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Effectiveness Evaluation of *It's Your Game: Keep It Real*, a Middle School HIV/Sexually Transmitted Infection/Pregnancy Prevention Program

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A B S T R A C T

Purpose: This study assessed the effectiveness of the HIV/sexually transmitted infection/pregnancy prevention program, *It's Your Game: Keep It Real (IYG).*
Methods: IYG was implemented by classroom teachers in 24 urban middle schools from 2012 to 2015. Using a quasi-experimental design, each year we surveyed ninth-grade students in 10 high schools that were selected based on feeder patterns from project middle schools. We compared two groups of students (n = 4,562): (1) students whose middle school grade cohorts did not receive *IYG* ("No-*IYG*"), and (2) students whose middle school grade cohorts received *IYG* ("*IYG*"). Multilevel analyses examined differences between the two groups in the initiation of any type of sexual activity (oral, vaginal, or anal sex), presexual behaviors, and psychosocial mediators.
Results: Students in the *IYG* group were less likely to report initiation of sexual activity by ninth grade compared to students in the No-*IYG* group (odds ratio .77; 95% confidence interval .66−.90). The *IYG* group was significantly less likely to have engaged in presexual behaviors, including having been on a date, had a boyfriend/girlfriend, and touched or been touched on private body parts. The *IYG* group had better outcomes on 11 of 19 psychosocial variables, including knowledge; beliefs about abstinence, sex, friends' beliefs, norms, and behaviors; reasons for not having sex; personal limits; exposure to risky situations; self-efficacy; and quality of dating relationships.
Conclusions: The results suggest that *IYG*, when implemented on a large scale by trained classroom teachers in urban public schools, had positive impacts on students' behaviors, beliefs, and knowledge.
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IMPLICATIONS AND CONTRIBUTION

Using a quasi-experimental design, this study replicated the *It's Your Game: Keep It Real* program and evaluated its effectiveness when implemented by trained teachers in urban public middle schools. Findings suggest that broader dissemination and implementation of the program may be warranted, and additional replications should be conducted.

Births among girls in the United States aged 15–19 years have declined by > 40% within the past decade, yet disparities in birth rates by racial and ethnic group remain a persistent challenge [1]. In 2014, the rates of live births per 1,000 Hispanic and black teens (38.0 and 34.9, respectively) were twice as high as that for non-Hispanic whites (17.3). Further, minority youth are at increased risk for sexually transmitted infections (STIs). In 2016, the rate of chlamydia cases among black women aged 15–19 years was 4.5 times than among white women in the same age group (6,485 and 1,433 cases per 100,000, respectively) [2]. These data point to the ongoing need for effective teen pregnancy and STI prevention interventions, particularly among minority youth.

Considerable research has been devoted to determining the most effective teen pregnancy prevention approaches. Comprehensive risk-reduction interventions have produced favorable effects on initiation of sex and risky sexual behaviors, but their effects on STIs and pregnancy outcomes have been inconsistent [3,4]. One recent systematic review resulted in a list of 28 program models with evidence of effectiveness [5]. In addition, two key gaps in the teen pregnancy prevention literature were identified: the lack of replication studies and the need for more research on Hispanic/Latino adolescents and other high-risk populations.

The majority of teen pregnancy prevention studies have been small-scale efficacy trials that aim to establish proof of concept [6]. Much less common are effectiveness studies that examine whether program impacts generalize to target population groups when implemented under more "real-world" conditions. In order to better position prevention science to help prevent unintended teen pregnancies and STIs, more replications of prevention interventions are needed [5,7].

The initiation of the teen pregnancy prevention (TPP) program in the Office of Adolescent Health of the U.S. Department of Health and Human Services provided a significant opportunity to study replications of evidence-based pregnancy prevention programs. In the first cohort of TPP grants (2011–2015), replications of 23 different program models were evaluated [8], including the middle school-based HIV/STI/teen pregnancy prevention program _It's Your Game: Keep It Real (IYG),_ [9–11]. Prior to the TPP program, two randomized efficacy trials of _IYG_, conducted by the program developers, demonstrated a delay in the onset of sexual behavior among ninth-grade students in urban Texas after they received the program in seventh and eighth grades [10,11]. The program was implemented in a sample of 15 and 10 schools, respectively, by facilitators hired and trained by the investigators. A subsequent study showed that the majority of psychosocial mediators targeted by the intervention were related to the desired behavioral outcomes [9].

