

Healthy Marriage and Relationship Education for High School Students: The One-Year Impacts of Two Versions of *Relationship Smarts* *PLUS* in Georgia



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**Healthy Marriage and
Relationship Education for
High School Students:
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in Georgia**

September 2021

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Overview

Introduction

Healthy marriage and relationship education (HMRE) programs for youth, and high school students in particular, aim to fill a common gap in what students learn about relationships in school. Although high schools often provide instruction on avoiding teen pregnancy and sexually transmitted infections, few provide information on the social or emotional aspects of romantic relationships.

HMRE programs help fill this gap by providing education on relationships through structured, classroom-based curricula. In the short term, these programs largely seek to change participants' expectations and beliefs about relationships, as well as improve participants' communication and relationship skills. In the longer term, many of these programs also aim to promote relationship quality and stability beginning in adolescence and extending into adulthood.

Prior studies have found positive impacts of HMRE programming on students' relationship skills, attitudes, and knowledge around the time the program ends. However, there is less evidence on whether these programs have sustained impacts on students' outcomes over a longer period. In addition, providers often find it hard to secure the class time necessary for a meaningful amount of programming, and they may shorten or drop lessons from the curriculum to fit within the allotted time. There is currently no rigorous evidence on the effects of shortening an HMRE curriculum for youth.

Primary research questions

The present study sought to address two interrelated research questions:

1. What is the impact of offering HMRE programming as part of the regular school curriculum on high school students' relationship skills, attitudes, and knowledge beyond the end of programming?
2. How does shortening an HMRE program influence the impact on students' relationship skills, attitudes, and knowledge beyond the end of programming?

Purpose

This report is the second in a series on the implementation and impacts of an HMRE program delivered to students in two Atlanta-area high schools. For the study, trained facilitators from More than Conquerors Inc., a nonprofit social service agency near Atlanta, delivered the *Relationships Smarts PLUS (RQ+)* Version 3.0 curriculum in health classes for primarily 9th grade students. The impact study compared groups of students who were offered two different versions of the curriculum—the full 12-lesson, 18 hour version and a shortened 8-lesson, 12 hour version developed for this study—against a control group of students who were not offered any HMRE programming.

This report documents the study methods and presents program impacts based on follow-up data collected one year after students enrolled in the study. Exploratory analyses also use data from a program exit survey. An earlier report provides detailed information on the program's design and implementation. A future report will examine longer-term program impacts based on a follow-up survey of students two to three years after they enrolled in the study. The study was conducted by Mathematica and Public Strategies as part of the Strengthening Relationship Education and Marriage Services (STREAMS) evaluation for the Administration for Children and Families in the U.S. Department of Health and Human Services.

What we learned

- One year after study enrollment, students offered the full *RQ+* curriculum and students in the control group reported similar levels on 9 of 10 outcomes related to their relationship skills, attitudes, and knowledge. For one outcome related to unrealistic relationship beliefs, students offered the full *RQ+* curriculum were more likely than students in the control group to disagree with the belief that feelings of love are enough to sustain a happy marriage.
- One year after study enrollment, the impacts for students offered the full, 12-lesson version of *RQ+* were not consistently different from the impacts for students offered the shortened, 8-lesson version.
- Exploratory analyses uncovered small, positive impacts of both the full and shortened versions of *RQ+* on students' relationship attitudes immediately after the program ended, but they did not uncover evidence of impacts on students' relationship expectations or experiences after one year.
- Taken together, the overall pattern of results suggests that the program had the expected immediate impacts on some outcomes at the end of the program, but that these impacts faded by one year after the program ended. Offering 12 versus 8 lessons had no influence on the overall pattern of results.

Methods

During two consecutive school years, 1,862 students from 61 health classes in two high schools received permission from a parent or guardian to participate. The study team randomly assigned each health class to one of three research groups: (1) a group that was offered the full 12-lesson, 18 hour *RQ+* curriculum, (2) a group that was offered the shortened 8-lesson, 12 hour *RQ+* curriculum, and (3) a control group that was not offered any HMRE programming. For the impact analysis presented in this report, we used data from a one-year follow-up survey administered to students in all three research groups to compare students on 10 outcomes related to their relationship skills, knowledge, and attitudes. For the exploratory analyses, we used data from a program exit survey to measure impacts on students' relationship attitudes immediately following the program, and we used data from the one-year follow-up survey to measure impacts on outcomes related to students' relationship expectations and experiences.

Considerations for HMRE programs and research

The results of this study provide practical guidance for some of the key choices schools and program providers must make in planning an HMRE program for high school students. For both versions of the curriculum, we learned that schools can reasonably expect to have impacts on students' relationship attitudes around the time the program ends but that these impacts are likely to fade after the end of programming. For schools and program providers that want to increase the chances for sustained impacts after the end of programming, the findings suggest that current program models may not be intensive enough to have a lasting impact on students' outcomes. Therefore, schools may need to devote more time to HMRE programming or sustain programming over a longer period. Alternatively, providers could choose to offer the program at a time when it may be more relevant to students, such as later in high school when students are more likely to be dating someone than early in high school.

Research on HMRE programs for high school students is still in its early stages. This study was one of the first to use a random assignment design to examine the impacts of HMRE programming on students' relationship skills, attitudes, and knowledge beyond the end of programming. Future studies should assess long-term impacts of different curricula on the same and different outcomes for youth to provide additional evidence on how HMRE programs may have a lasting impact of adolescents' future romantic relationships. Additionally, programs should be implemented in various settings to identify those that might have favorable, long-term impacts on youth relationships.

Introduction

Healthy marriage and relationship education (HMRE) programs for youth, and high school students in particular, aim to fill a common gap in what students learn about relationships in school. Although high schools often provide instruction on avoiding teen pregnancy and sexually transmitted infections (STIs), few provide information on the social or emotional aspects of romantic relationships (Centers for Disease Control and Prevention 2015). This gap is important in part because while rates of teen pregnancy and sexual activity among high school students have declined in recent years (Abama and Martinez 2017), many young people say they want more information and support when it comes to romantic relationships (Weissbourd et al. 2017).

HMRE programs help fill this gap by providing students education on relationships through structured, classroom-based curricula. Commonly used curricula cover topics such as knowing when you are ready for a relationship, understanding the difference between healthy and unhealthy relationships, avoiding teen dating violence, communicating effectively, and managing conflict (Scott and Huz 2020). Some but not all curricula provide information on decision making about sexual activity and ways to avoid teen pregnancy and STIs. The programs are delivered by trained teachers or facilitators to small groups of 15 to 30 youth and typically involve a mix of teacher-led instruction and more interactive activities, such as small-group discussions, role-plays, and skill-building exercises. The programs are often provided as part of an existing high school class, such as health or family and consumer sciences (Scott et al. 2017; Scott and Huz 2020). Other programs take place in after-school programs or community-based settings. Since the mid-2000s, the federal government has funded HMRE programs for youth through the competitive Healthy Marriage grant program administered by the Office of Family Assistance (OFA) in the Administration for Children and Families (ACF) at the U.S. Department of Health and Human Services. To date, the state and local organizations funded by these grants have provided HMRE programming to more than 80,000 youth around the country (Avellar et al. 2020; Scott et al. 2017).

Prior studies have provided some evidence on the effectiveness of delivering HMRE programming to high school students, but questions remain. Studies have found positive impacts on students' relationship skills, attitudes, and knowledge around the time the program ends (Simpson et al. 2018). However, there is less evidence on whether these programs have sustained impacts on students' outcomes over a longer period. In addition, for programs delivered in schools, providers can find it hard to secure the class time necessary for a meaningful amount of programming. Common HMRE curricula for high school students typically include 10 to 15 lessons, each 60- to 90-minutes in length (Scott et al. 2017; Scott and Huz 2020). In schools with limited classroom time available, program developers and providers have shortened or dropped lessons from the full curriculum to fit within the allotted time (Futris et al. 2013; McElwain et al. 2016). However, reducing the dosage of programming might also reduce the breadth or duration of impacts on students' outcomes. There is currently no rigorous evidence to suggest whether shortening or significantly adapting an HMRE curriculum for youth could interfere with the curriculum's intended effects.

To expand available evidence on HMRE programs for high school students, ACF's Office of Planning, Research, and Evaluation with funding from OFA contracted with Mathematica and its partner, Public Strategies, to conduct a random assignment impact study and an accompanying implementation study of an HMRE program for high school students as part of the Strengthening Relationship Education and Marriage Services (STREAMS) evaluation. As discussed in this report, the impact study sought to

address two interrelated questions of practical importance to HMRE program developers, providers, and policymakers:

1. What is the impact of offering HMRE programming as part of the regular school curriculum on high school students' relationship skills, attitudes, and knowledge beyond the end of programming?
2. How does shortening an HMRE program influence the impact on students' relationship skills, attitudes, and knowledge beyond the end of programming?

To conduct this study, Mathematica and Public Strategies collaborated with More Than Conquerors Inc. (MTCI), a nonprofit social service agency near Atlanta, Georgia. MTCI received a federal grant from OFA in 2015 to deliver *Relationship Smarts PLUS* Version 3.0 to youth in high school. *Relationship Smarts PLUS*—which is often referred to by its nickname, *RQ+*, to reflect its emphasis on improving relationship IQ—is a widely implemented HMRE curriculum for youth. For STREAMS, MTCI delivered *RQ+* in two Atlanta-area high schools as part of a semester-long health class for primarily 9th grade students. As discussed in this report, the impact study compared two different versions of the curriculum—the full 12-lesson version and a shortened 8-lesson version—against a control group of students who were not offered any HMRE programming.

This report is the second in a series on the implementation and impacts of *RQ+* as delivered by MTCI in two Atlanta-area high schools. It presents findings from the impact study based on follow-up survey data collected one year after students enrolled in the study. Additional analyses use data from a program exit survey to compare short-term impacts on students' outcomes with the findings of prior research. The report also describes the students who participated in the study, provides information on program costs and implementation, and documents the study methods. An earlier report provided detailed information on the program's design and implementation during the first year of the impact study (Baumgartner and Zaveri 2018). A future report will examine longer-term program impacts based on a follow-up survey of students two to three years after they enrolled in the study.

About the STREAMS evaluation

Since the early 2000s, the Administration for Children and Families (ACF) in the U.S. Department of Health and Human Services has led a sustained effort to expand available evidence on healthy marriage and relationship education (HMRE) programs. In 2015, ACF contracted with Mathematica and its partner, Public Strategies, to conduct the Strengthening Relationship Education and Marriage Services (STREAMS) evaluation to help identify strategies for improving the delivery and effectiveness of HMRE programs. The evaluation has a particular emphasis on understudied populations and program approaches not covered in ACF's prior federal evaluations. STREAMS includes in-depth process studies, random assignment impact studies, a rapid-cycle evaluation of text message reminders to improve attendance at HMRE group workshops, a formative evaluation of a facilitation training curriculum for HMRE programs for high school students, and predictive analytic modeling of attendance at HMRE group workshops. Learn more about the evaluation at <https://www.acf.hhs.gov/opre/research/project/strengthening-relationship-education-and-marriage-services-streams>.▲

Background on HMRE programming for high school students

HMRE programs for high school students are delivered during a key stage in life during which many young people want and need help learning how to navigate romantic relationships. Many youth experience their first romantic relationship in high school, although the number of youth who report dating has declined in recent years. In 2001, 78 percent of high school seniors reported dating, compared to 51 percent in 2017 (Eickmeyer et al. 2020). On a national survey of young adults, more than half of youth said they wished they had received more guidance on romantic relationships in school (Weissbourd et al. 2017). In a related survey of high school students, slightly more than 40 percent said they wanted to talk with adults in their schools about how to have a mature romantic relationship, while almost 30 percent said they wanted to talk about how to deal with breakups (Weissbourd et al. 2017).

The theory behind curriculum-based HMRE programs for youth suggests the potential for both short- and long-term effects. Like many educational programs for youth, HMRE programs aim to have a direct, immediate impact on participants' skills, attitudes, and knowledge. They primarily seek to inform participants' expectations and beliefs about romantic relationships, as well as to improve participants' communication and relationship skills (Hawkins 2017; Karney et al. 2007; Stanley et al. 2020). In addition to expecting these immediate effects, some researchers and practitioners see HMRE programs as also playing a broader, more long-term role in promoting relationship quality and stability beginning in adolescence and extending into adulthood (Hawkins 2017). Research shows that relationships in adolescence can shape a person's attitudes, skills, and behaviors in lasting ways (Karney et al. 2007). If this is the case, then providing HMRE programming to high school students might have the potential to improve adult relationship quality and stability by setting a foundation for positive relationship experiences earlier in life.

