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Effects of an afterschool program on the academic outcomes of children and youth residing in public housing neighborhoods: A quasi-experimental study

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ABSTRACT

Afterschool programs (ASPs) designed to increase academic performance and prevent behavior problems among young people are implemented widely. Yet few evaluations that include a comparison group have been conducted to assess the effects of these preventive interventions. This is particularly true for programs located in community settings, where research infrastructure tends to be less developed than schools. This study used a quasi-experimental design with nonequivalent comparison groups to examine the effects of a community-based ASP - located in low-income and racially segregated neighborhoods - on academic performance and school behavior problems among students in grades kindergarten to 12. The ASP's ecological program model is guided by positive youth development and a public health framework that considers risk and protective factors for academic and other behavior problems. Intervention components include academic tutoring, homework help, a manualized reading curriculum, and skill building groups that aim to enhance participants' academic and social-emotional development. Youth who participated in the ASP (n = 418; mean age = 10.8 years; 52% female; 89% youth of color) had significantly higher levels of school attendance, a greater increase in independent reading level over the academic year, and lower odds of incurring a suspension or expulsion from school than youth in a comparison group (n = 226; mean age = 8.99; 49% female; 94% youth of color). Participation in the ASP was also significantly related to classroom teacher ratings of proficiency in the subject areas of math and science. These findings suggest that community-based afterschool interventions have the potential to improve academic performance and school behavior among children and youth living in public housing.

1. Introduction

Afterschool programs (ASPs) have been developed across the United States in response to research indicating that the hours following release from school constitute a high-risk period of the day for children and adolescents. For example, most arrests for juvenile crime occur between the hours of 2 pm and 6 pm when many young people are unsupervised by parents due to their employment responsibilities (Afterschool Alliance, 2017; Puzzanchera, 2014). ASPs, therefore, offer an important milieu for providing structured interventions in supervised and supportive environments to children and youth lacking supervision during this time of day. ASPs also aim to improve academic performance among youth by providing a range of educational supports to young people (Jenson et. al., 2013).

ASPs have multiple goals, including improving outcomes in school performance, promoting positive development, and preventing delinquency, substance use, and other behavioral health problems (Kremer, Maynard, Polanin, Vaughn, & Sarteschi, 2015). While diverse in their components, ASPs typically provide some combination of academic instruction, recreation, mentoring, health promotion, and social and emotional skill training. Many programs aim to increase positive social bonds with pro-social peers, parents, other adults, and program staff. Often, ASPs are offered in low income neighborhoods to enable underserved youth to access academic support services and participate in recreational enrichment activities commonly afforded to their wealthier peers (Jenson et al., 2013; Halpern, 1999).

Evidence pertaining to the effectiveness of ASPs is complicated by a host of methodological and practical factors. There are few randomized trials of ASPs in school or community settings. Instead, quasi-experimental designs in which comparisons are made between program

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participants and a sample of comparable nonparticipants have become more widely used in the past decade. However, many evaluations are still limited to assessing within-group changes in only those children and youth receiving services (Kremer et al., 2015). Additionally, many evaluative studies of ASPs suffer from high rates of attrition and sporadic attendance (Bender et al., 2011).

Complicating matters further, findings from individual investigations and meta-analyses of ASPs reveal mixed results, often depending on the quality of the intervention. For example, a longitudinal investigation of students participating in a national afterschool initiative called the *21st Century Community Learning Centers* (CCLC) revealed few or no significant effects of program participation on academic performance (Dynarski et al., 2004; James-Burdumy et al., 2005; Roth, Malone, & Brooks-Gunn, 2010). Conversely, meta-analyses of ASPs in school and community settings in the past decade conducted by Durlak, Weissberg, and Pachan (2010) and by Lauer et al. (2006) reported significant and large effects across several academic and behavior outcomes for students participating in high-quality ASPs. Findings from these two meta-analyses revealed that comprehensive ASPs offering highly-structured, sequenced and targeted interventions that utilized explicit and active learning strategies were more effective than programs with diffuse goals, haphazard or unrelated activities, or didactic teaching methods. Finally, a recent meta-analysis comprising 24 individual studies conducted by Kremer et al. (2015) found small, but non-significant, positive effects of ASPs on school attendance and externalizing behaviors.