One replication of _IYG_ supported by the TPP program was conducted by independent evaluators in 24 middle schools in rural South Carolina. Delivered by trained teachers or school staff members (e.g., nurse or counselor), the program showed no effect on the rate of sexual initiation at the end of eighth grade [12]. However, modest effects on psychosocial mediators were found.

The present paper describes findings from a second replication, in which we used a quasi-experimental design to evaluate the effectiveness of _IYG_ when implemented by trained classroom teachers in 24 urban public middle schools in Los Angeles County, California.

Methods

Study design and school selection

The target population for the program was youth attending middle schools in areas of Los Angeles County with teenage birth rates that surpassed the mean county rate by at least 20% in 2008. Within two school districts that agreed to participate in the project, we targeted 10 high schools located in areas with elevated teen birth rates. Students enrolled in these schools were primarily from low socioeconomic status families, with the percentage of students qualifying for free or reduced-price lunch ranging from 70.5% to 89.3% [13].

We recruited 24 middle schools that comprised the largest sources of enrollment for the target high schools. The _IYG_ intervention was delivered to students in the participating middle schools over three academic years (2011–2012 to 2013–2014).

Using a quasi-experimental cohort design, sometimes referred to as an "institutional cycles design" [14], we measured program outcomes among four cohorts of ninth-grade students enrolled in the target high schools (Figure 1). The first two cohorts comprised the comparison group ("No-_IYG_"). Students in these cohorts were assessed in spring of 2012 and 2013, respectively, and had not received the _IYG_ intervention during middle school (due to initiation of program implementation after they attended eighth grade). The second two cohorts, assessed in the same high schools in spring of 2014 and 2015, respectively, had received the intervention during grades 7 and 8 in the project middle schools; thus, they comprised the intervention (_IYG_) group. Within each high school, approximately 10 classes of ninth-grade students enrolled in a required subject were randomly selected to participate in the outcome survey.

Intervention

IYG is a 24-lesson HIV/STI/teen pregnancy prevention curriculum that uses a life skill decision-making paradigm, is grounded in social cognitive and social influence theories [15–17], and is designed to be implemented over a 2-year period (seventh and eighth grades). The program is highly interactive, combining classroom-based activities (e.g., movie acting, role plays, and group discussion) with individual journaling and tailored computer-based activities [11].

We recruited 144 science, health, or physical education teachers to deliver the _IYG_ curriculum. Our goal was to implement the program school-wide; that is, to reach all students enrolled in participating middle schools during seventh and eighth grades.

Year	2012	2013	2014	2015
No-IYG Group	O (9th Grade)			
		O (9th Grade)		
IYG Group	X (7th Grade)	X (8th Grade)	O (9th Grade)	
		X (7th Grade)	X (8th Grade)	O (9th Grade)

Figure 1. Study design. _It's Your Game: Keep It Real_ (_IYG_) intervention began in feeder middle schools in 2012. O = behavioral survey administered; X = intervention.

Teachers delivered *IYG* lessons during regular classroom periods in the fall or spring semester, depending on the needs of the school. We adapted the program such that 18 of the lessons were delivered in seventh grade and six lessons were delivered in eighth grade. Prior to program delivery, teachers participated in a 3-day training conducted by curriculum developers. A project staff member was assigned to each school to support implementation of computer-based lessons and provide other technical assistance as needed.

Survey participants

All students in the selected ninth-grade classes were invited to participate in the outcome survey. We used an implied parental consent procedure in which students were assumed to have consent if their parents did not return a signed form declining the youth's participation. Students were free to decline assent at any time.

