


# Impact of a relationship-based intervention, Love Notes, on teen pregnancy prevention

Anita P. Barbee<sup>1</sup>  | Michael R. Cunningham<sup>2</sup> | Becky F. Antle<sup>1</sup> | Cheri N. Langley<sup>1</sup>

<sup>1</sup>Center for Family and Community Well-Being, Kent School of Social Work and Family Science, University of Louisville, Louisville, KY

<sup>2</sup>Department of Communication, University of Louisville, Louisville, KY

## Correspondence

Anita P. Barbee, Center for Family and Community Well-Being, University of Louisville, 2213 S. 3rd Street, Louisville, KY 40292, USA.

Email: [anita.barbee@louisville.edu](mailto:anita.barbee@louisville.edu)

## Funding information

The study was funded by the Office of Adolescent Health, U.S. Department of Health and Human Services, grant number TP2AH000010-01-00.

## Abstract

**Objective:** In this research, a randomized controlled trial (RCT) tested the efficacy of two teen pregnancy prevention (TPP) curricula, Reducing the Risk and Love Notes, compared with a group of adolescents in a control condition, on primary pregnancy prevention among youth at high-risk for teen pregnancy. A secondary purpose was to examine two potential mediators, negative beliefs about teen pregnancy and intentions to follow the sequence of completing education, marrying or establishing a committed relationship, and then having children.

**Background:** Teen pregnancy rates for racial/ethnic minority youth in the United States are disproportionately high compared with White youth. Given the positive view of children in these populations and the drive for youth to form peer relationships and explore their sexuality, meeting these cultural and developmental needs within TPP may be critical.

**Methods:** The study examined the number of reported pregnancies across the first year after the interventions from a three-arm, cluster RCT engaging 1,448 youth living in poverty between the ages of 14 and 19 years in 23 community-based organizations in a southeastern U.S. city.

**Results:** At the 1-year follow-up, youth in Love Notes report significantly fewer pregnancies compared with the control condition (18 pregnancies, 3.51%),  $F(2, 1,309) = 4.17$ ,  $p = .02$ ,  $d = 0.11$ . There was no significant difference between Reducing the Risk (31 pregnancies, 6.14%) and the control condition (27 pregnancies, 6.49%) in number of pregnancies. Less favorable attitudes about having a child as a teenager and other attitudes were associated with predicted outcomes.

**Conclusions:** This study provides additional evidence for the efficacy of Love Notes, which embeds sex education

into a larger curriculum on life planning and healthy relationship formation and maintenance.

**Implications.**

TPP approaches need to add content on planning and relationships to comprehensive sexual education.

**KEYWORDS**

adolescent pregnancy, family relations, Love Notes, sexual behavior, teen pregnancy

This study compares the efficacy of two teen pregnancy prevention (TPP) programs to a group in a control condition using a cluster randomized controlled trial (CRCT) with participants from communities that are marginalized. Teen pregnancy rates remain an issue in the United States, although the rates of teen pregnancy declined 37% between 1990 and 2010. The Obama administration created the Office of Adolescent Health in 2009 and funded grants to study the efficacy of TPP programs, especially among those most at risk. Overall, by 2009 the rates of teen pregnancy for Black youth were more than double those of White youth (59.1 pregnancies per 1,000 Black adolescents compared with 25.6 pregnancies per 1,000 White adolescents). The rates for Latina youth were almost three times those of White youth (70.1 pregnancies per 1,000 Latina youth compared with the 25.6 pregnancies per 1,000 for White youth (Centers for Disease Control and Prevention, 2011). The rates continued to drop after 2010 (Centers for Disease Control and Prevention, 2011). Abma and Martinez (2017) assessed sexual activity of never-married adolescent young men and adolescent young women aged 15 to 19 years at five points in time (1988, 1995, 2002, 2006–2010, 2011–2015) and showed that vaginal sexual intercourse for adolescent young women steadily dropped from a high of 51% in 1988 to a low of 42% in the 2011–2015 period, whereas for males the drop was from a high of 60% in 1988 to a low of 44% in 2011–2015.

Race differences were assessed starting in 2002 and found higher sexual activity among non-Hispanic Black youth compared with White youth. Among adolescent young women, 56.6% of Black versus 45.1% of White adolescent young women had had vaginal intercourse in 2002, which dropped for both groups to 46.6% of Black versus 44.3% of White adolescent young women by 2015. Among adolescent young men, 63.3% of Black versus 40.8% of White adolescent young men had had vaginal intercourse in 2002. The percentages dropped for Black adolescent young men to 58.6% but rose for White adolescent young men to 42.8%. Latina vaginal intercourse increased over the same period from 37.1% to 41.4%, but both rates were lower than their non-Hispanic Black and White counterparts. Among Latinos, engagement in vaginal intercourse decreased during that time from 54.8% to 45.7%. In 2002, Latino adolescent young men were less sexually active than non-Hispanic Black but more sexually active than White adolescent young men, and that pattern persisted.

These numbers show that by the 2011–2015 period (during which the current study was conducted), the higher rate of vaginal intercourse in the African American group was largely driven by males, for Black female rates were only slightly higher than for White adolescent young women by 2011–2015 (47% vs. 44%, respectively). Pregnancy rates of Black adolescent young women were higher than for White adolescent young women, but this difference was not accounted for by contraceptive use. In terms of ever having used contraception, percentages of adolescent young women using contraception rose from 80% in 1988 to 90% in 2011–2015 and rose for adolescent young men from 84% to 95% in the same period, but race differences were not noted. As sexual activity dropped and contraceptive use rose, other variables must have affected teen pregnancy rates.

## THEORETICAL BACKGROUND AND CONCEPTUAL MODEL FOR PRESENT STUDY

Using different theoretical models, several hypotheses can be generated as to why teen pregnancy among racial/ethnic minority youth has been persistently higher than among White youth. Those in health fields draw on such models as Andersen's (2008) behavioral model of health service use and postulate that differential pregnancy rates are due to a lack of access to and application of comprehensive sex education, health care, and effective contraception in these deprived communities (e.g., Committee on Adolescent Health Care, 2017).

Our team generated a second set of hypotheses primarily derived from life history theory (Ellis, 2019). These hypotheses focus on the impact of poverty, environmental threat, and the lack of social and economic opportunities on sexual behavior and reproduction among young people (e.g., Su & Addo, 2018). Life history theory hypothesizes that an adverse ecology, which poses many threats to safety and little access to resources, leads to a limited life expectancy and increased urgency to reproduce sooner rather than later. In the United States, these adverse circumstances are more prevalent in racial/ethnic minority communities than in more affluent White enclaves and linked to early family formation, consistent with life history theory (Carlson et al., 2014; Ellis, 2019). In addition, infant mortality is higher in racial/ethnic minority populations than White populations and that is paralleled by the respective birth rates of the two groups. As infant mortality declined with improved prenatal and medical care in both racial/ethnic minority and White populations, the birth rates of both groups declined in parallel (Cunningham & Barbee, 1991).

Racial/ethnic minority youth are more likely to live in poverty than White youth, and poverty is a major predictor of teen pregnancy (e.g., Su & Addo, 2018) beyond race. Winters and Winters (2012) found that during good economies, the variation in teen pregnancy was the result of socioeconomic status alone. Black youth were more likely than White youth to experience teen pregnancy only when the economy was in a downturn. That is, when job opportunities were lacking, pregnancies among Black teens rose. When job opportunities were more plentiful, pregnancies among Black teens dropped, consistent with life history theory.

This finding speaks to a related aspect of deprivation, the actual or perceived lack of opportunity to escape poverty. This reality is especially pronounced for racial/minority youth, due to structural racism, which is built into institutions, including the family, perpetuating the oppression of racial/ethnic minority groups according to critical race theory and posttraumatic slave syndrome (Godfrey et al., 2019; St. Vil et al., 2019). Both hopelessness and higher levels of experience with discrimination have been associated with higher rates of teen pregnancy (e.g., Hall et al., 2015; Kearney & Levine, 2012). While growing up in poverty, unsafe environments, and feeling unable to advance in the larger society should be addressed through policy and economic opportunities (Matoba et al., 2022), we believe it is useful for TPP facilitators to be aware of these variables and to inform participants of the contextual variables influencing their feelings, behavior, and decisions (Karney, 2021).

