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AMP!: A Cross-site Analysis of the Effects of a Theater-based Intervention on Adolescent Awareness, Attitudes, and Knowledge about HIV

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Abstract

AMP! (*A*rts-based, *M*ultiple component, *P*eer-education) is an HIV intervention developed for high school adolescents. *AMP!* uses interactive theater-based scenarios developed by trained college undergraduates to deliver messages addressing HIV/STI prevention strategies, healthy relationships, and stigma reduction towards people living with HIV/AIDS. We used a pre-test/post-test, control group study design to simultaneously assess intervention effect on ninth grade students in an urban county in California (N = 159) and a suburban county in North Carolina (N = 317). In each location, the control group received standard health education curricula delivered by teachers; the intervention group received *AMP!* in addition to standard health education curricula. Structural equation modeling was used to determine intervention effects. The post-test sample was 46% male, 90% self-identified as heterosexual, 32% reported receiving free or reduced lunch, and

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Compliance with ethical standards & ethical approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all individual participants included in the study.

Conflict of Interest

The authors declare that they have no conflict of interest.

49% White. Structural models indicated that participation in *AMP!* predicted higher scores on HIV knowledge ($p = .05$), HIV awareness ($p = .01$), and HIV attitudes ($p = .05$) at the post-test. Latent means comparison analyses revealed post-test scores were significantly higher than pre-test scores on HIV knowledge ($p = .001$), HIV awareness ($p = .001$), and HIV attitudes ($p = .001$). Further analyses indicated that scores rose for both groups, but the post-test scores of intervention participants were significantly higher than controls (HIV knowledge ($p = .01$), HIV awareness ($p = .01$), and HIV attitudes ($p = .05$)). Thus, *AMP!*'s theater-based approach shows promise for addressing multiple adolescent risk factors and attitudes concerning HIV in school settings.

Keywords

HIV prevention; Adolescents; Sexual health; Stigma reduction

Introduction

Adolescence is a critical period in the life course, often associated with a marked increase in experimentation with substance use, sexual activity, and other high-risk health behaviors (Muchimba, Haberstick, Corley, & McQueen, 2013; Moss, Chen, & Yi, 2014). According to the most recent Youth Risk Behavior Survey, 47% of high school students reported having had sexual intercourse, 41% did not use a condom during last sexual intercourse, and 22% reported having consumed alcohol or drugs before their last sexual intercourse (Centers for Disease Control and Prevention [CDC], 2014). Collectively, these behaviors increase adolescents' risk for human immunodeficiency virus (HIV) and other sexually transmitted infections (STIs).

Prevention of HIV and other STIs is a significant health priority in the United States (US). In 2009, adolescents and young adults age 13–29 accounted for 39% of new HIV infections (CDC, 2012a). Increasing rates of STIs among adolescents and young adults age 15–24 also reflects the trend of young people having unprotected sex at earlier ages. Further, there has been an increase in the incidence of young adults diagnosed with clinical AIDS which, given the life cycle of the virus, implies that these young adults most likely contracted HIV during adolescence (CDC, 2012b). These findings underscore the need to identify effective sexual health and HIV prevention strategies for adolescents.

School settings are prime locations for delivering prevention programs addressing adolescent sexual health. While many school-based interventions are designed to prevent adolescent drug and alcohol use, few address HIV prevention through comprehensive sexual health education. Despite convincing evidence that comprehensive sexual health education is more effective at reducing STIs, delaying age of first sex, and reducing teen pregnancy as compared to abstinence-only education (Kohler, Manhart, & Lafferty, 2008; Lindberg & Maddow-Zimet, 2012), many school systems across the US continue to endorse abstinence-only education (Doan & McFarlane, 2012; Kearney & Levine, 2012). In this study, we compared outcomes from two distinct types of sexual health education delivery: an intervention group which received a theater-based program along with standard health education, and a control group which only received the standard health education. This study

assessed the efficacy of a theater-based comprehensive sexual health intervention in enhancing mediators of HIV prevention (i.e., HIV knowledge, HIV awareness, and HIV attitudes) among high school students.

Intervention Background

AMP! (*A*rts-based, *M*ultiple component, *P*eer-education) is a comprehensive sexual health intervention delivered in high school settings. *AMP!* was developed through a collaboration between the Los Angeles Unified School District's HIV/AIDS Prevention Unit and the University of California Los Angeles (UCLA) Art & Global Health Center (AGHC). The intervention was initially developed in 2010 as an arts education tool and has since undergone re-design using best practices outlined by the CDC for school-based sexual health interventions (Douglas, 2007; Centers for Disease Control [CDC] and Prevention, 2010a; Centers for Disease Control [CDC] and Prevention, 2010b; Gavin, Catalano, David-Ferdon, Gloppen, Markham, 2010). These practices include designing intervention activities that are consistent with community values and resources, pilot testing of intervention components, using theory-driven intervention strategies, and the use of intervention methods that are age appropriate and relevant to adolescent culture.

