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United Way After-School Program Evaluation

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In February, 2012, the United Way of Greater Rochester (UWGR) approached Children's Institute to discuss the design and implementation of an evaluation of after-school programs funded by UWGR. Of special interest were academic outcomes of program participants, as compared with a propensity score-matched control group. Planned outcome variables included NYS English Language Arts (ELA), Mathematics and Science scores, grade-point averages (GPA), and school attendance.

For the 2010-2011 academic year, attendance was collected for after-school program participants using the COMET[®] application by these providers:

- Baden Street Settlement House
- Boys & Girls Club of Rochester
- Charles Settlement House
- Ibero-American Action League
- SouthWest Area Neighborhood Association
- The Center for Youth Services
- The Community Place of Greater Rochester
- Urban League of Rochester
- YMCA of Greater Rochester

In all, attendance records for 2,775 students were extracted from the COMET[®] database. After obtaining permission from the Rochester City School District (RCSD), these records were matched with school records by students' names and dates of birth. A total of 1,995 records were successfully matched, with 1,904 remaining after duplicate records were removed. Eliminating students who only participated in summer activities yielded 1,603 records, and dropping students who did not attend at least 30 hours of programming (the minimum number of hours that United Way uses to define a student as a participant) produced a sample of 1,346. Limiting this sample to students who had complete matching data and ELA achievement test outcome data yielded a final group of 640 students. Because ELA tests are administered from 3rd to 8th grade, this group included only 4th - 8th graders. Third grade students did not have a prior-year ELA for matching.

A control group of RCSD students was matched to the after-school program sample using propensity score matching (PSM) methodology. PSM uses matching variables as covariates to allow unbiased estimates of treatment effects. Initially, we planned to match on the following variables:

- Sex
- Ethnicity
- Age
- Limited English proficiency (LEP) status
- Individualized Education Program (IEP) status
- Prior year (2009-10) ELA New York State ELA scale score
- Prior year GPA

Since GPA was available only for 7th and 8th graders, this variable was dropped from the PSM procedure.

The matching algorithm identified the following variables as predicting membership in the after-school program group, compared to a matching pool of 9,570 non-program students with

complete data for all matching variables, after controlling for each of the matching variables: Female (-), Black (+), Hispanic (+), and IEP (-) ($ps < .05$). After matching, there were no statistically significant differences for any matching variable. Univariate descriptive statistics are presented in Table 1, below.

Table 1. Descriptive statistics for treatment group, matching pool, and matched control group.

	Treatment group (N=640)		Matching pool (N=9570)		Matched control group (N=640)	
	Mean	SD	Mean	SD	Mean	SD
Female	0.45	0.50	0.50	0.50	0.45	0.50
Black	0.81	0.39	0.64	0.48	0.81	0.40
Hispanic	0.14	0.34	0.23	0.42	0.14	0.35
Age as of June 1, 2011	12.06	1.55	12.35	1.68	12.16	1.62
IEP 2009-10	0.16	0.36	0.20	0.40	0.16	0.36
ELL 2009-10	0.04	0.20	0.08	0.27	0.04	0.19
NYS ELA scale score 2009-10	654.21	19.56	653.00	22.36	654.35	19.61

Note that treatment group Hispanics were directionally under-represented relative to the matching pool when other predictors were not controlled for, but over-represented when controlling for other predictors.

Because each treatment subject was individually matched with a control subject, the appropriate statistical test to examine differences in outcomes was a dependent *t*-test for paired samples, using difference scores within each pair for each outcome variable. Results are displayed in the table below.

Table 2. Group descriptive statistics, paired-sample *t*-tests, and effect sizes for outcome difference scores.

	N per group	Treatment group		Control group		Difference		t	p	Effect Size
		Mean	SD	Mean	SD	Mean	SD			
NYS ELA scale score	640	652.24	20.62	652.79	19.28	-0.55	21.19	-0.65	ns	-0.03
NYS Mathematics scale score	638	660.60	27.84	659.63	30.34	0.96	36.12	0.67	ns	0.03
Percent Unexcused absences	338	4.28	5.37	6.46	9.93	-2.18	11.03	-3.64	.0003	-0.22
Percent Absences	338	5.29	6.54	8.00	11.51	-2.71	12.94	-3.85	.0001	-0.24
Percent Present	338	94.71	6.54	92.00	11.51	2.71	12.94	3.85	.0001	0.24
GPA, Grades 7 & 8 only	124	2.18	0.94	1.96	1.09	0.22	1.38	1.77	.08	0.20
NYS Science scale score, Grade 8	28	34.43	9.94	33.14	7.98	1.29	11.04	0.62	ns	0.16

There are clear differences between the groups with regard to school attendance. On average, the treatment group was present at school over two percent more than the matched controls, and had fewer unexcused absences. The attendance difference translates to an average four days more in school per year for the after-school program group, based on a 180-day school year. GPAs for 7th and 8th grade program participants were almost one quarter of a letter grade greater, although this difference did not attain the threshold for statistical significant ($p \leq .05$) used in this evaluation. There were no statistically significant differences in NYS ELA scores, Mathematics scores, or 8th grade NYS Science scores.