Relatedly and consistent with life history theory is the finding that parenthood is particularly valued in the Black community that suffers from high death rates in their neighborhoods (Edin & Kefalas, 2005; Edin & Nelson, 2013). Many Black youth perceive either pressure to become mothers or an implicit norm that teen pregnancy is acceptable (e.g., Macutkiewicz & Macbeth, 2017). Such norms reduce inhibiting beliefs that could deter teen pregnancy (e.g., Barber et al., 2021) and in some cases enhance a desire in adolescent Black women to become mothers sooner rather than later (e.g., Secor-Turner et al., 2011).

Another factor that may be important for all youth that is typically not addressed strongly in TPP programs is that youth are in the developmental stage of individuating from their family, and part of that process is focused on enhanced ties to peers including romantic partners (Erikson, 1968). The desire to form close relationships with peers and sexually attractive

romantic partners is strong during the teen years (Anderson et al., 2021; Furman, 2018). Reaching better pregnancy outcomes among high-risk groups requires TPP programming that is attuned to the participant's developmental stage and life goals in a context of social and economic challenges and that helps youth see that their relationship decisions and sexual behavior choices can have a direct impact on how their lives turn out (Macutkiewicz & Macbeth, 2017).

## Promising TPP Interventions

In a review of evidence-based TPP, it was noted that effective programs for reducing high-risk sexual behavior, pregnancy, and the spread of sexually transmitted infections include comprehensive sex education information. Such programs provide either direct access to effective contraception devices and reproductive health care or information about how to access them (Goesling, et al., 2014; Mark & Wu, 2022). Most programs are delivered as training in mixed-gendered classrooms or after school settings. Generally, between 10 and 25 modules are delivered daily over a week, weekly within a month, or monthly across several months. There are, however, a range of effective program models delivered in diverse settings including schools, community centers, clinics, and mental health facilities (Juras et al., 2019). Research has not found one structural model for success in improving sexual health outcomes.

The content of these comprehensive sex education programs focuses primarily on the most immediate contributing factors to high rates of adolescent pregnancy, which is engagement in high-risk sexual behaviors. These high-risk behaviors include having multiple partners and a lack of consistent use of condoms and other forms of birth control (e.g., Goesling et al., 2014). Therefore, the TPP curricula tend to cover such topics as the positive outcomes of delaying sexual engagement and not having sex with multiple partners; avoiding vaginal sex to prevent pregnancy; how to remain abstinent by avoiding high-risk situations that tempt youth to have unprotected sex; and the enhancement of sexual communication, decision-making, and problem-solving skills. Such programs also typically include presentations about anatomy and demonstrations of proper condom use and various forms of effective birth control (for a review, see Kirby, 2007). In most such programs, however, there is *limited or cursory focus* on planning for the future, building relationship skills, or on setting a path to escape situations or entanglements that might compromise one's health or life goals (e.g., Anderson et al., 2021). A handful of programs include a component of community and volunteer engagement to reduce youth's free time and to occupy youth in positive activities that can serve as an alternative to sexual engagement (Daley et al., 2015), but such programs often are missing the comprehensive sex education components.

## Interventions tested in current study

Professionals in this area agree that comprehensive sex education is an essential ingredient to TPP (Goesling et al., 2014), but it may be insufficient to meet all needs of adolescents, particularly youth living in poverty or racial/ethnic minority youth. Traditional TPP programs have a theoretical foundation that is focused on the individual rather than the social and ecological context, and generally presumes rational decision-making and planned behavior that can be assisted by education about birth control and related types of information. Simply offering TPP programs to youth at risk of teen pregnancy may be less effective if the programs do not help youth to work on or at least think about the impact of their circumstances on their relationships and how to overcome barriers to a successful future. Programming may also need to meet the youth where they are to interest them in the curriculum by giving them information on relationship formation and maintenance, as well as safe breakups. Joining them in their curiosity and

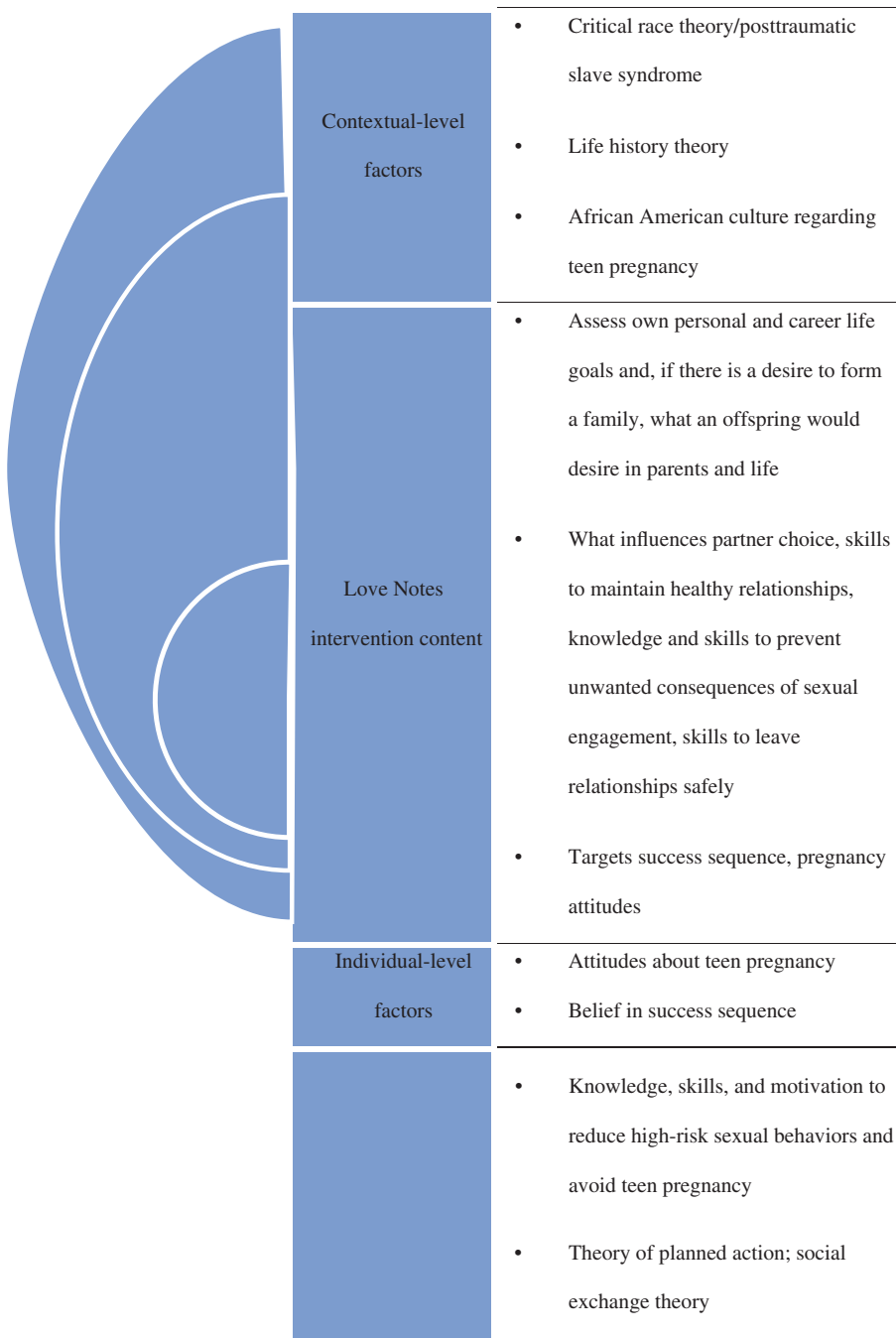
excitement about relationships and sexual experiences and their hopes for having children may open them up to the information regarding the advantages of delaying parenthood until some other life goals have been met, which was titled the “success sequence” by Haskins and Sawhill at the Brookings Institute (see Goesling et al., 2020). Furthermore, giving youth the space to think about their futures and instructions on conversations to have with a trusted adult about paths to independence and family formation, may all be essential for substantially reducing teen pregnancy with groups vulnerable to teen pregnancy.

Thus, we wondered if a curriculum that addressed both how to reduce teen pregnancy by reducing risky sexual behavior and that also addressed other predictors of teen pregnancy in the context of relationship formation would perform better at helping youth delay pregnancy than typical TPP programs. Thus, we compare a typical TPP program, *Reducing the Risk*, to a relationship-based program, *Love Notes*. *Reducing the Risk* was identified as having evidence of effectiveness by the Department of Health and Human Services Teen Pregnancy Prevention Evidence Review. *Reducing the Risk* was chosen because it includes content typical of comprehensive sex education curricula noted earlier but does not focus on life planning within adverse environments or sequencing life events to facilitate success, nor does it include extensive information regarding healthy relationships. Several studies found that *Reducing the Risk* increased birth control and condom use (Affainie-Godwyll et al., 2013; Hubbard et al., 1998; Goesling et al., 2014; Kirby et al., 1991; Reyna & Mills, 2014; Zimmerman et al., 2008). None of the studies testing *Reducing the Risk* efficacy found reductions in teen pregnancy, *per se*, and so the time was ripe for extending the evidence to this important outcome. The fifth edition of *Reducing the Risk* with adaptations was used in the current study (Barth, 2011; Langley et al., 2015).