When offered in school as part of an existing class such as health or family and consumer sciences, HMRE programs for high school students take a universal prevention approach in the sense that all students have a chance to participate regardless of their current relationship status or prior relationship experiences (Wadsworth and Markman 2012). In a typical school setting, only some students will be in a relationship at the time they receive the program. For other students, the instruction they receive on romantic relationships will not have a direct application to their lives until the future. Partly for this reason, many youth HMRE programs address additional topics of potential relevance to all students, such as personal values and goals or relationships with family and friends. In other cases, program providers have steered away from universal programs in favor of a more selective strategy—for example, by offering HMRE programming outside of school to teen parents or higher risk youth who were more likely to be in a romantic relationship at the time of the program (Allen et al. 2014; Barbee et al. 2016).

Research on HMRE programs for high school students indicates that most participants appreciate the content. For example, a recent large-scale study summarized the characteristics and experiences of more than 45,000 youth who received federally funded HMRE programming over a nearly three-year period from July 2016 to March 2019 (Avellar et al. 2020). The youth were offered group-based HMRE workshops either in school or through a local community-based organization. At the end of the workshops, participants completed a survey on their experiences with the programs. Among those youth who completed the survey, 94 percent reported having learned new skills they planned to use in their relationships and 92 percent reported confidence in their ability to use the skills and knowledge they learned from the program. When asked how much the programs had helped them, more than 90 percent said the programs had helped them either “a lot” or “a little”; only 5 percent said the programs did not help them.

Consistent with these findings, studies suggest that HMRE programs can improve youth's relationship skills, attitudes, and knowledge around the time the program ends. A meta-analysis of 15 studies of HMRE programs for youth ages 13 to 18 found evidence that programming can affect youths' relationship skills and attitudes, such as reducing their adherence to immature relationship beliefs and improving their ability to recognize signs of unhealthy or dangerous relationships (Simpson et al. 2018). However, most of these studies were not designed to test the impact of HMRE programming on participants' outcomes by using a comparison group. Instead, they estimated program effects by comparing participants' outcomes before and after they participated in the program. Other studies included in the meta-analysis estimated program effects by comparing participants' outcomes to a control group of youth that may have differed in ways other than their participation in the program. Only three of the studies used an experimental, randomized controlled trial (RCT) design to estimate program impacts. On average, studies that used a more rigorous research design found smaller impacts on these outcomes (Simpson et al. 2018). Studies that compared participants' outcomes before and after the program found an average effect size of 0.36 on outcomes measuring youth's relationship attitudes and knowledge and 0.46 on outcomes measuring their relationship skills. In comparison, studies that included a control group found an average effect size of 0.28 on outcomes measuring relationship attitudes and knowledge and 0.18 on outcomes measuring relationship skills. All of these outcomes were measured immediately or within a few weeks of the program's ending.

Research has yielded less evidence on whether impacts on students' relationship skills, attitudes, and knowledge can be sustained over a longer period (Simpson et al. 2018). For example, a multi-year evaluation examined the effectiveness of an earlier version of *RQ+*, the same curriculum used in the present study (Kerpelman et al. 2009; Kerpelman et al. 2010). This evaluation found that one year after the program, students in the study's program group maintained fewer faulty relationship beliefs—such as believing that feelings of love should be enough to sustain a happy marriage—than students in the study's control group. Students in the program group also had better conflict management skills and higher standards for future romantic partners one year after the program (Kerpelman et al. 2009; Kerpelman et al. 2010). However, fewer than 25 percent of students in the study sample responded to the one-year follow-up survey, raising the possibility that the findings were unique to the select subset of students who completed the survey and might not constitute an unbiased estimate of program impacts.

Relatedly, research has offered little evidence on the potential of these programs to achieve the broader goal of improving the longer-term trajectory of students' relationship behaviors and experiences. Given the relatively short length of most programs (10 to 15 sessions) and few longer-term follow-up studies, researchers have generally not examined the potential for impacts on students' romantic relationship behaviors and experiences, such as when they have their first romantic relationship, the stability and quality of their relationships, or their likelihood of getting married or being in a committed relationship as an adult. Instead, studies have focused on more proximate or surrogate outcomes that might predict relationship behaviors and experiences in the future (De Gruttola et al. 2001). For example, a quasi-experimental study of an in-school HMRE program found that those in the program reported lower use of verbal aggression in their dating relationships than those in a control group (Schramm and Gomez-Scott 2012). Likewise, an RCT of a community-based HMRE program for youth ages 14 to 19 found that program participation was associated with higher rates of birth control use and fewer sexual partners six months after the program ended (Barbee et al. 2016). There is limited evidence on the impacts of HMRE programs for high school students when it comes to relationship quality and stability in adulthood.

The *Relationship Smarts PLUS 3.0* curriculum

For the present study, students received lessons from *RQ+*, a widely used HMRE curriculum for youth ages 13 to 18 distributed by The Dibble Institute (Dibble Institute 2021). The first version of the curriculum was released in 2007. According to the curriculum developer, it was designed to help youth learn about themselves and their values, plan for the future, understand more about the characteristics of healthy relationships, and develop skills to form and maintain healthy relationships (Pearson and Reed 2015). Since then, it has been periodically updated to include new content and highlight findings from the latest research on healthy relationships. The present study focuses on Version 3.0 of *RQ+*, the version available when the study started in 2016. The Dibble Institute released Version 4.0 of the curriculum in 2018. As noted above, a prior evaluation conducted with high school students in Alabama examined the impacts of an earlier version of *RQ+* (Kerpelman et al. 2009; Kerpelman et al. 2010; Ma et al. 2014).

The full *RQ+* Version 3.0 curriculum includes 12 lessons, each lasting about 90 minutes. The lessons are interactive and flexible, featuring full-class and small-group discussions as well as activities such as role-plays, drawing, and games. Facilitators can use a slide deck and instructor manual provided by the distributor to guide the lessons, but the curriculum developer encourages facilitators to modify the curriculum based on their audience, community standards, and cultural context. Youth receive a workbook for completing individual and small-group classroom activities as well as short homework assignments. Each lesson also includes an assignment for youth to take home and complete with a parent or trusted adult. The curriculum distributor offers training on *RQ+*, but facilitators are not required to be trained to deliver the curriculum. Facilitators can deliver sessions either in school as part of the regular school day or in after-school programs or other community-based settings.

The curriculum covers a broad range of topics (Table 1). Lessons are intended to be taught sequentially, building on one another. The first two lessons ask youth to reflect on their goals and values as well as the character traits they value in others. Lessons 3 through 7 cover healthy and dangerous relationships. Youth learn the characteristics of healthy relationships and principles to help guide early relationship development. They also learn the warning signs of unhealthy relationships and strategies for how to exit those relationships safely. In Lessons 8 and 9, youth learn about communication and conflict management, including techniques for becoming a better listener and solving problems with a romantic partner. Lessons 10 and 11 cover intimacy and sexual decision making, including information on preventing pregnancy and STIs. The final lesson addresses the role of technology and social media in relationships.

Table 1. Summary of RQ+ lessons

Lesson name	Lesson overview
1. Who am I, and where am I going?	Youth learn more about themselves, their development, and what is important to them, and they identify future goals.
2. Maturity issues and what I value	Youth discuss what maturity looks like from physical, mental, emotional, and social perspectives; prioritize values that are important to them; and discuss character traits they value in others.
3. Attraction and infatuation	Youth think about the foundational elements of healthy relationships and how they develop, and they learn about the brain chemistry of attraction to understand the importance of taking a new relationship slowly.
4. Principles of smart relationships	Youth learn seven research-based principles to use when starting a romantic or peer relationship, and they learn about the concept of mature, balanced love.
5. Is it a healthy relationship?	Youth learn how to tell if a relationship is healthy or unhealthy and why people sometimes find themselves in unhealthy relationships.
6. Decide, don't slide	Youth learn and apply the concept of sliding versus deciding, or making clear and active decisions related to life, relationships, and the timing of family formation.
7. Dating violence and breaking up	Youth learn about why people break up, how to tell when it's time to break up, and healthy ways to break up. They also learn to recognize early signs of dating violence and how to get help if they or someone they know are a victim of dating violence.
8. Communication and healthy relationships	Youth examine communication patterns they experienced growing up and become aware of patterns that damage relationships. They also learn communication skills, such as taking a time-out and the speaker-listener technique.
9. Communication challenges and more skills	Youth further build communication skills and learn to recognize hidden issues in arguments and to solve problems with their partner.
10. Sexual decision making	Youth apply the concept of sliding versus deciding to choices about sex; begin to understand the dimensions of intimacy and the social and emotional sides of sex; identify sexual boundaries; get medically accurate information on pregnancy and sexually transmitted infections; and role-play how to say "no" in risky situations.
11. Unplanned pregnancy through the eyes of a child	Youth consider the social, emotional, and financial benefits of parents' healthy relationships to the child and discuss what it means to be a good parent.
12. Teens, technology, and social media	Youth reflect on the role of technology and social media in their lives and the risks, discuss how they influence honesty and social-emotional skills, and develop a personal success plan.

RQ+ = *Relationship Smarts PLUS*.

Implementing RQ+ in Georgia

MTCI is a nonprofit social service provider in suburban Atlanta with a long history of providing HMRE programming. In 2015, MTCI received a federal grant from OFA to deliver *RQ+* to Atlanta-area high school students. The organization had received two earlier rounds of grant funding from OFA in 2006 and 2011, which it used to serve more than 2,000 high school students. In Georgia, public high schools require students to take a single semester of health. MTCI partnered with several local high schools to deliver HMRE programming as part of these required classes. With its 2015 round of funding, MTCI decided to deliver *RQ+*, a curriculum it had not used before, because the organization determined that it was age-appropriate for its target population of youth entering high school.

Based on MTCI's grant application, Mathematica contacted MTCI in fall 2015 about participating as a site in the STREAMS evaluation. The study team identified MTCI as a promising site for an impact study

because of its history of successfully delivering HMRE programming to high school students through prior rounds of OFA grant funding. In addition, for the 2015 round of grant funding, MTCI planned to serve enough students to support a random assignment program impact study. The implementation setting also would allow for a strong test of the study's research questions. The organization's plan to deliver a widely distributed HMRE curriculum (*RQ+*) would enable a direct comparison of the study's results with the findings of prior research and maximize the study's relevance for other HMRE program providers.

The STREAMS study team worked in collaboration with staff from MTCI and a local county health department (Gwinnett, Newton, and Rockdale County Health) to develop a program implementation plan that would support a random assignment impact study. For the study, MTCI had interest in both (1) assessing the overall impact of its programming and (2) learning whether and how program impacts varied according to the number of instructional hours students received. Like other HMRE providers, MTCI had found it challenging to fit its in-school programming into the limited available class time. As part of its 2015 round of grant funding, MTCI proposed investigating the importance of instructional hours on youth outcomes. The study team worked with MTCI to refine these interests into a design for a random assignment impact study and develop an implementation plan that aligned with the study's overarching research questions. A separate report provides additional information on MTCI's program design and implementation during the first year of the impact study (Baumgartner and Zaveri 2018).

The impact study design called for MTCI facilitators to deliver two different versions of *RQ+* as part of their semester-long health classes: (1) the full 12-lesson version of the curriculum and (2) a shortened 8-lesson version. MTCI hired and trained a group of facilitators to deliver the *RQ+* lessons in school during the regular school day. These facilitators delivered *RQ+* during regularly scheduled health classes once or twice per week, accounting for holidays and other school constraints and closures. To generate a sufficient sample size for the impact study, MTCI worked with staff from the local health department to recruit two large public high schools to participate in the study and made plans with each school to enroll students in the study and deliver programming over two consecutive school years (the 2016–2017 and 2017–2018 school years).

