Abstract Title Page

Title: Do Effects of Social-Emotional Learning Programs Vary by Level of Parent Participation? Evidence from a Randomized Trial

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Abstract Body

Background: A wide and rich body of literature has identified the family as the key context influencing children's development (Fan & Chen, 2001; Jeynes, 2005; Kreppner & Lerner, 2013). In response, school districts and policymakers have sought to engage parents in children's learning, particularly low-income families (Booth & Dunn, 2013). Meta-analyses conclude that efforts to engage low-income parents do improve students' academic achievement (Jeynes, 2012; Jeynes, 2014). Such research has prompted developers of some school-based preventive interventions to integrate programming components targeted at students' parents. Social Emotional Learning (SEL) programs are one such type of school-based preventive intervention. SEL programs aim to improve children's social-emotional competencies (behavioral regulation, attentional skills, problem-solving, social skills), in order to support their academic development. Typically implemented in school settings, SEL programs explicitly target teacher and student individual-level skill development and the quality of classroom contexts (e.g., Brown et al., 2010; Rivers et al., 2013). Some interventions also use a comprehensive prevention approach that engages parents in services (e.g., Kumpfer et al., 2002). Such models theorize that parents can be effective in enhancing social-emotional skill development at home if they are exposed to the content that their children learn at school. Yet, given few quantitative studies on parent program take-up rates, little is known about the factors that are predictive of parents' participation in SEL programs (Wilson, 2012). Moreover, although ecological theory suggests that two-generation service models should enhance the efficacy of SEL interventions (Bronfenbrenner & Morris, 1998), there is little empirical research testing this hypothesis. Given that parent programs can be resource intensive, it is critical to determine whether they do in fact enhance the benefits of SEL programs for students. Knowledge of parent program efficacy can inform future SEL intervention development, implementation, and scale-up in urban elementary schools.

Purpose of Study: This paper examines the parenting component of *INSIGHTS into Children's Temperament*, an SEL program that includes a manualized curriculum for teachers, students, and parents. Results from a randomized trial revealed that *INSIGHTS* improved students' achievement and sustained attention, and reduced their disruptive behaviors (O'Connor et al., 2014). The current study tests whether program impacts on low-income urban kindergarten and first grade students' academic, social-emotional, and behavioral outcomes differed by levels of parent participation.

Setting: This study took place in 22 low-income urban public elementary schools. All classrooms were regular education, with an average of 16.57 students (SD = 3.54). Schools had an average attendance rate of 86.26% (SD = .19) and an average size of 465 students (SD = 158.46). Schools also had high percentages of students who were racial/ethnic minorities (Black, M = .77, SD = .13; Hispanic, M = .40, SD = .27) and eligible for free or reduced lunch (M = .80, SD = .16).

Participants: Ninety-one percent of participating children were age five or six when they enrolled in the study (M = 5.38 SD = 0.61). Half (52%) of the children were male. Eighty-seven percent of children qualified for free or reduced lunch. Seventy-five percent of children were black, non-Hispanic, 16% were Hispanic, non-black, and the remaining children were biracial. Twenty-two percent of students' parents graduated from a 2- or 4-year college.

Intervention: *INSIGHTS* is a comprehensive social/behavioral intervention with teacher, parent, and classroom programs. In brief, *INSIGHTS* provides teachers and parents with a temperament framework for supporting the individual differences of children. Using this framework, *INSIGHTS* helps parents and teachers recognize a child's temperament and respond with warmth and discipline strategies that

support adaptive social-emotional and behavioral outcomes (McClowry et al., 2010). *INSIGHTS*' ultimate goal is to support students' academic development.

The *INSIGHTS* intervention implemented in this study included: (a) parent, (b) teacher, and (c) universal classroom sessions (see McClowry et al., 2010). Parents and teachers attended 10 weekly 2-hr facilitated sessions based on a structured curriculum that included didactic content and professionally produced vignettes as well as handouts and group activities. During the same 10 weeks, the classroom program was delivered in 45-min lessons to all students in the classrooms of participating teachers.

*Intervention fidelity***.** Facilitators followed scripts, used checklists, documented sessions, and received ongoing training and supervision. 93% of the curriculum was adequately covered, on average.

INSIGHTS dosage. The average number of teacher sessions attended was 9.44 (*SD* = 0.91). The average number of classroom sessions attended by the participating children was 8.30 (*SD* = 2.25). Although dosage for the child and teacher components of the program was almost uniformly high, there was significant variation in parent participation across schools; participation ranged from 23% of parents attending more than 80% of sessions to 66% attending more than 80% of sessions.

*Attention-control condition***.** Schools not assigned to *INSIGHTS* participated in a 10-week, supplemental reading program after school for children whose parents consented. Dosage and fidelity were both deemed adequate in the attention-control condition.

Research Design: Eleven schools were randomized to *INSIGHTS*; the remaining eleven schools were assigned to the attention-control condition. Half of the children and teachers were in the *INSIGHTS* program (n = 225, n = 57); the remaining child and teacher participants (n = 210, n = 63) were in the attention-control condition. Examination of pretest variables suggests group equivalence except for children's reading scores, which favored the control group.