Enrollment in the target classes numbered 9,641 students, for whom 274 parents (2.8%) declined consent and 318 students (3.3%) declined assent. On the day of data collection, 1,975 students (20.0%) were absent, and another 103 were not surveyed for other reasons (Spanish-speaking only, special education, etc.), resulting in the collection of 6,971 surveys (72.3% of all students enrolled). The analysis sample was restricted to those who reported being in ninth grade (n = 6,399; 91.7% of all surveys). Also excluded from the analysis were students who reported a race/ethnicity other than Hispanic/Latino or black/African-American (n = 235, 3.7%), an age below 13 or above 16 (n = 392, 6.1%), or attendance at a nonparticipating middle school during seventh and eighth grades (n =1,343, 21.0%). The final sample included 4,562 youths.

Data collection

Implementation evaluation. Teachers (n = 144) submitted implementation logs that assessed the proportion of lessons they delivered fully (i.e., all activities were implemented). Also, they provided data on the proportion of enrolled students in attendance at each program session. These data were aggregated at the school level and divided by enrollment data [13] to estimate program reach. Observations, conducted by trained program staff, assessed the quality of implementation of 2% of the total lessons delivered across the 3-year program period.

Student survey. Students completed the survey during one regular class session, for which they received a $5 gift card. The survey was administered by trained project staff via audio-enhanced, computer-assisted self-interviewing software on netbook computers with privacy screens. Students had the option to listen to a reading of each question in English over headphones. All responses were anonymous. The study procedures were approved by the Institutional Review Boards of the University of Southern California and the Los Angeles County Department of Public Health.

Measures

Survey items were drawn from previous evaluations of *IYG* [9–11].

Participant characteristics. Participants were asked their age, grade in school, gender, and race/ethnicity (Native American/Alaska Native, Asian, black/African-American, Hispanic/Latino, Native Hawaiian/ other Pacific Islander, white, and/or other). Students who identified as black/African-American, whether alone or in combination with another race/ethnicity, were coded as African-American. Similarly, students who identified as Hispanic/Latino, whether alone or in combination with another response (except for black/African-American), were coded as Hispanic/Latino. Other measures included whether students lived with both parents, had ever lived in a group or foster home, and what language they spoke at home.

We provided a list of feeder middle schools and asked subjects to indicate which school they attended during grades 7 and 8 (one school per grade). In data analyses, we included only those subjects that reported attending a project middle school in both seventh and eighth grade. Those students in the 2012 and 2013 cohorts were designated as the "No-*IYG*" group and those in the 2014 and 2015 cohorts were designated as the "*IYG*" group.

As a validation measure, we asked students whether they had participated in IYG lessons in seventh or eighth grade (yes/no/not sure).

Primary outcome measures

Lifetime sexual behaviors. Participants were asked if they had ever engaged in oral sex (performed or received), vaginal intercourse, or anal intercourse (three items; all with yes/no response option). Questions described the behaviors using anatomical labels (e.g., "By anal sex we mean when a male puts his penis in his partner's anus (that is, their butt)"). A binary composite "any sex" variable was created to indicate experience with one or more of these three types of sex.

Secondary outcome measures

Recent sexual behaviors. Three items assessed whether participants had engaged in oral, vaginal, or anal sex in the past 3 months (yes/no response option for each), and the binary "recent sex" variable indicated experience with one or more of these behaviors. Other measures included condom use at last vaginal or anal sex (two items; yes/no) and whether the subject had vaginal or anal sex without the use of condoms in the past 3 months (two items; yes/no).

Presexual behaviors. Subjects were asked whether they had ever gone alone on a date (one item), ever had a boyfriend or girlfriend (one item), or ever touched someone's private parts or had their own private parts touched (two items); all items had a yes/no response option [18].

Psychosocial measures. The survey included 18 measures of psychosocial mediators [9]. Table 1 presents sample items, the response format, and coefficient alpha for each construct. For heuristic purposes, we organized the constructs into three categories: information regarding risk, motivation to change risk behaviors, and behavioral skills, consistent with the information-motivation-behavior skills model of sexual risk behaviors [19].

Analysis approach

We used *t* tests and chi-square tests were used to compare demographic, primary, and secondary outcome measures between the *IYG* and No-*IYG* groups. Hierarchical models were used to properly account for the within-school clustering of students [20–22]. All statistical analyses were performed using the "mixed" or "melogit" procedures in Stata [23] for continuous and dichotomous outcomes, respectively.