*Love Notes*, at the time of this research, was a new and largely untested approach to TPP that embeds comprehensive pregnancy and disease prevention messages in a curriculum that emphasizes the importance of thinking about where relationships fit into their larger set of life goals. *Love Notes* focuses on encouraging youth to plan for achieving long-term success and helps them understand family dynamics that can influence partner choice and relationship communication patterns. In the program, youth are advised in how to form and maintain healthy relationships. Youth also receive instruction in avoiding getting hurt in relationships and how to exit unhealthy relationships safely to reach their own life goals plus the goals of any children they might have in the future.

The problems associated with teen pregnancy and parenthood are made explicit, but to reduce the chance of reactance, sexual engagement and early pregnancy is not moralistically forbidden. Instead, youth are given the opportunity to think about how a teen pregnancy might not help them fulfill their life goals for independence, a successful job or career, involvement in fun and loving relationships, or creating a happy family where the needs of their children are met (Pearson, 2016). *Love Notes* employs sound pedagogy and includes the use of brief lectures, video, music, discussion, workbook exercises involving self-reflection and goal setting, role plays/scenarios, games, and group activities, many of which involve the use of artistic expression. Youth leave each session with a charge to further contemplate the information in a workbook and to talk to a Trusted Adult Connection (TAC) regarding their life goals. The TAC is an important component in the curriculum to build resilience in youth to help them build their social support network to counteract the risks in their lives.

*Love Notes* taps into the primary motivation for adolescents in this critical developmental engagement. At the same time, *Love Notes* also takes into consideration the cultural, societal, and ecological influences on youth, living in deprived and dangerous neighborhoods, who are more likely to be exposed to predators and to peers reacting to racism and oppression in self-destructive ways. The goal of *Love Notes* is to give youth the knowledge and skills to choose safe partners and maintain healthy relationships, while also reaching personal goals for both economic success and the success of subsequent offspring by reducing high-risk sexual activity and delaying parenthood (see Figure 1).



**FIGURE 1** Conceptual framework for teen pregnancy prevention [Color figure can be viewed at [wileyonlinelibrary.com](http://wileyonlinelibrary.com)]

Research on an early version of Love Notes (Love U2: Relationship Smarts) with youth at high risk of teen pregnancy delivered through the public school system (Adler-Baeder et al., 2007) and in a community setting (Antle et al., 2011) found an impact on youth's awareness of healthy versus unhealthy relationship patterns, reduction of acceptance of violence and

verbal aggression in dating relationships and enhanced communication and conflict management skills. Love Notes as a TPP intervention, however, had not been previously tested.

## Control group focus and study purpose

Thus, a rigorous evaluation design was used comparing a typical comprehensive sex education program—in this study, the Reducing the Risk program—with a healthy relationship curriculum, Love Notes. Both TPP programs were evaluated compared with a control program that did not overlap in content with either experimental condition. The program chosen for comparison was the Power of We, which is a highly engaging program and focused on the importance of structural changes to facilitate success of inhabitants of communities that experience extreme deprivation of resources and how to actively advocate for such changes (Network Center for Community Change, *n.d.*).

The goal of the study was to test the hypothesis that the relationship-focused curriculum (Love Notes) would perform better with youth, most of whom were from families living in poverty and racial/ethnic minority youth on a variety of dependent variables. The study was conducted in an urban setting where pregnancy and birth rates were among the highest in the nation. As of January 2009, Kentucky ranked eighth highest in the United States in birth rates of adolescents, with an overall adolescent birth rate of 51.3 per 1,000 for adolescent young women 15 to 19 years of age and a birth rate of 57 per 1,000 for Black adolescent young women of the same age. Each of these birth rates were significantly higher than the national rate, which was 39.1 per 1,000 females.

The purpose of the current study was threefold: first, to test the efficacy in reducing teen pregnancy of an adapted version of Reducing the Risk compared with a control condition, the Power of We. The second goal was to test the efficacy of a new TPP intervention, Love Notes, compared with the same control condition. A previous paper (Barbee et al., 2016) based on the same dataset compared these interventions versus the control on four high-risk sexual behaviors at the 3- and 6-month follow-up periods. At 3 and 6 months, youth in Reducing the Risk reported fewer sexual partners and greater use of birth control compared with the control condition. At 6 months, Love Notes participants reported greater use of both birth control and condoms and fewer sexual partners, and they were less likely to have ever had sex compared with the control condition. Thus, both Reducing the Risk and Love Notes had the potential for reducing pregnancy. Because of the low base rate of the pregnancy outcome in any given time period (3, 6, or 12 months post-intervention), the current work examined reports of teen pregnancy up to 1 year after the intervention. Third, we tested the impact of relevant mediators. We examined whether (a) negative attitudes toward becoming pregnant and (b) intentions to organize their lives so that pregnancy comes after schooling and establishment of a stable relationship, consistent with the “success sequence” that is taught in the Love Notes curriculum, mediates pregnancy outcomes more in the Love Notes than the other two conditions. Finally, we examined the direct relationship between preexisting attitudes about teen pregnancy and the success sequence and teen pregnancy outcomes.

## Hypotheses and research questions

Compared with participants in the Power of We control condition, it was hypothesized (H1) that participants in the Reducing the Risk intervention group and (H2) participants in the Love Notes intervention group would report fewer pregnancies up to 1 year after the conclusion of the program but that (H3) the effect would be stronger for Love Notes than Reducing the Risk program participants. We also predicted (H4) that across programs, participants’ negative

attitudes about teen pregnancy and belief in the “success sequence” would be correlated with fewer pregnancies. Because of the program content, we hypothesized (H5) that the Reducing the Risk intervention would increase negative pregnancy attitudes but have no effect on success sequence attitudes. However, we expected (H6) that the Love Notes intervention would impact both negative pregnancy and success sequence attitudes.

## METHODS

The study received Institution Review Board approval from a southeastern university and can be found at the clinical trial registry ([clinicaltrials.gov](https://clinicaltrials.gov) identifier NCT01411878). Because this was a study on the impact of curricula focused on healthy relationships and sexuality among youth from diverse backgrounds, we intentionally assembled a diverse team of researchers and facilitators and partnered with a diverse set of organizations embedded in the communities we were serving to deliver the programs. We conceptualized diversity in terms of (a) the discipline from which members of the research team were grounded, (b) their racial and ethnic diversity, and (c) their diversity of gender, gender identity and sexual orientation. Members of the research team were educated in a wide array of disciplines including Black Studies, Couple and Family Therapy, Family Studies, Public Health, Social Psychology, and Social Work. They were from diverse races and ethnicities; 62.5% were of African American descent, and 12.5% were of Asian, Latino, or Middle Eastern descent. These researchers included seven women and seven men. We also ensured that most facilitators were in the early-adult phase of life (ages 22–40 years) to be relatable to the youth and to have an approximate match to the sample of youth we were serving. We engaged in targeted recruiting of a diverse set of professionals who were former students, with whom we had collaborated on other community-based projects, or who were serving youth in the partner organizations for this research study. Most sessions included both a woman and a man as facilitators so that more youth could identify. Approximately 5% of facilitators also were from the LGBTQIA+ community, and they were called on to facilitate, especially when we knew ahead of time, that a larger proportion of youth in the groups would be from that community as well.<sup>1</sup> All team members and facilitators were either experts in race equity, cultural humility, and/or LGBTQIA+ inclusion and/or engaged in trainings and dialogues about the importance of respect and meeting youth where they were given their varied cultural contexts as part of the training of facilitators and ongoing implementation.

### Setting and design

Youth who were aged 14 to 19 years who were at high risk for teen pregnancy and who were involved in out-of-school activities at 23 youth serving organizations were recruited to participate in a camp. The camp occurred across 2 consecutive Saturdays and was given the acronym of CHAMPS! (Creating Healthy Adolescents through Meaningful Prevention Services!). The 23 participating community-based organizations where CHAMPS! Camps occurred included faith-based agencies, community centers, child welfare serving agencies, refugee and immigrant serving agencies, and resource centers located in low-performing schools in the parts of the city with the highest poverty rates and racial/ethnic minority youth.