Theater-based peer education strategies have been shown to be effective for engaging adolescents in interventions that address sensitive health topics like HIV prevention (Jackson, 1993; Lieberman, Berlin, Palen, & Ashley, 2012). The interactive nature of theater-based interventions for HIV prevention affects participants' emotional and cognitive appraisals, which may result in more attitudinal and behavioral shifts as compared to traditional didactic teaching methods for HIV prevention (Joronen, Rankin, & Astedt-Kurki, 2008; Lieberman et al., 2012). Moreover, peer-education strategies characterized by using actors who resemble participants (i.e., actors are of a similar age, gender, and race of participants) are shown to increase intervention uptake as they are more culturally and developmentally appropriate for adolescents than traditional teaching methods (Lieberman et al., 2012). Previous evaluations of theater-based interventions have shown that adolescents find these approaches more acceptable and memorable than traditional teaching methods (Lieberman et al., 2012; Lightfoot, Taboada, Taggart, Trang, & Burtaine, 2015). The use of theater-based peer education strategies for adolescent HIV and other STIs prevention may be more effective than traditional teaching methods and warrant further evaluation (Joronen et al., 2008).

AMP! consists of three components (Table 1) developed and delivered by college undergraduate students enrolled in a two semester credit-bearing course where they learn interactive theater techniques and receive sexual health training from HIV prevention specialists. Constructs from the theory of reasoned action (Fishbein, 1979; Fishbein & Middlestadt, 1989) and social cognitive theory (Bandura, 1986) undergird each component of the intervention, including addressing behavioral expectations and reciprocal determinism (Bandura, 1986), normative beliefs, and attitudes (Fishbein, 1979). Observational learning is used to increase self-efficacy, behavioral capability, and expectations toward engaging in HIV prevention. As illustrated in Figure 1, intervention activities are designed to increase HIV knowledge, improve awareness and attitudes, and increase self-efficacy through lessons

on general sexual health and HIV prevention, partner communication, and problem solving skills. Changing adolescent normative beliefs and attitudes about sexual risk is a critical precursor to adolescent behavior change (Black, Sun, Rohrbach, Sussman, 2011; Moyer-Gusé, Mahood, & Brookes, 2011; Foster, Neighbors, & Young, 2014). The theoretical underpinnings of the *AMP!* intervention focus on retention of changes in HIV knowledge, attitudes, awareness, and self-efficacy in order to impact HIV risk behaviors. The intervention activities shown in Figure 1 are informed by the aforementioned theoretical constructs to change HIV knowledge, HIV awareness, and HIV attitudes, and in turn increase HIV prevention (i.e., increase condom use and HIV/STI testing). We did not measure behavior change (HIV prevention) in these pilot studies. Rather, we assess the efficacy of *AMP!* in enhancing mediators of HIV prevention (i.e., HIV knowledge, HIV awareness, and HIV attitudes) among high school students.

A previous mixed-methods evaluation of the pilot implementation of *AMP!* in North Carolina found that high school participants manifested statistically significant changes in HIV knowledge and attitudes towards safe sex and people living with HIV/AIDS (PLWHA), and that high school participants preferred *AMP!* to a standard health education class (Lightfoot et al., 2015). However, the research team recognized the need for well-designed (i.e., methodologically rigorous) and theory-driven evaluations of theater-based HIV prevention interventions in school settings. Thus, the current study uses data from *AMP!*'s implementation in two school-based study settings to address this need.

Methods

Study Design

AMP! was conducted in two school districts, one in an urban county in California and one in a suburban county in North Carolina. The urban district serves over 640,000 students spread over 720 square miles. The suburban district serves 10,000 students across 401 square miles. Two high schools from each district were selected by district-level administrative staff to participate in the *AMP!* study. The same staff also selected at random which school would receive the intervention and which would serve as the control. All students enrolled in the ninth grade at each school were eligible for the study and were invited to participate.

The recruitment procedures were identical at both sites. A member of the project team visited participating ninth grade health classes to explain the *AMP!* study, answer questions, and distribute parental consent forms. Only youth whose parents granted them permission to take part in the study and who provided their own assent participated in the study. All data were collected as part of Institutional Review Board (IRB) approved studies directed by the University of California, Los Angeles and the University of North Carolina at Chapel Hill. Due to privacy considerations expressed by the IRB, study questionnaires were anonymous and individual students could not be tracked for longitudinal analyses.

Students at the control schools received standard health education classes, which in both sites included a sexual health unit delivered by classroom teachers. The unit was delivered over eight weeks and consisted of classroom sessions where teachers presented fact-based information about sexual health using textbooks and lectures. Students at the intervention

schools received *AMP!* (three 60–90 minute sessions delivered over the same eight weeks) in addition to the standard school curriculum. To avoid contamination (i.e., the inadvertent delivery of intervention messages to control group participants) across study sites, control participants were from high schools at a sufficient geographic distance from intervention schools (Keogh-Brown et al., 2007).