Differences between the groups in means for continuous outcomes and odds ratios for dichotomous outcomes were calculated

Table 1
Psychosocial outcomes: scales and indexes with basic psychometric properties

Construct	No. of items	Example item	Response format	α
Information				
HIV/STI knowledge	11	You cannot get an STI from having oral sex.	True, false, not sure; % correct	NA
Condom knowledge	6	Do condoms help a person keep from getting HIV, the virus that causes AIDS?	True/yes, false/no, not sure; % correct	NA
Motivation				
Goals and plans for future	3	I have goals and plans for the future.	4-point scale; not at all true (0), very much true (3)	.72
Beliefs about the importance of abstinence	3	Having sex at my age makes life more difficult.	4-point scale; SD (0), SA (3)	.83
Beliefs about the importance of condom use	3	I believe condoms should always be used if a person of my age has sex.	4-point scale; SD (0), SA (3)	.86
Reasons for not having sex	10	Here are some reasons teens may choose to NOT have sex. Why would you choose NOT to have sex at your age? Example response: I am too young.	Yes (1), no (0); count of yes responses	NA
Perceived parents' beliefs about delaying teen sex	3	My parent(s) believe people of my age should wait until they are older before they have sex.	4-point scale; SD (0), SA (3)	.56
Perceived friends' acceptability of teen sex	4	Most of my friends believe people of my age should wait until they are older before they have sex.	4-point scale; SD (0), SA (3)	.78
Perceived prevalence of friends' sexual behavior	4	How many of your friends have had sexual intercourse?	5-point scale; none (0), all (4)	.76
Perceived prevalence of teen sexual behavior	1	Most teens of my age are having sex.	4-point scale; SD (0), SA (3)	NA
Personal acceptability of teen sex	4	I believe it is ok for people of my age to have sex with a serious boyfriend or girlfriend.	4-point scale; SD (0), SA (3)	.76
Behavioral skills				
Personal limits for sexual behavior	4	I have personal rules or limits about which of the following behaviors. Example response: Not to have sex now.	Yes (1), no (0); no. of yes responses	NA
Self-efficacy to refuse sex	6	Imagine you are alone with someone you like very much. Could you stop them if they wanted to kiss you on the lips, but you did not want them to?	4-point scale; I definitely could not (0), I definitely could (3)	.90
Self-efficacy to obtain reproductive health care	6	If I wanted to get birth control (like pills, shots, or the patch for myself or my partner) I know where I could go to get it.	4-point scale; SD (0), SA (3)	.72
Condom self-efficacy	6	I could get condoms if I wanted to.	4-point scale; SD (0), SA (3)	.79
Quality of friendships	4	My best or closest friend and I can count on each other to keep promises.	5-point scale; not at all true (0), really true (4)	.88
Quality of dating relationships[a,b]	4	My boyfriend or girlfriend and I can count on each other to keep promises.	4-point scale; not at all true (0), very much true (3)	NA
Exposure to risky situations[c]	6	In the past 3 months, how often have you gone to a party where alcohol was being used?	4-point scale; never (0), 6 or more times (3)	NA

NA = not applicable; SA = strongly agree; SD = strongly disagree; STI = sexually transmitted infection.
[a] Asked of those who currently have a boyfriend or girlfriend.
[b] Items were averaged; mean was transformed into binary measure (low quality ≤ 3; high quality = 3).
[c] Items were transformed into binary measure (exposure to none of the six situations = 0; exposure to any of the 6 = 1).

after adjusting for other covariates. All models controlled for gender, age, race/ethnicity (black/African-American or Hispanic/Latino), language spoken at home (English or other), ever been in foster care, and currently living in a two-parent household. Covariate selection was guided by previous research on correlates of adolescent sexual risk behaviors [24–29].

Analyses were conducted on the set of records with no missing outcome or covariate data for that model. A low proportion (0%–5%) of records was missing, which is within the tolerance range to maintain valid statistical inferences when eliminating cases with missing values in data analyses [30].