To create the shortened version of *RQ+* required for the study, the STREAMS study team and MTCI consulted with the curriculum developer and distributor. Together, the group decided that the shortened 8-lesson version of the curriculum would exclude the standard lessons on communication and conflict management skills (Lessons 8 and 9), sexual decision making (Lesson 10), and unplanned pregnancy (Lesson 11). The group decided that removing these later lessons would be less disruptive to students' comprehension of the curriculum than removing any of the earlier lessons because some concepts from earlier lessons are revisited later in the curriculum. In addition, the decision to remove 4 full lessons from the curriculum rather than deliver condensed versions of all 12 lessons would allow students who received the shortened curriculum to cover selected topics with the same depth as students who received the full curriculum. The decision also made it easier for MTCI to train facilitators and maintain fidelity to the curriculum, especially because MTCI used the same facilitators to deliver the full and shortened versions. To support MTCI's delivery of the shortened version of *RQ+*, the curriculum distributor developed a customized slide deck and workbooks that removed references to content taught in Lessons 8 through 11. As a result of this process, MTCI had the training and materials necessary to deliver two different versions of *RQ+* that were identical in all respects except for the 4 excluded lessons (Table 2). For both versions of the curriculum, each lesson was planned to include 90 minutes of material. The amount of planned instructional time totaled 18 hours for the full curriculum and 12 hours for the shortened curriculum.

Table 2. Lessons included in the full and shortened versions of RQ+

Lesson name	Full version	Shortened version
1. Who am I and where am I going?	✓	✓
2. Maturity issues and what I value	✓	✓
3. Attraction and infatuation	✓	✓
4. Principles of smart relationships	✓	✓
5. Is it a healthy relationship?	✓	✓
6. Decide, don't slide	✓	✓
7. Dating violence and breaking up	✓	✓
8. Communication and healthy relationships	✓	
9. Communication challenges and more skills	✓	
10. Sexual decision-making	✓	
11. Unplanned pregnancy through the eyes of a child	✓	
12. Teens, technology, and social media	✓	✓

RQ+ = *Relationship Smarts PLUS*.

Study design

The impact study used a random assignment design that compared the outcomes of students across three research groups. Students in one group were offered the full 12-lesson RQ+ curriculum. Students in a second group were offered the shortened 8-lesson version of RQ+. Students in a third research group were not offered any HMRE programming.

Sample intake

The STREAMS study team worked with staff from MTCI and the county health department to enroll students from the health classes of the two participating high schools for two consecutive school years (the 2016–2017 and 2017–2018 school years). The schools were both large public high schools in Gwinnett County, northeast of Atlanta. Across the two schools, the study team invited students from 61 health classes to participate. The classes served primarily 9th-grade students but also included some older students who had not previously taken health. The classes were each a semester long and were held during either the fall or spring semester.

All students in the selected health classes were eligible to participate, but they had to receive permission from a parent or guardian. Permission covered participation in both the study and the program, which MTCI facilitators delivered as part of the regular classroom instruction. Participation in both the study and programming was voluntary. The parents or guardians of the students had on average two to three weeks to sign and return the permission forms at the start of the semester. Students received a \$5 gift card for returning the form, regardless of whether their parents or guardians accepted or declined the invitation for the students to participate. For any students who did not return a completed permission form within this period, a member of the study team attempted to call the students' parents or guardians to request permission by telephone. Across the two schools, a total of 1,862 students received permission to participate, 604 in the full RQ+ group, 658 in the shortened RQ+ group, and 600 in the control group. In total, 93 percent of eligible students received permission to participate in the study. Permission rates were similar across the three research groups (92 percent for the full RQ+ group, 94 percent for the shortened RQ+ group, and 93 percent for the control group).

Random assignment

Concurrent with the permission process, the STREAMS study team randomly assigned each participating health class to one of the three research groups. The team conducted random assignment near the start of each semester, after the schools had set their class schedules for the semester. To ensure that each of the three research groups had an even mix of classes from the two study schools, the study team grouped the participating classes by school when conducting random assignment. During the two-year sample intake period, the team randomly assigned 21 classes to the group that was offered the full 12-lesson *RQ+* curriculum, 20 classes to the group that was offered the shortened 8-lesson version of the curriculum, and 20 classes to the control group that was not offered any HMRE programming. For classes assigned to either the control group or the group offered the shortened curriculum, MTCI staff delivered supplementary lessons from a job readiness curriculum called *12 Pluses for Work Readiness and Career Success*. The lessons covered such topics as career planning, resume writing, planning for a job search, appropriate workplace attire, and interview skills. For classes assigned to the control group, MTCI educators delivered twelve 90-minute lessons of the *12 Pluses* curriculum on average once or twice per week during the semester. For classrooms offered the shortened version of the *RQ+* curriculum, MTCI educators delivered four 90-minute lessons of the *12 Pluses* curriculum after the class completed the 8 *RQ+* lessons. With this design, students in all 61 study classes received the same total amount of instruction from the MTCI educators, but the content of the instruction differed across the study's three research groups. This design helped isolate the effects of the *RQ+* curriculum by making other aspects of the classroom environment as similar as possible across the treatment and control groups.

Because this approach to random assignment resulted in having students from all three research groups within the same schools, the study team made efforts to ensure that each class adhered to its assigned group and to minimize the risk of contamination or spillover effects (either from students switching classes or social interactions between students). These efforts included (1) waiting for schools to finalize class schedules at the start of each semester before conducting random assignment, (2) coordinating with MTCI to ensure that facilitators who delivered the *RQ+* lessons would not also deliver the supplementary job readiness curriculum (and vice versa), and (3) regularly monitoring data on student attendance and program activities. As discussed in more detail in the appendix to this report, we found little evidence that the study's approach to random assignment led to contamination or spillover effects. For example, the one-year follow-up survey asked students to report their level of exposure to HMRE programming in the past year, as well as their knowledge of their friends' exposure to HMRE programming. Compared to students offered either the full or shortened versions of *RQ+*, students in the control group were statistically significantly less likely to say they had attended a class in the prior year on romantic relationships or dating, dating violence, teen pregnancy or STIs, or marriage. Students in the control group were also statistically significantly less likely to say that their friends had attended a class about romantic relationships or dating, dating violence, or teen pregnancy or STIs.

Data collection

For the impact analysis presented in this report, we relied primarily on data from the following two surveys, which were administered to students in all three research groups:

1. **Baseline survey.** Near the start of the semester, before the MTCI facilitators had delivered any lessons, the members of the STREAMS study team administered a baseline survey to students in class. The survey collected information on the students' demographics, family backgrounds, attitudes, perceived skills, and relationship experiences. Of the 1,862 students who received permission for the

study, 1,836 students completed the baseline survey, for a response rate of 99 percent. The appendix to this report contains additional details on the survey administration procedures and response rates.

- 2. One-year follow-up survey.** About one year after the baseline survey, the study team attempted to contact students in all three research groups to complete a one-year follow-up survey. The team administered most of the surveys in school using tablet computers. For students no longer enrolled in a study school or who were otherwise unavailable to complete the survey in school, the team attempted to contact students outside of school to administer the survey by telephone. The survey collected information on students' attitudes, perceived skills, and relationship experiences in the year following the program. Of the 1,862 students who received permission for the study, 1,582 students completed the one-year follow-up survey, for a response rate of 85 percent. The response rate was similar for each of the three research groups (85 percent for the full *RQ+* group, 84 percent for the shortened *RQ+* group, and 86 percent for the control group).

In addition to these surveys, the study team also administered a shorter-term program exit survey at the end of each semester. This program exit survey was administered as a requirement of MTCI's grant from OFA and included a standardized set of survey questions that all grantees had to collect as a condition of their grant funding. Some but not all of the questions overlapped in content with the questions included on the STREAMS one-year follow-up survey. We used data from the program exit survey for one of our exploratory analyses (described later in this report). The study team also administered a longer-term follow-up survey to students two to three years after they enrolled in the study. Findings from that round of data collection will be presented in a future impact report.

Analysis

For the purpose of this report, we conducted both a confirmatory analysis and an exploratory analysis (Schochet 2009). We used the confirmatory analysis to answer the study's two research questions about (1) whether HMRE programs for high school students could lead to sustained impacts on students' relationship skills, attitudes, and knowledge and (2) how shortening an HMRE program influenced the impact on these outcomes. We used the exploratory analysis to aid interpretation of the confirmatory impact findings and to inform future research.

For the confirmatory analysis, we used data from the one-year follow-up survey to measure program impacts on 10 outcomes related to students' relationship skills, knowledge, and attitudes (Table 3). We selected these outcomes from among the many measures of relationship skills, knowledge, and attitudes available in the literature because they aligned with both the general theory behind HMRE programming for youth and the more specific goals and content of the *RQ+* curriculum. For example, the *RQ+* curriculum emphasizes the importance of communication in relationships and of making deliberate, intentional decisions about relationships. We selected measures of relationship skills that align with these themes. Similarly, for the measures of relationship attitudes and knowledge, we selected outcomes that align with specific content covered by one or more of the *RQ+* curriculum lessons. For each outcome, we measured program impacts by comparing students' average outcomes across the three research groups (full *RQ+* curriculum, shortened *RQ+* curriculum, and control group). We specified both the outcomes and methods before examining the data to prevent the perception that we decided which findings to report after seeing the results.

Table 3. Confirmatory outcomes

Outcome	Measure
Relationship skills targeted by the RQ+ curriculum	
Perceived general relationship skills	Continuous scale variable: Average of responses to six survey questions; each question asked students to report their level of agreement with a statement such as, “I believe I will be able to effectively deal with conflicts that arise in my relationship” or “I have the skills needed for a lasting, stable romantic relationship”; questions are a subset of items from the Relationship Deciding Scale (Vennum and Fincham 2011); scale values range from 1 to 4, with higher values indicating greater perceived relationship skills.
Perceived conflict management skills	Continuous scale variable: Average of responses to five survey questions; each question asked students to report their perceived ability to perform certain conflict management skills, such as listening to another person’s opinion during a disagreement or working through problems without arguing; adapted from the Conflict Management Subscale of the Interpersonal Competence Scale (Buhrmester et al. 1988); scale values range from 1 to 4, with higher values indicating greater perceived skills.
Relationship attitudes and knowledge targeted by the RQ+ curriculum	
Disagreement with unrealistic relationship beliefs	Series of three separate continuous variables: Each variable corresponds to students’ reported level of disagreement with the statements, “There is only one true love out there who is right for me to marry,” “In the end, feelings of love should be enough to sustain a happy marriage,” and “Living together before marriage will improve a couple’s chances of remaining happily married”; taken from the Attitudes About Romance and Mate Selection Scale (Cobb et al. 2003) and used in a prior evaluation of RQ+ by Kerpelman and colleagues (2009); each variable ranges from 1 to 4, with higher values indicating stronger disagreement.
Disapproval of teen dating violence	Continuous scale variable: Average of responses to 12 survey questions; each question asked students to report their level of disagreement with a statement such as, “A boy angry enough to hit his girlfriend must love her very much” and “There are times when violence between dating partners is okay”; taken from the Acceptance of Couple Violence Scale (Dahlberg et al. 2005); scale values range from 1 to 4, with higher values indicating greater disapproval of teen dating violence.
Desire to avoid teen pregnancy	Series of three separate continuous variables: Each variable corresponds to students’ reported level of agreement with the statements, “Getting pregnant in the next year or two would hurt my chances of being successful in life,” “If I got pregnant in the next year or two, I would have to become a responsible adult before I wanted to,” and “If I got pregnant in the next year or two, my life would become a lot better”; taken from the Evaluation of Adolescent Pregnancy Prevention Approaches (Smith et al. 2012); each variable ranges from 1 to 4, with higher values indicating a greater desire to avoid teen pregnancy.
Knowledge of pregnancy and STIs	Continuous index variable: Sum of correct responses to five true or false statements—for example, “All sexually transmitted infections (STIs) can be cured” (false) and “You cannot tell if a person has HIV by looking at them” (true); taken from the Evaluation of Adolescent Pregnancy Prevention Approaches (Smith et al. 2012); index values range from 0 to 5, indicating the total number of correct responses.

RQ+ = *Relationship Smarts PLUS*; STIs = sexually transmitted infections.

For the exploratory analysis, we used data from the program exit survey to measure impacts on students’ relationship attitudes immediately following the program, because previous research has found impacts on these outcomes at program exit. We compared the findings from this analysis with our confirmatory impact findings measured after one year to aid the interpretation of our results. Because the program exit survey was administered as a requirement of MTCI’s grant from OFA and covered only some of the same content as the STREAMS one-year follow-up survey, the results of this analysis are less comprehensive

than the results of our confirmatory analysis. From the program exit survey, we included six measures of students' relationship attitudes that best align with our confirmatory outcomes and the outcomes used in prior studies.