Data Collection: Baseline data (T1) were collected in the winter of kindergarten prior to students and classrooms receiving 10 weeks of kindergarten intervention. Time 2 (T2) data were collected following intervention in the late spring of the kindergarten year. Time 3 (T3) data were collected in the fall of first grade prior to 10 weeks of first grade intervention. Time 4 (T4) data were collected after the first grade intervention in the late winter of the first grade year, followed by Time 5 (T5) data in late spring. Assignment to *INSIGHTS* was measured as a dummy variable (1 = *INSIGHTS*; 0 = attention-control).

Outcome variables. Outcome variables mirror the ones assessed in the study examining intent-to-treat effects of *INSIGHTS* (see O'Connor et al., 2014). Reading and math achievement were assessed using raw scores from the Letter-Word Identification and Applied Problems subtests of the Woodcock-Johnson III Tests of Achievement, Form B (WJ-III; Woodcock McGrew, & Mather, 2001). Child sustained attention was measured with the Attention Sustained subtest from the Leiter International Performance Scale—Revised (Roid & Miller, 1997). Child behavior problems were measured with the 36-item Sutter–Eyberg Student Behavior Inventory, the teacher-report version of the Eyberg Child Behavior Inventory (Eyberg & Pincus, 1999; α = .97).

Parent dosage was assessed using facilitators' reports of the number of parent sessions attended. Although there was uniformly high dosage for the classroom and teacher programs, parental attendance was lower. Although program staff made all possible efforts to engage parents in *INSIGHTS* sessions, the average number of sessions parents attended was 5.93 (SD = 4.15). Twenty-five percent of the parents were present for all sessions and 38% were present for eight sessions or more. In line with previous work, we defined high parent program participation as attending 8 or more *INSIGHTS* parent sessions (1 = 8 or more sessions; 0 = less than 8 sessions) (Hsueh et al., 2012; Gaubert et al., 2010). There were 84 students assigned to *INSIGHTS* whose parents participated at high levels. The remaining 141 students in the *INSIGHTS* group participated in less than 8 sessions (about 2/3 of this parent group did not participate at all). These students are compared to 210 comparison condition participants.

Confounding covariates represent the variables that predict parent participation and any of the student outcomes. We included child-level demographic variables (ethnicity, gender, age, free lunch eligibility) and parent-level variables (age, ethnicity, parent education, marital status, work status) as confounding covariates. We also included teacher-reports of teacher-child closeness and conflict (Pianta, 2001), teacher reports of academic competence in math and reading (DiPerna & Elliott, 2000), parent-reports of parent involvement in school (Manz et al., 2004), and parent reports of four dimensions of child temperament – negative reactivity, activity, task persistence, and withdrawal (McClowry, 2002).

Data Analysis: There was 0% to 20% missing data across study variables. Twenty separate datasets were thus imputed by chained equations, using STATA MICE in STATA version 12. STATA ran each set of analyses 20 times and aggregated the findings across the imputed datasets.

Descriptive analysis. Descriptive statistics on continuous study variables were first compared across the high parent dosage *INSIGHTS* group, the low parent dosage *INSIGHTS* group, and the comparison group. Independent samples t-tests were used to test for significant group differences (between the high dosage parent group and the low dosage parent group) between study variables.

Treatment impact models. Because dosage was not randomly assigned in this experiment, it is possible that certain types of study participants (e.g., more motivated participants) were more likely to take up the treatment. To address this limitation, we used inverse probability of treatment weighting (IPTW) to address possible selection bias into being a high dose participant (Austin, 2011; Imbens, 2004). To begin the IPTW modeling, we used a logistic regression with school fixed effects to estimate the likelihood of high parent program participation from a set of confounding covariates. We then used the coefficients for the *INSIGHTS* group and applied them to covariate data for the group of students originally randomly assigned to the comparison group. Next, we used IPTW to weight the comparison group so that it looked like the high participation group in terms of all confounding covariates. Using the weighted comparison group, one can estimate the effect of high parent participation in *INSIGHTS* on post-treatment outcomes, relative to the outcomes for the students in the comparison group whose parents would have participated at high levels if given the opportunity. The *estimand* is then the effect of the treatment on those who participated at high levels. In contrast, when we examined these models for the low participation group, the *estimand* was the effect of the treatment on those who participated at low levels. Following Hill et al.'s (2003) guidance, we then assessed the balance between the groups.

Finally, using a sample composed of the high participation group and weighted comparison group, we ran a series of individual growth models similar to those examined in the previous intent-to-treat study (see O'Connor et al., 2014), but applying the appropriate weights. We examined main effects of assignment to *INSIGHTS* on students' outcomes at the end of first grade, and also tested whether effects of *INSIGHTS* varied over time. After applying the weights from the IPTW procedure, the coefficient for Treatment represents the impact of high participation on the outcome relative to what would have happened in the absence of *INSIGHTS*. The coefficient for Treatment x Time represents the impact of high participation on growth in the outcomes, relative to what would have happened in the absence of *INSIGHTS*. Causal inference is correct if the appropriate assumptions for IPTW are met. As we discussed at the beginning of this section, we then repeated this entire procedure to estimate low parent participation treatment impacts relative to the comparison group members whose parents would have participated at low levels if given the opportunity.