Mixed findings from investigations of ASPs suggest a need for additional evaluative studies of high quality, theoretically-informed programs. This is particularly true for research assessing the relationship between participation in ASPs and measures of academic performance and school behavior, which arguably persist as the central developmental tasks of childhood. In the current study, we compare school attendance, school suspension rates, and academic achievement in four subject areas between youth participating in a community-based ASP located in four Denver, Colorado urban public housing neighborhoods with a convenience sample of young people residing in similar neighborhoods without structured ASPs.

1.1. Effects of ASPs on school attendance and suspensions

Participation in ASPs is positively related to school attendance in several studies. In a meta-analysis of 69 evaluative studies, Durlak et al. (2010) found a positive relationship between participation in high quality ASPs and school attendance. Likewise, Kremer et al. (2015) synthesized the effects of 16 afterschool evaluations and found a positive overall effect on school attendance. Arcaira, Vile, and Reisner (2010) compared a group of former ASP participants to a group of matched nonparticipants; former participants had significantly higher rates of school attendance in 9th, 10th, 11th, and 12th grade than did matched nonparticipants. Thus, a growing body of evidence suggests that well-designed, structured ASPs in school and community settings can positively affect participants' school attendance.

School suspension is another important academic indicator that has been linked to loss of instructional time, school dropout, and contact with the criminal justice system (Fabelo et al., 2011). Many school-based strategies have been developed to reduce suspensions and expulsions, including restorative approaches that aim to work collectively with administrators, teachers, students, and parents to problem-solve conflicts rather than exclude students from the classroom (Jenson et. al., 2013). Although no studies directly link afterschool programming to rates of suspension or expulsion among ASP participants, Durlak et al. (2010) found that participation in high-quality ASPs was associated with fewer problem behaviors, operationalized as conduct issues and disciplinary referrals. The limited number of studies in this area suggests that additional research is needed to assess the relationship between participation in ASPs and students' likelihood of suspension.

1.2. Effects of ASPs on academic achievement

Many ASPs use specific intervention components to improve students' academic performance in reading, math, science, and other subjects. Enhancing reading skills is a particularly important focus of many ASPs (Jenson et. al., 2013). Literacy training in afterschool program settings generally takes two forms. One model is to implement manualized curricula that defines learning goals and establishes protocols for participant eligibility, content, and evaluation. A second model seeks to embed literacy training in the context of other afterschool interventions.

At least two manualized literacy and reading instructional programs have been implemented and tested in afterschool settings. *Read 180*, a Scholastic, Inc. program, helps students who are reading two or more years below grade level by combining digital media with traditional classroom instruction (Hasselbring & Goin, 2004; Slavin, Cheung, Groff, & Lake, 2008). The program is delivered by trained instructors using a combination of whole-group instruction, small-group rotations, and whole-class wrap-up strategies. Two randomized trials have been conducted of the *READ 180* curricula in ASPs. Kim, Samson, Fitzgerald, and Hartry (2010) examined the effects of the program among 294 students in grades 4 to 6. Participants were randomly assigned to *READ 180* or to a routine school district ASP. Interventions in both groups were taught four days per week over 23 weeks. Participation in *READ 180* was positively associated with oral reading fluency and attendance for students in the 4th grade; no effect of the program was evident for students in grades 5 and 6. In a second study, Kim, Capotosto, Hartry, and Fitzgerald (2011) examined the effects of *Read 180* among 312 students enrolled in an ASP in a midsized urban school district. Children were randomly assigned to receive *READ 180* training or to a routine afterschool condition that did not include a structured reading program. Students who received *READ 180* performed significantly better than control group participants on measures of vocabulary and reading comprehensive. No group differences were found, however, on spelling or oral reading fluency.

A second manualized curriculum, *Read Well*, uses whole-classroom, small-group instruction, and individual student practice strategies to increase students' reading skills. A randomized trial of the *Read Well* curriculum conducted in 24 elementary schools in New Mexico and Oregon revealed significantly greater skills among *Read Well* participants than other students on measures of sight-word recognition and decodable words (Gunn, Smolkowski, & Vadasy, 2011). The intervention has been the subject of numerous single group designs and quasi-experimental evaluations comparing aggregate reading scores in cohorts of young people in time periods before and after implementation of the program (Read Well, 2017). Findings from these studies consistently reveal significant improvements in reading proficiency among participants.