For the exploratory analysis, we also used data from the one-year follow-up survey to measure program impacts on outcomes related to students' relationship expectations and experiences. As discussed earlier in the report, research has provided little evidence so far on whether HMRE programs for high school students are achieving their broader goal of improving the trajectory of students' relationship behaviors and experiences in adolescence and adulthood. Although data from a one-year follow-up survey cannot provide a definitive answer to this question, the analysis can speak to the potential for such impacts to emerge in the future. To explore this possibility, we examined program impacts on 10 outcomes related to students' relationship expectations and experiences from the one-year follow-up survey. Data from the study's long-term follow-up survey (described earlier) will enable us to conduct an even stronger test of whether the program had impacts on these outcomes. The appendix to this report provides a more detailed description of our exploratory outcomes from the program exit survey and one-year follow-up survey.

Characteristics of students in the study

The two schools that participated in the study are large, public high schools that draw students from racially and ethnically diverse neighborhoods (Table 4). More than half of the students in the study sample identified as Hispanic (56 percent) and about one-quarter identified as Black (26 percent). Some 41 percent of students said they primarily spoke Spanish at home, while 9 percent reported speaking multiple languages or a language other than English or Spanish. Students in these high schools are more economically disadvantaged than average. Among the students in the two study schools, 76 percent were eligible for free or reduced-price lunch, compared with 61 percent of students statewide and 53 percent of students nationally (National Center for Education Statistics 2018). On the baseline survey, 51 percent of students reported living with both biological parents, compared with 67 percent among all children ages 12 to 17 nationally (U.S. Census Bureau 2018).

Table 4. Student demographic characteristics at baseline

Measure	Percentage
Grade in school	
9th grade	87
10th grade or higher	13
Gender	
Male	53
Female	47
Race and ethnicity	
Hispanic	56
Black, non-Hispanic	26
White, non-Hispanic	5
Other	13
Born outside of the United States	18
Primary language spoken at home	
English	49
Spanish	41
Other	9
Living arrangements	
Lives with both biological parents	51
Lives with biological mother only	39
Lives with biological father only	4
Lives with neither biological parent	6
Biological parents are currently married	45
Sample size	1,836

Source: Baseline survey conducted by Mathematica.

Note: Percentages may not sum to 100 due to rounding.

Students reported relatively limited exposure to prior instruction on sexual decision making and romantic relationships (Table 5). At the time of study enrollment, about one in four students reported attending a class on teen pregnancy or STIs (29 percent) or romantic relationships or dating in the past year (24 percent). Fewer students reported attending a class on dating violence (11 percent) or marriage (8 percent). Students also reported limited involvement in dating relationships and sexual activity. Thirty percent of students reported currently being in a dating relationship on the baseline survey and 15 percent reported having ever had sexual intercourse. Data from national surveys indicate that the percentage of high school students who report experience with dating and sexual activity increases with age (Abama and Martinez 2017; Eickmeyer et al. 2020).

Table 5. Student relationship experiences and expectations at baseline

Measure	Percentage
Attended a class in the prior year on:	
Romantic relationships or dating	24
Dating violence	11
Teen pregnancy or STIs	29
Marriage	8
Currently in a dating relationship	30
Ever had sexual intercourse	15
Expects to get married	
Almost no chance	4
Some chance	13
Fifty-fifty chance	33
Good chance	36
Almost certain	13
Sample size	1,836

Source: Baseline survey conducted by Mathematica.

Note: Percentages may not sum to 100 due to rounding.

STIs = sexually transmitted infections.

Program implementation and costs

An earlier process study of the program concluded that it was well implemented and that facilitators delivered both versions of the *RQ+* curriculum as intended (Baumgartner and Zaveri 2018). The process study collected data on MTCI’s implementation of the program during the 2016–2017 school year. As part of the data collection for the study, facilitators completed a short self-assessment after each class about how closely they adhered to the curriculum materials and planned content. In more than 90 percent of classes, facilitators reported using all of the intended curriculum materials and following all of the instructional guidance in the manual. In focus groups, students reported liking that the classes were more interactive than lecture based. For example, one lesson included a “values auction” in which students used fake money to prioritize and bid on things they valued, such as having a best friend, going to college, getting married, and having children. Students felt that such interactive activities kept them engaged. Students also liked that many of the lessons, such as those on communication and recognizing the signs of healthy and unhealthy relationships, addressed skills that could be used to improve their friendships in addition to their current or future dating relationships.

Based on cost information from MTCI, the STREAMS study team estimated the cost to deliver the full 12-lesson version of *RQ+* as \$1,163 per student. Personnel costs for the facilitators and other support and administrative staff accounted for the largest portion (80 percent) of these costs. Contracted services, which included a community liaison and financial and IT support, accounted for an additional 14 percent of the costs. To our knowledge, these estimates reflect the first publicly reported cost information on HMRE programs for high school students, so we were unable to determine if these costs are typical. However, a cost study of 28 evidence-based teen pregnancy prevention programs for adolescents found that the median program cost was \$927 per participant (Zaveri et al. 2017), slightly less than MTCI’s cost of implementing *RQ+*. The programs included in that study served similar populations of youth but were

not limited to school-based programs. The appendix to this report contains additional detail on the cost estimates and how they were calculated.

Students who participated in the study attended the program classes at high rates (Table 6). As part of its OFA grant, MTCI entered data on student attendance and program activities into a secure data system. These data show that average attendance rates (defined as the average portion of students in attendance at each class) were around 90 percent for each research group. As a result, students received most of the intended content. On average, students in classes randomly assigned to the full *RQ+* group received 16.5 hours of *RQ+* content out of 18 possible hours. Students in classes randomly assigned to the shortened *RQ+* group received an average of 11.2 hours of *RQ+* content out of 12 possible hours, and they received an average of 5.3 hours of content from the supplemental job readiness curriculum (*12 Pluses*) out of 6 possible hours. Students in classes randomly assigned to the control group received an average of 16.3 hours of the job readiness curriculum (*12 Pluses*) content out of 18 possible hours; as intended, they did not receive any HMRE content from the *RQ+* curriculum.

Table 6. Attendance and hours of content received by students

	Full <i>RQ+</i>	Shortened <i>RQ+</i>	Control
Attended at least one class period (%)	99.5	99.5	100.0
Average attendance rate (%)	89.3	88.6	89.0
Average hours of content received			
Average hours of <i>RQ+</i> content received	16.5	11.2	0.0
Average hours of <i>12 Pluses</i> content received	0.1	5.3	16.3
Total average hours received	16.6	16.5	16.3
Sample size	604	658	600

Source: Electronic attendance records entered by MTCI staff.

12 Pluses = *12 Pluses for Work Readiness and Career Success*, the job readiness curriculum offered to students in the control group and shortened *RQ+* group; *RQ+* = *Relationship Smarts PLUS*.

One challenge MTCI faced was a lack of Spanish-speaking facilitators to work with the substantial proportion of students whose primary language was Spanish (41 percent). Most of the *RQ+* facilitators were African American; no facilitators identified as Hispanic or Latino, and only one spoke Spanish (Baumgartner and Zaveri 2018). During the first year of the study, facilitators primarily attempted to engage Spanish-speaking students by pairing them with students who were fluent in both English and Spanish and asking these students to translate parts of the lessons and activities. During the following summer, MTCI worked with the STREAMS study team and the *RQ+* curriculum distributor to translate many of the workbook and homework assignments into Spanish. Facilitators distributed these translated materials to Spanish-speaking students during the second year of the study. In addition, before the second year of the study, MTCI facilitators participated in a training delivered by local experts about best practices for working with English-language learners and understanding the cultural and familial backgrounds of their Hispanic and Latino students. We accounted for this implementation challenge in the impact analysis by conducting a subgroup analysis for possible differences in program impacts on confirmatory outcomes based on students' primary language spoken at home (as described in the appendix).

Program impacts

For the purpose of this report, we focus the presentation of program impacts on the study's two main research questions. First, to assess whether HMRE programming for high school students can lead to sustained impacts on students' relationship skills, attitudes, and knowledge after programming has ended, we focus on the comparison of students offered the full, 12-lesson version of *RQ+* with students in the control group who were not offered any HMRE programming. Next, to assess how shortening an HMRE program influences the impacts on students' relationship skills, attitudes, and knowledge beyond the end of programming, we focus on the comparison of students offered the full version of *RQ+* with students offered the shortened, 8-lesson version of the curriculum designed for this study. To supplement these results, we end this section of the report by presenting findings from our exploratory analysis, which focused on additional outcomes from the program exit survey and the one-year follow-up survey.

Impacts on relationship skills, attitudes, and knowledge after one year

We found limited evidence of impacts on students' relationship skills, attitudes, and knowledge after one year. Compared to students in the control group, students offered the full *RQ+* curriculum reported similar levels of relationship skills, attitudes, and knowledge for 9 of the 10 outcome measures (Table 7). For example, for our measure of general relationship skills, students in the full *RQ+* group averaged 3.07, while students in the control group averaged 3.08. For our measure of conflict management skills, students in both groups averaged 2.67. Both scales ranged from 1 to 4, with higher values indicating greater perceived skills. Therefore, the reported averages for both groups reflected a moderate level of perceived skills. Students in the full *RQ+* group and students in the control group both reported high levels of disapproval of teen dating violence and a strong desire to avoid teen pregnancy. For our measure of knowledge of pregnancy and STIs, students in both groups answered on average just under three out of five knowledge questions correctly.

Table 7. Impacts on students’ relationship skills, attitudes, and knowledge after one year

Measure	Full RQ+ group	Control group	Impact	Effect size
Relationship skills				
Perceived general relationship skills (range = 1 to 4)	3.07	3.08	-0.01	-0.02
Perceived conflict management skills (range = 1 to 4)	2.67	2.67	-0.00	-0.01
Relationship attitudes and knowledge				
Disagreement with unrealistic relationship beliefs (ranges = 1 to 4)				
Belief in only one true love	2.57	2.49	0.07	0.08
Belief that love is enough to sustain a happy marriage	2.54	2.42	0.12**	0.14
Belief that cohabiting will improve the chances of a happy marriage	2.34	2.35	-0.01	-0.01
Disapproval of teen dating violence scale (range = 1 to 4)	3.59	3.59	-0.00	-0.00
Desire to avoid teen pregnancy (ranges = 1 to 4)				
Teen pregnancy would hurt my chances of being successful	3.09	3.08	0.02	0.02
Teen pregnancy would make me become a responsible adult before I wanted to	3.19	3.23	-0.04	-0.05
Teen pregnancy would make my life a lot better (reverse coded)	3.29	3.33	-0.03	-0.05
Knowledge of pregnancy and STIs index (range = 0 to 5)	2.99	2.94	0.05	0.03
Sample size	513	517		

Source: Baseline and one-year follow-up surveys conducted by Mathematica.

Note: The numbers in the columns labeled Full RQ+ group and Control group are regression-adjusted means on the one-year follow-up survey for each study group.

***/**/* Impact estimates are statistically significant at the .01/.05/.10 levels, respectively, two-tailed test.

RQ+ = *Relationship Smarts PLUS*; STIs = sexually transmitted infections.

We did find a statistically significant impact for one of our three measures of unrealistic relationship beliefs. Specifically, students offered the full RQ+ curriculum were more likely than students in the control group to disagree with the belief that feelings of love are enough to sustain a happy marriage (Table 7). On a scale ranging from 1 to 4, with higher values indicating stronger disagreement, students in the full RQ+ group had an average score of 2.54 on this measure compared to an average score of 2.42 for students in the control group. The difference in scores corresponds to an effect size of 0.14 standard deviations, which is smaller than the average effect sizes found in prior studies of HMRE programs for youth (Simpson et al. 2018). Another way to think about the magnitude of the impact is that it is equivalent to the full RQ+ curriculum causing about 1 in 8 students to move up one value on the four-point scale. As discussed in the appendix to this report, the impact we observed for this outcome measure remains when we use other estimation strategies. However, it does not remain statistically significant when we adjust for the total number of significance tests conducted across the study’s three research groups.

The limited impacts on students’ skills, attitudes, and knowledge at the time of the one-year follow-up survey reflect the fact that students in both research groups experienced improvements on these outcomes between the baseline and one-year follow-up surveys. Prior descriptive studies have found improvements on these outcomes when looking only at program participants (Simpson et al. 2018). As shown in Table 8, we found similar improvements when looking at students in the full RQ+ group. However, students in

the control group also experienced improvements. For example, for our measure of general relationship skills, average scores increased from 2.98 to 3.07 for students in the full *RQ+* group and from 3.01 to 3.08 for students in the control group. Because we found improvements for both research groups, we cannot attribute them to the impact of HMRE programming. Instead, this finding suggests that other factors, such as students’ growing levels of relationship experience and maturity, likely contributed to improvements in these outcomes for both research groups.