Results

Implementation evaluation

Based on attendance data, we estimate a mean reach of 86.1% of the seventh- and eighth-grade students (n = 50,766) enrolled in the participating schools across 3 years of program implementation. On average, teachers reported completing delivery of 91% of the intended program lessons. On a scale ranging from 1 = poor to

5 = excellent, observers rated the average quality of implementation as 4.25.

Characteristics of student sample

There were no significant differences between the IYG and No-IYG groups in gender, whether English was spoken at home, whether the subject lived in a two-parent household, and the subject's history of living in a foster or group home (Table 2). Students in the IYG group (mean age of 15.0 years, SD = .38) were statistically significantly younger than students in the No-IYG group (mean age of 15.1 years, SD = .37; $p < .0001$); however, the difference of .1 year translates to a 1.2-month difference in average age, which is probably not clinically significant. There was a smaller proportion of African-American students in the IYG group compared to No-IYG group ($p = .04$).

Behavioral outcomes

Table 3 shows differences in the primary and secondary sexual behavioral outcomes between the IYG and No-IYG groups. The IYG group had significantly lower odds of reporting having had any

Table 2
Participant demographics by *IYG* group membership

	No-*IYG* group		*IYG* group	
Measure	n	% or mean (SD)	n	% or mean (SD)
Sex				
Male	1,142	50.5	1,171	50.9
Female	1,119	49.5	1,130	49.1
Ethnicity*				
Hispanic/Latino	2,028	89.7	2,105	91.5
African-American	233	10.3	196	8.5
Mean age***	2,261	15.1 (.37)	2,301	15.0 (.38)
Speaks English at home				
No	418	18.5	392	17.0
Yes	1,843	81.5	1,908	83.0
Two-parent household				
No	658	29.3	638	27.9
Yes	1,591	70.7	1,652	72.1
Ever been in foster care/a group home				
No	2,163	95.8	2,220	96.6
Yes	94	4.2	78	3.4

Total N = 4,562. Totals for individual variables vary due to missing values.
*$p < .05$; ***$p < .001$.
IYG = *It's Your Game: Keep It Real*; SD = standard deviation.

type of sex (adjusted odds ratio [AOR] .77; 95% confidence interval [CI] .66, .90), oral sex (AOR .81; 95% CI .68, .97), and vaginal sex (AOR .75; 95% CI .63, .89) compared to the No-*IYG* group. The difference between the two groups in lifetime anal sex was not statistically significant.

Compared to the No-*IYG* group, the *IYG* group was less likely to report having any sex (AOR .77; 95% CI .63, .95), oral sex (AOR .75; 95% CI .59, .96), and vaginal sex (AOR .73; 95% CI .59, .92) in the

past 3 months. The *IYG* group was more likely to report using a condom at last anal sex (AOR 1.86; 95% CI 1.07, 3.25). There were no statistically significant differences between the two groups in the prevalence of having unprotected vaginal or anal sex in the past 3 months or condom use at last vaginal sex.

The *IYG* group was less likely to report lifetime presexual behaviors, including being alone on a date (AOR .85; 95% CI .75, .95), having a boyfriend or girlfriend (AOR .80; 95% CI .69, .94), and