Findings from meta-analyses also suggest that high-quality afterschool interventions can also enhance participants' standardized test scores in English, math, and science (Durlak et al., 2010; Lauer et al., 2006). More recently, O'Donnell and Kirkner (2014) used a comparison group to show that 10-12th graders participating in an ASP had significantly higher math and English scores than comparison students, and that a greater percentage of participating youth moved from "basic" to "proficient" or from "proficient" to "advanced" in both English and math than did comparison students. Arcaira et al. (2010) found that former participants in an ASP performed better on math and English standardized tests in high school than did matched nonparticipants. Although both groups passed these tests at similar rates, the investigators found that former ASP participants achieved "proficient" and "advanced" scores at significantly higher rates than matched nonparticipants.

1.3. Summary

Evidence pertaining to the effectiveness of ASPs in improving academic outcomes and reducing school suspensions and expulsions among children and youth is at a relatively early stage when compared to what is known about the effects of many other school- and community-based preventive and early intervention programs for young people (Jenson et. al., 2013). However, recent findings from a growing number of studies reveal significant improvements in attendance and academic achievement - particularly literacy and reading skills - among children and youth who participate in afterschool interventions. Findings appear to be most robust in programs that use manualized instructional curricula, adhere to implementation protocols, and incorporate high levels of program structure (Durlak et al., 2010; Kremer et al., 2015). Investigators have also found positive long-term effects of participation in afterschool interventions during elementary school on levels of academic achievement during high school and college (e.g., Fabiano, Pearson, & Williams, 2005).

1.4. The current study

This prospective study is an exploratory evaluation into the effects of a community-based ASP located in four public housing neighborhoods in Denver, Colorado on measures of academic performance and school behavior. Each of the four program sites is physically located in the public housing complex of their respective neighborhoods. A quasi-experimental design is used to compare school attendance, school suspension, and other academic outcomes among program participants and a convenience sample of students residing in two public housing neighborhoods without ASPs. Prior studies of the ASP have been limited to examining within-group changes in literacy skills and reading proficiency among program participants (Anthony et. al., 2009; Bender et. al., 2011; Jenson et. al., 2013). The investigation is conducted by an independent evaluation team and improves on earlier research designs by including a convenience sample of students from comparable community sites to better assess the effects of interventions offered at the program sites.

2. Method

2.1. Design and procedures

A nonequivalent comparison group design was used to compare measures of academic achievement between participants in the intervention and comparison groups. Youth in the intervention group were participants in the community-based ASP. Participants in the program were recruited from each of the four public housing neighborhoods and attended intervention activities up to four days per week during the academic year. Youth in the comparison group lived in two public housing neighborhoods not served by an ASP. Project team members and graduate students used a variety of recruitment strategies, including public events and fliers to enlist the convenience sample of comparison group participants. Parent consent and youth assent were obtained for participants in both the intervention and comparison groups. All procedures and consent and assent protocols were approved by the Institutional Review Board of the University of (redacted for peer review).

2.1.1. Intervention

Intervention activities in the program include: 1) structured literacy and reading instruction through the *Read Well* curriculum (Gunn et al., 2011); 2) individual tutoring focused on increasing participants' reading, math, science, and social science skills; and 3) *Second Step* social and emotional skill training groups (Committee for Children, 2018). These three intervention elements are part of the program's overall theory of change and recognize the importance of teaching basic literacy skills, providing individual academic support, and developing social and emotional skills as key elements in promoting academic achievement and other positive behavior at school.

Read Well is a research-based intervention program delivered to small groups of students with documented efficacy (Cambium Learning Group, n.d.). *Read Well* features mastery-based and research-validated instructional strategies, unique sound sequence, differentiated instruction with flexible pacing, and ongoing assessment and progress monitoring. Trained full-time Bridge Project program staff provide this service in person to children at each of the four sites throughout the program year. *Read Well* is delivered in 45-minute sessions three times per week.

