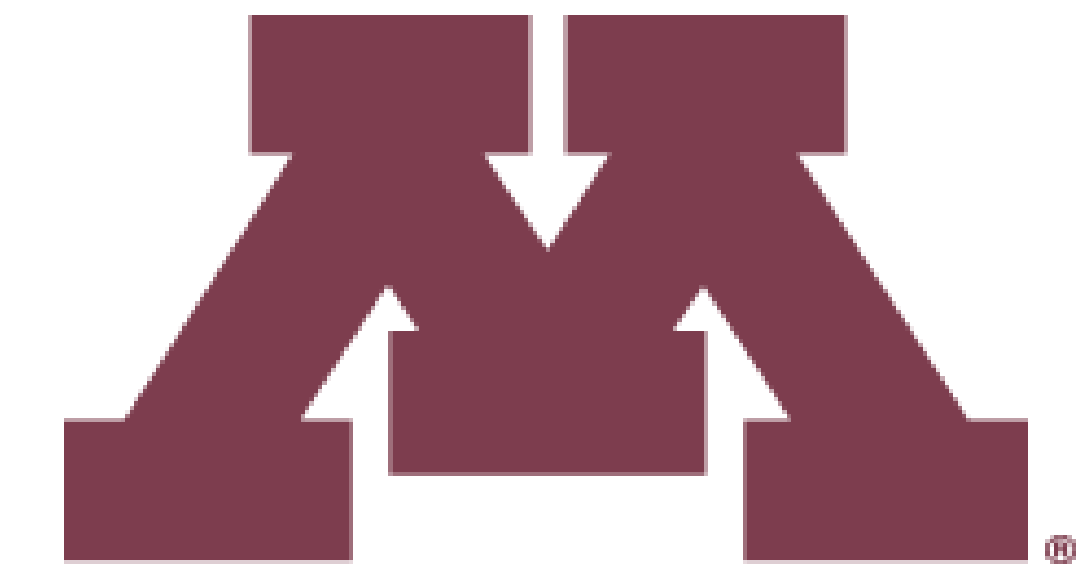




Dosage Effects of a Preschool-to-Third Grade (PK-3) Intervention on School Outcomes



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Background/Objectives

Investments in large-scale preschool programs have increased in the last decade, although findings on the effects of those programs and Head Start are mixed (Farran & Lipsey, 2015). Recent findings from state preschool programs found positive effects of preschool at kindergarten entry, but the effects fade out after transition to elementary school (Lipsey et al., 2015; Pima et al., 2012). The fade out of positive effects were resulted from the quality of elementary school children attended subsequently (Zhai et al., 2012). Preschool to Third grade (PK-3) framework has caught attention as the belief of providing children a continuity from preschool through third grade will sustain the gains in preschool and lead to better developmental outcomes over all in addition to academic outcomes (Reynolds, et al., 2010). Yet empirical evidences on the value-added of PK-3 continuity are scant.

Research Questions

The present study investigates the dosage and gender subgroup effects of a PK-3 program, the Child-Parent Center (CPC) Program, on school outcomes.

1. Do the associations between the CPC program and school outcomes vary by dosage?
2. Do the dosage effects of the CPC program differ by gender?

Sample and Data

The study sample is drawn from the Chicago Longitudinal Study (CLS), an on-going investigation of a panel of low-income minority children growing up in high-poverty neighborhoods in Chicago. The original sample (N=1,539) included 989 children who entered the Child-Parent Center (CPC) program in preschool and graduated from kindergarten in 1986 from 20 Centers, and 550 children who participated in alternative government-funded programs in the Chicago Public Schools in 1986 without CPC preschool experience. Data have been collected longitudinally starting from child's birth from various sources, such as participants, parents, teachers, school records, and administrative records (Reynolds, 2000).

Measures

- CPC Intervention: preschool program (PK, ages 3-4), kindergarten (K, age 5), and school-age program (1st to 3rd grade, ages 6-8). Six groups were assessed: 1) no

intervention, 2) no PK but had school-age participation, 3) PK only or PK+K (reference group), 4) PK to 1st grade participation (PK-1), (5) PK to 2nd grade participation (PK-2), and (6) PK to 3rd grade participation (PK-3)

- **Outcomes:** academic performance (math and reading scores on Iowa Test of Basic Skills, ITBS), grade retention, special education placement, classroom adjustment (6-item scale rated by teachers), magnet school enrollment, school mobility, school commitment (16-item self-reported about commitment to education), parent involvement in school, and expectation of college attendance.
- **Covariates:** child's characteristics (age, gender, race, and birthweight), family risk factors (maternal education, employment, marital status, and age at child's birth; number of children in the household; participation in the Aid to Families with Dependent Children (AFDC) program; family conflict; family financial problems; and family substance abuse) and neighborhood characteristics (poverty, unemployment and female head of household).