Participants

Four-hundred and seventy-six ninth grade students residing in California (N = 159) and in North Carolina (N = 317) attending local public high schools participated in the current study. Two hundred and thirty-seven students were in the control group and 239 participated in the *AMP!* intervention. Participants completed a pre- and post-intervention questionnaire; 476 participants completed the pre-intervention questionnaire while 423 participants completed the post-intervention questionnaire, (California = 123, North Carolina = 300). At the pre-test, 49% were assigned to the intervention group, 68% of the sample was from North Carolina, the sample was 45% male, 87% self-identified as heterosexual, 31% reported having a free or reduced lunch, and 47% were White. At the post-test, 46% were in the intervention group, 74% of the sample was from North Carolina, the sample was 46% male, 90% self-identified as heterosexual, 32% reported having a free or reduced lunch, and 49% were White. At the pre-test, less than 2% reported being American Indian or Alaska Native, 16% were Asian, 8% were African-American, less than 1% were Native Hawaiian or other Pacific Islander, 47% were White, and the remainder (26%) identified themselves as "other" (34% of students identified themselves as Hispanic in another separate question). At the post-test, 2% reported being American Indian or Alaska Native, 17% were Asian, 9% were African-American, less than 1% were Native Hawaiian or other Pacific Islander, 49% were White, and the remainder (24%) identified themselves as "other." Thirty-one percent identified themselves as Hispanic.

Measures

We used measures that have been demonstrated to be reliable and valid for adolescents to assess HIV knowledge, HIV awareness, and HIV attitudes. Questions were drawn from the CDC's Youth Risk Behavior Survey (Brener et al., 2004), the World Health Organization's knowledge, attitudes, and practices survey instrument for adolescents (World Health Organization, 1989), and the Towards a Healthy Tomorrow survey (Stanton et al., 1998). Demographic covariates were also included as important controls. The same questionnaire was administered three weeks pre-intervention and three weeks post-intervention. All measures were based on participant self-report.

HIV knowledge was a single continuous sum score based on correct responses to 10 questions. **HIV awareness** and **HIV attitudes** were structured as multiply determined latent variables. Preliminary factor analyses indicated the structures of the latent variables, which were confirmed as described below in the confirmatory factor analysis (CFA). HIV awareness consisted of four items concerning their familiarity with various HIV issues, which were scaled from 1–4 (strongly disagree to strongly agree): 1) "I am informed about how HIV affects people in other parts of the world"; 2) "I am familiar with how I can affect international HIV policy issues as a student"; 3) "I understand how the United States

influences international HIV issues"; and 4) "I am familiar with the HIV treatment available to people within the United States." HIV attitudes consisted of three items, which were scaled from 1–4 (strongly disagree to strongly agree): 1) "I feel comfortable discussing HIV with my peers"; 2) "I feel compassionate toward people with HIV"; and 3) "I speak up when I hear someone tell a myth about HIV."

Demographic covariates

All background demographics were dichotomous (no = 0, yes = 1). They included 1) whether the student was in the control (0) or intervention group (1); 2) whether the student was from California (0) or North Carolina (1); 3) gender (female = 0, male=1); 4) whether the student identified him/herself as heterosexual (no = 0, yes = 1); 5) as a proxy for socioeconomic status, whether the student was receiving a free or reduced price lunch at school (no = 0, yes = 1); and 6) whether the student reported being White (no = 0, yes = 1). The California sample was more racially diverse than the North Carolina sample. Thus, including other dichotomous indicators of race/ethnicity would have been confounded with site differences.

Analysis

The EQS structural equations program (Bentler, 2006) was used to assess an initial latent variable confirmatory factor model and a subsequent predictive path model. Further multi-sample techniques are described below. Because we could not link the students' pre- and post-tests due to participant confidentiality, identical separate models were run for the pre-test and the post-test to assess the impact of being in the intervention group on the outcome variables at the pre-test. It was possible that, prior to participating in *AMP!*, intervention or control group participants could be considerably higher or lower on the outcome variables; this situation would suggest that improvements shown at post-test could be spurious. Thus, it was essential to examine pre-test associations, and associations with other covariates of interest.

The initial confirmatory factor analysis (CFA) assessed the adequacy of the hypothesized factor structure developed through preliminary factor analysis (measurement model) and the associations among the latent variables and the single item variables. Then a directional latent variable path model positioned the dichotomous background control variables of intervention group membership, study site, gender, sexual orientation, free lunch status, and race as predictors of the outcome variables of HIV knowledge, HIV awareness, and HIV attitudes. Nonsignificant paths and covariances were gradually dropped until only significant paths and covariances remained.

Latent variable structural equation models compare a proposed hypothetical model with a set of actual data. The closeness of the hypothetical model to the empirical data is evaluated statistically through various goodness-of-fit indexes. Goodness-of-fit was assessed with the maximum likelihood chi-square ($\chi 2$), the Comparative Fit Index (CFI), and the root mean squared error of approximation (RMSEA) (Hu & Bentler, 1999; Bentler, 2006). The CFI ranges from 0 to 1 and reflects the improvement in fit of a hypothesized model over a model of complete independence among the measured variables. CFI values at .95 or greater are

desirable, indicating that the hypothesized model reproduces 95% or more of the covariation in the data. The RMSEA is a measure of lack of fit per degrees of freedom, controlling for sample size. Values less than .06 indicate a relatively good fit between the hypothesized model and the observed data.