One-to-one tutoring with students is also used by staff at the ASP to promote positive youth outcomes. One-to-one tutoring is an intervention in which children are matched with volunteer adult tutors. Once matched, students meet in person with the same tutor at least once a week, for 45 min. During this session, the children and tutors focus on reading strategies and building literacy confidence. Tutoring is offered throughout the academic year. Finally, students participate in the *Second Step* curriculum, an evidence-based, manualized social and emotional learning curriculum aimed at increasing social, cognitive, and behavioral skills (Low, Cook, Smolkowski, & Buntain-Ricklefs, 2015). *Second Step* is taught by program staff and graduate interns. It includes 10 structured sessions per academic semester that target empathy, emotion management, and social problem solving. These sessions involve role-plays, skill-building games, songs, and group discussions.

The ASP is a university-community partnership that receives financial and logistical support from the city's housing authority and the University of (redacted for peer review). Additional information and detailed descriptions of the intervention and the university-community partnership can be found in (redacted for peer review, 2013).

2.2. Sample

Participants were recruited from an ongoing ASP intervention located in the four public housing neighborhoods. A total of 644 students are included in the current analysis with 418 (64.91%) in the intervention group and 226 (35.09%) in the comparison group (see Table 1). Eligible participants included students in grades K to 12 who resided in 6 of the city's public housing neighborhoods. Students in the intervention group were participants in an ASP established in partnership with Denver Housing Authority that offers literacy training, academic support, and social and emotional learning to children and youth in

Table 1
Descriptive statistics of study sample.

	Bridge project (N = 418)		Comparison (N = 226)	
	M/N	*SD/%*	*M/N*	*SD/%*
Demographics*				
Age (in years)**	10.80	3.45	8.99	3.43
Gender				
Male	202	48.33%	116	51.33%
Female	216	51.67%	110	48.67%
Race/ethnicity**				
Black/African American	169	40.43%	79	34.96%
Caucasian/White	46	11.00%	13	5.75%
Latino/a	96	22.97%	75	33.19%
Asian/Pacific Islander	56	13.40%	8	3.54%
Multiracial/Unknown	51	12.20%	47	20.80%
Grade**	4.83	3.29	3.77	3.16
DRA2 Fall	6.53	4.89	7.70	5.41

* $p < .05$.
** $p < .01$.

four neighborhoods. Eligible comparison participants were children in grades K to 12 residing in two public housing communities not served by the Bridge Project or another ASP.

ASP program staff recruited students from four public housing neighborhoods and asked them to participate in Bridge Project intervention activities. Recruitment methods included contacts with local schools, community open houses in the neighborhood to advertise the program, and circulation of flyers in the neighborhood to public housing residents. Parents enrolled their children in the ASP on designated dates at each of the four program sites. Concurrently, graduate research assistants recruited comparison participants from two other public housing neighborhoods not served by the Bridge Project or by another ASP. They conducted in-person recruitment with parents and students at special events in each neighborhood hosted by the Denver Public Housing Authority. All potential participants received a project information sheet at the time of recruitment. Research assistants obtained parental consent first, followed by youth assent.

The characteristics of intervention and comparison group neighborhoods are similar. All neighborhoods are under the auspices of the Denver Public Housing Authority and residents in all six neighborhoods meet the same public housing income eligibility criteria. Students in the intervention group had an average age of 10.90 (SD = 3.45), which made them significantly older than those students in the comparison group (M = 9.05, SD = 3.45; $p < .01$). Reflecting the findings with age, the average grade level of participants was significantly different with students in the intervention group having a higher average grade level (M = 4.83, SD = 3.29) than the comparison group (M = 3.77, SD = 3.16; $p < .01$). The two groups also differed significantly in terms of racial composition ($p < .01$). In particular, almost twice as many Caucasian/White students were in the intervention group (11.00% vs. 5.75%), and the proportion of Asian/Pacific Islander in this group was lower in the comparison group (13.40% vs. 3.54%). However, the groups were comparable in terms of the proportion of Black or African American youth (40.43% vs. 34.96). Gender was similar between the two groups with females comprising 51.67% of the intervention group and 48.67% of the comparison students.

2.3. Measures

2.3.1. Demographics

The demographic characteristics of age, gender, race/ethnicity, and grade level were examined for all participants. Age was a continuous variable recorded in years, and gender was dichotomized as either male (1) or female (0). Race/ethnicity was measured with the five categories of Black/African American, Caucasian/White, Latino/a, Asian/Pacific Islander, and Multiracial/Unknown. The category of Black/African American included a substantial number of immigrant youth from Africa, and since Black/African American was the largest race/ethnicity category, it served as the reference group in all analyses. Grade level was a continuous measure that corresponded to a youth's numeric grade (range = 0 to 12), and those youths in kindergarten were identified with a value of zero. The group variable indicated ASP participation (1 = intervention group; 0 = comparison group).

