Start sites to receive multi-component intervention services (and therefore serve as the "treatment group") and another nine Head Start sites to receive a lower-intensity package of services (including the support of a lower-cost "teacher's aide" in the classroom one day a week); these latter sites were designated as "control group" classrooms.

Though trainings were offered to all teachers randomized to treatment, not all teachers were able to take advantage of these sessions: Teachers attended three of the five trainings on average. Similarly, even though classroom visits were a main ingredient of the intervention package, some classrooms received as few as 21 visits while other classrooms received as many as 40 visits, with an average of 29 visits (or 128 hours of consultation) during the academic year. Analyses of consultants' logs suggest that the most common social services offered to teachers were social support and coaching during MHCs' classroom visits.

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

*Data collection.* The present investigation will examine associations among treatment, kindergarteners' academic skills, and ATL (n = 367). The measure of ATL (e.g., children's on

task behavior) was based the Cooper Farran Behavior Rating Scale (CFBRS; Cooper & Farran, 1991). Teacher reports of academic skills were based on items from the Early Childhood Longitudinal Study – Kindergarten Cohort (ECLS-K).

Developmental indicators in preschool included self-regulation, social competence, and academic skills. Self-regulation was directly assessed using the Preschool Self-Regulation Assessment (PSRA; Smith-Donald et al., 2007), which has shown to have measurement equivalence across African American and Latino children and boys and girls (Raver et al., submitted). The PSRA consists of 2 components: a battery of tasks administered by a trained assessor, and an assessor report. The first component includes 2 executive functioning tasks and 4 effortful control tasks (Smith-Donald et al., 2007). The executive functioning tasks included Balance Beam (Murray & Kochanska, 2002) and Pencil Tap, which was adapted from the peg-tapping task (Blair & Razza, 2007; Diamond & Taylor, 1996). The effortful control tasks consisted of Toy Wrap, Toy Wait, Snack Delay, and Tongue Task, which were adapted from lab-based delay tasks (see Murray & Kochanska, 2002). These tasks were selected because they were brief, required few materials, yet yielded useful data for 3- to 5-year-old children in lab-based protocols and in a pilot field study (Smith et al., 2007). Assessors live-coded latencies or performance levels for each task. To calculate executive functioning and effortful control composites, task scores were standardized and averaged. Over 20% of the self-regulation assessments were videotaped and double-coded. For all continuous variables, the consistency of the assessor and coder responses was examined, where Cronbach's alphas had an average of .93 and ranged from .73 - .99.

The second component of the PSRA includes a 28-item assessor report (Smith-Donald et al., 2007) that provides an overall portrait of children's attention, behavior, and emotions throughout the assessor-child interaction. The framework and descriptors for these items were adapted from the 15-item Leiter-R social-emotional rating scale (examiner version; Roid & Miller, 1997) and the Disruptive Behavior-Diagnostic Observation Schedule coding system (DB-DOS; Wakschlag et al, 2005). The assessor report included 16 items that tapped children's attention/impulse control (e.g., "pays attention during instructions and demonstrations"). Items were coded using a Likert scale ranging from 0 to 3, and some items were reverse-coded to minimize automatic responding. Inter-rater reliability and internal validity of the assessor report constructs were high, with a Cronbach's alpha of .92 for internal consistency.

To assess children's social competence, teachers completed the short form of the Social Competence and Behavior Evaluation (SCBE-30; LaFreniere & Dumas, 1996). The SCBE-30 provides information on the socioemotional adjustment of children ages 3-6. It includes a social competence subscale, which consists of 10 items (e.g., "works easily in groups"). We used a 6-point scale, ranging from 0 = never to 5 = always. As reported in previous research (LaFreniere & Dumas, 1996), internal validity was high for the current sample ( $\alpha = .85-.93$ ); however, inter-rater reliability was relatively lower ( $ICC = .55-.72$ ).

Prior to administering the academic assessments, assessors evaluated children's understanding of spoken English using the game "Simon Says" ( $\alpha=.92$ ) (PreLAS Simon Says; Duncan & DeAvila, 1998). The assessor directs children's behavior with a list of commands. However, children must follow the directions of the assessor only when he or she begins a command with the phrase "Simon says". Bilingual children who passed this screener completed both Spanish and English assessments, and their highest score was used in analysis. Children who only spoke English only participated in English assessments.