Results: *Factors related to parent program participation*. There were differences between the high and low dosage parent participation groups at baseline (see Table 1). Specifically, high dosage parents were older, more likely to be married, more educated, more likely to be working full-time, and more likely to have children with high baseline skills. See Table 2 for additional descriptive statistics.

Dosage effects on disruptive behaviors and sustained attention. As illustrated (see Table 3), there

were no average impacts for high dosage or low dosage participants in *INSIGHTS*, relative to the comparison condition. There were, however, significant dosage effects on growth in outcomes across time. Growth in sustained attention was faster for *INSIGHTS* participants with high parent participation, relative to comparison participants with predicted high levels of parent participation ($B = 2.80$, $p < .05$).

In the low parent participation group there were also significant effects on growth. Growth in sustained attention was faster for *INSIGHTS* participants with low parent participation, relative to the comparison group ($B = 4.03$, $p < .05$). Reductions in disruptive behaviors were faster for *INSIGHTS* participants with low parent participation, relation to the comparison group ($B = -.16$, $p < .05$). Impacts for the low dosage group were bigger for sustained attention ($\chi^2 = 7.53$, $p < .01$). The treatment impact on disruptive behaviors was also larger for the group with low parent dosage ($\chi^2 = 5.16$, $p < .01$).

Dosage effects on math and reading achievement. There were no average treatment impacts for high dosage participants in *INSIGHTS*, relative to their counterfactual condition of no treatment receipt (see Table 3). However, there were main treatment effects of *INSIGHTS* for low dosage participants for both math ($B = 1.17$, $p < .05$) and reading achievement ($B = 3.26$, $p < .05$), relative to the comparison group. At the final time point, low dosage participants in *INSIGHTS* had higher math and reading achievement relative to their comparison condition. See Figures 1 and 2 for illustrations of these effects. Growth in math ($B = 2.23$, $p < .01$) and reading ($B = 4.14$, $p < .05$) achievement was faster for students in *INSIGHTS* with high levels of parent participation, relative to their counterfactual condition. There were similar findings, however, for the low participation group. Growth in math ($B = 2.34$, $p < .05$) and reading achievement ($B = 4.56$, $p < .05$) was faster for students in *INSIGHTS* with lower levels of parent participation, relative to the comparison condition. Differences for the low dosage group were larger for both math ($\chi^2 = 7.06$, $p < .01$) and reading ($\chi^2 = 9.18$, $p < .01$) achievement.

Tenability of assumptions and sensitivity analyses. Sensitivity analyses demonstrate that assumptions for IPTW were tenable (e.g., see balance statistics in Tables 4 and 5). We also repeated the analyses using a 5 out of 10 session threshold as "high dosage." Results from these models were consistent with the findings favoring impacts for the low parent dosage group.

Conclusions: Previous research on school-based preventive interventions has typically found that more program dosage – at multiple levels – is associated with larger gains for students (Brotman et al., 2011; Lochman et al., 2006; Reyes et al., 2012). Yet, the results of the current paper suggest that the dosage story in the *INSIGHTS* evaluation may be more nuanced than has been previously understood in literature on school-based interventions. Broadly, there were program impacts for children whose parents participated at *high* and *low* levels. However, the magnitude of the program effects on math and reading achievement, and more adaptive behaviors was actually larger for children whose parents participated at *lower* levels. After considering selection into being a high dosage versus low dosage parent, however, evidence suggests that children of low dosage parents were more likely to be at risk for poor achievement, behaviors, and attention. Such selection differences may help explain why gains in achievement and sustained attention, and reductions in disruptive behaviors, were larger for the group of students whose parents participated at lower levels. Findings suggest that the parents whose children are already at an advantage may be the ones most likely to participate in programming. The children whose parents do not participate may experience the biggest impact because they have a greater need for school-based services than children whose parents participate at lower rates. In cases where participating parents have children who already have higher academic and behavioral skills at baseline, it may be unlikely for those interventions to produce larger effects for the high dosage parents. Presenters will discuss implications of these findings for program recruitment, targeting, and intervention scaling and replicability.

Appendix A. References

Austin, P. C. (2011). An introduction to propensity score methods for reducing the effects of confounding in observational studies. *Multivariate Behavioral Research, 46*(3), 399-424.

Booth, A., & Dunn, J. F. (Eds.). (2013). *Family-school links: How do they affect educational outcomes?* Mahway, NJ: Erlbaum Publishing.