2.3.2. Developmental reading assessment

The *Developmental Reading Assessment, 2nd Edition* (DRA2) is a diagnostic tool to assess a youth's independent reading level and can be used with youth in kindergarten through eighth grade (redacted for peer review, 2014). The DRA2 allows teachers to observe how a youth is progressing in her or his ability to understand and use a variety of different types of spoken and written words. Within the public-school system in this study, the DRA2 was administered on a semi-annual basis, once in the fall semester and once in the spring semester to track change in a youth's reading ability over the academic year. To determine an overall performance level on the DRA2, a student's score on oral reading fluency and comprehension/printed language are combined to create an overall performance level. There are 19 rating levels of overall performance (A, 1, 2, 3, 4, 6, 8, 10, 12, 14, 15, 18, 20, 24, 28, 30, 34, 38, and 40), with each level from A to 40 indicating improvement in overall performance. However, the values of the DRA2 overall performance score are not a ratio measurement (where a score of 10 is twice is as much as a score of 20), thus each overall performance score was converted into a rating level with a value between 1 and 19. A DRA2 difference score of this rating level was then computed by subtracting the spring semester rating level from the fall semester rating level. DRA2 tests were administered by classroom teachers to all students in ASP and comparison groups. Teachers were blinded to group membership.

2.3.3. Attendance

School attendance records for participants in both the intervention and comparison groups were obtained from the local public-school system. Attendance was a measure of the proportion of minutes attended by each youth divided by the total minutes enrolled in the school system within the academic year. Attendance was only measured in the spring semester.

2.3.4. Course proficiency

Teachers rated students at the end of the academic year as either advanced, proficient, partially proficient, or unsatisfactory at their grade level within the subject areas of reading, math, science, and social science. Preliminary analyses with ordered logistic regression using all four levels of proficiency failed to meet the assumption for proportional odds, so the course proficiency variable was collapsed into two dichotomous categories (1 = proficient; 0 = not proficient). The first category of proficient included the values of advanced and proficient, and the second category of not proficient contained those youths indicated as partially proficient and unsatisfactory.

2.3.5. Suspension/expulsion

Suspension and expulsion records for youth in both conditions were provided by the public-school system at the end of the academic year. A dichotomous measure (1 = yes; 0 = no) indicating that a youth received, or did not receive, a suspension or expulsion from school throughout the academic year was used in the current analysis.

2.4. Analysis plan

All variables were tested for the assumptions of normality, multicollinearity, and homoscedasticity prior to the fitting of multivariate models. Attendance failed to meet the assumption of normality with high negative skewness and high kurtosis. A transformation of the attendance variable following the recommendation by Tabachnick and Fidell (2013) of reflection and then computing the logarithm was undertaken. However, the transformed variable of attendance still failed normality. Next, outliers were checked for with a standardized score of > 3.29 (Tabachnick & Fidell, 2013), and 13 cases were identified with attendance values < 0.61. With the exclusion of the outlier values, attendance met the assumption of normality based on the criteria identified by Curran, West, and Finch (1996). Multicollinearity was also an issue between the demographic variables of age and grade level with variance inflation factor values > 8, thus all multivariate models excluded the variable of age. Homoscedasticity was also violated as evidenced by a significant Cook-Weisberg test, thus, to help to correct for this issue, HC3 robust standard errors were used in the linear regression models (Long & Ervin, 2000).

Missing data exceeded 50% on the outcome variables of DRA2, reading proficiency, math proficiency, science proficiency, and social science proficiency. This proportion of missing data exceeds the recommended threshold of 40% to reliably conduct multiple imputation (Jakobsen, Gluud, Wetterslev, & Winkel, 2017). Therefore, a complete case analysis was conducted for all outcome measures with the

understanding that the results are exploratory and can only be used to generate hypotheses to test in future studies with a lower proportion of missing data on the available outcome measures (Jakobsen et al., 2017).