Once the “Simon says” screener was finished, assessors administered tests of children’s math, letter naming, and vocabulary skills. Based on the Early Childhood Longitudinal Study’s Kindergarten Cohort (ECLS-K), the math subscale includes 19 items that tap children’s early math skills such as their recognition of numbers and shapes, understanding of size, and ability to count (Zill, 2003a). For example, children were shown a picture of 2 paintbrushes and asked how many paintbrushes were on the page. Items were coded as correct (1) or incorrect (0), and children’s scores across the math items were averaged ( $\alpha = .82$ ). For letter naming, children were asked to identify as many letters of the alphabet as possible (Zill, 2003b). Because the English alphabet contains 26 letters and the Spanish alphabet contains 30 letters, we calculate the percentage of English letters known and percentage of Spanish letters known ( $\alpha = .92$ ).

Lastly, the vocabulary subscale was adapted from the Peabody Picture Vocabulary Test (PPVT-III; Dunn & Dunn, 1997) for children who spoke English only, and from the Spanish-language version of the PPVT (i.e., the Test de Vocabulario en Imagenes Peabody (TVIP; Dunn, Lugo, Padilla, & Dunn, 1986) for children who spoke Spanish. Children were shown 24 sets of 4 pictures and asked to point to the picture that illustrated a given word. We coded each trial as correct (1) or incorrect (0), and then calculated the mean score across all trials ( $\alpha = .78$ ). Internal validity was good ( $> .7$ ) on all three academic subscales.

*Preliminary data analysis.* Given the nesting of children within classrooms, which were nested within sites, we employed hierarchical linear modeling (HLM; Raudenbush & Bryk, 2002). Our multi-level models were characterized by the following equations. Below is our level 1 equation:

$$(1) Y_{ijk} = \pi_{0jk} + \pi_{1jk}Ch_{ijk} + \pi_{2jk}F_{ijk} + e_{ijk}$$

At level 1, we predicted children’s ATL and academic skills in kindergarten from child, classroom, and site characteristics in preschool. We controlled for characteristics of children (Ch) (i.e., gender, age, and race/ethnicity) and families (F) (i.e., human capital risk index, marital status, family size, whether Spanish was spoken at home, and welfare status). We centered the covariates so that  $\pi_{0jk}$  represents ATL and academic skills for the average child. The coefficients  $\pi_{1jk}$  through  $\pi_{2jk}$  represent the association between children’s academic skills and their social competence, behavior problems, and background characteristics in classroom  $jk$ . We also include  $e_{ijk}$  as a child-specific random effect.

Next, we present our level 2 equation:

$$(2) \pi_{0jk} = \beta_{00k} + \beta_{01k}Cl_{jk} + \beta_{02k}T_{jk} + r_{0jk}$$

Here, we predicted the intercept at level 1. Covariates at level 2 included features of classrooms (Cl) (i.e., quality in terms of behavior management and emotional climate, number of adults, number of children). We also included characteristics of teachers (T) (i.e., level of education, depressive symptoms, and experience with work-related stressors). Though not shown here,  $\beta_{10} - \beta_{20}$  represent the pooled within-classroom regression coefficients for the Level-1 covariates.

Finally, below is our level 3 equation:

$$(3) \beta_{00k} = \gamma_{000} + \gamma_{001}S_k + u_{00k}$$

Here, we predicted the intercept at level 2. Level 3 site covariates (S) included treatment status, whether a family support worker was on staff, the size of the program, the percentage of families

who were African American, and the percentage of families who received welfare. Results were essentially the same when the 4 latter site characteristics were replaced with dummy variables representing pairs of sites that were matched on family and site characteristics that reflected program capacity. One site in each pair was randomly assigned to the treatment group, and the other site was then assigned to the control group. Though not shown here,  $\gamma_{010}$  and  $\gamma_{020}$  represent the pooled within-site regression coefficients for the level 2 covariates.

In order to assess whether direct assessments added value to our analyses, we estimated a second set of models, where equation 1 was replaced by the following equation:

$$(4) Y_{ijk} = \pi_{0jk} + \pi_{1jk}Ch_{ijk} + \pi_{2jk}F_{ijk} + \pi_{3jk}Lit_{ijk} + \pi_{4jk}Math_{ijk} + \pi_{5jk}SR_{ijk} + \pi_{5jk}SS_{ijk} + e_{ijk}$$

Here, equation 4 included preschoolers' literacy, math, self-regulatory, and social skills as covariates.

### **Findings / Results:**

When predicting ATL and academic skills in kindergarten from treatment and other preschool experiences, we found treatment impacts on language, literacy, and math skills in kindergarten. However, these findings did not hold in more conservative models that controlled for academic and social outcomes in preschool. There were no treatment impacts on ATL in kindergarten. Thus, we did not conduct tests of mediation.