Bronfenbrenner, U., & Morris, P.A. (1998). The ecology of developmental processes. In W. Damon (Series Ed.) & R.M. Lerner (Vol. Ed.), *Handbook of child psychology: Vol.1 Theoretical models of human development* (5th ed., pp. 993 - 1028). New York: Wiley.

Brotman, L. M., Calzada, E., Huang, K. Y., Kingston, S., Dawson-McClure, S., Kamboukos, D., ... & Petkova, E. (2011). Promoting effective parenting practices and preventing child behavior problems in school among ethnically diverse families from underserved, urban communities. *Child Development*, *82*(1), 258-276.

Brown, J. L., Jones, S. M., LaRusso, M. D., & Aber, J. L. (2010). Improving classroom quality: Teacher influences and experimental impacts of the 4rs program. *Journal of Educational Psychology*, *102*(1), 153 – 167.

DiPerna, J. C., & Elliott, S. N. (2000). *The Academic Competence Evaluation Scales*. San Antonio, TX: The Psychological Corporation.

Eyberg, S.M., & Pincus, D. (1999). *Eyberg Child Behavior Inventory and Sutter-Eyberg Student Behavior Inventory-Revised: Professional Manual.* Odessa, FL: Psychological Assessment Resources.

Fan, X., & Chen, M. (2001). Parental involvement and students' academic achievement: A meta-analysis. *Educational Psychology Review*, *13*(1), 1-22.

Hill, J., Brooks-Gunn, J., & Waldfogel, J. (2003). Sustained effects of high participation in an early intervention for low-birth-weight premature infants. *Developmental Psychology*, *39*(4), 730 – 744.

Gaubert, J. M., Knox, V., Alderson, D. P., Dalton, C., Fletcher, K., & McCormick, M. (2010). The Supporting Healthy Marriage Evaluation: Early Lessons from the Implementation of a Relationship and Marriage Skills Program for Low-Income Married Couples. *MDRC*.

Hsueh, J., Principe Alderson, D., Lundquist, E., Michalopoulos, C., Gubits, D., Fein, D., & Knox, V. (2012). The Supporting Healthy Marriage evaluation: Early impacts on low-income families. *OPRE Report*, *11*.

Imbens, G. (2004). Nonparametric estimation of average treatment effects under exogeneity: A review. *Review of Economics and Statistics, 86*, 4-29.

Jeynes, W. (2012). A meta-analysis of the efficacy of different types of parental involvement programs for urban students. *Urban Education*, *47*(4), 706-742.

Jeynes, W. H. (2005). A meta-analysis of the relation of parental involvement to urban elementary school student academic achievement. *Urban Education*,*40*(3), 237-269.

Jeynes, W. H. (2014). A meta-analysis on the factors that best reduce the achievement gap. *Education and Urban Society*. Advance online publication.

Kreppner, K., & Lerner, R. M. (Eds.). (2013). *Family systems and life-span development*. Hillsdale, NJ: Erlbaum Publishing.

Kumpfer, K. L., Alvarado, R., Smith, P., & Bellamy, N. (2002). Cultural sensitivity and adaptation in family-based prevention interventions. *Prevention Science*, *3*(3), 241-246.

Manz, P. H., Fantuzzo, J. W., & Power, T. J. (2004). Multidimensional assessment of family involvement among urban elementary students. *Journal of School Psychology*, *42*(6), 461-475.

Lochman, J. E., Boxmeyer, C., Powell, N., Roth, D. L., & Windle, M. (2006). Masked intervention effects: Analytic methods for addressing low dosage of intervention. *New Directions for Evaluation*, *2006*(110), 19-32.

McClowry, S. G. (2002). The temperament profiles of school-age children. *Journal of Pediatric Nursing*, *17*(1), 3-10.

McClowry, S. G., Snow, D. L., Tamis-LeMonda, C. S., & Rodriguez, E. T. (2010). Testing the efficacy of INSIGHTS on student disruptive behavior, classroom management, and student competence in inner city primary grades. *School Mental Health*, *2*(1), 23-35.

O'Connor, E. E., Cappella, E., McCormick, M. P., & McClowry, S. G. (2014). An examination of the efficacy of INSIGHTS in enhancing the academic and behavioral development of children in early grades. *Journal of Educational Psychology*, *106*(4), 1156.

Pianta, R. C. (2001). *STRS: Student-teacher Relationship Scale: Professional manual*. Psychological Assessment Resources.

Reyes, M. R., Brackett, M. A., Rivers, S. E., White, M., & Salovey, P. (2012). Classroom emotional climate, student engagement, and academic achievement. *Journal of Educational Psychology*, *104*(3), 700 – 712.

Rivers, S. E., Brackett, M. A., Reyes, M. R., Elbertson, N. A., & Salovey, P. (2013). Improving the social and emotional climate of classrooms: A clustered randomized controlled trial testing The RULER Approach. *Prevention Science*, *14*(1), 77-87.

Roid, G. H., & Miller, L. J. (1997). *Leiter international performance scale-revised: Examiners manual*. Wood Dale, IL: Stoelting.