The outcome measures of DRA2, attendance, reading proficiency, math proficiency, science proficiency, social science proficiency, and suspension/expulsion are the complete list of outcomes available for this evaluation. Analysis of the outcome measures began with bivariate models of either an independent samples *t*-test or chi-square (not reported herein). These unadjusted models indicated significant differences in attendance, DRA2 difference scores, and suspension and expulsion between the intervention and the comparison group. To learn more about these relationships and to control for possible confounding variables on each outcome measure, multivariate regression models were fitted separately for each outcome. Multiple linear regression models, with HC3 robust standard errors, were fitted for the continuous outcomes of attendance and DRA2 difference scores. For regression models with the outcome of attendance, sensitivity analysis was run to test for the effect on the model with outliers included and excluded. The results of the model were unchanged so the model with outliers is reported. Multiple logistic regression models were fitted for the categorical outcomes of reading proficiency, math proficiency, science proficiency, social science proficiency, and suspensions/expulsion. All models included the covariates of grade, gender, race, and group. The five-level categorical variable of race was dummy coded for multivariate regression analysis with the category Black/African-American as the reference group.

3. Results

3.1. Linear regression models

3.1.1. DRA2 difference scores

Involvement in the ASP was significantly related to higher DRA2 difference scores ($\beta = 0.31$, $p < .01$). Participation in the ASP had a small effect on DRA2 difference scores ($\eta^2 = 0.07$ [0.02, 0.14]). A youth's grade was also significantly associated with DRA2 difference score; youth in higher grades generally had a lower DRA2 difference score ($\beta = -0.69$, $p < .01$).

3.1.2. Attendance

Participation in the ASP showed a significant and positive association with a higher proportion of attended minutes ($\beta = 0.21$, $p < .01$). However, the effect of APS programming on attendance was small ($\eta^2 = 0.03$ [0.01, 0.07]). Grade was significantly and negatively associated with attendance, meaning an increase in a youth's grade level was related to a lower proportion of attended minutes throughout the academic year ($\beta = -0.16$, $p < .01$). Youth who identified as Asian had significantly higher attendance ($\beta = 0.08$, $p < .001$) than their Black/African-American peers. In contrast, Latino/a ($\beta = -0.10$, $p < .05$) and Multiracial/Other ($\beta = -0.16$, $p < .05$) youth had a lower proportion of attended minutes compared to Black/African-American youth.

3.2. Logistic regression models

3.2.1. Reading proficiency

Teacher ratings of reading proficiency did not differ by intervention or comparison group conditions (odds ratio [OR] = 1.30 [0.79, 2.14], $p = .30$). However, grade was significantly associated with teacher-rated reading proficiency; for every-one grade increase, the odds of reading proficiency went down 15% (OR = 0.85, $p < .05$). Youth who identified as male had a lower odds ratio (OR = 0.58, $p < .05$) to be rated by their teacher as proficient in reading.

3.2.2. Math proficiency

Intervention group participants had a greater likelihood (OR = 1.75 [1.06, 2.87], $p < .05$) of being rated proficient by teachers in math than youth in the comparison group, indicating a medium effect. Grade demonstrated a significant relationship to teacher-rated math proficiency; for every-one grade increase, the odds of proficiency in math decreased by 20% (OR = 0.80, $p < .01$). Youth who identified as Asian had a higher odds ratio (OR = 3.59, $p < .05$) to be rated as proficient in math than their Black/African-American peers in the study.

3.2.3. Science proficiency

Like the findings for math proficiency, the odds of proficiency in science were significantly related to both grade and participation in ASP programming. Involvement in the ASP significantly increased the odds to be rated as proficient in science (OR = 2.12 [1.22, 3.69], $p < .01$), indicating a large effect. With each one grade increase, the odds of proficiency in science decreased by 28% (OR = 0.72, $p < .01$).

3.2.4. Social science proficiency

Grade was the only predictor significantly associated with proficiency in social science. Each one grade increase was related to a 37% decrease in the odds of being rated as proficient in social science (OR = 0.63, $p < .01$). Social science proficiency did not differ by study group (OR = 1.44 [0.81, 2.53], $p = .21$) (Table 2).