Although we did not have individual longitudinal data, we were able to contrast the pre-test and post-test scores through the use of successive multi-sample constrained models. First, after assessing a baseline unrestrained model, multiple-group latent variable models tested the equivalence (invariance) of the measurement model between the two groups (Byrne, Shavelson, & Muthén, 1989; Stein, Lee, & Jones, 2006). The factor loading of each measured variable on its latent factor was constrained to equality across the two groups. The LaGrange Multiplier (LM) test reports which constraints are untenable (Chou & Bentler, 1990). We then assessed whether there were significant group differences in the latent means of the latent constructs in the model. We used the pre-test group as the reference group for the latent means analysis because we hypothesized that both post-test groups would report higher means due to the influence of the *AMP!* program and as well as their participation in standard health education classes over the course of the ninth grade. Group membership was included as a further predictor in the means analysis to assess its further impact on the outcome latent variables. This analysis reports the group mean differences as a *z*-score. To confirm our findings, we also contrasted the intervention and control students at post-test within time.

Results

Confirmatory Factor Analysis

Table 2 reports the means, standard deviations, ranges, and standardized factor loadings for the measured variables at pre-test and post-test. In addition to the aggregated post-test means and standard deviations, we also include the means of the control and intervention groups at post-test separately. As can be observed, scores are higher at post-test for both groups; further, scores are higher for the intervention group than the control group. Whether these differences are significant is reported below. All measured variables loaded significantly ($p < .001$) on their hypothesized latent factors. The fit indexes were highly acceptable (Pre-test ML $\chi 2$ (47, N = 476) =79.09; CFI = .97; RMSEA = 0.04; Post-test ML $\chi 2$ (47, N = 423) = 100.31; CFI = .96; RMSEA = 0.05).

Correlations among all of the latent and single-item demographic variables are reported in Table 3. Correlations among the pre-test scores are below the diagonal; post-test scores are above the diagonal. Of note, at the pre-test, intervention membership was not significantly associated with most baseline variables except that the North Carolina students were less likely to be in the intervention group (−.12, $p \leq .01$) and those in the intervention group expressed more positive HIV awareness (.12, $p \leq .05$) and were more likely to receive free or reduced lunch (.11, $p \leq .05$). These unexpected associations are most directly explained by the large negative association between being a North Carolina student and having a positive HIV awareness (−.23, $p \leq .001$) or receiving free or reduced lunch (−.54, $p \leq .001$) at the pre-test. North Carolina students were more likely to be White. These significant associations remained at the post-test, with the exception of the negative association with

HIV awareness, which was no longer significant (−.09). Further, intervention membership at the post-test was significantly correlated with a positive HIV awareness, (.14, $p \leq .01$), positive HIV attitudes (.11, $p \leq .05$), and greater HIV knowledge (.12, $p < .01$).

Path models

The final path models exhibited excellent fit statistics (Pre-test ML $\chi 2$ (64, N = 476) = 91.83; CFI = .98; RMSEA = 0.03; Post-test ML $\chi 2$ (69, N = 423) = 116.70; CFI = .97, RMSEA = .04). Results of the analyses with all significant paths included are depicted in Figures 2 and 3. Non-significant paths were dropped gradually. Latent variables are represented by circles; measured variables are depicted in rectangles. Only significant direct effects are shown in the figures. The substantial associations among the residuals of the outcome variables are also depicted. Significant associations among the predictors which control for the significant relations among them are not shown for readability but are similar to those reported in Table 3. For instance, the association between White ethnicity and being a North Carolina student ($p = 001$) remains in the predictive models.

In the pre-test model (Figure 2) which controls for the significant associations among all of the background demographics including intervention status, a more positive HIV awareness was predicted by being a student from California rather than North Carolina, being heterosexual, and having a free or reduced price lunch. More positive HIV attitudes were predicted by being a female, having a free or reduced price lunch, and being White. Greater HIV knowledge was predicted by being White and identifying oneself as heterosexual. In the post-test model (Figure 3), being in the intervention group had the only significant and positive impact on HIV awareness ($p = .01$). Higher HIV attitudes ($p = .05$) and HIV knowledge ($p = .05$) were predicted by being in the intervention group. Also, HIV attitudes were predicted by being White and HIV knowledge was predicted by White ethnicity and being a California student.

Latent Means analysis

In the constrained model, mean differences on the HIV-related latent variables were in the hypothesized direction in that both of the post-test groups (control and intervention) improved at follow-up. Post-test scores were substantially higher than pre-test scores on HIV awareness ($Z = 5.13$, $p \leq .001$), HIV attitudes ($Z = 3.41$, $p \leq .001$), and HIV knowledge ($Z = 9.79$, $p \leq .001$). The further impact of membership in the intervention group was included as an additional predictor in this analysis and enhanced the results. Beyond the improvement in both groups at follow-up, intervention group membership had considerable predictive power. Group membership had a positive effect at follow-up on HIV awareness ($Z = 2.36$, $p \leq .01$), HIV attitudes ($Z = 2.01$, $p \leq .05$), and HIV knowledge ($Z = 2.63$, $p \leq .01$). The direct comparison between the intervention and control group means at post-test had results similar to those depicted in Figure 3 (HIV awareness $Z = 2.47$, $p \leq .01$; HIV attitudes $Z = 1.78$, $p \leq .05$; HIV knowledge $Z = 2.45$, $p \leq .01$).