Participants were recruited and participated in the trial across a 31-month period from late 2011 through 2014. Follow-up data were collected through 2015. During completion of the baseline survey, youth were organized into clusters by the research manager (RM). Youth were randomly assigned to clusters, except for five youth for whom the RM made adjustments to ensure gender balance and to ensure that all members of the same household were in the same cluster to avoid cross-condition effects. The clusters were then randomly assigned to each of



three conditions—Reducing the Risk versus Love Notes versus the Power of We (control)—in a CRCT. There were 39 CHAMPS! Camps or cohorts. In eight of these, there were too few participants to assign to all three conditions, so the clusters were randomly assigned to the two interventions. There was a total of 39 Reducing the Risk, 39 Love Notes, and 31 Power of We sessions. Randomization was performed by the RM using an online randomizer (Urbaniak & Plous, 2013). The randomization was double blind because the evaluators were blind to each condition.

## Participants

To be eligible to participate in the study, participants needed the following: (a) parental informed consent for enrollment in the program and research sessions (if aged 14–17 years), (b) personal assent (if aged 14–17 years) or informed consent (if aged 18 or 19 years) for participation in the workshop and research sessions, (c) to be between 14 and 19 years of age, (d) to have an affiliation with youth serving organizations or be part of a current or former foster youth group; (e) to be unmarried, (f) able to participate verbally in English, (g) to have no cognitive impairment that precluded the subject from giving assent or informed consent, and (h) never to have been pregnant, had a child, or caused a pregnancy. A total of 1,448 youth attended all of Day 1 of CHAMPS Camps (515 Reducing the Risk, 511 Love Notes, and 422 Power of We), and 1,378 youth attended the entire intervention or control training (both full days of camp) for an overall dosage rate of 95% ( $n = 481$  or 93% for Reducing the Risk,  $n = 484$  or 94% for Love Notes, and  $n = 413$  or 98% for Power of We).

## Adaptations of the two intervention condition programs

Two interventions were adapted and tested for efficacy in reducing high-risk sexual behavior. Adaptations were needed first because these curricula were delivered in out-of-school time settings rather than in school, and thus there was little guarantee that youth would attend every session to receive the full dosage. Second, focus groups with youth indicated that using the “camp” format across 2 consecutive Saturdays would ensure participants’ attendance for the entire program. Third, it was learned during pilot sessions that most youth did not know anatomy, so videos explaining the reproductive systems were added. Finally, additional videos were added to capture the attention of youth and reinforce key concepts such as the importance of abstinence, types of contraception, and sexually transmitted infections.

### Reducing the Risk: Intervention Condition 1

Reducing the Risk consists of 16 45-minute modules (12 hours) that cover risk behaviors, abstinence, HIV and other sexually transmitted infection (STI) prevention, and skills development. Six additional short videos, due to the two adaptations noted earlier, brought the hours of content to 13 hours. In a third adaptation, several exercises were modified or replaced to clarify exercises (for a full description of adaptations, see Langley et al., 2015).

### Love Notes: Intervention Condition 2

Love Notes is a trauma-informed curriculum that aims to educate youth about healthy relationships and reduce teen dating violence and unprotected sex. Love Notes is a 13-module

curriculum (Pearson, 2016), partially derived from the Prevention and Relationship Enhancement Program (Markman et al., 2010), which is listed as an evidence-based practice for healthy relationships by Substance Abuse and Mental Health Services Administration ([www.samhsa.gov](http://www.samhsa.gov)). The curriculum builds on social exchange theory among others (see Figure 1), and the 13 modules give youth exercises to think about their aspirations for the future and where relationships fit into their overall life goals, conversation starters with trusted adults on how to forge a path to independence and managing relationships in that context (including the success sequence), skills in viewing romantic partner choices more critically, and skills in building a healthy relationship and assessing and safely extracting oneself from an unhealthy relationship. Love Notes also gives youth space to contemplate why delaying family formation would be in their own and any future offspring's best interest as well as how to delay family formation.

There were four adaptations to the 2008 version of Love Notes. First, instead of training youth in 13 1-hour sessions or four 3-hour sessions, youth were offered Love Notes during 2 consecutive Saturdays. Second, the curriculum developer enhanced the module on sexuality before the intervention began to ensure medical accuracy and comprehensiveness. Third, four educational videos on anatomy, reproduction, abstinence, and birth control were added (bringing the intervention time to 13 hours). Fourth, PowerPoint slides and abbreviated versions of the training materials were created to focus facilitators on key information from the full training manual.

## Description of control condition program

The control condition, the Power of We, was locally developed and helps youth learn more about assets in their neighborhoods, and ways to bring about positive change. The developer of the Power of We, Network Center for Community Change, an Annie E. Casey-funded grassroots organization, delivered the Power of We to participants over a 13-hour period. Youth walked their neighborhood to gather information about assets and watched films like *Waiting for Superman* to learn how to bring about community change. They created videos or artwork to demonstrate what they learned about community building and change. The content of the Power of We did not include any mention of individual planning, self-esteem, sexual health, healthy relationships, or intimate partner violence and thus had no overlap with content in either Reducing the Risk or Love Notes.

## Measures

### Pregnancy

One question about pregnancy was asked of participants, which varied slightly depending on the timing of the follow-up questionnaire: (a) In the past 3 months (at the 3- and 6-month follow-up period) or in the past 6 months (at the 12-month follow-up period), have you been pregnant or gotten someone pregnant? The pregnancy question was included in all surveys administered at baseline and 3, 6, and 12 months after the program ended.

### Negative attitudes about teen pregnancy

Negative sentiments about teen pregnancy were assessed by six items that examined feelings about becoming pregnant or stimulating a pregnancy. The first four items were answered on 5-point scales from *strongly agree* to *strongly disagree* and were scored in the direction of

negative attitudes. These four items were as follows: If you got pregnant or got someone pregnant, it would be embarrassing for your family; if you got pregnant or got someone pregnant, it would be embarrassing for you; getting pregnant or getting someone pregnant at this time in my life is one of the worst things that could happen to me; and it would not be all that bad if I got pregnant or got someone pregnant at this time in my life (reverse scored). The last two items allowed the choice of *happy*; *would not care*; and *angry or unhappy*, scored as 1, 3, and 5, respectively. These two items were as follows: How would you feel if you got pregnant or got someone else pregnant during the next year? and How do you think your mother or father would feel if you got pregnant or if you got someone else pregnant during the next year? The appropriateness of summing the diverse items was tested by evaluating the interitem correlations and was found to be psychometrically legitimate. The reliability of the negative pregnancy sentiment scale was  $\alpha = .79$ . The items had face validity and were tested for predictive validity in this study.

## Success sequence

The likelihood that youth thought they would order their lives in a conventional way, also named “the success sequence” in Love Notes, was measured using eight items. The eight items included the following: How likely are you to finish high school? How likely are you to go to college? How likely are you to have the career or job that you want (as an adult)? How likely are you to be able to pay your own way? How likely are you to be comfortable financially? How likely are you to become pregnant or get a partner pregnant without being married” (reverse scored)? How likely are you to get married? How likely are you to have good family relations? The item responses were 1 = *not at all likely*, 2 = *a little likely*, 3 = *somewhat likely*, and 4 = *very likely*. Once again, summing the items was appropriate. The reliability of the success sequence items was  $\alpha = .72$ . The items had face validity and were tested for predictive validity in this study.

Some researchers might argue that including an item about pregnancy in the success sequence scale was too much of an overlap with negative teen pregnancy sentiments. The reliability was only elevated slightly when the item was removed,  $\alpha = .74$ . The correlation between the negative pregnancy sentiments scale and likelihood of following the success sequence including the pregnancy item was  $r = .24$ ,  $p < .001$ , at baseline. The correlation was slightly higher at 12 months ( $r = .34$ ,  $p < .001$ ). When the pregnancy item was excluded, these correlations were similar at Time 1 ( $r = .20$ ,  $p < .001$ ) and at 12 months ( $r = .30$ ,  $p < .001$ ). Because pregnancy inside of a committed relationship is an integral part of the success sequence, we decided to keep that item in the scale.