Table 3
Behavioral outcomes by *IYG* group membership

					Multilevel regression estimate			
	No-*IYG*		*IYG*		Unadjusted		Adjusted[a]	
Outcome	n	% yes	n	% yes	UOR	(95% CI)	AOR	(95% CI)
Lifetime sexual behaviors								
Ever had any type of sex	479	21.2	387	16.8	.75***	(.65, .87)	.77***	(.66, .90)
Ever had oral sex	329	14.6	271	11.8	.78**	(.66, .93)	.81*	(.68, .97)
Ever had vaginal sex	386	17.1	299	13.1	.73***	(.62, .86)	.75***	(.63, .89)
Ever had anal sex	124	5.5	102	4.4	.80	(.61, 1.04)	.82	(.63, 1.08)
Recent sexual behaviors								
Sex in past 3 months[b]	240	10.7	189	8.2	.75**	(.61, .92)	.77*	(.63, .95)
Oral sex in past 3 months[c]	156	6.9	118	5.1	.73*	(.57, .93)	.75*	(.59, .96)
Vaginal sex in past 3 months[d]	205	9.1	152	6.6	.71**	(.57, .88)	.73**	(.59, .92)
Anal sex in past 3 months[e]	51	2.3	37	1.6	.71	(.46, 1.08)	.73	(.47, 1.12)
Condom/contraceptive use								
Condom use at last vaginal sex	280	73.7	215	71.9	.91	(.65, 1.28)	.93	(.66, 1.31)
Unprotected vaginal sex in past 3 months[f]	93	4.1	79	3.5	.83	(.61, 1.13)	.85	(.62, 1.15)
Condom use at last anal sex	59	48.0	65	63.7	1.91*	(1.11, 3.26)	1.86*	(1.07, 3.25)
Unprotected anal sex in past 3 months[g]	29	1.3	18	.8	.60	(.33, 1.09)	.62	(.34, 1.12)
Lifetime presexual behaviors								
Ever been alone on a date	1,303	58.0	1,237	54.0	.85**	(.76, .96)	.85**	(.75, .95)
Ever had a boyfriend or girlfriend	1,890	84.3	1,853	80.9	.79**	(.67, .92)	.80**	(.69, .94)
Ever touched private parts or been touched	843	38.0	743	32.9	.80***	(.71, .90)	.83**	(.73, .94)

*$p < .05$; **$p < .01$; ***$p < .001$.
AOR = adjusted odds ratio; CI = confidence interval; *IYG* = *It's Your Game: Keep It Real*; UOR = unadjusted odds ratio.
[a] The adjusted model controlled for student gender, age, ethnicity, language spoken at home, ever been in foster care, and currently living in a two-parent household.
[b] Participants who did not report having any type of sex were coded as zero.
[c] Participants who did not report having oral sex were coded as zero.
[d] Participants who did not report having vaginal sex were coded as zero.
[e] Participants who did not report having anal sex were coded as zero.
[f] Participants who did not report ever having sex or having sex in the past 3 months were coded as zero.
[g] Participants who did not report ever having anal sex or having anal sex in the past 3 months were coded as zero.

Table 4
Psychosocial outcomes by *IYG* group membership

Outcome	n	No-*IYG*		*IYG*		Multilevel regression estimate		Adjusted mean difference or adjusted odds ratio[a]	
		M	SD	M	SD	β	(95% CI)	AMD	(95% CI)
Information									
HIV/STI knowledge % correct	4,562	.64	.28	.64	.27	.00	(−.01, .02)	.00	(−.03, .04)
Condom knowledge % correct	4,562	.63	.25	.71	.25	.09***	(.07, .10)	.09***	(.05, .13)
Motivation									
Goals and plans for the future	4,559	2.57	.54	2.56	.55	−.01	(−.04.03)	−.01	(−.04, .03)
Beliefs about the importance of abstinence	4,483	1.85	.74	1.97	.74	.11***	(.07, .15)	.11***	(.06, .17)
Beliefs about the importance of condom use	4,497	2.41	.59	2.39	.62	−.03	(−.07, .01)	−.03	(−.07, .01)
Reasons for not having sex	4,464	4.00	2.30	4.44	2.36	.43***	(.30, .55)	.44***	(.25, .63)
Perceived parents' beliefs about delaying teen sex	4,503	2.27	.61	2.30	.61	.02	(−.02, .05)	.02	(−.02, .06)
Perceived friends' acceptability of teen sex	4,524	1.50	.60	1.39	.61	−.10***	(−.14, −.07)	−.11***	(−.16, −.06)
Perceived prevalence of friends' sexual behavior	4,524	1.65	.76	1.50	.80	−.14***	(−.18, −.09)	−.15***	(−.22, −.08)
Perceived prevalence of teen sexual behavior	4,484	2.02	.70	1.91	.72	−.09***	(−.13, −.05)	−.10***	(−.17, −.04)
Personal acceptability of teen sex	4,531	1.30	.63	1.22	.61	−.07***	(−.11, −.04)	−.08***	(−.13, −.02)
Behavioral skills (continuous)									
Personal limits for sexual behavior	4,407	2.11	1.05	2.21	1.05	.09**	(.03, .15)	.10**	(.02, .18)
Self-efficacy to refuse sex	4,485	2.13	.78	2.18	.80	.05*	(.01, .09)	.05*	(−.01, .11)
Self-efficacy to obtain reproductive health care	4,338	1.74	.54	1.76	.52	.03	(−.001, .06)	.03	(−.06, .11)
Condom self-efficacy	4,394	1.86	.57	1.88	.57	.02	(−.01, .05)	.02	(−.11, .15)
Quality of friendships	4,492	3.23	.85	3.26	.87	.02	(−.03, .07)	.02	(−.03, .08)
	n	%		%		β	(95% CI)	AOR	(95% CI)
Behavioral skills (dichotomous)									
Quality of dating relationships[b]	1,316	37.4		46.8		.37**	(.15, .59)	1.44**	(1.16, 1.81)
Exposure to risky situations	4,438	85.8		80.7		−.36***	(−.52, −.20)	.70***	(.59, .82)