Discussion

This study examined the extent to which participation in *AMP!*, a theater-based comprehensive sexual health intervention delivered to ninth grade students, led to positive changes in HIV knowledge, awareness, and attitudes. Consistent with the health behavior theories (i.e., social cognitive theory and theory of reasoned action) and empirical evidence used to develop *AMP!*, we expected intervention participants to have more positive changes in HIV related factors at post-test compared to participants in the control group who only received the standard health education class. Our hypothesis was confirmed in that there were statistically significant differences between the intervention and control conditions. Ninth grade students who participated in *AMP!* reported significant positive changes in HIV knowledge, HIV awareness, and HIV attitudes three weeks post-intervention. *AMP!* was designed to supplement pre-existing sexual health education. As such, we expected students in the control condition to show post-intervention improvement in the HIV-related factors; however, *AMP!* participants reported greater HIV knowledge scores, and enhanced attitudes and awareness about HIV.

AMP! delivers HIV prevention lessons in a lively, interactive, and age-appropriate way that contributes to the overall acceptance and uptake of its messages. The intervention includes lessons that address several adolescent problem behaviors, in addition to its lessons on sexual health. Prior research implicates that adolescent health risk brhaviors occur in clusters, rather than in isolation, and are influenced by a similar set of determinants (Jessor & Jessor, 1977; Guilamo-Ramos, Litardo, & Jaccard, 2005; Mustanski et al., 2013). Delivering interventions that use a cross-cutting approach may be an effective and efficient strategy to address multiple adolescent risk factors in resource-challenged settings such as schools (Vivolo, Holland, Teten, & Holt, 2010). *AMP!*'s cross-cutting approach—using near peers to facilitate and deliver intervention lessons, targeted sexual and adolescent health information, and interactive theater-based HIV prevention—provides participants with a platform through which they can rehearse and model risk reduction strategies that impact adolescent health behaviors.

There are several limitations to the current study that should be noted. One limitation is that we did not have individual longitudinal data, though we believe this limitation was mitigated by our use of multi-sample techniques. Additionally, given the relatively short length of time between completing the intervention and post-test for these pilot studies, it is difficult for us to determine the long-term effects of our intervention on participants' sexual health. In future studies, we will expand the timeframe to assess intervention effects on HIV prevention behaviors. Lastly, we did not measure sexual activity, and therefore do not know if the observed changes in HIV-related factors led to behavior change; however, theoretical and empirical evidence suggests that changes in these factors will result in changes in sexual health behaviors (Fishbein & Middlestadt, 1989; Kohler et al., 2008; Moyer-Gusé, Mahood, & Brookes, 2011).

Despite these limitations, there are several strengths to the current study. One is that we used a study design that controlled for a number of threats to internal validity. Additionally, we used strong well-constructed measures to determine changes in HIV-related factors, and our

sample size is large and suitable for the structural modeling we performed. We conducted the study in geographically distinct (urban and suburban) school settings, thus increasing the generalizability of our findings. Much of the research on the effectiveness of theater-based HIV prevention in school settings has been conducted in international settings without the incorporation of theory or rigorous evaluation methods (Joronen et al., 2008; Taboada et al., *in press*); our findings make a significant contribution to the science of these interventions.

AMP! is a school-based intervention delivered to students of various racial/ethnic and SES groups. Given disparate rates of HIV among adolescents in the U.S., our results are promising, and provide strong evidence of the effectiveness of *AMP!* to change adolescent HIV knowledge, awareness, and attitudes. To our knowledge, this is the first evaluation study of a theater-based HIV prevention program in U.S. schools to use an SEM approach to measure efficacy. Although this study addresses an important gap in the literature in discerning the effectiveness of the intervention to change adolescent problem behaviors, continued evaluation is needed. We present promising evidence regarding the efficacy of *AMP!* as a supplement to standard school-based sexual health education, future evaluation should test *AMP!'s* efficacy independent of standard sexual health education, and relative to a no-intervention condition. Furthermore, future research will need to assess the longitudinal effects of the intervention on sexual health behaviors and attitudes.