## Analytic methods

The analytic sample consisted of all trial participants who met program eligibility requirements and were present in both the baseline and at least one of the follow-up assessments. For this analysis, because of the low base rate of the outcome, we examined all reported pregnancies across all surveys gathered at the 3-, 6-, and 12-month follow-up time periods. A series of analyses of covariance (ANCOVA) were conducted using ethnicity, age, gender, and Time 1 scores on the variable as covariates. The tests between the interventions and between each intervention and the control condition had a priori predictions, so  $t$  tests and least significant difference post hoc statistics were used for the comparisons. That approach provided the best balance of the risk of Type I and Type II errors. An outcome of  $p \leq .05$  was considered statistically significant. There was detectable differential attrition across groups. All significant effects remained with Benjamini–Hochberg corrections.

## RESULTS

### Participant retention

At the 3-month follow-up, 1,090 participants completed the questionnaire, for an overall response rate of 75% (386 Reducing the Risk, 367 Love Notes, 337 Power of We), at the 6-month follow-up, 991 participants from all clusters completed the questionnaire for an overall response rate of 68% (338 Reducing the Risk, 345 Love Notes, 308 Power of We), at the 1-year follow-up, 1,034 participants from all clusters completed the questionnaire for an overall response rate of 71% (362 Reducing the Risk, 357 Love Notes, 315 Power of We).

No demographic difference between conditions emerged due to attrition, but participant retention was slightly higher for Power of We (80% at 3 months, 73% at 6 months, 75% at 12 months) compared to Reducing the Risk (75%, 66%, 70%) and Love Notes (72%, 68%, 70%). This suggests that Power of We was effective in engaging youth. If such variables in the control condition tended to reduce sexual behavior, they would work against finding an effect for Reducing the Risk and Love Notes.

### Demographics

Demographic analyses of the sample are presented in another paper (Barbee et al., 2016, Table 1) but are briefly summarized here. The mean age was 15.72 years, and there were no differences by condition. Sixty-three percent of the sample were adolescent young women, and there were no differences by condition. In terms of race, 88% were non-Hispanic Black youth, 7.2% of participants were non-Hispanic White youth, 3.5% were Latin youth, and less than 1% were Asian youth (no differences between groups). There was no significant difference in participants' race across groups, except that there were slightly more non-Hispanic Black youth in the control condition (91.9%) than in either the Reducing the Risk (88.8%,  $p < .05$ ) or the Love Notes (86.2%,  $p < .01$ ) conditions. Thus, the proportion of Black participants to those from other ethnic groups was used as a covariate in all analyses, along with gender and age but did not substantially affect outcomes.<sup>2</sup> In addition, 82% of youth were recipients of free or reduced lunch. Characteristic of an urban sample, 41.03% of study participants reported having had sexual intercourse. That made the participants at high risk for pregnancy and an appropriate group with whom to test the interventions.

### Program impact on pregnancy

To control for a possible confounding influence of age, gender, and ethnicity, an ANCOVA was conducted that controlled for the effect of age, gender, and ethnicity on pregnancies that

**TABLE 1** Demographics of program conditions

Measure	RTR	LN	POW	RTR vs. POW Contrast $p$	LN vs. POW Contrast $p$	LN vs. RTR Contrast $p$
Sample size	508	503	413			
Age at baseline (mean)	15.8	15.7	15.6	0.12	0.47	0.20
Gender (% female)	64.4	66.6	63.5	0.81	0.39	0.52
Ethnicity (% Black)	88.8	86.2	91.9	0.05	0.01	0.09

Note. LN = Love Notes; POW = Power of We; RTR = Reducing the Risk.

occurred in the 12 months after the program completions. There was a significant impact of the interventions on pregnancy,  $F(2, 1,309) = 4.17, p = .02, d = 0.11$  (see Table 2).

For H1, no significant difference was found between Reducing the Risk and Power of We in teen pregnancies during the first year after the end of the intervention. In the Reducing the Risk group, 31 youth (out of 505 [6.14%] youth in Reducing the Risk) reported a pregnancy within a year after the intervention, whereas 27 youth in the Power of We control condition (out of 416 [6.49%]) reported a pregnancy within a year after the intervention,  $t(921) = 0.23, p = .82, d = .015$ .

For H2, we found a significant difference between Love Notes and Power of We in teen pregnancies during the first year after the end of the intervention. Eighteen youth in the Love Notes group (out of 501 [3.51%] youth in that condition) reported a pregnancy within a year after the intervention while 27 youth in the Power of We control condition (out of 416 [6.49%] youth) reported a pregnancy within a year after the intervention,  $t(915) = 2.02, p = .04, d = .13$ .<sup>3</sup> Because pregnancies were lowest in the Love Notes group and only that group was significantly different from the control, H3 was supported in that Love Notes performed better on this outcome than did Reducing the Risk.

Another way to examine the data is through a public health approach. Public health reporting practices translate the numbers to rates per 1,000. Calculating results in our study in terms of rates per 1,000, there would have been 65 pregnancies per 1,000 for those in the Power of We control condition, 61 pregnancies per 1,000 for those in the Reducing the Risk condition, and 31 pregnancies per 1,000 for those in the Love Notes condition. The pregnancy rate for African American youth in the target state at the time of the study was 84 per 1,000 (Kost & Henshaw, 2014). Because 88% of the youth in the CHAMPS! program were African or African American, comparing the youth in our study to that rate is a reasonable one and shows that all three conditions performed better than typical rates per 1,000 in the state.

### Program impact and teen pregnancy attitudes

Supporting this notion that the sample was high risk, the overall mean in the sample on negative sentiments about teen pregnancy was 23.57 ( $SD = 5.30$ ) out of 30 or 78.57% of maximum negativity. Thus, many youth indicated that being involved in a teen pregnancy would be considered a negative life event. The outcome for pregnancies was paralleled by the outcome for negative sentiments about teen pregnancy. Negative sentiments about teen pregnancy were significantly negatively associated with actual pregnancy at 3 months ( $r = -.12, p < .0001$ ), 6 months ( $r = -.14, p < .0001$ ), and 12 months ( $r = -.15, p < .0001$ ) and the average of available 3-, 6-, and 12-month attitude scores ( $r = -.15, p < .0001$ ), controlling for preprogram attitude score, age, gender, and ethnicity. Preprogram attitudes were much more weakly associated with pregnancy ( $r = -.07, p < .01$ ), suggesting that the programs may have altered attitudes.

Attitudes against teen pregnancy were not measured immediately after the programs, and all attitudes showed some slippage after 3 months (see Table 3). Nonetheless, attitudes against

**TABLE 2** Pregnancy outcomes as a function of programs

	Overall	RTR	LN	POW	<i>F</i>	<i>p</i>	RTR vs. POW <i>p</i>	LN vs. POW <i>p</i>	<i>d</i> <sup>a</sup>	RTR vs. LN <i>p</i>	<i>d</i> <sup>a</sup>
Pregnancy (%) <sup>a</sup>	5.34	6.13	3.59	6.49	4.17	.02	0.84	0.04	.13	0.06	.12
Sample size	1,422	505	501	416							

*Note.* Scores are corrected for effect of age, gender, and ethnicity. LN = Love Notes; POW = Power of We; RTR = Reducing the Risk.  
<sup>a</sup>Within 12 months after program.

**TABLE 3** Effects of intervention program, and time on negative attitudes to pregnancy

Negative attitudes to pregnancy	RTR	LN	POW	<i>F</i>	<i>p</i>	RTR vs. POW <i>p</i>	LN vs. POW <i>p</i>	RTR vs. LN <i>p</i>
Preprogram	23.73	23.47	23.61	0.32	.73	0.46	0.70	0.46
3 months postprogram	23.15	23.16	22.74	2.22	.10	0.19	0.18	0.97
6 months postprogram	22.54	22.74	22.31	1.41	.25	0.51	0.22	0.55
12 months postprogram	21.60	22.50	22.00	3.22	.04	0.29	0.20	0.02 <sup>a</sup>
Averaged across 3, 6, 12 months	22.28	22.76	22.30	3.13	.04	0.95	0.10	0.07 <sup>b</sup>

Note. Scores are corrected for effect of age, gender, ethnicity, and preprogram score. LN = Love Notes; POW = Power of We; RTR = Reducing the Risk.

<sup>a</sup>*d* = .15. <sup>b</sup>*d* = .12.