Wilson, W. J. (2012). *The truly disadvantaged: The inner city, the underclass, and public policy*. Chicago: University of Chicago Press.

Woodcock, R.W., McGrew, K.S., & Mather, N. (2001). *Woodcock Johnson Psychoeducational Battery-Third Edition*. Chicago: Riverside Publishing.

Appendix B. Tables & Figures

Table 1

Descriptives for All Study Variables at Baseline by Treatment Dosage and Condition

	Tx High Dosage N = 84		Tx Low Dosage N = 131		Control N = 220	
Variable	Mean	SD	Mean	SD	Mean	SD
Demographic characteristics						
Child age	5.57	0.72	5.56	0.69	5.52	0.59
Child black	0.75	0.44	0.77	0.42	0.73	0.44
Child Hispanic	0.21	0.41	0.20	0.40	0.16	0.37
Child male	0.54	0.50	0.52	0.50	0.52	0.50
Parent age	36.35	9.41	33.83	7.26	35.95	8.76
Parent years education	12.73	2.18	12.32	2.45	13.37	2.97
Parent unmarried	0.62	0.49	0.61	0.49	0.50	0.50
Parent black	0.75	0.44	0.81	0.40	0.76	0.44
Parent works full time	0.14	0.35	0.12	0.33	0.16	0.37
Child characteristics at baseline						
Sustained attention	47.49	12.25	45.62	12.84	45.47	12.79
Motor activity (1 - 5)	2.91	0.91	2.87	0.95	2.79	1.02
Negative reactivity (1 - 5)	2.87	0.84	2.86	0.86	2.93	0.90
Task persistence (1 - 5)	3.80	0.78	3.81	0.75	3.78	0.82
Withdrawal (1 - 5)	2.34	0.85	2.47	0.86	2.38	0.97
Reading achievement (0 - 72)	17.11	8.29	16.00	7.45	18.49	7.58
Math achievement (0 - 67)	15.21	4.61	14.31	4.87	14.47	5.15
Behavior problems (1 - 7)	2.37	1.23	2.27	1.18	2.20	1.09
Reading skills (1 - 5)	2.62	0.83	2.54	0.86	2.75	0.80
Math skills (1 - 5)	2.68	0.71	2.62	0.68	2.76	0.67
Critical thinking skills (1 - 5)	2.63	0.74	2.61	0.69	2.68	0.64
Student-teacher conflict (1 - 5)	1.92	0.94	1.89	1.06	1.83	0.96
Student-teacher closeness (1 - 5)	4.13	0.69	4.18	0.74	4.11	0.80
Parent involvement (1 - 4)	2.69	0.52	2.72	0.53	2.74	0.55
Parent-child conflict (1 - 5)	2.12	0.72	2.05	0.73	2.09	0.83
Parent-child closeness 1 - 5)	4.57	0.31	4.53	0.42	4.57	0.36
Behavioral engagement (%)	0.65	0.20	0.69	0.19	0.70	0.20
Off-task behaviors (%)	0.16	0.09	0.15	0.09	0.14	0.09

Table 2

Descriptives for All Study Outcomes at Follow-up Points by Treatment Dosage and Condition