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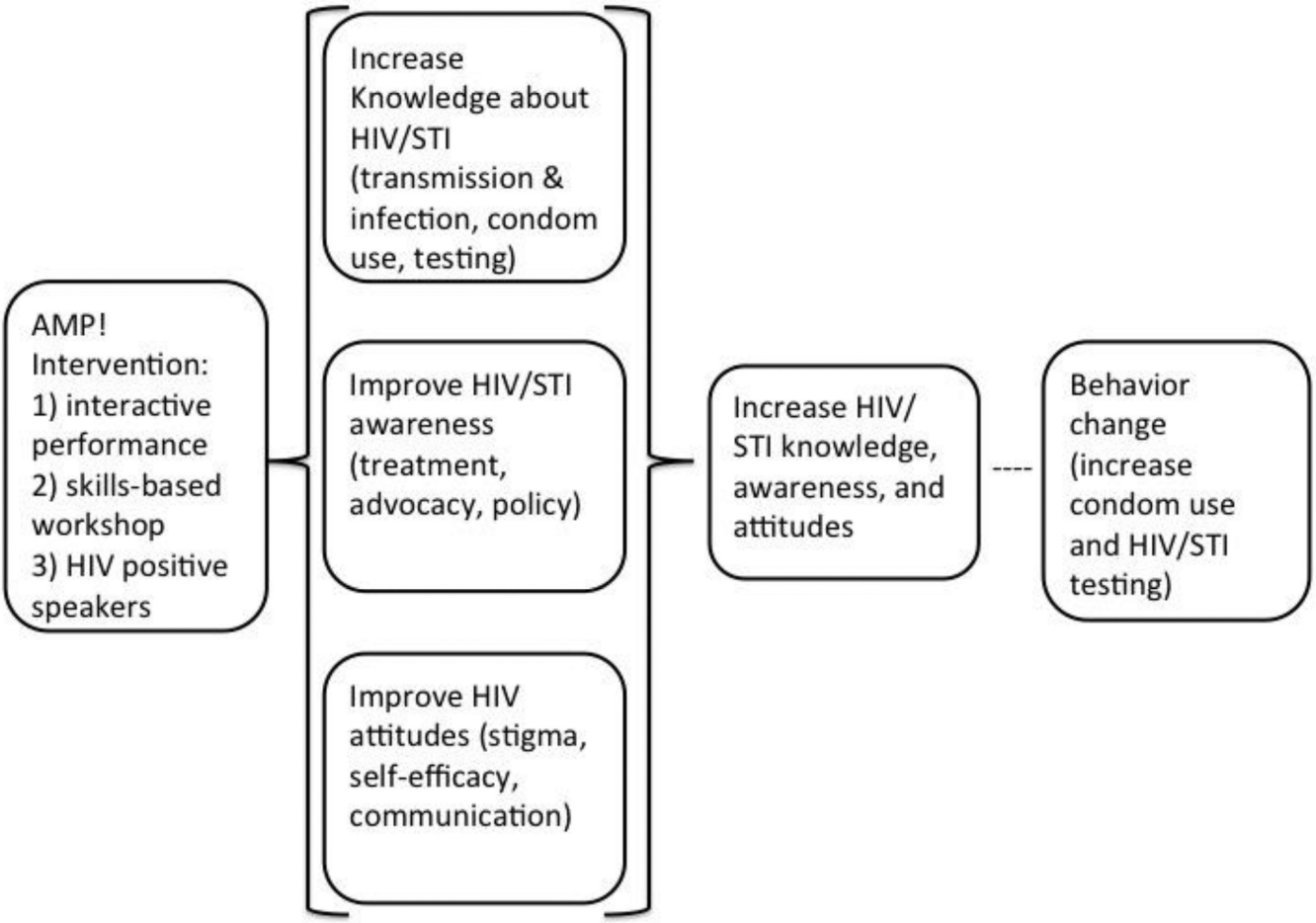

Figure 1.
AMP! Logic Model
Note, the dashed line indicates that we did not measure behavior change (increase condom use and HIV/STI testing).