Table 8. Changes in students’ relationship skills and attitudes from baseline to one-year follow-up

Measure	Full <i>RQ+</i> group		Control group	
	Baseline	One Year	Baseline	One Year
Perceived general relationship skills (range = 1 to 4)	2.98	3.07	3.01	3.08
Perceived conflict management skills (range = 1 to 4)	2.60	2.66	2.61	2.67
Disagreement with unrealistic relationship beliefs (ranges = 1 to 4)				
Belief in only one true love	2.41	2.59	2.33	2.49
Belief that love is enough to sustain a happy marriage	2.27	2.53	2.32	2.42
Belief that cohabiting will improve the chances of a happy marriage	2.29	2.34	2.29	2.35
Disapproval of teen dating violence scale (range = 1 to 4)	3.54	3.60	3.52	3.59
Sample size	513	513	517	517

Source: Baseline and one-year follow-up surveys conducted by Mathematica.

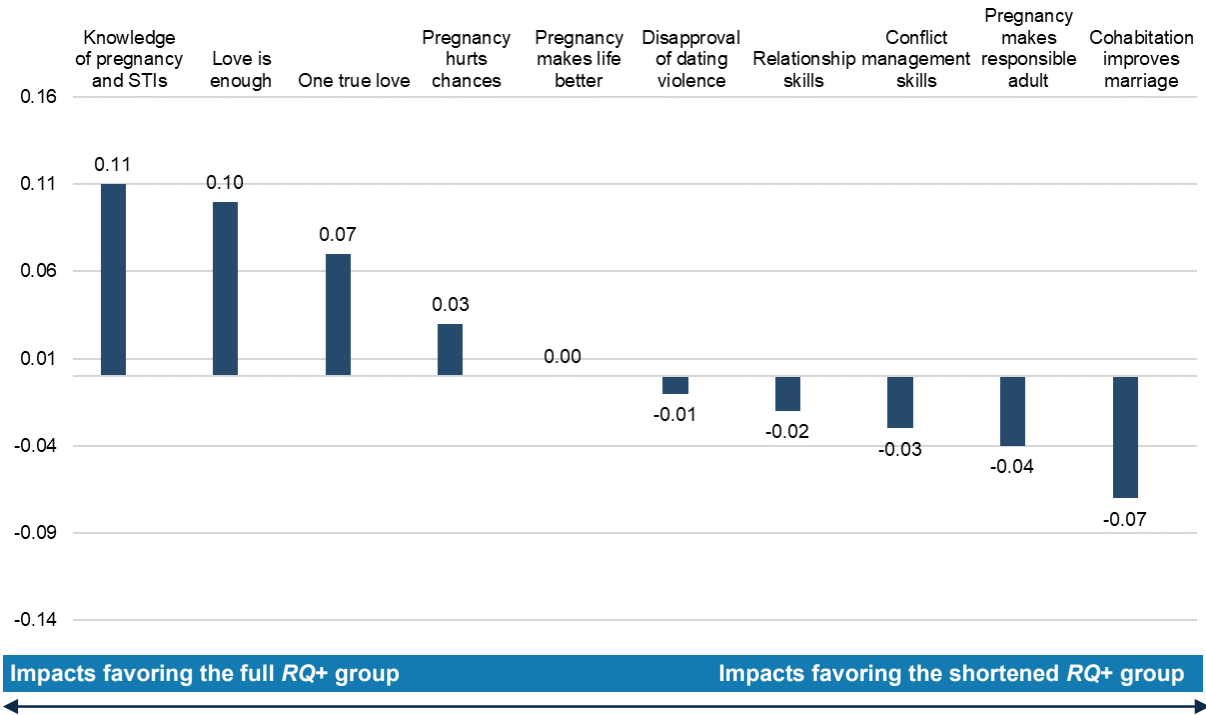
Note: The outcomes measuring desire to avoid teen pregnancy and knowledge of pregnancy and STIs were not included in the table because they were not measured at baseline.

RQ+ = *Relationship Smarts PLUS*; STIs = sexually transmitted infections.

Impacts of shortening the HMRE program

We found no evidence to suggest that shortening the curriculum had an impact on students’ outcomes. For our measures of students’ relationship skills, knowledge, and attitudes, the impacts for students offered the full, 12-lesson version of *RQ+* were not consistently bigger (or smaller) than the impacts for students offered the shortened, 8-lesson version (Figure 1). Students in the full *RQ+* group had slightly larger impacts for four outcomes and slightly smaller impacts for five outcomes than students in the shortened *RQ+* group. The two groups had equivalent impacts on one outcome. None of the differences in impacts between the two groups was statistically significant (see Appendix Table A.5 for effect sizes and *p*-values from the analyses comparing the full and shortened *RQ+* groups).

Figure 1. Difference in students’ relationship skills, knowledge, and attitudes between the full and shortened *RQ+* groups



RQ+ = Relationship Smarts PLUS; STIs = sexually transmitted infections.

Exploratory impacts on students’ relationship attitudes immediately after the program

Findings from our exploratory analysis suggest that both the full and shortened versions of the curriculum had impacts on students’ relationship attitudes immediately after the program, but that they faded by the time of the one-year follow-up survey. For this analysis, we identified six measures of students’ relationship attitudes on the program exit survey that captured similar outcomes to those on the one-year follow-up survey. We found that students offered the full version of *RQ+* were more likely than students in the control group to disagree with the statement, “If you are happily married, you don’t need to work on your relationship” (Table 9). On a scale ranging from 1 to 4, with higher values indicating stronger disagreement, students in the full *RQ+* group had an average score of 3.00 on this measure, whereas students in the control group had an average score of 2.86. The difference in scores corresponded to an effect size of 0.18, which was larger than any of the effect sizes we found for the one-year follow-up survey. Another way to think about the magnitude of this impact is that it is equivalent to the full *RQ+* curriculum causing about 1 in 7 students to move up one value on the four-point scale. Students offered the full version of *RQ+* also had higher average scores than students in the control group on a scale that measured disapproval of unhealthy relationship behaviors. For this scale, the difference in scores corresponded to an effect size of 0.12, which was larger than all but one of the effect sizes we found for the one-year follow-up survey. The magnitude of this impact is equivalent to the full *RQ+* curriculum causing about 1 in 15 students to move up one value on the four-point scale. For the other measures of relationship attitudes included in this analysis, the effect sizes were also in the expected positive direction, but the impacts did not reach statistical significance at the 10 percent level.

Table 9. Impacts on students' relationship attitudes at program exit

Measure	Full RQ+ group	Control group	Impact	Effect size
Marriages are happy or unhappy and there is not much you can do to change it (reverse coded; range = 1 to 4)	2.82	2.80	0.02	0.03
If you are happily married, you don't need to work on your relationship (reverse coded; range = 1 to 4)	3.00	2.86	0.14***	0.18
It is ok to live with someone without being married (reverse coded; range = 1 to 4)	2.15	2.07	0.08	0.11
Disapproval of teen dating violence scale (range = 1 to 4)	3.41	3.36	0.05	0.07
Disapproval of unhealthy relationship behaviors scale (range = 1 to 4)	3.56	3.49	0.07*	0.12
Beliefs about relationship communication scale (range = 1 to 4)	3.11	3.16	-0.05	-0.09
Sample size	503	532		

Source: Baseline and program exit survey conducted by Mathematica.

Note: The numbers in the columns labeled Full RQ+ group and Control group are regression-adjusted means on the one-year follow-up survey for each study group.

***/**/* Impact estimates are statistically significant from zero at the .01/.05/.10 levels, respectively, two-tailed test.

HMRE = healthy marriage and education; RQ+ = *Relationship Smarts PLUS*.

We found similar results when comparing students in the shortened RQ+ group to students in the control group (see Appendix Table A.12). Students offered the shortened version of RQ+ were more likely than students in the control group to disagree with the statement, "If you are happily married, you don't need to work on your relationship." Students offered the shortened version of RQ+ were also more likely than students in the control group to disagree with the statement, "It is ok to live with a boyfriend/girlfriend without being married." Compared to students in the control group, students offered the shortened version of RQ+ reported lower average scores on a scale that measured beliefs about relationship communication. However, we found no statistically significant difference on this scale when comparing students offered the shortened version versus the full version of the curriculum.

Exploratory impacts on students' relationship expectations and experiences one year after the program

Findings from our exploratory analysis showed no evidence of program impacts on students' relationship expectations and experiences after the program ended. At the one-year follow-up, students in the full RQ+ group and the control group had similar expectations for their future relationships (Table 10). In both groups, around 60 percent of students said they expected to get married and expected to be married to one person for life. Around 30 percent said they expected to live with someone outside of marriage. Just over 10 percent said they expected to have a child outside of marriage. For the measures of relationship experiences, students in both research groups were equally likely to report being in a relationship, being in an unhealthy relationship, and ever having sex at the one-year follow-up. In addition, the self-reported quality of relationships with parents and friends did not differ significantly between the research groups. The impacts on students' relationship expectations and experiences were similar when we compared students in the shortened RQ+ group to students in the control group (see Appendix Table A.13). We did not find any significant differences between students in the shortened RQ+ group and students in the control group on the measures of relationship expectations or relationship experiences.

Table 10. Impacts on students’ relationship expectations and experiences after one year

Measure	Full RQ+ group	Control group	Impact	Effect size
Relationship expectations				
Expects to get married (%)	60	56	3.29	0.07
Expects to be married to one person for life (%)	60	61	-0.63	-0.01
Expects to live with a partner outside marriage (%)	30	32	-1.15	-0.02
Expects to have children outside marriage (%)	12	13	-1.23	-0.04
Relationship experiences				
In a relationship (%)	35	36	-1.12	-0.02
In an unhealthy relationship (%)	13	11	1.27	0.04
Ever had sex (%)	22	23	-1.02	-0.02
Relationship quality with parents (range = 1 to 4)	2.96	3.03	-0.07	-0.08
Relationship quality with friends (range = 1 to 4)	2.77	2.78	-0.01	-0.01
Sample size	513	517		

Source: Baseline and one-year follow-up surveys conducted by Mathematica.

Note: The numbers in the columns labeled Full RQ+ group and Control group are regression-adjusted means on the one-year follow-up survey for each study group.

***/**/* Impact estimates are statistically significant from zero at the .01/.05/.10 levels, respectively, two-tailed test.

HMRE = healthy marriage and relationship education; RQ+ = *Relationship Smarts PLUS*.

Discussion and lessons learned

This study sought to expand the available evidence on the impacts of HMRE programs for high school students. These programs provide information on such topics as knowing when you are ready for a relationship, understanding the difference between healthy and unhealthy relationships, communicating effectively, and managing conflict in relationships. When asked, many young people say they want more information on these topics (Weissbourd et al. 2017). However, outside of HMRE programs, relatively few students receive education on these topics in school. To provide evidence on the impacts of these programs, we partnered with MTCI, an organization experienced in providing HMRE programming to high school students, to deliver two versions of the RQ+ curriculum to students in two Atlanta-area high schools. The full version included all 12 RQ+ lessons and the shortened version included 8 RQ+ lessons. For both versions of the curriculum, we compared students’ outcomes after one year with a control group of students who were not offered any HMRE programming.

Key findings

The first research question we examined was whether HMRE programming for high school students could have sustained impacts on students’ relationship skills, attitudes, and knowledge beyond the end of programming. We found that students offered the full RQ+ curriculum reported similar levels on these outcomes on the one-year follow-up survey as students in the control group. For 9 of the 10 outcome measures included in our confirmatory analysis, we found no statistically significant difference between the two groups. Earlier studies that have examined students’ relationship skills, attitudes, and knowledge

before and after they participate in HMRE programming have found improvements in these outcomes over time (Simpson et al. 2018). Although we also found this pattern for students offered the full *RQ+* curriculum, the improvements in our study were similar for students in the control group. This points to the importance of including a control group when estimating program impacts to avoid erroneously equating improvements in outcomes to the effects of HMRE programming. Also similar to prior studies, our exploratory analysis found evidence of small, positive impacts on students' relationship attitudes immediately after the program ended (Simpson et al. 2018). However, we did not find evidence of program impacts on students' relationship expectations or experiences on the one-year follow-up survey. Taken together, the overall pattern of results suggests that the program had the expected immediate impacts at the end of the program but that these impacts faded by one year after the program ended.