Table 1. Selected Characteristics by Intervention Groups

Variables	PK-3	PK-2	PK-1	PK or PK + K	No PK + any sch-age	No Interv en.
Original sample size	173	377	134	305	166	377
Preprogram Characteristics						
Mother not complete HS, child age 0-3,%	40**	52	56	54	61	59
Eligible for subsidized meals, child age 0-3,%	88	80*	84	87	86	81
Mother under age 18 at child birth, %	13	15	19	16	20	16
4 or more children in family, child age 0-3,%	14	18	13	16	18	18
Participate in AFDC, child age 0-3,%	60	64	60	65	69	58
Mother not employed, child age 0-3,%	64	66	66	71	72	61**
Single parent family status, child age 0-3,%	75	77	79	76	75	76
If missing any risk factors, child age 0-3,%	9**	10**	19	22	17	18
Reside in high poverty neighborhood,%	58**	85	75	81	72**	74**
Low birth weight (<2500g),%	12	10	13	10	16	12
Child underage at preschool entry,%	2	1	1	1	8**	4*
Family conflict, child age 0-5,%	8	5	8	4	5	6
Family financial problems, child age 0-5,%	6	6	11	8	8	6
Substance abuse parent, child age 0-5,%	4	5	4	4	2	5
Female child, %	54	53	50	50	42	49
African American child,%	95	92	91	93	98*	92
Age in months at kindergarten	63.8**	63.2*	63.2	62.6	64.1**	63.5**
Sample recovery and characteristics						
% with achievement by 3 rd grade	99**	92**	76	72	83*	82**
% with achievement by 8 th grade	98**	94**	86	78	89**	84
% with school mobility	99**	95**	86	79	90**	86
% with expectations to go to college	84**	79**	69	66	66	68

Note: ** P < .01, * P < .05.