	Time 2						Time 3						Time 4						Time 5					
	Tx High Dosage		Tx Low Dosage		Control		Tx High Dosage		Tx Low Dosage		Control		Tx High Dosage		Tx Low Dosage		Control		Tx High Dosage		Tx Low Dosage		Control	
	N = 84		*N* = 131		*N* = 220		*N* = 84		*N* = 131		*N* = 220		*N* = 84		*N* = 131		*N* = 220		*N* = 84		*N* = 131		*N* = 220	
Variable	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Sustained attention	52.24	12.27	50.25	12.92	53.67	10.76	59.49	8.57	56.67	10.06	56.40	9.26	59.58	9.07	59.69	8.37	59.14	9.07	61.60	9.51	61.36	7.79	60.54	9.45
Reading achievement (0 - 72)	20.06	8.14	19.92	7.73	23.75	7.97	22.86	11.34	23.10	10.38	26.37	10.21	30.95	9.89	30.91	8.72	32.49	8.54	31.29	9.82	32.50	9.13	30.57	11.41
Math achievement (0 - 67)	17.05	4.87	17.08	4.91	17.71	5.04	18.60	5.63	17.91	5.03	18.69	4.25	22.45	4.39	22.42	4.00	22.60	3.84	23.24	4.85	23.44	4.98	23.17	4.19
Behavior problems (1 - 7)	2.60	1.62	2.47	1.40	2.22	1.12	2.31	1.30	2.13	1.15	2.32	1.15	2.53	1.60	2.19	1.22	2.43	1.38	2.49	1.53	2.17	1.26	2.83	1.42
Reading skills (1 - 5)	2.82	0.78	2.68	0.80	2.86	0.79	2.42	0.87	2.43	0.86	2.51	0.91	2.65	0.93	2.76	0.92	2.87	0.99	2.75	1.10	2.89	1.04	2.94	0.97
Math skills (1 - 5)	2.81	0.74	2.71	0.69	2.87	0.66	2.47	0.77	2.50	0.72	2.62	0.73	2.69	0.85	2.69	0.84	2.83	0.87	2.83	0.76	2.84	0.82	2.88	0.83
Critical thinking skills (1 - 5)	2.76	0.68	2.85	0.71	2.99	0.62	2.67	0.64	2.61	0.63	2.71	0.74	2.71	0.90	2.76	0.85	2.96	0.91	3.05	0.81	2.95	0.76	3.03	0.86
Student-teacher conflict (1 - 5)	1.93	1.10	1.90	1.03	1.81	0.97	1.78	1.10	1.65	0.82	0.71	0.86	1.96	1.08	1.75	0.91	1.83	1.04	1.98	1.21	1.92	1.09	1.90	1.09
Student-teacher closeness (1 - 5)	4.27	0.73	4.24	0.83	4.10	0.77	3.79	0.81	3.79	0.81	4.03	0.74	3.91	0.75	4.07	0.73	4.11	0.68	4.02	0.84	4.02	0.84	4.15	0.75
Parent involvement (1 - 4)	2.74	0.51	2.66	0.55	2.70	0.55	2.97	0.57	2.79	0.47	2.73	0.41	2.84	0.41	2.72	0.46	2.64	0.50	2.78	0.42	2.71	0.44	2.59	0.49
Parent-child closeness (1 - 5)	4.59	0.43	4.50	0.45	4.58	0.40	4.57	0.37	4.62	0.33	4.59	0.38	4.57	0.37	4.59	0.37	4.62	0.35	4.54	0.39	4.58	0.42	4.57	0.42
Parent-child conflict (1 - 5)	2.17	0.80	2.04	0.98	2.03	0.84	1.99	0.84	2.00	0.84	2.02	0.82	1.96	0.78	1.97	0.86	1.95	0.82	1.98	0.76	1.88	0.75	1.96	0.90
Behavioral engagement (%)	0.64	0.27	0.69	0.25	0.66	0.24	0.70	0.15	0.69	0.16	0.71	0.16	0.69	0.16	0.72	0.18	0.70	0.15	0.71	0.19	0.74	0.20	0.75	0.24
Off-task behaviors (%)	0.16	0.12	0.16	0.12	0.17	0.12	0.19	0.09	0.18	0.08	0.17	0.08	0.13	0.08	0.13	0.07	0.14	0.07	0.14	0.08	0.13	0.09	0.14	0.09

Table 3

Estimates from Inverse Probability of Treatment Weighting Procedure

Outcomes	High Parent Dosage *N* = 84 B		SE	Low Parent Dosage *N* = 131 B		SE	Sig. difference, high and low dosage
Average impact							
Math achievement	0.56		0.42	1.17	**	0.37	**
Reading achievement	1.59		1.27	3.26	**	1.24	**
Sustained attention	1.80		1.35	0.96		1.45	
Behavior problems	-0.12		0.17	-0.25		0.17	
Treatment x time impact							
Math achievement	2.23	**	0.18	2.34	**	0.18	
Reading achievement	4.14	**	0.30	4.56	**	0.34	*
Sustained attention	2.80	**	1.03	4.03	**	0.69	**
Behavior problems	-0.06		0.09	-0.16	*	0.07	**

** $p < .01$, * $p < .05$, † $p < .10$

Note: The final column ("sig. difference, high and low dosage") describes whether the magnitude of the coefficient for the high parent dosage group is statistically significantly different from the magnitude of the coefficient for the low parent dosage group.

Table 4

Balance Statistics for Inverse Probability of Treatment Weighting Predicting High Parent Participation in INSIGHTS Program