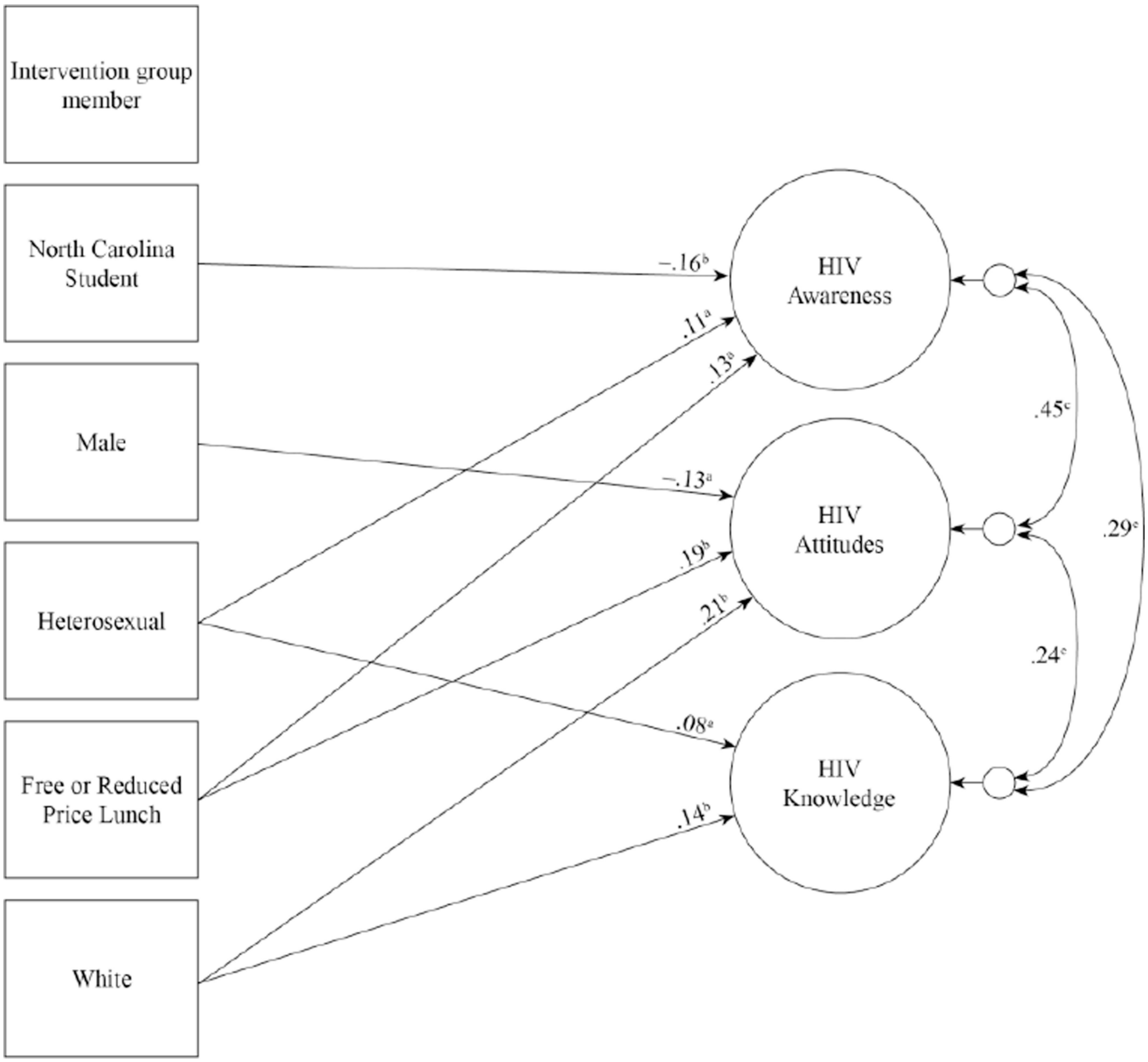

Figure 2.

Significant regression paths predicting outcomes among control and intervention participants before AMP! intervention.

Large circles represent latent variables, rectangles represent single-item indicators. For readability, correlations among the predictors are not shown. Regression coefficients are standardized (a = $p < .05$, b = $p < .01$, c = $p < .001$).

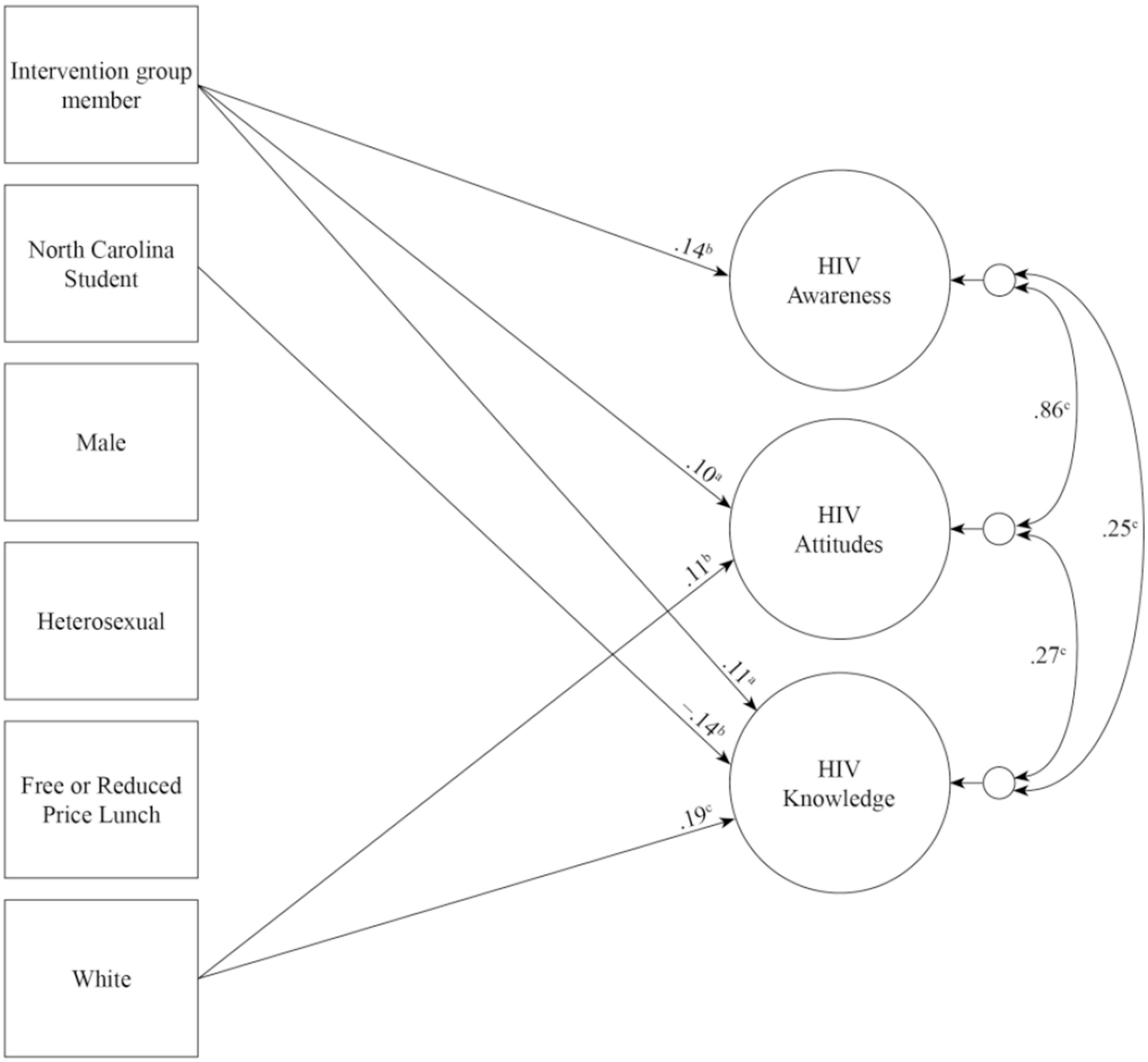

Figure 3.