Interestingly, when predicting learning related and academic skills in kindergarten from treatment and other preschool experiences, we detected significant linkages between the following variables. In terms of child and family characteristics, we found that boys were at risk for lower scores. Furthermore, children's social competence and executive functioning were positively linked to better language, literacy, and math scores. Also, children whose parents had lower levels of education were at academic risk.

Regarding teacher and classroom characteristics, children whose preschool classrooms were rated higher in terms of classroom quality tended to have higher academic scores. Additionally, children whose teachers reported having more control in the classroom tended to have higher academic performance.

### **Conclusions:**

In sum, preliminary evidence of CSRP impact on children's language, literacy, and math skills in kindergarten so far does not hold in more conservative models. Moreover, there was no preliminary evidence of CSRP impact on children's approaches to learning in kindergarten. Interestingly, preliminary evidence of child, family, and classroom characteristics in preschool as predictive of kindergarten outcomes

We will continue to explore whether CSRP yielded an impact on children's academic skills via more adaptive ATL, by following participants into first grade. The full CSRP intervention was administered throughout most of the preschool year. Therefore, there could be a lagged effect, once the entire intervention was completed. Results will be discussed in the context of early intervention and early childhood education. Implications for programs and policies will be addressed.

## Appendices

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### Abstract 3 Title Page

**Title:** Long-term impacts of the Chicago School Readiness Project on children's behavior in Kindergarten: The moderating role of child baseline characteristics and kindergarten school quality

**Choice of Conference Section:** Early Education

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## Abstract 3 Body

### **Background/Context:**

As ecological models have been increasingly applied to development in educational contexts, the classroom as its own unique system comprising characteristics of teachers, children, and the dynamic relationships between them, has become both a focus of intense study and a target of classroom-based intervention and prevention efforts, particularly with regard to social and emotional skills and behaviors. Exposed to a wide range of economic and psychosocial stressors, children in low-income families face greater chances of developing emotional and behavioral problems. The principal aim of the Chicago School Readiness Project intervention was to improve low-income preschool-aged children's school readiness by increasing their emotional and behavioral adjustment via a key set of classroom processes including the quality of relationships between children and teachers.

### **Purpose/Objective/Research Question/Focus of Study:**

This paper investigates the long-term impact of participation in the Chicago School Readiness Project (CSRP) during the Head Start year on children's behavioral outcomes at the end of their Kindergarten year. The primary questions addressed in the paper are: (1) What is the experimental impact of CSRP on two-year change (from Fall Head Start to the end of Kindergarten) in children's externalizing and internalizing outcomes, controlling for key baseline child, classroom and teacher 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 two-year impact of CSRP moderated by child-level baseline demographic covariates (including child gender, race/ethnic background, family socioeconomic risk, and community risk) and baseline levels of behavioral risk? (3) Addressing school factors that may account for enhanced or reduced intervention effects due to the transition to Kindergarten, is the two-year impact of CSRP moderated by school characteristics in Kindergarten?

### **Settings:**

The baseline of CSRP intervention included a total of 35 classrooms at 18 Head Start sites located in seven of the most economically disadvantaged neighborhoods in Chicago. Children were followed to approximately 170 kindergarten classrooms.

### **Population/Participants/Subjects:**

Overall 602 children and 94 teachers participated in the CSRP. In the Fall of the Head Start year, children on average were 4 years old and about half were boys. About 66% of participating children were non-Hispanic Black, 26% were Hispanic, and 8% were members of other racial/ethnic groups. Teachers on average were 40 years old and almost all (97%) were female. About 70% of teachers were non-Hispanic Black, 20% were Hispanic, and 10% were non-Hispanic White.

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

The CSRP intervention included three components of services. The first was a 30-hour teacher training focusing on behavior management strategies, which were adapted from the Incredible

Years teacher training module (Webster-Stratton, Reid, & Hammond, 2004). All treatment-assigned teachers were invited to participate in the five 6-hour training sessions held on Saturdays from September to March during the Head Start year. Paired with the training, the second component was the placement of mental health consultants (MHCs) in treated classrooms. MHCs attended classes one morning per week to coach teachers in implementing the behavior management strategies as well as assisting teachers with stress reduction. The third component included individual MHC services for a small number of children (three to four children per class) with high emotional and behavioral problems from March to May in the Head Start year. To ensure that the child-staff ratio was similar across treatment and control classrooms, teachers in the control group were given staffing support by a teacher's aide who only provided an extra pair of hands and eyes during everyday classroom activities for the same amount of time per week as the MHCs in the treatment group.