*p < .05; ** p < .01; *** p < .001.
AMD = adjusted mean difference; AOR = adjusted odds ratio; β = beta coefficient; CI = confidence interval; *IYG = It's Your Game: Keep it Real.*
[a] The multilevel models controlled for student gender, age, ethnicity, language spoken at home, ever been in foster care, and currently living in a two-parent household.
[b] Asked of those who currently have a boyfriend or girlfriend.

having touched someone's private parts or had their private parts touched (AOR .83; 95% CI .73, .94).

Psychosocial outcomes

The *IYG* group showed a higher level of knowledge about condoms compared to the No-*IYG* group (adjusted mean difference [AMD] .09, 95% CI .05, .13), but the difference in HIV/STI knowledge was not statistically significant (Table 4).

The IYG group had significantly better outcomes on six risk-reduction motivation constructs, including beliefs about the importance of abstinence (AMD .11, 95% CI .06, .17), reasons for not having sex (AMD .44, 95% CI .25, .63), perceived friends' beliefs about delaying teen sex (AMD −.11, 95% CI −.16, −.06), perceived prevalence of friends' sexual behavior (AMD −.15, 95% CI −.22, −.08), perceived prevalence of teen sexual behavior (AMD −.10, 95% CI −.17, −.04), and personal acceptability of teen sex (AMD −.08, 95% CI −.13, −.02).

The IYG group had better outcomes on four of seven behavioral skills measures, including personal limits (AMD .10, 95% CI .02, .18), self-efficacy to refuse sex (AMD .05, 95% CI −.01, .11), exposure to

risky situations (AOR .70; 95% CI .59, .82), and quality of dating relationships (AOR 1.44; 95% CI 1.16, 1.81).

Discussion

Consistent with randomized efficacy trials of *IYG* [9,11], the present study showed a significant program effect on the initiation of sexual behaviors and vaginal sex during the last 3 months, as well as significant effects on psychosocial mediators. In addition, there was a significant impact on presexual behaviors, which have been suggested as more appropriate indicators of sexual health program effects among younger adolescents than initiation of sexual intercourse [18].

While there were similarities between *IYG* efficacy trials and the present study, several differences should be considered when making comparisons. Key similarities included the characteristics of program participants (low-income, urban minority youth), scope of program implementation (10−15 schools in the efficacy trials and 24 schools in our study), level of implementation fidelity (high in both cases), and program outcome measures. Important differences were study design (experimental vs. quasi-experimental) and implementation approach (delivery by outside staff vs.

classroom teachers, and delivery of an equivalent number of lessons in seventh and eighth grades vs. most lessons delivered in seventh grade) in the efficacy trials and present study, respectively.