3.2.5. Suspension/expulsion

Youth in the ASP program were found to have a significantly lower odds ratio to have a suspension/expulsion relative to the comparison group participants (OR = 0.38, [0.21, 0.67], $p < .01$), indicating a large effect. Grade was significantly related to the odds of a youth incurring a suspension/expulsion in the academic year. For every-one grade increase, the odds of a suspension/expulsion increased 23% (OR = 1.23, $p < .01$). Males had a significantly higher odds ratio to incur a suspension/expulsion (OR = 2.73; $p < .05$).

4. Discussion

A quasi-experimental, exploratory design was used to compare measures of school attendance, reading skills, teacher ratings of subject matter proficiency, and school suspensions and expulsions between youth enrolled in a structured ASP in four public housing neighborhoods and a convenience of young people living in public housing neighborhoods not served by a structured ASP. Findings from this study add to what is a very mixed evidentiary base regarding the effectiveness of ASPs for children and youth living in high-risk neighborhoods.

Youth who participated in the community-based ASP had significantly higher rates of school attendance than young people in the comparison group. This finding is consistent with several other investigations (e.g., Arcaira et al., 2010) and points to the important role that ASPs can play in building commitment to and involvement in school. Staff in the ASP evaluated in this study are trained to reinforce the importance of attendance and participation in school activities through program components of tutoring, homework help, and social and emotional skill training. Staff also communicate regularly with participants' school administrators and teachers about student progress and challenges, including attendance patterns. Differences in school attendance favoring youth in the intervention group may reflect these ASP strategies.

Literacy training is a key intervention component in the ASP examined in this study. Efforts to increase reading skills include instruction through the manualized *Read Well* curricula, one-on-one tutoring, and homework help. Students in the intervention group displayed significantly greater increases in reading skills over the academic school year as measured by the DRA2 inventory compared to students in the comparison group. These results are consistent with our prior evaluations, which find significant improvements in literacy and reading

Table 2
Effects of bridge project/ASP participation on attendance, academic achievement, and suspension/expulsion.

	Linear regression models		Logistic regression models				
	DRA2 difference coefficient [95% CI]	Attendance coefficient [95% CI]	Reading proficiency odds ratio [95% CI]	Math proficiency odds ratio [95% CI]	Science proficiency odds ratio [95% CI]	Social science proficiency odds ratio [95% CI]	Suspension/ expulsion odds ratio [95% CI]
Bridge/ASP participation	0.31** [0.16, 0.45]	0.21** [0.12, 0.30]	1.30 [0.79, 2.14]	1.75* [1.06, 2.87]	2.12** [1.22, 3.69]	1.44 [0.81, 2.53]	0.38** [0.21, 0.67]
Grade	−0.69** [−0.99, −0.39]	−0.16** [−0.24, −0.07]	0.85* [0.74, 0.97]	0.80** [0.70, 0.92]	0.72** [0.61, 0.84]	0.63** [0.53, 0.75]	1.23** [1.13, 1.33]
Gender	−0.08 [−0.20, 0.04]	−0.05 [−0.12, 0.03]	0.58* [0.36, 0.93]	0.68 [0.42, 1.09]	0.80 [0.50, 1.37]	0.87 [0.50, 1.48]	2.73** [1.52, 4.90]
Caucasian/White	−0.01 [−0.14, 0.12]	−0.04 [−0.19, −0.02]	0.93 [0.39, 2.58]	0.85 [0.35, 2.07]	0.52 [0.20, 1.32]	0.98 [0.36, 2.65]	0.77 [0.25, 2.37]
Latino/a	0.03 [−0.09, 0.16]	−0.10* [−0.19, −0.02]	1.01 [0.57, 1.81]	1.01 [0.57, 1.80]	0.73 [0.39, 1.36]	1.13 [0.60, 2.14]	0.80 [0.40, 1.58]
Asian	0.03 [−0.11, 0.15]	0.08** [0.03, 0.12]	2.08 [0.73, 5.90]	3.59* [1.24, 10.41]	4.77 [0.98, 23.21]	3.04 [0.77, 12.02]	0.16 [0.02, 1.22]
Multiracial/other	−0.003 [−0.15, 0.15]	−0.16** [−0.26, −0.07]	1.72 [0.93, 3.16]	1.51 [0.77, 2.95]	1.07 [0.50, 2.31]	1.13 [0.51, 2.53]	1.32 [0.61, 2.85]
DRA fall	−0.16* [−0.32, −0.01]						
Analysis sample size	Bridge = 142 Non-ASP = 92	Bridge = 418 Non-ASP = 221	Bridge = 173 Non-ASP = 126	Bridge = 182 Non-ASP = 127	Bridge = 178 Non-ASP = 124	Bridge = 159 Non-ASP = 118	Bridge = 418 Non-ASP = 221

Note. For attendance and DRA2 difference scores, standardized coefficients (β) from linear regression are presented. For all other outcome variables, odds ratios from logistic regression are presented. CI = confidence intervals.