### **Research Design:**

CSRP randomly assigned a multifaceted classroom-based intervention to two cohorts of Head Start children and teachers in seven of the most economically disadvantaged neighborhoods in Chicago, with Cohort One participating from fall to spring in 2004–05 and Cohort Two from fall to spring in 2005–06. Using a clustered randomized controlled trial (RCT) design and a pairwise matching procedure (Bloom, 2005), we first identified nine pairs of matched sites based on a range of site-level demographic characteristics that were collected by each site and reported annually to the federal government. One site in each matched pair then was randomly assigned to the treatment group and the other to the control group. Two classrooms from each site were initially included. One classroom left after randomization due to Head Start funding cuts. As a result, 35 classrooms (i.e., 18 in the treatment and 17 in the control groups) participated in the CSRP.

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

CSRP-enrolled children were followed from Head Start programs into kindergarten, with follow-up parent and teacher interviews completed in the fall of the follow-up year (92% had follow-up data from one or more reporters). Preliminary analyses of school-based follow-up data suggest that children made the transition from 35 Head Start preschool classrooms to over 170 kindergarten classrooms. Those schools whose percentage of children meeting ISAT testing criteria (as reported by Chicago Public Schools elementary scorecard) fell lower than one standard deviation below the mean of all elementary schools are coded as “low-performing.” Poverty-related risk is measured by three indicators: family income-to-needs ratios (i.e., less than half the federal threshold in the previous year), maternal educational attainment (i.e., less than a high school degree), and mothers' employment (i.e., 10 hours or less of work per week). Data reflecting poverty-related risk were collected in the fall of both years.

Child behavioral risk was calculated using baseline teacher reports on the Behavior Problems Index with children designated as high having scores higher than 1 standard deviation above the mean. Teachers were given the Behavior Problems Index (BPI; Zill, 1990) in the fall and spring for each CSRP-enrolled child in their classrooms. Other child-level covariates include child gender, race/ethnicity, whether Spanish was spoken at home, whether he/she was in a single-parent family, and his/her behavioral problems in the fall of Head Start.

To account for classroom-level differences in resources and support for children's social-emotional development, both trained observers and teachers provided classroom-level data in the fall. Trained observers, who were blind to randomization, assessed the quality of children's classrooms using the Classroom Assessment Scoring System (CLASS; La Paro, Pianta, &

Stuhlman, 2004) and the Early Childhood Environment Rating Scale, revised edition (ECERS-R, Harms, Clifford, & Cryer, 2003). Using the ECERS and CLASS, observers rated overall classroom quality as well as dimensions of emotional climate, including teacher sensitivity, behavior management, and negative climate. While conducting observations, staff noted the number of children and adults in the classroom. In the fall, administrators at each Head Start site also provided CSRP with access to site-level characteristics. Child outcomes were measured at baseline, the Spring of the Head Start year, and in the Spring of Kindergarten using the teacher report form of the Child Behavior Checklist externalizing and internalizing scales.

To accommodate the nested nature of the design, estimates of intervention impact on change in the primary child outcomes from pre-intervention baseline (Fall, Head Start year) to the 3<sup>rd</sup> time point (Spring, Kindergarten year) were calculated using a series of 3-level hierarchical linear growth models with, and without site fixed effects in HLM 6.02. In these models, Level 1 represents time (i.e., the 3 repeated assessments of the constructs of interest for each child), Level 2 represents the child/teacher/classroom, and Level 3 represents sites (Head Start sites). All child- and /teacher classroom-, and Kindergarten school-level covariates were included at Level 2. Level 3 included a treatment dummy. In addition, as indicated above, we examined a number of cross-level treatment by baseline, and Kindergarten school, covariate interactions.

### **Findings/Results:**

Findings to date through the end of the Head Start year are summarized below. Analyses examining main and interactive intervention effects through the end of Kindergarten will be complete by December 1, 2009. Results after the Head Start year indicate significant treatment effects for teacher-reported and independent observations of children's internalizing and externalizing behavior problems, with effect sizes ranging from  $d = .53$  to  $d = .89$  (Raver et al., 2009). Moreover, there was some evidence for the moderating role of child gender, race/ethnic group membership, and exposure to poverty-related risk, with stronger effects of intervention for some groups of children than for others.

### **Conclusion:**

Previous research has found that the CSRP intervention had significant effects on improving classroom processes as well as children's social-emotional skills, self-regulation, and pre-academic skills, and reducing their behavior problems (Raver et al., 2008; Raver et al., 2009; Raver et al., in press). This paper represents the first report of impact on children's behavior into Kindergarten, and focuses specifically on factors that may enhance or undermine long-term treatment effects.

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