**TABLE 4** Effects of program on success sequence

Success sequence	RTR	LN	POW	RTR vs. POW	LN vs. POW	RTR vs. LN
Preprogram	27.08	27.14	27.12	0.23	0.65	0.09
12 months postprogram	26.21	26.77	26.17	0.91	0.10	0.12

Note. Scores are corrected for effect of age, gender, ethnicity, and preprogram score. LN = Love Notes; POW = Power of We; RTR = Reducing the Risk.

teen pregnancy appeared to have been influenced by the training programs, especially Love Notes. Three months after the intervention, participants in the Love Notes condition had significantly higher negative sentiments about teen pregnancy than participants in the Power of We control condition (23.36 vs. 22.70; least significant difference [LSD]  $p = .04$ ); there was no difference between those in the Reducing the Risk intervention and the control condition (23.14; LSD  $p = .16$ ). Six months after the intervention, the participants in the Love Notes condition had only marginally higher negative sentiments about teen pregnancy than participants in the Power of We condition (22.89 vs. 22.31, LSD  $p = .09$ ) and the Reducing the Risk again did not differ from the control condition (22.56, LSD  $p = .46$ ). At 12 months, the Love Notes group remained marginally higher than the Power of We condition (22.59 vs. 21.98, LSD  $p = .10$ ) and was significantly higher than the Reducing the Risk group (21.69, LSD  $p = .01$ ). At 12 months, the Reducing the Risk condition did not differ from the Power of We condition (LSD  $p = .44$ ).

## Program impact and success sequence

The overall mean on baseline adherence to the success sequence was moderate with an overall mean of 26.96 ( $SD = 3.93$ ) out of 32, or 84.25%. Endorsement of the success sequence was assessed only at the pretest and at 12 months (see Table 4). Nonetheless, later success sequence scores were associated with pregnancy at the 12-month posttest ( $r = -.17$ ,  $p < .001$ , excluding the pregnancy item,  $r = -.14$ ,  $p < .001$ ), while controlling for preprogram scores, age, gender, and ethnicity. Preprogram scores were more weakly associated with pregnancy outcomes ( $r = .05$ ,  $p = .09$ ), which is consistent with the attitudes against teen pregnancy findings and demonstrates the regression discontinuity when a program has impact. No differences between the Love Notes and the Power of We conditions were found in endorsement of the success sequence 12 months posttraining, nor between Love Notes and Reducing the Risk or Reducing the Risk and Power of We.

## DISCUSSION

The results of the study using a CRCT design support the efficacy of Love Notes but not Reducing the Risk on curbing teen pregnancy across a year post-intervention. Youth in Love Notes experienced significantly fewer pregnancies than those in a control group and far fewer than the normal rate of pregnancy in the state of Kentucky. Thus, our hypotheses were supported that embedding sex education into a larger curriculum on life planning and healthy relationship formation and maintenance would have a greater impact on a group of racial/ethnic minority youth in curbing high-risk sexual behavior and teen pregnancy than either a typical comprehensive sex education curriculum alone or a curriculum aimed at general empowerment. We hypothesized that because Love Notes helped youth think about their aspirations for the future and where relationships fit in their overall life goals, encouraged them to have conversations with trusted adults on how to forge a path to independence and how to view romantic partner choices more critically, while also giving them space to contemplate why delaying family formation would be in their own and any future offspring's best interest as well as how to delay family formation, that they might be more likely to reduce risky sexual behavior, which was reported in Barbee et al. (2016), and thus experience fewer pregnancies as reported here.

As predicted, analyses of negative attitudes about teen pregnancy found that those feelings were highly associated with pregnancy outcomes at each follow-up period and were most influenced by the Love Notes curriculum overall. Likewise, analyses of the likelihood of adhering to a sequence where family formation occurs after schooling and commitment to a relationship partner found that endorsement of the sequence was associated with pregnancy outcomes. Those youth who participated in Love Notes endorsed the success sequence marginally more than youth in Power of We or Reducing the Risk. These results support the life event history theoretical approach (Ellis, 2019) and add evidence that a teen pregnancy program that attends to youth interest in relationship formation, but also to the tough ecology in which youth experience poverty and other forms of oppression, can be effective. Such an intervention gives youth concrete ways of navigating their ecology to increase the chance of reaching their own life goals for meaningful work, relationships, and independence.

As noted earlier, comprehensive sex education is essential for teaching youth *how* to prevent a pregnancy and STIs (e.g., Goesling et al., 2014; Kirby et al., 2007). Thus, Love Notes included information about anatomy, abstinence, birth control, and STIs and also how to prevent both pregnancy and STIs (Barbee et al., 2016). However, these findings also support our hypothesis that the messages included in a TPP curriculum need to address *why* postponing pregnancy and family formation might be advantageous. Love Notes allowed youth to think about (a) the trauma they may have endured in their family of origin, the community, school, and society as well as the impact those experiences and structures have on partner choices and how they plan for their own relationship futures. It encouraged participants to consider their need for connection with lessons on how to determine what they want in a relationship partner; how to find someone who is a good match for their life aspirations; how to initiate and build a positive, healthy relationship; and how to discern a healthy relationship partner or dynamics from unhealthy partners or dynamics. Finally, the information provided in Love Notes about sexuality is couched in terms of getting to know someone well before engaging in intimate behaviors such as disclosing hopes and dreams, sharing deep emotional feelings, or engaging in intimate physical activity so that they remain both emotionally and physically safe. Thus, youth practice ways to get to know a romantic partner and slow down the pace of physical interaction until trust is built.

It is in this context that youth have the opportunity to think about the impact their sexual behavior could have on their own lives: Disease can hurt them or hasten death, whereas pregnancy in the teen years can cause delays in schooling (high school, college, trade school,

apprenticeships, and other forms of job preparation) and self-sufficiency and increase the chances that they and any future offspring will live in poverty. Youth watch music videos and other dramatizations that remind them how entering into parenthood with someone whom they do not know well, who is incompatible, disrespectful, controlling, or violent can also affect the life of a child. All these messages are geared to help youth think about *why* delaying childbirth is in the best interest for them, their romantic partners, and their future offspring. While the positives of being involved in a healthy romantic relationship, safe sexuality, and the joys of parenthood (e.g., being a positive role model, creating a ready-made family, having someone who will love them and look up to them, and perhaps doing so with a loving romantic partner; Cox et al., 2021) are all promoted in Love Notes, also included are the inherent dangers in jumping into a sexual relationship too quickly with someone one barely knows. These dangers include trying to raise a child without the resources of education or another person who will be good to them and their child.

We also found that all three programs engaging primarily Black youth produced pregnancy outcomes that were lower than the pregnancy rate of Black youth in the state of Kentucky overall. This way of examining the results gives additional credence to the Reducing the Risk intervention as well. In addition, finding that the pregnancy rate in our control condition was lower than the rate for African American youth in the target state at the time of the study, we cannot exclude the possibility that the engagement of youth in the Power of We had a salutary effect that reduced the apparent impact of Reducing the Risk in the CRCT.

## Implications

These results have implications not only for the efficacy of the Love Notes intervention in curbing teen pregnancy but also for the impact of such programs on cost savings in beleaguered state systems. The Power to Decide estimates that teen pregnancy in the target state costs \$29,200 per youth affected (Power to Decide Campaign to Prevent Teen and Unplanned Pregnancy; <https://powertodecide.org>). The 46% lower rate of pregnancy in the Love Notes condition than the control saved the state \$788,400. The policy implication for interventions such as Love Notes is that both state governmental agencies and the private sector could use a pay for success or social impact bond model (Liebman & Sellman, 2013) to invest in interventions on the evidence-based list of programs as preventative measures to lower teen pregnancy rates that, in the long run, will also lower rates of child maltreatment, child health problems, school problems, entry into the juvenile justice system, and entry into adult prisons.

This study adds to the growing literature on “what works” to reduce teen pregnancy. By exposing youth to a heavy dose of life planning and healthy relationship material in the context of TPP, the Love Notes intervention was successful in reducing teen pregnancy overall. This study of Love Notes contributes to the search for comprehensive programming to increase adolescent health across multiple areas (Kagesten et al., 2014). Addressing life planning and more than one high-risk behavior (e.g., interpersonal violence, risky sexual behavior) may be more cost-effective both in terms of time and expenditures in enhancing positive youth development and reducing maladaptive behavior.

Finally, bringing a relationship science and social work perspective to a public health problem enriched the type of intervention that was developed and tested. No evidence-based TPP curriculum before Love Notes spent more than a short time on healthy relationship formation and maintenance as a strategy for addressing achievement of life goals and ways of moving out of poverty. Thus, shifting the context of a TPP program from one purely focused on health behavior to one focused on life goal achievement and the role healthy relationship formation and maintenance play in goal achievement were radical for public health professionals.



Yet this approach seemed to resonate with the youth and resulted in a lower pregnancy rate in youth at highest risk for such an outcome.