The second research question we examined was whether shortening an HMRE curriculum could interfere with its intended effects. We answered this question by comparing outcomes for students offered the full 12-lesson version of *RQ+* with those offered a shortened 8-lesson version developed specifically for this study. The shortened version of the curriculum excluded the standard lessons on communication and conflict management skills, sexual decision making, and unplanned pregnancy. All other aspects of program design and implementation were similar. We found no evidence to suggest that shortening the curriculum had an impact on students' outcomes. For our measures of students' relationship skills, knowledge, and attitudes on the one-year follow-up survey, we did not find consistently bigger or smaller impacts for students offered the full version of *RQ+* compared to those offered the shortened version of *RQ+*. Students in both groups reported similar skills, knowledge, and attitudes after one year. Our exploratory analysis found similar results for measures of students' relationship attitudes from the program exit survey and for measures of students' relationship expectations and experiences from the one-year follow-up survey.

Considerations for HMRE programs

These results provide practical guidance for some of the key choices schools and program providers must make in planning an HMRE program for high school students. We designed this study in part to consider the choice between an 8- and a 12-lesson version of the *RQ+* curriculum. The shortened 8-lesson version of *RQ+* designed for this study required 12 hours of instructional time to deliver. The full 12-lesson version required a somewhat longer, but still modest, 18 hours of instructional time. We ultimately found that the choice of 8 or 12 lessons had little influence on the overall pattern of results. For both versions of the curriculum, we found that schools can reasonably expect to have impacts on students' relationship skills, attitudes, and knowledge around the time the program ends but that these impacts are likely to fade after the end of programming. Schools with limited class time available might prefer the shortened curriculum. However, in most states, public schools are required to provide about 1,000 total hours of instructional time over the course of a school year (Education Commission of the States 2020). From that perspective, both versions of the curriculum require less than two percent of total instructional time and give schools a way to provide HMRE content to students without having to make substantial changes or cuts to the other classes they offer.

Schools and program providers that want to increase the chances for sustained impacts after the end of programming may face a bigger choice. For them, our findings suggest that current program models may not be intensive enough to have a lasting impact on students' outcomes, and therefore that schools may need to devote more than 18 hours to HMRE programming or to sustain programming over a longer period. For both versions of the curriculum delivered in this study, the impacts we found on relationship attitudes immediately after the program largely disappeared by a year later. Likewise, we found no

evidence of impacts on students' relationship skills or experiences one year later. However, we cannot fully rule out the possibility of longer-term effects until we analyze data from the study's longer-term follow-up survey. Adding more time for HMRE programming would give students more opportunity to reflect on and practice the concepts addressed in class. In turn, this may help students process the information and improve their knowledge and skills. Because devoting more time to HMRE programming in 9th grade health or consumer science classes may not be feasible, another option could be to provide a sequence of programming across multiple grade levels—for example, an introductory class during 9th grade and a follow-up class a year or two later. Increasing program dosage would also allow program developers to add content that is relevant to high school students but often not included in HMRE curricula, such as sexual orientation and gender identity (Scott and Huz 2020).

Alternatively, providers could choose to offer the program at a time when it may be more relevant to students. If schools are limited in the amount of time they can devote to programming, then the choice of when to offer the program becomes a key decision. For the present study, MTCI delivered programming as part of a required health class for primarily 9th grade students. From a practical perspective, health class was a natural fit because the topics covered in the *RQ+* curriculum aligned with class requirements. However, delivering the program in health classes also meant serving a relatively young group of students, most of whom were not in romantic relationships. Studies of how people learn indicate that students are more likely to retain information and skills when the material is immediately relevant to their lives (Merriam and Bierema 2014). To the extent that school schedules and course requirements allow, programs could try offering HMRE programming to older high school students, who are much more likely to report dating someone than students just entering high school (Eickmeyer 2020) and who therefore might have more opportunities to apply the concepts and skills in their own relationships.

Considerations for research

Research on HMRE programs for high school students is still in its early stages. This study was one of the first to use a random assignment design to examine the impacts of HMRE programming on students' relationship skills, attitudes, and knowledge beyond the end of programming. To increase the generalizability of the findings, we evaluated a widely implemented curriculum delivered in a setting that aligns with how other organizations commonly deliver HMRE programming in schools (Scott et al. 2017). However, we cannot say the findings from this study necessarily generalize to all school-based HMRE programs. Similarly, when selecting outcomes for the analysis, we considered the general theory behind HMRE programming for high school students; however, we also considered the specific content and goals of the *RQ+* curriculum. There might be outcomes specific to other curricula that we did not capture.

Future studies should assess the longer-term impacts of various HMRE curricula on the same and different outcomes for youth to continue to learn whether HMRE programs have a lasting impact on youths' romantic relationships, both later in adolescence and in adulthood. Additionally, these studies should examine programs in a variety of settings to understand how the context in which programs are implemented matters for youths' outcomes. These studies will further advance the evidence on HMRE programming for high school students and provide additional guidance on the most effective ways to design and implement these programs.

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References

- Abama, J. C., and G. M. Martinez. "Sexual Activity and Contraceptive Use Among Teenagers in the United States, 2011–2015." National Health Statistics Reports, No. 104. Hyattsville, MD: National Center for Health Statistics, 2017.
- Allen, Kimberly, Rasha El-Beshti, and Autumn Guin. "An Integrative Adlerian Approach to Creating a Teen Parenting Program." *The Journal of Individual Psychology*, vol. 70, no. 1, 2014, pp. 6–20.
- Antle, B.F., D.J. Sullivan, A. Dryden, E.A. Karam, and A.P. Barbee. "Healthy relationship education for dating violence prevention among high-risk youth." *Children and Youth Services Review*, vol. 33, 2011, pp. 173-179.
- Avellar, Sarah, Alexandra Stanczyk, Nikki Aikens, Mathew Stange, and Grace Roemer. "The 2015 Cohort of Healthy Marriage and Responsible Fatherhood Grantees: Interim Report on Grantee Programs and Clients." OPRE Report No. 2020-67. Washington, DC: Office of Planning, Research and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services, 2020.
- Barbee, A. P., M. R. Cunningham, M. A. van Zyl, B. F. Antle, and C. N. Langley. "Impact of Two Adolescent Pregnancy Prevention Interventions on Risky Sexual Behavior: A Three-Arm Cluster Randomized Control Trial." *American Journal of Public Health*, vol. 106, suppl. S1, 2016, pp. S85–S90.
- Baumgartner, Scott, and Heather Zaveri. "Implementation of Two Versions of Relationship Smarts Plus in Georgia." OPRE Report No. 2018-121. Washington, DC: Office of Planning, Research and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services, 2018.
- Buhrmester, D., W. Furman, M. T. Wittenberg, and H. T. Reis. "Five Domains of Interpersonal Competence in Peer Relationships." *Journal of Personality and Social Psychology*, vol. 55, no. 6, 1988, pp. 991–1008.
- Centers for Disease Control and Prevention. "Results from the School Health Policies and Practices Study 2014." Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, Division of Adolescent and School Health, 2015.
- Cobb, Nathan P., Jeffry H. Larson, and Wendy L. Watson. "Development of the Attitudes About Romance and Mate Selection Scale." *Family Relations*, vol. 52, no. 3, 2003, pp. 222–231.
- Dahlberg, L. L., S. B. Toal, M. Swahn, and C. B. Behrens. "Measuring Violence-Related Attitudes, Behaviors, and Influences Among Youths: A Compendium of Assessment Tools." 2nd ed. Atlanta, GA: Centers for Disease Control and Prevention, National Center for Injury Prevention and Control, 2005.
- De Gruttola, Victor G., Pamela Clax, David L. DeMets, Gregory J. Downing, Susan S. Ellenberg, Lawrence Friedman, Mitchell H. Gail, et al. "Considerations in the Evaluation of Surrogate Endpoints in Clinical Trials: Summary of a National Institutes of Health Workshop." *Controlled Clinical Trials*, vol. 22, no. 5, 2001, pp. 485–502.
- Dibble Institute. 2021. <https://www.dibbleinstitute.org>. Accessed August 13, 2021.
- Education Commission of the States. "50-State Comparison: Instructional Time Policies." 2020. Available at <https://www.ecs.org/50-state-comparison-instructional-time-policies/>. Accessed February 21, 2021.

- Eickmeyer, Kasey, Paul Hemez, Wendy D. Manning, Susan L. Brown, and Karen Benjamin Guzzo. "Trends in Relationship Formation and Stability in the United States: Dating, Cohabitation, Marriage, and Divorce." Bethesda, MA: Marriage Strengthening Research and Dissemination Center, May 2020.
- Futris, T. G., T. E. Sutton, and E. W. Richardson. "An Evaluation of the Relationship Smarts Plus Program on Adolescents in Georgia." *Journal of Human Sciences and Extension*, vol. 1, no. 2, 2013, pp. 1–15.
- Goesling, Brian. "A Practical Guide to Cluster Randomized Trials in School Health Research." *Journal of School Health*, vol. 89, no. 11, 2019, pp. 916–925.
- Hawkins, Alan J. "Shifting the Relationship Education Field to Prioritize Youth Relationship Education." *Journal of Couple and Relationship Therapy*, vol. 17, no. 3, 2017, pp. 165–180.
- Karney, B. R., M. K. Beckett, R. L. Collins, and R. Shaw. *Adolescent Romantic Relationships as Precursors of Healthy Adult Marriages: A Review of Theory, Research, and Programs*. Santa Monica, CA: RAND Corporation, 2007.
- Kerpelman, J. L., J. F. Pittman, F. Adler-Baeder, S. Eryigit, and A. Paulk. "Evaluation of a Statewide Youth-Focused Relationships Education Curriculum." *Journal of Adolescence*, vol. 32, no. 6, 2009, pp. 1359–1370.
- Kerpelman, J. L., J. F. Pittman, F. Adler-Baeder, K. J. Stringer, S. Eryigit, H. S. Cadely, and M. K. Harrell-Levy. "What Adolescents Bring to and Learn from Relationship Education Classes: Does Social Address Matter?" *Journal of Couple and Relationship Therapy*, vol. 9, 2010, pp. 95–112.
- Levin, Henry M., and Patrick J. McEwan. "Cost-Effectiveness Analysis: Costs and Applications." Thousand Oaks, CA: Sage Publications, 2001.
- Lippman, L., K. Moore, L. Guzman, R. Ryber, H. McIntosh, M. Ramos, M. Caal, et al. *Flourishing Children: Defining and Testing Indicators of Positive Development*. New York, NY: Springer, 2014.
- Ma, Y., J. F. Pittman, J. L. Kerpelman, and F. Adler-Baeder. "Relationship Education and Classroom Climate Impact on Adolescents' Standards for Partners/Relationships." *Family Relations*, vol. 63, no. 4, 2014, pp. 453–468.
- McElwain, A., V. Finnegan, A. Whittaker, J. Kerpelman, F. Adler-Baeder, and A. Duke. "Evaluation and Lessons Learned from an Undergraduate Service Learning Course Providing Youth-Focused Relationship Education." *Evaluation and Program Planning*, vol. 58, 2016, pp. 116–124.
- Merriam, S. B., and L. L. Bierema. "Andragogy: The Art and Science of Helping Adults Learn." In *Adult Learning: Linking Theory and Practice*, edited by S. B. Merriam and L. L. Bierema. San Francisco, CA: Jossey-Bass Publishers, 2014, pp. 42–60.
- National Center for Education Statistics. "Digest of Education Statistics: 2018." Washington, DC: National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education, 2018.
- Orr, Larry L. *Social Experiments: Evaluating Public Programs with Experimental Methods*. Thousand Oaks, CA: Sage, 1999.
- Pearson, Marline, and Kay Reed. "Youth-Focused Relationship Education: Relationship Smarts PLUS and Love Notes." In *Evidence-based Approaches to Relationship and Marriage Education*, edited by James Ponzetti, Jr. Abingdon, UK: Routledge, 2015.