* $p < .05$.

** $p < .01$.

outcomes for program participants (e.g., Anthony, Alter, & Jenson, 2009, Bender et. al.,2011, Jenson et. al., 2013). Furthermore, they extend the body of evidence for ASP participants and suggest that changes in reading proficiency experienced by participants are greater than those experienced by a convenience sample of their peers who are not exposed to extensive literacy training during the after-school hours.

ASP participants were significantly less likely than youth in the nonequivalent comparison group to receive a suspension or expulsion from school during the academic year. Suspensions and expulsions cause considerable disruption in individual learning and academic progress (Fabelo et al., 2011). They have been linked to a harmful trajectory called “the school to prison pipeline” that has gained much attention from policy makers and advocates in recent years (Anyon et al., 2016). Furthermore, studies indicate that children of color are suspended or expelled from school at significantly higher rates than their Caucasian/White counterparts, even when a variety of confounds like student behavior are considered (e.g., Jenson & Bender 2014, Anyon et. al., 2014). Youth in the current study were predominately students of color, suggesting they may have been at elevated risk for suspensions or expulsions. The positive effect of participation in the ASP on attendance suggests that AFPs may be a promising, yet largely untapped, strategy for reducing suspensions. Additional studies of the relationship between ASP participation and school suspensions or expulsions are needed to help explain this relationship.

Finally, significant effects of ASP participation on teacher ratings of proficiency were found in math and science. Program participation was not associated with ratings of proficiency in reading or social science. Teacher ratings are conducted in the school district at the end of each academic year. As such, they are very broad indicators of a student's skill and performance. Moreover, they are subjective and based on teacher perception. Additional measures of school performance such as standardized test scores may be more objective measures of academic achievement and should be explored in the future. That said, it is encouraging that intervention group participants out-performed their counterparts in the comparison group on the less subjective DRA2 assessment.

4.1. Limitations

Several study limitations should be noted. There were several baseline differences between the intervention and comparison groups despite efforts to balance the two groups through the intentional recruitment of students living in public housing neighborhoods without ASPs. Recruiting participants from within the same public housing units may have minimized baseline differences but this was not feasible based on the program's mission to serve all children in each of the program neighborhoods. In addition, the degree to which comparison group students received literacy training or other ASP intervention components is unknown. This concern, however, is tempered by the fact that most students in the intervention and comparison groups attended the same public schools and received similar educational experiences.

The lack of fall semester measures for attendance, course proficiency, and suspension/expulsion in the available administrative data is a further limitation to the current findings. Without a control variable to account for a baseline measure of the outcomes in each of the models, outside of the DRA2 model, it is impossible to know whether the current findings were a product of existing differences present at the start of the study and not the result of the intervention.

The large proportion of missing data for the outcomes of DRA2 and course proficiency substantially limits what can be drawn from this study. Given that > 50% of cases were missing data on these outcome measures, all results should be considered as only generating hypotheses that must be thoroughly investigated in future studies with better available outcome data for analysis (Jakobsen et al., 2017). Finally, the use of a convenience sample in the comparison group creates the possibility of a selection bias and threatens the internal validity of the study. Furthermore, participants in the ASP may be more motivated to improve their academic performance than comparison group students as evidenced by their enrollment in services during the hours following release from school.

5. Conclusion

Afterschool intervention is a promising approach to increasing literacy skills and improving key school outcomes for young people. ASPs like the current program that prioritize children and youth in high-risk and poor neighborhoods should be part of a comprehensive strategy to increase academic achievement and improve young people's behavior at school and in the community. Findings from this study add to existing knowledge of the effectiveness of ASPs and point to the need for additional research that explores the mechanisms behind these trends.

Conflict of interest

The authors have no conflicts of interest regarding the study presented here.

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