Our behavioral outcomes differed from those of the other *IYG* effectiveness study supported by the TPP program [12]. The South Carolina study showed modest positive effects on program mediators, but did not find significant program effects on initiation of vaginal sex or sexual activity in the past 3 months. While our study employed a quasi-experimental design and targeted urban youth and the South Carolina study was a randomized controlled trial targeting rural youth, the two studies were similar in scope (implementation in 24 middle schools), implementation model (delivery by classroom teachers), and quality of implementation (high).

The results of our study provide support for the positive impact of *IYG* when implemented with fidelity among urban minority youth. In combination with efficacy trial results [9,11], they suggest that broader dissemination of *IYG* among urban minority youth may be warranted. However, the lack of consistency between our findings and those of the South Carolina study [12] points to the need for multiple replications, in order to reach conclusions about the robustness of prevention program effects and make decisions about large-scale implementation [7].

Another challenge in scaling up effective prevention programs is ensuring that interventions remain relevant and up to date [31]. Although *IYG* was considered state of the art when we conducted our study, policy changes such as the California Healthy Youth Act (2016), which mandates sexual health curricula include material on gender identity, sexual orientation, and other topics [32], may limit use of the program in California and perhaps nationwide.[1]

One of the key strengths of our study was utilizing classroom teachers to deliver *IYG*. By integrating the program into local school systems and building their capacity to sustain it, we demonstrated the feasibility of scaling up evidence-based sexual health programs in school settings [31]. To date, the evidence base for school-based pregnancy prevention has been built primarily on models in which the program is delivered by facilitators working for evaluators or other outsider organizations [5]. To increase the public health impact of effective teen pregnancy prevention programs, more evaluations of teacher-led program delivery, along with strategies for building school readiness and capacity for implementation, are needed.

Another strength of our study is that teacher self-reports and observations showed high levels of implementation completion and quality, respectively. The intervention reached a majority of youths enrolled in project middle schools (86.1%). This finding was validated by student reports that 92.8% of those in the *IYG* group received the curriculum in middle school (data not shown).

Several limitations of the study should be noted. Our quasi-experimental design did not allow us to rule out entirely alternative explanations for program effects such as selection bias and history [14]. The *IYG* group had a higher proportion of Latinos (91.5% vs. 89.7%) and was younger by .1 years (1.2 months) compared to the No-*IYG* group, although it might be argued the clinical significance of these differences was minimal. We controlled for demographic differences between the two groups; however, there

may have been other underlying differences that were not measured, which accounted for the observed program effects.

In regard to the potential effect of history, Youth Risk Behavior Surveillance System (YRBS) data showed a 5.1% decline in initiation of sexual intercourse among youth in grades 9–12, from 2013 to 2015 (32.7% to 27.6%) [33], a period that overlaps with our study by 2 years. We observed a 4.4% difference between ninth-grade youth in 2012–2013 who had not received *IYG*, and ninth-grade youth in 2014–2015 who had received the program (21.2% vs. 16.8%). While it is possible that we were measuring this historical pattern, our findings and those of the YRBS are not directly comparable in terms of sample age and representativeness. Thus, it is unclear whether the decline measured by the YRBS is a viable explanation for our study outcomes.

Another limitation of our study design is that it did not allow us to evaluate change in behavioral outcomes from pre- to postprogram. A randomized controlled trial was not feasible in our setting. Nevertheless, the study makes a valuable contribution to the literature on teen pregnancy prevention programming. There is growing acknowledgement that rigorous and well-executed quasi-experimental comparison group designs may approximate estimates of program impacts produced by randomized controlled trials, and such designs are highly appropriate in research that addresses the translation of tested and proven prevention interventions into practice on a large scale [34].

In conclusion, our study replicated the behavioral effects of the *IYG* efficacy trials [9,11], but they were not consistent with the findings of a recent replication study [12]. In order to evaluate the robustness of *IYG* program impacts, more replication studies need to be conducted and synthesized. Further, studies that evaluate effectiveness when the program is integrated into school systems and delivered by classroom teachers will help inform ongoing efforts to scale up evidence-based teen pregnancy prevention programs.

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[1] As of 2018, the copyright and distribution rights for *IYG* are owned by ETR Associates, which is developing a revised version of the program that will include the topics mandated in the California Healthy Youth Act.

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