- Schochet, Peter Z. “An Approach for Addressing the Multiple Testing Problem in Social Policy Impact Evaluations.” *Evaluation Review*, vol. 33, no. 6, 2009, pp. 539–567.
- Schochet, Peter Z. “RCT-YES User’s Manual.” Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Research, June 2016.
- Schramm, D. G., and J. Gomez-Scott. “Merging Relationship Education and Child Abuse Prevention Knowledge: An Evaluation of Effectiveness with Adolescents.” *Marriage and Family Review*, vol. 48, 2012, pp. 792–808. doi:10.1080/01494929.2012.714722.
- Scott, Mindy E., and Huz, Ilana. “An Overview of Healthy Marriage and Relationship Education Curricula.” Bethesda, MA: Marriage Strengthening Research and Dissemination Center, June 2020.
- Scott, Mindy E., Elizabeth Karberg, Ilana Huz, and Maryjo Oster. “Healthy Marriage and Relationship Education Programs for Youth: An In-Depth Study of Federally Funded Programs.” OPRE Report No. 2017-74. Washington, DC: Office of Planning, Research and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services, 2017.
- Simpson, D. M., N. D. Leonhardt, and A. J. Hawkins. “Learning About Love: A Meta-Analytic Study of Individually-Oriented Relationship Education Programs for Adolescents and Emerging Adults.” *Journal of Youth and Adolescence*, vol. 47, no. 3, 2018, pp. 477–489.
- Smith, Kimberly, Silvie Colman, Christopher Trenholm, Alan Hershey, Brian Goesling, Anastasia Erbe, Caitlin Davis, et al. “Evaluation of Adolescent Pregnancy Prevention Approaches: Design of the Impact Study.” Princeton, NJ: Mathematica Policy Research, October 2012.
- Stanley, Scott M., Ryan G. Carlson, Galena K. Rhoades, Howard J. Markman, Lane L. Ritchie, and Alan J. Hawkins. “Best Practices in Relationship Education Focused on Intimate Relationships.” *Family Relations*, vol. 69, no. 3, 2020, pp. 497-519.
- U.S. Census Bureau. “America’s Families and Living Arrangements: 2018; Children (C Table Series).” Washington, DC: U.S. Census Bureau, 2018. Available at <https://www.census.gov/data/tables/2018/demo/families/cps-2018.html>. Accessed April 5, 2020.
- Vennum, Amber, and Frank D. Fincham. “Assessing Decision Making in Young Adult Romantic Relationships.” *Psychological Assessment*, vol. 23, no. 3, 2011, p. 739.
- Wadsworth, Martha E., and Howard J. Markman. “Where’s the Action? Understanding What Works and Why in Relationship Education.” *Behavior Therapy*, vol. 43, no. 1, 2012, pp. 99-112.
- Weissbourd, Richard, Trisha Ross Anderson, Alison Cashin, and Joe McIntyre. “The Talk: How Adults Can Promote Young People’s Healthy Relationships and Prevent Misogyny and Sexual Harassment.” Cambridge, MA: Harvard Graduate School of Education, 2017.
- Zaveri, Heather, Theresa Schulte, and Adam Swinburn. “The Cost of Implementing Select Evidence-Based Programs that Prevent Teen Pregnancy: An Overview of Study Findings.” Washington, DC: U.S. Department of Health and Human Services, Office of Adolescent Health, September 2017.

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Technical Appendix

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This technical appendix supplements the impact study of a healthy marriage and relationship education (HMRE) program for high school students, which was conducted by Mathematica and Public Strategies as part of the Strengthening Relationship Education and Marriage Services (STREAMS) evaluation. The first section of the appendix provides additional detail on the random assignment procedures for the impact study. The second section describes the survey administration procedures and response rates. The third section provides information on the study team's methods to collect and analyze data on program costs. The fourth and fifth sections provide additional detail on the study's confirmatory and exploratory impact analyses, respectively.

Random assignment

The impact study used a classroom-level random assignment design with three research groups. Classes assigned to one of the three research groups offered students the full 12-lesson version of the *Relationship Smarts PLUS (RQ+)* curriculum. Classes assigned to a second research group offered students a shortened 8-lesson version of the *RQ+* curriculum that was designed specifically for this study. Classes assigned to a third research group did not offer students any HMRE programming. Researchers describe this type of classroom-level random assignment as a cluster or group randomized trial because it involves randomly assigning all students in the same classroom to the same research group rather than randomly assigning each individual student (Goesling 2019).

We used classrooms, not individual students, as the unit of random assignment mainly due to the practical constraints of conducting an impact study in schools. Program staff from More Than Conquerors Inc. (MTCI) had negotiated with school staff and a representative from the county health department to deliver the *RQ+* lessons as part of a required high school health class for primarily 9th grade students. We did not have the option to randomly assign individual students to different class schedules or to exclude certain students from the required health classes. Rather, we assigned all students in the same classroom to the same research group. We also considered the possibility of using schools, rather than classrooms, as the unit of random assignment. However, impact studies of school health programs using school-level random assignment typically require at least six to eight schools to achieve enough statistical power (Goesling 2019). Given the smaller number of schools available for this study, we identified classrooms as the most feasible unit of random assignment.

For classes assigned to either the control group or the group offered the shortened 8-lesson version of the curriculum, MTCI staff delivered supplementary lessons from a job readiness curriculum called *12 Pluses for Work Readiness and Career Success*. The lessons covered such topics as career planning, resume writing, planning for a job search, appropriate workplace attire, and interview skills. For classes assigned to the control group, MTCI educators delivered twelve 90-minute lessons of the *12 Pluses* curriculum on average once or twice per week during the semester. For classrooms offered the shortened version of the *RQ+* curriculum, MTCI educators delivered four 90-minute lessons of the *12 Pluses* curriculum after the class completed the *RQ+* lessons. With this design, students in all study classes received the same total amount of instruction from the MTCI facilitators, but the content of the instruction differed across the study's three research groups. This design helped isolate the effects of the *RQ+* curriculum by making other aspects of the classroom environment as similar as possible across the treatment and control groups. From a practical perspective, the design also helped simplify the logistics of the study, because it enabled the schools to keep the regular teaching staff and health curriculum on a consistent schedule across all classes in the study, regardless of random assignment status.

Over the course of the 2016–2017 and 2017–2018 school years, we enrolled 1,862 students from 61 health classes at two high schools to participate in the study. We conducted random assignment near the start of each semester after the schools had set their class schedules for the semester, for a total of four times during the study. To ensure that each of the three research groups had an even mix of classes from the two study schools, we randomly assigned classes separately by school. This approach to random assignment resulted in a blocked evaluation design, with each combination of school and semester defined as a separate block.

Data from the baseline student survey showed that the random assignment process yielded groups of students that were generally similar at baseline (Table A.1). The students were similar in grade level and on all measured demographics. The share of students who reported prior attendance in a class about romantic relationships or dating, dating violence, teen pregnancy or sexually transmitted infections (STIs), or marriage was also similar. In addition, the students reported similar perceptions of their general relationship skills. On average, students offered the shortened version of the curriculum reported slightly weaker perceived conflict management skills. The difference in average scale scores was statistically significant at the 5 percent level only between the shortened *RQ+* group and the control group. As discussed in greater detail later in the appendix, controlling for statistically significant baseline differences in the impact analysis did not change the study’s overall findings.

Table A.1. Baseline characteristics for the full sample, by study group

Measure	Full <i>RQ+</i> group	Shortened <i>RQ+</i> group	Control group
Demographics			
Grade in school (%)			
9th grade	85	88	87
10th grade or higher	15	12	13
Gender (%)			
Male	53	53	53
Female	47	47	47
Race and ethnicity (%)			
Hispanic	54	56	57
Black, non-Hispanic	28	25	26
White, non-Hispanic	5	6	5
Other	13	14	12
Born outside of United States (%)	19	19	16
Primary language spoken at home (%)			
English	47	52	48
Spanish	42	40	42
Other or multiple languages	11	8	10
Living arrangements (%)			
Lives with both biological parents	49	50	52
Lives with biological mother only	41	40	38
Lives with biological father only	4	5	4
Lives with neither biological parent	6	5	6
Biological parents are currently married (%)	44	43	47
Relationship information, experiences, and behaviors			
Attended a class in the prior year on (%):			
Romantic relationships or dating	23	23	25

Measure	Full RQ+ group	Shortened RQ+ group	Control group
Dating violence	10	10	13
Teen pregnancy or STIs	29	28	30
Marriage	8	8	7
Currently in a dating relationship (%)	30	29	31
Ever had sexual intercourse (%)	16	16	13
Relationship skills			
Perceived general relationship skills (range = 1 to 4)	3.0	3.0	3.0
Perceived conflict management skills (range = 1 to 4) ^b	2.6	2.5	2.6
Relationship knowledge and attitudes			
Disagreement with unrealistic relationship beliefs (ranges = 1 to 4)			
Belief in only one true love	2.4	2.4	2.3
Belief that love is enough to sustain a happy marriage	2.3	2.3	2.3
Belief that cohabiting will improve the chances of a happy marriage	2.3	2.2	2.3
Disapproval of teen dating violence scale (range = 1 to 4)	3.5	3.5	3.5
Desire to avoid teen pregnancy scales (ranges = 1 to 4)			
Teen pregnancy would hurt my chances of being successful	n.a.	n.a.	n.a.
Teen pregnancy would make me become a responsible adult before I wanted to	n.a.	n.a.	n.a.
Teen pregnancy would make my life a lot better	n.a.	n.a.	n.a.
Knowledge of pregnancy and STIs index (range = 0 to 5)	n.a.	n.a.	n.a.
Sample size^d	596	647	593

Source: Baseline survey conducted by Mathematica.

Note: Percentages may not sum to 100 due to rounding.

^a Differences between the full RQ+ group and the control group are statistically significant at the .05 level, two-tailed test.

^b Differences between the shortened RQ+ group and the control group are statistically significant at the .05 level, two-tailed test.

^c Differences between the full and shortened RQ+ groups are statistically significant at the .05 level, two-tailed test.

^d The sample includes 1,836 students who completed a baseline survey.

n.a. = not applicable, question was asked only on the one-year follow-up survey; RQ+ = *Relationship Smarts PLUS*; STIs = sexually transmitted infections.

One potential limitation of classroom-level random assignment is the risk of contamination or spillover effects from having students from all three research groups within the same schools (Goesling 2019). Such effects could arise, for example, if the MTCI facilitators shared information from the RQ+ curriculum across all three research groups, if changes in students’ schedules resulted in some students switching health classrooms during the semester, or if information was shared informally through friendships or social interactions between students assigned to different research groups. We undertook three efforts to mitigate this risk:

1. Before the start of study enrollment and random assignment, we coordinated with MTCI to ensure that the facilitators responsible for delivering the RQ+ lessons would not also have responsibility for delivering lessons from the supplementary job readiness curriculum (and vice versa). MTCI used separate groups of facilitators for each curriculum throughout the study period.

2. As required by MTCI's grant from the Office of Family Assistance within the U.S. Department of Health and Human Services, the MTCI facilitators entered data on student attendance and program activities in a secure computer system. They entered these data immediately following each class period for all three research groups. We regularly reviewed the data to check that the facilitators had delivered the appropriate lessons to each research group and to assess student attendance.
3. At the start of each semester, we waited for up to a month after the first day of school before conducting random assignment. For example, for the first round of random assignment for the fall semester of the 2016–2017 school year, school started the second full week of August (the week of August 8, 2016) and we conducted random assignment during the last full week of August (the week of August 22, 2016). This delay allowed the study schools time to finalize students' schedules, which in turn minimized the chances of students switching classrooms after random assignment.

Students' responses to questions on the one-year follow-up survey showed little evidence of contamination or spillover effects (Table A.2). The survey asked students to report their level of exposure to HMRE programming in the past year, as well as their knowledge of their friends' exposure to HMRE programming. Compared to students offered either the full or shortened versions of *RQ+*, students in the control group were statistically significantly less likely to say they had attended a class in the prior year on romantic relationships or dating, dating violence, teen pregnancy or STIs, or marriage. Students in the control group were also statistically significantly less likely to say that their friends had attended a class about romantic relationships or dating, dating violence, or teen pregnancy or STIs. More students in the control group said they didn't know if their friends had attended classes on these topics than said their friends had attended such classes. The survey questions did not refer specifically to the *RQ+* curriculum or programming offered by MTCI. Therefore, for all three research groups, some of the students who reported that they or their friends had attended classes on these topics could have been referring to other school classes or to classes they had attended outside of school.