An implication of this study that was not a focus at the conceptualization phase but is an outcome nonetheless is its contribution to the Grand Challenge of Social Work to ensure healthy development for all youth (Jenson & Hawkins, 2018). Developmentally, youth are seeking to establish their identities and do so in the context of relationship formation with peers (Furman, 2018). Ensuring that youth think about ways to enhance their discernment skills when it comes to formation of friendships or romantic relationships, and then developing skills in maintaining positive relationships while extracting themselves from unhealthy ones, are all essential to positive youth development. The fact that these skills can also help youth navigate a sexually charged landscape so that they can remain emotionally as well as physically healthy during their exploration of their sexuality is an added bonus. Delaying family formation until young adulthood (mid- to late 20s) not only helps youth solidify their own identities before taking on the important role of parent but also gives them more time to complete high school and either higher education or the learning of a trade or work skills that can help them be self-sufficient (Lerman et al., 2017). Having a child once one is economically more able to care for the child helps not only the parent but also the offspring develop into strong adults. So targeting this aspect of youth development is critical not only to the youth's well-being but also to that of the next generation.

## Limitations

Despite these important findings, we also note a handful of limitations. Although we found very important differences between two interventions and a control condition, the three-arm study design resulted in smaller sample sizes in each of the three conditions than if only one intervention had been examined. The impact of the interventions at the various follow-up times on attitudes and pregnancy might have been more evident if we had a larger number of participants in each condition. In addition, we felt it was important for the youth to have a meaningful experience in the control condition and so exposed them to a positive training on building community assets. Our control condition was so engaging and empowering that it might have had beneficial impacts on youth sexual behavior, despite having no program content on that topic. A review of positive youth development programs with no content on sex education found that some have a positive impact on sexual and reproductive health (e.g., Gavin et al., 2010). In addition, because the emphasis of the study was to test interventions to reduce teen pregnancy and fatherhood among racial/ethnic minority youth and 88% of the sample was Black and 4% was Latino living in urban environments, generalizability of results for rural White youth is not a given. Although 7% of the sample was White and there were no race/ethnicity differences in outcomes, certainly replication with other samples is needed. Love Notes is being tested in West Virginia, South Carolina, and other states with rural White youth using both the camp and more extended administration. Although this research was disrupted during the last federal administration, promising evaluation may be forthcoming. Such results may allow us to dispel any concern that the current results are outmoded because the study and data-gathering occurred 7 to 9 years ago.

In a longitudinal study, there is always the possibility of attrition. To ensure that was not causing spurious differences between groups, we tested for the comparability of the conditions on the baseline demographic and outcome measures at 3, 6, and 12 months and used those measures as covariates. Finally, in a self-report study, there is always a risk of participants concealing their actual behavior and making false, socially desirable, or random statements, resulting in biased or imprecise data. Our administration procedures were designed to minimize such tendencies, and there is no reason to expect that would cause differences between randomized groups.

## Future directions

The interventions that we tested sought to promote healthy youth development and prevent common health problems (e.g., pregnancy, STI transmission, violence) among adolescents who experienced the most disadvantage, disenfranchisement, and trauma in the community. More research on this topic and with youth who are highly vulnerable is needed. Although Love Notes is now on the list of evidence-based curricula to combat teen pregnancy, another RCT is needed to give it the highest rating of efficacy. Replication of results is essential for science to progress. In addition, future research on Love Notes needs to tease out which aspects of the content had the biggest impact on youth behavior and positive outcomes such as fewer pregnancies. Because so many additional streams of information were presented to youth than is usually presented in typical TPP curricula, it is difficult to know which aspect of the curriculum was most important in changing behavior. Some clues in this study show that it had an impact on negative sentiments about teen pregnancy and belief in the success sequence, but other factors, such as the information on choosing safe partners, could have also driven the impact. Future studies will also need to look at the cumulative impact of Love Notes on multiple outcomes such as reducing the spread of STIs, reducing intimate partner violence, and reducing depression after romantic breakups. Once all these outcomes have been studied, social work and family science scholars can promote policy changes and raise funds to ensure that scale-up efforts are possible to get curricula such as Love Notes into schools and community centers throughout the country to shift the trajectory of youth outcomes in a number of areas (e.g., reducing teen pregnancy, reducing teen dating violence, reducing teen suicides). Research such as this can then serve as fuel to ensure that the Grand Challenge of Social Work regarding positive outcomes for youth is fulfilled.

## ORCID

Anita P. Barbee  <https://orcid.org/0000-0002-3951-1276>

## ENDNOTES

- <sup>1</sup> Two partner organizations catered to LGBTQIA youth. To ensure LGBTQIA representation among leaders in groups from those organizations, at least one facilitator was LGBTQIA to lead those training groups. While LGBTQIA youth were spread across the study sites, most were concentrated in sessions drawing from these organizations, and it was critical to ensure the youth had facilitators who represented their experiences.
- <sup>2</sup> Baseline equivalence analyses are reported in Table 1 of the Barbee et al. (2016) paper, with appropriate hierarchical linear modeling (HLM) control for clustering. No effects for clusters were found thus the ANCOVA was conducted rather than HLM on this analysis.
- <sup>3</sup> We report estimated means that have been adjusted for age, gender, and ethnicity. Because separate analyses were conducted for Reducing the Risk versus Power of We and Love Notes versus Power of We, the adjusted means will vary slightly across analyses.

## REFERENCES

- Abma, J. C., & Martinez, G. M. (2017). Sexual activity and contraceptive use among teenagers in the United States, 2011–2015. In *National Health Statistics Reports* (Vol. No. 104). National Center for Health Statistics.
- Adler-Baeder, F., Kerpelman, J., Higginbotham, B., Schramm, D., & Paulk, A. (2007). The impact of relationship education on adolescents from diverse backgrounds. *Family Relations*, *56*(3), 291–303.
- Affainie-Godwyll, A. M., Jurich, J., Whitted, B., & Espino, D. (2013). Evaluation of two comprehensive sexuality education programs: Safer Choices and Reducing the Risk. *Family Science Review*, *18*(1), 23–49.
- Andersen, R. M. (2008). National health surveys and the behavioral model of health services use. *Medical Care*, *46*(7), 647–653 <https://doi.org/10.1097/MLR.0b013e31817a835d>.
- Anderson, P., Coyle, K., Guinosso, S., Ferrand, J. L., Owora, A., Houghton, R. F., & Walsh-Buhi, E. (2021). Promoting adolescent health relationships (The About Us program): *Protocol for a Randomized Clinical Trial*, *10*(9), e30499.
- Antle, B. F., Sullivan, D. J., Dryden, A. A., Karam, E. A., & Barbee, A. P. (2011). Promoting healthy relationships among high-risk youth. *Children and Youth Services Review*, *33*(1), 173–179.