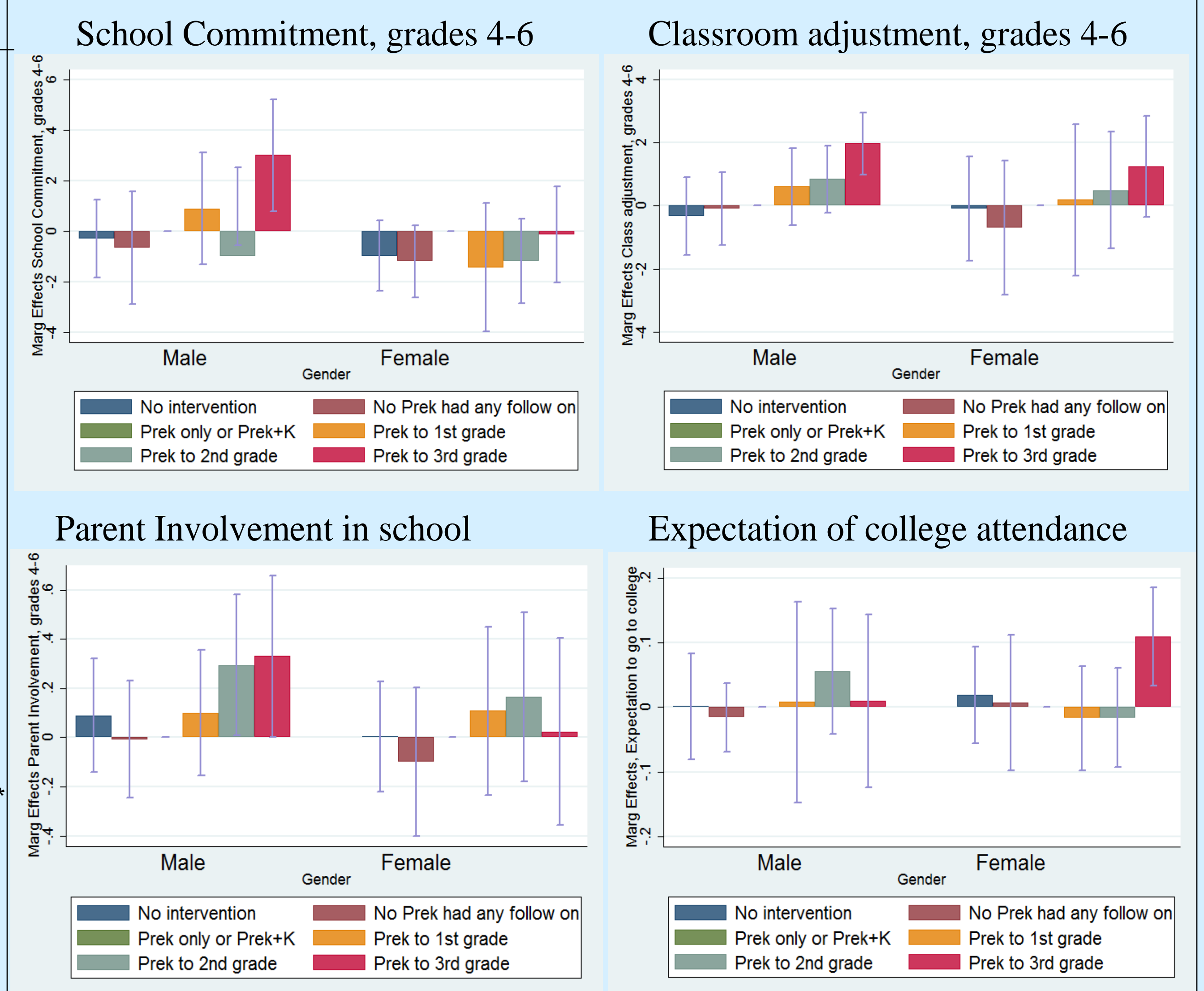
Results

Table 2. Adjusted Means by Program Groups

Outcomes	PK-3	PK-2	PK-1	PK only or PK +K	No PK had any school-age	No interve.
Math scores, grade 3	107.53***	102.43**	99.59	98.22	100.83	96.61
Reading scores, grade 3	105.48***	98.28**	95.2	92.96	96.92	91.88
Math scores, grade 8	152.14**	150.58	146.34	146.53	145.1	144.09
Reading scores, grade 8	151.14***	147.96	143.72	144	141.41	141.21
Ever retained, grades 1-8, %	0.02***	0.22*	0.31	0.33	0.25	0.38
Ever in special edu, grade 1-8, %	0.13	0.09	0.18	0.19	0.21	0.17
Years in special edu, grade 1-8	0.39*	0.33*	0.72	0.75	0.84	0.76
School commit. grade 6-10	51.37*	49.94	49.87	50.15	48.66	49.36
Classroom adjustment, grade 3	20.44*	19.11	18.77	18.34	18.18	18.41
Classroom adjustment, grade 4-6	19.8*	19.01	18.84	18.53	18.17	18.25
Parent involvement, grades 4-6	1.00	1.03	0.93	0.85	0.77	0.87
Ever enrolled magnet school, grade 4-8, %	0.23	0.11	0.04	0.05	0.06	0.01
Ever school mobility, grade 4-8, %	0.45**	0.55*	0.66	0.65	0.63	0.74
Expectation of college attendance, grade 10, %	0.89	0.85	0.84	0.84	0.80	0.84

Note: Adjusted means/rates on the outcomes are calculated using the marginal means, which were adjusted for preprogram characteristics (i.e., child's gender, child's race, family variables, and socio-demographic factors) and selection and attrition by IPW. Standard errors are clustered at the site-level. *** p<0.001, ** p<0.01, * p<0.05.

Figure 1. Marginal Effects for Selected Outcomes by Gender



Note: Error bars represent confidence intervals at the 95% level. Marginal effects are adjusted for preprogram characteristics, selection and attrition IPW.

Discussion

- PK-3 dosage is associated with positive outcomes compare to PK-2 and PK only or PK+K.
- Improving school outcomes are the pathways leading to long-term effects on education.
- Gender differential effects: Cognitive on females and social-emotional on males.

Limitations

- Quasi-experimental design limits causality.
- Dosage of preschool was not considered.
- Policy contexts now and then are different.
- Generalizability is limited.

Conclusions

PK-3 dosage is associated with better school outcomes beyond third grade than preschool program alone or PK-2 dosage. Preschool programs with no subsequent school-age programs to support preschool gain are less likely to connect to long-term benefits. Replication and extension of findings to other locations and samples will further strengthen confidence in the benefits of PK-3 interventions for young children.

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Acknowledgements

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