	Treatment		Unweighted Comparison		Weighted Comparison			
Variable	Mean	SD	Mean	SD	Mean	SD	STD Difference	Ratio of SDs
Demographic characteristics								
Child age	5.54	0.72	5.36	0.68	5.47	0.70	0.10	1.03
Child black	0.75	0.44	0.81	0.39	0.76	0.43	-0.02	1.02
Child Hispanic	0.22	0.41	0.18	0.39	0.20	0.42	0.05	0.98
Child female	0.46	0.50	0.49	0.50	0.49	0.50	-0.06	1.00
Parent age	36.76	9.42	33.41	7.35	36.12	8.73	0.07	1.08
Parent years education	12.74	2.18	12.52	2.25	12.61	2.22	0.06	0.98
Parent unmarried	0.63	0.48	0.62	0.49	0.62	0.48	0.02	1.00
Parent black	0.75	0.44	0.81	0.39	0.76	0.42	-0.02	1.05
Parent works full time	0.15	0.35	0.13	0.33	0.14	0.35	0.03	1.00
Child characteristics at baseline								
Sustained attention	47.23	12.04	45.56	13.01	46.11	12.37	0.09	0.97
Motor activity (1 - 5)	3.01	0.93	2.81	0.86	2.95	0.89	0.06	1.04
Negative reactivity (1 - 5)	2.92	0.79	2.77	0.72	2.85	0.77	0.09	1.03
Task persistence (1 - 5)	3.76	0.81	3.81	0.65	3.72	0.73	0.05	1.11
Withdrawal (1 - 5)	2.39	0.83	2.48	0.71	2.47	0.74	-0.10	1.12
Reading achievement (0 - 72)	16.98	8.55	16.05	7.47	16.39	7.91	0.07	1.08
Math achievement (0 - 67)	15.22	4.68	14.72	4.72	14.74	4.77	0.10	0.98
Behavior problems (1 - 7)	2.36	1.26	2.20	1.17	2.25	1.19	0.09	1.06
Reading skills (1 - 5)	2.65	0.79	2.53	0.84	2.61	0.81	0.05	0.98
Math skills (1 - 5)	2.70	0.70	2.63	0.71	2.64	0.70	0.09	1.00
Critical thinking skills (1 - 5)	2.64	0.73	2.62	0.69	2.66	0.77	-0.03	0.95
Student-teacher conflict (1 - 5)	1.91	0.94	1.89	1.03	1.87	1.01	0.04	0.93
Student-teacher closeness (1 - 5)	4.14	0.69	4.19	0.72	4.11	0.73	0.04	0.95
Parent involvement (1 - 4)	2.68	0.50	2.69	0.47	2.64	0.47	0.08	1.06
Parent-child conflict (1 - 5)	2.12	0.72	2.07	0.72	2.10	0.70	0.03	1.03
Parent-child closeness 1 - 5)	4.58	0.28	4.54	0.42	4.60	0.32	-0.07	0.88
Behavioral engagement (%)	0.65	0.20	0.68	0.20	0.67	0.20	-0.10	1.00
Off-task behaviors (%)	0.16	0.09	0.14	0.08	0.15	0.08	0.08	1.13

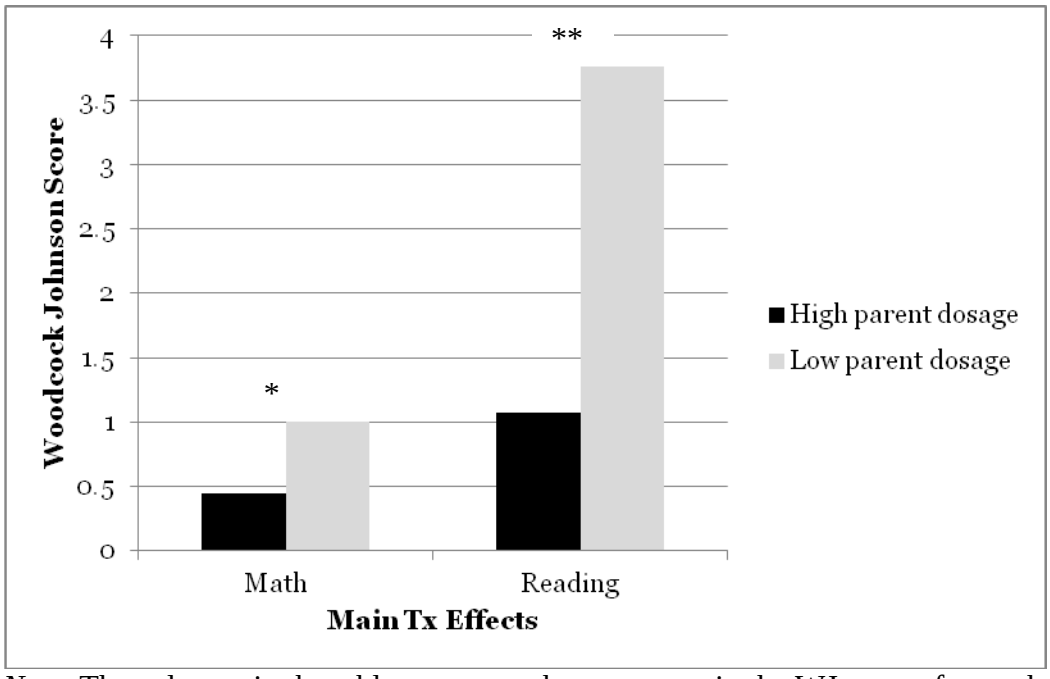
Note: "Good balance" is represented by a situation where the absolute value of the standardized difference is no greater than .1 and the ratio of standard deviations is between .9 and 1.1.