- Barbee, A. P., Cunningham, M. R., van Zyl, M. A., Antle, B. F., & Langley, C. N. (2016). Impact of two teen pregnancy prevention interventions on condom and birth control use: A three-arm, cluster randomized control trial. *American Journal of Public Health, 106*(Suppl. 1), S85–S90.
- Barber, J. S., Guzzo, K. B., Budnick, J., Kusunoki, Y., Hayford, S. R., & Miller, W. (2021). Black–White differences in pregnancy desire during the transition to adulthood. *Demography, 58*(2), 603–630.
- Barth, R. (2011). *Reducing the risk* (5th ed.). ETR.
- Carlson, D. L., McNulty, T. L., Bellair, P. E., & Watts, S. (2014). Neighborhoods and race/ethnic disparities in adolescent sexual risk behavior. *Journal of Youth and Adolescence, 43*(9), 1536–1549.
- Centers for Disease Control and Prevention. (2011). Vital Signs: Teen Pregnancy—United States, 1991–2009. *Morbidity and Mortality Weekly Report, 60*, 414–435.
- Committee on Adolescent Health Care. (2017). Committee Opinion No 699: Adolescent pregnancy, contraception, and sexual activity. *Obstet Gynecol, 129*, e142–e149.
- Cox, S. M., Lashley, C. O., Henson, L. G., Medina, N. Y., & Hans, S. L. (2021). Making meaning of motherhood: Self and life transitions among African American adolescent mothers. *American Journal of Orthopsychiatry, 91*(1), 120–131. <https://doi.org/10.1037/ort0000521>.
- Cunningham, M. R., & Barbee, A. P. (1991). Differential K-selection versus ecological determinants of race differences in sexual behavior. *Journal of Research in Personality, 25*(2), 205–217.
- Daley, E.M., Buhi, E.R., Wang, W., Singleton, A., Debate, R., Marhefka, S., Perrin, K., Noble, C., Maness, S., Mahony, H., Powers, E., Noble, S., Rahman, S., Malmi, M., Hall, K., & Ziembra, R. (2015). *Findings from the Replication of an Evidence-Based Teen Pregnancy Prevention Program. Evaluation of Wyman's Teen Outreach Program® in Florida: Final impact report for Florida Department of Health.* <https://opa.hhs.gov/sites/default/files/2020-07/fldoh-final-report.pdf>
- Edin, K., & Kefalas, M. (2005). *Promises I can keep: Why poor women put motherhood before marriage*. University of California Press.
- Edin, K., & Nelson, T. J. (2013). *Doing the best I can: Fatherhood in the inner city*. University of California Press.
- Ellis, B. J. (2019). Developmental adaptation to stress: An evolutionary perspective. *Annual Review of Psychology, 70*, 111–139. <https://doi.org/10.1146/annurev-psych-122216-011732>.
- Erikson, E. H. (1968). *Identity: Youth and crisis*. Norton.
- Furman, W. (2018). Romantic relationships in adolescence. In W. M. Bukowski, B. Laursen, & K. H. Rubin (Eds.), *Handbook of peer interactions, relationships and groups* (2nd ed., pp. 410–428). Guilford Press.
- Godfrey, E. B., Santos, C. E., & Burson, E. (2019). For better or worse? System-justifying beliefs in sixth-grade predict trajectories of self-esteem and behavior across early adolescence. *Child Development, 90*(1), 180–195. <https://doi.org/10.1111/cdev.12854>.
- Goesling, B., Colman, S., Trenholm, C., Terzian, M., & Moore, K. (2014). Programs to reduce teen pregnancy, sexually transmitted infections, and associated sexual risk behaviors: A Systematic review. *Journal of Adolescent Health, 54*(5), 499–507.
- Goesling, B., Inanc, H., & Rachidi, A. (2020). *Success sequence: A synthesis of the literature* (OPRE Report 2020–41). [https://www.acf.hhs.gov/sites/default/files/documents/opre/Success\\_sequence\\_review\\_2020\\_508\\_0.pdf](https://www.acf.hhs.gov/sites/default/files/documents/opre/Success_sequence_review_2020_508_0.pdf)
- Hall, K. S., Kusunoki, Y., Gatny, H., & Barber, J. (2015). Social discrimination, stress, and risk of unintended pregnancy among young women. *Journal of Adolescent Health, 56*(3), 330–337. <https://doi.org/10.1016/j.jadohealth.2014.11.008>.
- Hubbard, B. M., Giese, M. L., & Rainey, J. (1998). A replication of Reducing the Risk, a theory-based sexuality curriculum for adolescents. *Journal of School Health, 68*(6), 243–247. <https://doi.org/10.1111/j.1746-1561.1998.tb06347.x>.
- Jenson, J. M., & Hawkins, J. D. (2018). Ensuring healthy development for all youth: Unleashing the power of prevention. In R. Fong, J. Lubben, & R. P. Barth (Eds.), *Grand challenges for social work and society: Social progress engineered by science*. Oxford University Press.
- Juras, R., Steinka-Fry, K., Kelsey, M., Lipsey, M., & Layzer, J. (2019). *Meta-analysis of federally funded teen pregnancy prevention programs: Final report*. Office of Population Affairs, Office of the Assistant Secretary for Planning and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services.
- Kagesten, A., Parekh, J., Tuncalp, O., Turke, S., & Blum, R. W. (2014). Comprehensive adolescent health programs that include sexual and reproductive health services: A systematic review. *American Journal of Public Health, 104*, e23–e36. <https://doi.org/10.2105/AJPH.2014.302246>.
- Karney, B. (2021). Socioeconomic status and intimate relationships. *Annual Review of Psychology, 72*, 391–414.
- Kearney, M. S., & Levine, P. B. (2012). Why is the teen birth rate in the United States so high, and why does it matter? *Journal of Economic Perspectives, 26*(2), 141–163. <https://doi.org/10.1257/jep.26.2.141>.
- Kirby, D. R. (2007). Emerging answers: Research findings on programs to reduce teen pregnancy and sexually transmitted diseases. *National Campaign to Prevent Teen and Unplanned Pregnancy.* <https://powertodecide.org/sites/default/files/resources/primary-download/emerging-answers.pdf>.
- Kirby, D. R., Barth, R. N., Leland, N., & Fetro, J. V. (1991). Reducing the Risk: Impact of a new curriculum on sexual risk-taking. *Family Planning Perspectives, 23*(6), 253–263.

- Kost, K., & Henshaw, S. (2014). *U.S. teenage pregnancies, births and abortions, 2010: National and state trends by age, race and ethnicity*. Guttmacher Institute. <http://www.guttmacher.org/USTPtrends10.pdf>.
- Langley, C., Barbee, A. P., Antle, B., Christensen, D. N., Archuleta, A. J., Sar, B. K., ... Borders, K. (2015). Enhancement of Reducing the Risk for the 21st century: Improvement to a curriculum developed to prevent teen pregnancy and STIs. *American Journal of Sexuality Education, 10*, 40–69.
- Lerman, R. I., Price, J., & Wilcox, W. B. (2017). Family structure and economic success across the lifecourse. *Marriage and Family Review, 53*(8), 744–758. <https://doi.org.echo.louisville.edu/10.1080/01494929.2017.1316810>.
- Liebman, J., & Sellman, A. (2013). *Social impact bonds: A guide for state and local governments*. Harvard Kennedy School Social Impact Bond Technical Assistance Lab.
- Macutkiewicz, J., & Macbeth, A. (2017). Intended adolescent pregnancy: A systematic review of qualitative studies. *Adolescent Research Review, 2*, 113–129. <https://doi.org/10.1007/s40894-016-0031-2>.
- Markman, H. J., Stanley, S. M., & Blumberg, S. (2010). *Fighting for your marriage*. Jossey-Bass.
- Mark, N. D., & Wu, L. L. (2022). More comprehensive sex education reduced teen births: Quasi-experimental evidence. *Proceedings of the National Academy of Sciences, 119*(8), e2113144119.
- Matoba, N., Edwards, A., Rankin, K., DeSisto, C., & Collins, J. W. (2022). Teen birth across generations among non-Latino Whites and African-American women: The effect of race and neighborhood income. *Maternal and Child Health Journal, 26*(7), 1584–1593.
- Network Center for Community Change (n.d.). *The Power of We*.
- Pearson, M. (2016). *Love Notes: Evidence-Based Program model*. The Dibble Institute for Marriage. *Education*.
- Reyna, V. F., & Mills, B. A. (2014). Theoretically motivated interventions for reducing sexual risk taking in adolescence: A randomized controlled experiment applying fuzzy-trace theory. *Journal of Experimental Psychology: General, 143*(4), 1627–1648.
- Secor-Turner, M., Sieving, R., & Garwick, A. (2011). Social messages, social context, and sexual health: Voices of urban African American youth. *American Journal of Health Behavior, 35*(2), 162–174.
- St. Vil, N. M., St. Vil, C., & Fairfax, C. N. (2019). Posttraumatic slave syndrome, the patriarchal nuclear family structure, and African American male–female relationships. *Social Work, 64*(2), 139–145.
- Su, J. H., & Addo, F. R. (2018). Born without a silver spoon: Race, wealth, and unintended childbearing. *Journal of Family and Economic Issues, 39*(4), 600–615.
- Urbaniak, G. C., & Plous, S. (2013). Research randomizer (Version 4.0) [Computer software]. <http://www.randomizer.org>
- Winters, L. I., & Winters, P. C. (2012). Black teenage pregnancy: A dynamic social problem. *American Sociological Review, 56*, 1–14. <https://doi.org/10.1177/2158244012436563>.
- Zimmerman, R. S., Cupp, P. K., Donohew, L., Sionean, C., Feist-Price, S., & Helme, D. (2008). Effects of a school-based, theory-driven HIV and pregnancy prevention curriculum. *Perspectives on Sexual Reproductive Health, 40*(1), 42–51. <https://doi.org/10.1363/4004208>.

**How to cite this article:** Barbee, A. P., Cunningham, M. R., Antle, B. F., & Langley, C. N. (2022). Impact of a relationship-based intervention, Love Notes, on teen pregnancy prevention. *Family Relations, 1–20*. <https://doi.org/10.1111/fare.12798>