Relatively high rates of missing values were noted for several of the outcome variables. Because the absence of either the treatment student's or the control student's information will result in the elimination of the pair from the analyses described above, school attendance, 7th-8th grade GPA, and 8th grade Science outcomes were reanalyzed using independent-group *t*-tests. Although these will maximize available sample sizes, they offer less protection from uncontrolled factors because the groups are not necessarily matched on key variables.

Table 3. Group descriptive statistics, independent-group *t*-tests, and effect sizes for outcome difference scores.

	Treatment group			Control group			Difference		t	p	Effect Size
	N	Mean	SD	N	Mean	SD	Mean	SD			
Percent Unexcused absences	607	4.36	5.53	602	6.18	9.07	-1.83	7.5072	-4.23	.0001	-0.20
Percent Absences	607	5.33	6.82	602	7.58	10.43	-2.26	8.81	-4.45	.0001	-0.22
Percent Present	607	94.67	6.82	602	92.42	10.43	2.26	8.81	4.45	.0001	0.22
GPA, Grades 7 & 8 only	211	2.15	0.97	203	1.90	1.13	0.25	1.05	2.38	.02	0.22
NYS Science scale score, Grade 8	92	34.22	9.15	84	33.14	7.98	0.59	9.88	0.39	ns	0.13

Overall results were similar to those from the prior analyses. GPA for 7th and 8th grades was statistically significantly ($p \leq .05$) greater for the treatment group.

The pairwise analyses indicated that, of the various outcome measures, only attendance showed statistically significant ($p \leq .05$) differences. Accordingly, we examined program effects on school attendance separately by sex, age, and ethnicity, using the difference scores between the treatment and control matched pairs. None of the comparisons was statistically significant. See the table below.

Table 4. Descriptive statistics and ANOVA results comparing percent school attendance treatment-matched control difference scores by sex, age, and ethnicity.

	N	Mean	Std	F	p
Females	153	1.51	10.99	2.38	ns
Males	185	3.69	14.30		
9 years old	38	0.37	8.62	1.12	ns
10 years old	109	2.40	11.39		
11 years old	61	3.87	9.85		
12 years old	34	5.16	17.74		
13 years old	53	1.14	17.13		
14 years old	34	2.25	12.60		
15 years old+	9	10.01	15.01		
Black	264	2.16	12.11	0.47	ns
Hispanic	51	4.00	14.59		
White	12	2.30	6.71		

For the treatment group, the relationships between the amount of program attendance and the outcome variables were examined. After-school attendance was reported in two ways: as the number of days attended, and as a total number of minutes attended. Only attendance prior to May 1, 2011 is included, as NYS standardized exams are given in May, and program attendance after that time cannot be construed as a potential predictor of the exam results.

The attendance variables were correlated with each of the outcome variables used in the prior analyses. These results are shown in Table 5.

Table 5. Treatment group correlations between program attendance and outcomes.

	Duration	Days
NYS ELA scale score	.06	.06
NYS Mathematics scale score	.08 ^c	.09 ^c
Percent Unexcused absences	-.18 ^a	-.18 ^a
Percent Present	.19 ^a	.19 ^a
GPA, Grades 7 & 8 only	.17 ^b	.20 ^b
NYS Science scale score, Grade 8	.25 ^c	.24 ^c

^a $p < .001$

^b $p < .01$

^c $p < .05$

Program attendance correlations with school attendance; 7th – 8th grade GPA, and 8th grade NYS Science scores, are modest but statistically significant, so that greater program attendance is positively related to outcomes. The correlation of attendance with the Mathematics score, although statistically significant, is of such a small magnitude as to render it irrelevant.

In summary, after-school program recipients were carefully matched with other students who were not enrolled in UWGR-funded programs. Comparisons of the two groups revealed that program children attended school at greater rates and had fewer unexcused absences than the matched control students, and that 7th and 8th grade GPA may be marginally greater ($p = .08$) for the program participants. We did not find school attendance gains to be a function of student sex, age, or ethnicity. We did not find statistically significant or meaningful differences in ELA, Mathematics, or Science NYS achievement test scores. Moderate positive relationships between program attendance and school attendance were found.