Significant regression paths predicting outcomes among control and intervention participants after AMP!.

Large circles represent latent variables, rectangles represent single-item indicators. For readability, correlations among the predictors are not shown. Regression coefficients are standardized (a = $p < .05$, b = $p < .01$, c = $p < .001$).

Table 1

AMP! Program Components

Theoretical Constructs	Intervention Component and Description
• Evaluation of behavioral outcomes • Behavioral beliefs • Normative beliefs • Expectations • Observational learning (modeling)	Performance: Undergraduate students developed, and performed a theater piece about sexual health and HIV. • The final performance was an episodic compilation of scenes, monologues, and song – weaving together humor, vulnerability, personal narrative, and medically accurate information to promote HIV prevention. • Topics addressed in the performance included: Facts about HIV and STIs, contraception, testing, general sexual health information, substance use during sexual activity, peer communication, and partner communication.
• Reciprocal determinism • Behavioral capability • Self-efficacy • Observational Learning (modeling)	Interactive Theater Workshop: Undergraduate students led high school students in an interactive workshop. • The workshop began with warm up activities, and then presented three short scenarios demonstrating risky sexual situations. Intervention participants role-played what they would do if they were in the situation, and then discussed their choices. • Topics addressed in the workshop included: Proper condom use, hands-on condom demonstrations, condom negotiation skills, partner communication, and parent communication.
• Expectations • Behavioral beliefs • Evaluation of behavioral outcomes • Normative beliefs	HIV-positive Speakers: Local HIV+ advocates used personal stories to share their experiences of being a young person living with HIV, and a Q&A session. • Topics discussed included: Personal stories of what it's like to live with HIV, how/when they learned about their diagnosis, behaviors that put them at risk, issues of disclosure and stigma, and medication routines.

Table 2

Summary statistics, ranges and factor loadings in the Confirmatory Factor Analysis for the pre-test (N = 476) and post-test (N = 423) participants.

Variables (range)	Pre-test % or Mean/SD	Post-test % or Mean /SD	Post-test Controls	Post-test Intervention group	Pre-test Factor Loading*	Post-test Factor Loading*
Background (0–1)						
Intervention member	49%	46%	———	———	———	———
North Carolina student	68%	74%	76%	71%	———	———
Male	45%	46%	46%	46%	———	———
Heterosexual	87%	90%	90%	89%	———	———
Free, reduced lunch	31%	32%	30%	33%	———	———
White	47%	49%	47%	51%	———	———
Outcome latent variables						
HIV Attitudes (1–4)						
Comfort discussing HIV	2.91/0.72	3.09/0.74	3.07 (0.77)	3.11 (0.71)	.41	.69
Compassion for people	2.88/0.79	3.10/0.71	3.06 (0.69)	3.15 (0.72)	.49	.60
Speak up about HIV	2.43/0.78	2.74/0.83	2.65 (0.85)	2.84 (0.79)	.69	.69
HIV Awareness (1–4)						
Informed	3.01/0.72	3.21/0.73	3.15 (0.75)	3.28 (0.71)	.70	.73
Can affect international policy	2.41/0.80	2.69/0.85	2.61 (0.90)	2.78 (0.79)	.74	.66
US international policy	2.52/0.77	2.75/0.81	2.68 (0.82)	2.82 (0.81)	.82	.73
Familiar with treatment	2.54/0.79	3.03/0.75	2.94 (0.78)	3.13 (0.71)	.63	.75
HIV Knowledge (0–10)	7.15/1.72	8.84/1.45	8.68 (1.55)	9.03 (1.31)	———	———

*All factor loadings significant, $p \leq .001$.

Table 3

Correlations among Measured and Latent Variables in Model (pre-test below the diagonal, post-test above the diagonal)

Variables									
Baseline Demographics	1	2	3	4	5	6	7	8	9
1. Intervention member	—	−.07	.01	−.02	.03	.04	.14 ^{b}	.11 ^{a}	.12 ^{b}
2. North Carolina student	−.12 ^{b}	—	−.12 ^{b}	.04	−.55 ^{c}	.50 ^{c}	−.09	−.04	−.07
3. Male	−.01	−.09	—	.18 ^{c}	−.01	.03	.00	−.05	−.03
4. Heterosexual	−.02	.12 ^{a}	.06	—	−.06	.06	.07	.04	.02
5. Free, reduced lunch	.11 ^{a}	−.55 ^{c}	.01	−.03	—	−.49 ^{c}	.10	.03	−.01
6. White	−.03	.57 ^{c}	.01	.09	−.47 ^{c}	—	−.07	.07	.11 ^{a}
Latent variables									
7. HIV Awareness	.12 ^{a}	−.23 ^{c}	.05	.07	.22 ^{c}	−.20 ^{c}	—	.85 ^{c}	.26 ^{c}
8. HIV Attitudes	.04	−.02	−.12 ^{a}	−.04	.11	.10	.42 ^{c}	—	.29 ^{c}
9. HIV Knowledge	−.04	.07	.01	.08	−.03	.13 ^{b}	.26 ^{c}	.24 ^{c}	—

$^{a}p \leq .05$;

$^{b}p \leq .01$;

$^{c}p \leq .001$