Table 5

Balance Statistics for Inverse Probability of Treatment Weighting Predicting Low Parent Participation in INSIGHTS Program

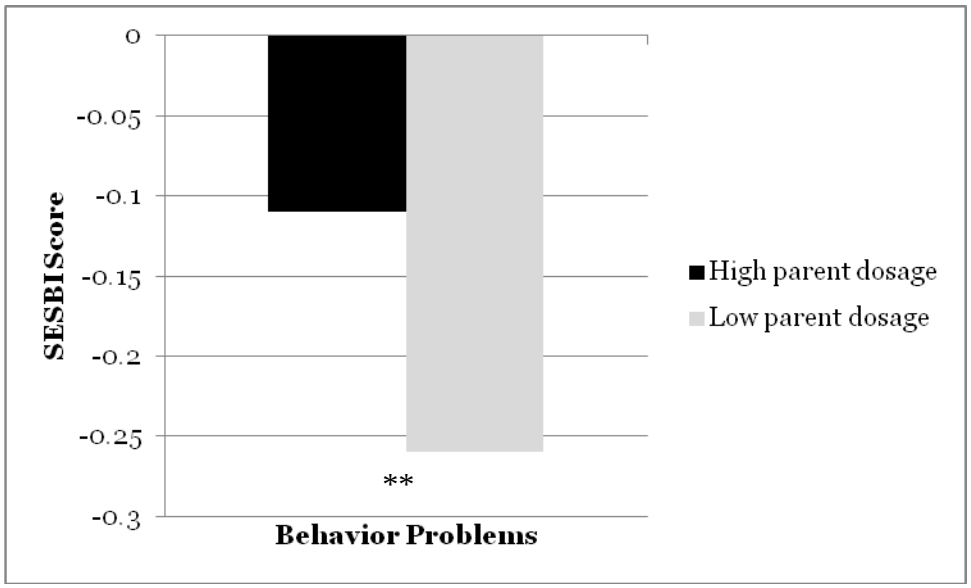
	INSIGHTS Low Dosage		Unweighted Comparison		Weighted Comparison			
Variable	Mean	SD	Mean	SD	Mean	SD	STD Difference	Ratio of SDs
Demographic characteristics								
Child age	5.56	0.69	5.36	0.68	5.50	0.68	0.09	1.01
Child black	0.77	0.42	0.81	0.39	0.77	0.44	0.00	0.95
Child Hispanic	0.20	0.40	0.18	0.39	0.22	0.40	-0.05	1.00
Child female	0.52	0.50	0.49	0.50	0.52	0.50	0.00	1.00
Parent age	33.83	7.26	33.41	7.35	34.14	7.75	-0.04	0.94
Parent years education	12.32	2.45	12.52	2.25	12.34	2.46	-0.01	1.00
Parent unmarried	0.61	0.49	0.62	0.49	0.63	0.49	-0.04	1.00
Parent black	0.81	0.40	0.81	0.39	0.79	0.42	0.05	0.95
Parent works full time	0.12	0.33	0.13	0.33	0.13	0.30	-0.03	1.10
Child characteristics at baseline								
Sustained attention	50.25	12.92	45.56	13.01	49.14	13.10	0.09	0.99
Motor activity (1 - 5)	2.87	0.95	2.81	0.86	2.95	0.91	-0.08	1.04
Negative reactivity (1 - 5)	2.86	0.86	2.77	0.72	2.83	0.84	0.03	1.02
Task persistence (1 - 5)	3.81	0.75	3.81	0.65	3.77	0.76	0.05	0.99
Withdrawal (1 - 5)	2.47	0.86	2.48	0.71	2.49	0.84	-0.02	1.02
Reading achievement (0 - 72)	20.06	8.14	16.05	7.47	20.14	8.07	-0.01	1.01
Math achievement (0 - 67)	17.05	4.87	14.72	4.72	16.89	4.91	0.03	0.99
Behavior problems (1 - 7)	2.60	1.62	2.20	1.17	2.55	1.60	0.03	1.01
Reading skills (1 - 5)	2.82	0.78	2.53	0.84	2.79	0.81	0.04	0.96
Math skills (1 - 5)	2.81	0.74	2.63	0.71	2.86	0.70	-0.07	1.06
Critical thinking skills (1 - 5)	2.76	0.68	2.62	0.69	2.81	0.73	-0.07	0.93
Student-teacher conflict (1 - 5)	1.93	1.10	1.89	1.03	1.95	1.04	-0.02	1.06
Student-teacher closeness (1 - 5)	4.27	0.73	4.19	0.72	4.22	0.70	0.07	1.04
Parent involvement (1 - 4)	2.74	0.51	2.69	0.47	2.70	0.50	0.08	1.02
Parent-child conflict (1 - 5)	4.59	0.43	2.07	0.72	5.63	0.42	-2.42	1.02
Parent-child closeness 1 - 5)	2.17	0.80	4.54	0.42	2.16	0.79	0.01	1.01
Behavioral engagement (%)	0.64	0.27	0.68	0.20	0.67	0.30	-0.11	0.90
Off-task behaviors (%)	0.16	0.12	0.14	0.08	0.15	0.11	0.06	1.09

Note: "Good balance" is represented by a situation where the absolute value of the standardized difference is no greater than .1 and the ratio of standard deviations is between .9 and 1.1.



Note. The columns in the table represent change scores in the WJ scores for math and reading.

Figure 1
Differential Impact by Dosage on Math and Reading Achievement



Note. The columns in the table represent change scores in SESBI behavior problems score.

Figure 2
Differential Impact by Dosage on Disruptive Behaviors