Table A.2. Exposure to program information at one-year follow-up, by study group

Measure	Full RQ+ group	Shortened RQ+ group	Control group
Attended a class in the prior year on (%):			
Romantic relationships or dating ^{a,b}	49	45	33
Dating violence ^{a,b}	45	42	24
Teen pregnancy or STIs ^a	52	47	42
Marriage ^{a,b}	37	35	18
Career planning or job readiness	62	66	67
Friends attended a class in the prior year on (%):			
Romantic relationships or dating ^{a,b}	34	37	26
Dating violence ^{a,b}	27	29	16
Teen pregnancy or STIs	35	39	36
Marriage ^{a,b}	22	25	14
Career planning or job readiness	42	42	45
Don't know if friends attended a class on (%):			
Romantic relationships or dating	35	36	40
Dating violence	36	38	42
Teen pregnancy or STIs	43	39	42
Marriage	40	40	42
Career planning or job readiness	31	35	32
Sample size^d	513	552	517

Source: Follow-up survey conducted by Mathematica.

^a Differences between the full RQ+ group and the control group are statistically significant at the .05 level, two-tailed test.

^b Differences between the shortened RQ+ group and the control group are statistically significant at the .05 level, two-tailed test.

^c Differences between the full and shortened RQ+ groups are statistically significant at the .05 level, two-tailed test.

^d The sample includes 1,582 students who completed a one-year follow-up survey.

RQ+ = *Relationship Smarts PLUS*; STIs = sexually transmitted infections.

Survey administration and nonresponse

Students had to receive permission from a parent or guardian to respond to the study surveys. To facilitate the permission process, we worked with MTCI and school staff at the beginning of each semester to collect permission forms from the parents or guardians of eligible students. These permission forms were distributed before random assignment and therefore did not reference a student's research group assignment. We offered each student a \$5 gift card for returning a signed permission form. For students who did not return their permission forms, schools allowed us to call the students' parents or guardians to request permission by phone. During these phone calls, we read the permission form aloud over the phone and then marked a response on a printed copy of the form on behalf of the parent or guardian. Permissions received in this manner required a third-party witness from the study team to observe the phone

conversation and initial the completed permission form. The New England Institutional Review Board approved all the study's consent and data collection procedures.

For those students who received permission from a parent or guardian, we administered (1) a baseline survey in class near the start of the semester before the MTCI facilitators had delivered any lessons and (2) a one-year follow-up survey about 12 months after the baseline survey, either in school or outside of school by telephone. We designed the surveys to capture a broad range of demographic and personal characteristics, including students' attitudes about relationships and their relationship experiences. The first section of the survey captured information on students' backgrounds, including demographic information and future education and career goals. The second section asked questions about students' family and friends. Later sections of the survey gauged students' opinions on their relationship skills, including understanding others' feelings, showing respect to others, and working through problems without arguing. The final section of the survey asked about current relationships, including current dating status and satisfaction if currently dating. As required by MTCI's grant, we also administered a program exit survey in class near the end of the semester after the MTCI facilitators had completed all the lessons. This program exit survey included a standardized set of survey questions that all grantees had to collect as a condition of their grant funding. Some but not all of the questions overlapped in content with the questions included on the STREAMS one-year follow-up survey.

We administered the baseline and program exit surveys in class with tablet computers. Students completed the surveys individually by reading the questions and entering their responses directly on the tablets. We provided headphones for any students who wanted or needed to listen to the questions read aloud while completing the surveys. Students had their choice of completing the surveys in either English or Spanish. For the one-year follow-up survey, we used these same in-school survey administration procedures for as many students as possible. We attempted to contact students who were no longer enrolled in a study school or who were otherwise unable to complete the survey in school by telephone, to administer the survey over the phone. Eighteen percent of students who completed the follow-up survey did so by telephone. Students received a \$15 gift card for completing the survey in school or a \$20 gift card for completing the survey outside of school by telephone.

These survey procedures yielded high consent and survey response rates (Table A.3). The baseline survey had an overall response rate of 99 percent for consented students (Table A.3). As expected, due to students' absences, changes in class schedules, and school transfers, the program exit survey and one-year follow-up survey both had a lower overall response rate (84 percent and 85 percent for consented students, respectively). For all three surveys, response rates were within 5 percentage points across the three research groups.

Nonresponse to the one-year follow-up survey had little material effect on the similarity of students in the treatment and control groups (Table A.4). When examining baseline demographic and personal characteristics for only those students who completed a one-year follow-up survey, we found that students in all three research groups were similar on gender, race and ethnicity, percentage of those born outside of the United States, living arrangements, and having biological parents who are currently married. The groups were also similar on current relationship status, ever having sexual intercourse, perceived general relationship skills, disagreement with unrealistic relationship beliefs, and disapproval of teen dating violence. A smaller percentage of students in the full *RQ+* group than the shortened *RQ+* group were in 9th grade (86 percent versus 91 percent) and spoke English as their primary language at home (45 percent versus 52 percent). Students in the full *RQ+* group were less likely than students in the control group to report attending a class in the prior year on dating violence (9 percent versus 13 percent). In addition,

students in the shortened *RQ+* group reported lower perceived conflict management skills than the control group (2.5 versus 2.6 on a 4-point scale). As discussed in greater detail later in the appendix, controlling for statistically significant baseline differences in the impact analysis did not change the study’s overall findings.

Table A.3. Consent and survey response rates, by study group

	Full <i>RQ+</i> group	Shortened <i>RQ+</i> group	Control group	All students
Number of students				
Eligible for study	656	700	646	2,002
Returned consent form	628	674	618	1,920
Received consent	604	658	600	1,862
Completed baseline survey	596	647	593	1,836
Completed exit survey	527	539	505	1,571
Completed follow-up survey	513	552	517	1,582
Consent rate				
Returned consent form	96%	96%	96%	96%
Received consent				
All eligible students	92%	94%	93%	93%
Students who returned consent form	96%	98%	97%	97%
Baseline survey response rate				
All eligible students	91%	92%	92%	92%
Consented students	99%	98%	99%	99%
Exit survey response rate				
All eligible students	80%	77%	78%	78%
Consented students	87%	82%	84%	84%
Follow-up survey response rate				
All eligible students	78%	79%	80%	79%
Consented students	85%	84%	86%	85%

Table A.4. Baseline characteristics for the analytic sample, by study group

Measure	Full RQ+ group	Shortened RQ+ group	Control group
Demographics			
Grade in school (%)			
9th grade ^c	86	91	87
10th grade or higher ^c	14	9	13
Gender (%)			
Male	52	51	53
Female	48	49	47
Race and ethnicity (%)			
Hispanic	57	56	57
Black, non-Hispanic	26	25	24
White, non-Hispanic	5	6	5
Other	13	14	14
Born outside of United States (%)	19	18	16
Primary language spoken at home (%)			
English ^c	45	52	47
Spanish	44	40	43
Other or multiple languages	11	8	10
Living arrangements (%)			
Lives with both biological parents	52	52	55
Lives with biological mother only	39	39	36
Lives with biological father only	4	4	4
Lives with neither biological parent	5	5	5
Biological parents are currently married (%)	47	46	50
Relationship information, experiences, and behaviors			
Attended a class in the prior year on (%):			
Romantic relationships or dating	22	23	24
Dating violence ^a	9	10	13
Teen pregnancy or STIs	28	28	29
Marriage	8	8	7
Currently in a dating relationship (%)	29	29	31
Ever had sexual intercourse (%)	14	14	12
Relationship skills			
Perceived general relationship skills (range = 1 to 4)	3.0	3.0	3.0
Perceived conflict management skills (range = 1 to 4) ^b	2.6	2.5	2.6
Relationship knowledge and attitudes			
Disagreement with unrealistic relationship beliefs (ranges = 1 to 4)			
Belief in only one true love	2.4	2.4	2.3
Belief that love is enough to sustain a happy marriage	2.3	2.3	2.3
Belief that cohabiting will improve the chances of a happy marriage	2.3	2.2	2.3

Measure	Full RQ+ group	Shortened RQ+ group	Control group
Disapproval of teen dating violence scale (range = 1 to 4)	3.5	3.5	3.5
Desire to avoid teen pregnancy scales (ranges = 1 to 4)	n.a.	n.a.	n.a.
Teen pregnancy would hurt my chances of being successful	n.a.	n.a.	n.a.
Teen pregnancy would make me become a responsible adult before I wanted to	n.a.	n.a.	n.a.
Teen pregnancy would make my life a lot better	n.a.	n.a.	n.a.
Knowledge of pregnancy and STIs index (range = 0 to 5)	n.a.	n.a.	n.a.
Sample size	513	552	517

Source: Baseline survey conducted by Mathematica.

Note: Percentages may not sum to 100 due to rounding.

^a Differences between the full RQ+ group and the control group are statistically significant at the .05 level, two-tailed test.

^b Differences between the shortened RQ+ group and the control group are statistically significant at the .05 level, two-tailed test.

^c Differences between the full and shortened RQ+ groups are statistically significant at the .05 level, two-tailed test.

n.a. = not applicable, questions were asked only on the one-year follow-up survey; RQ+ = *Relationship Smarts PLUS*; STIs = sexually transmitted infections.

Program cost estimates

To provide context on MTCI’s implementation of RQ+, we estimated the cost of delivering the full 12-lesson version of the curriculum using the “ingredients” or resources cost method (Levin and McEwan 2001), a common standard in the field. The first step of this method involves identifying all the resources required to deliver the program. For MTCI, resources included facilitators who delivered the program, administrative staff who provided support, office supplies and equipment, program incentives, travel costs, and other shared administrative and indirect resources. Resources did not include start-up costs or building space to deliver programming because MTCI delivered its program in schools. We identified relevant resources from MTCI’s staff.

The second step of the resource cost method involves assigning a dollar value to each resource identified, either directly from accounting records or by estimating the value using market prices or publicly available sources. For this step, we relied primarily on MTCI’s accounting records to value the resources, with two exceptions. First, to account either for local prices or the cost of living near Atlanta, we used an index to adjust the total value of resources for personnel (staff salaries, payroll taxes, and benefits) and non-personnel (after all other adjustments). We created the index using average metropolitan-area and national wages as reported in May 2018 by the Bureau of Labor Statistics for the following labor categories: (1) health educators, (2) social and human service assistants, (3) social and community service managers, and (4) marriage and family therapists. After applying this index, the resulting estimates represented the costs of operating the program in a location with a cost of living equal to the national average. Second, to estimate the annual value of equipment and facilities-related expenses, we divided the value of the original purchase price of the equipment by the useful life based on depreciation guidelines from the Internal Revenue Service.

We estimated both (1) the total annual program cost for the 2017–2018 academic year and (2) the average cost to serve one participant (also known as the per participant cost). We calculated the per participant

cost by dividing the total annual program cost by the total number of students who received programming across all three research groups (full, shortened, or control) during the 2017–2018 academic year ($n = 914$ students). From MTCI’s perspective, all three research groups required the same resources for program implementation because they offered the same dosage of programming (12 lessons) and differed only in the curricula provided (*RQ+*, *12 Pluses*, or a combination). In addition, MTCI staff reported that common resources such as administrative costs, facilities, equipment, and supplies were shared equally across the three research groups.

Based on these methods, we estimated the cost to MTCI at \$1,163 per participant. This per participant cost reflected an estimated total annual program cost of \$1,062,673 divided by a total of 914 students who received programming during the 2017–2018 school year. Personnel costs for workshop facilitators and other support and administrative staff accounted for 80 percent of these costs. Contracted services, including a community liaison and financial and IT support, accounted for 14 percent. Supplies, equipment, and other direct costs accounted for 5 percent, while facilities accounted for the remaining 1 percent of the program cost.

Details of confirmatory analysis

Before conducting the impact analysis, we specified the outcomes and analytic methods we planned to use for answering the study’s main research questions. Specifying this confirmatory analysis in advance prevents focusing the assessment of program impacts on outcomes that happen to emerge as statistically significant or the perception that this might have been the case (Schochet 2009). We publicly documented the outcomes selected for the confirmatory analysis as part of the study’s registry on the website clinicaltrials.gov (identifier: NCT02832856).

Confirmatory outcomes

In selecting outcomes for the confirmatory analysis, we sought to balance the need for a comprehensive assessment of the program with an equally important need to limit the number of statistical tests conducted. HMRE programs for high school students can potentially impact a broad range of relationship skills, attitudes, knowledge, and behaviors (Simpson et al. 2018). However, from a statistical perspective, the more outcomes examined the more likely it is that at least one test will find a statistically significant but spurious impact. Selecting too many outcomes for the confirmatory analysis increases the chances of falsely identifying an impact of the program when no true impact exists (Schochet 2009). To balance these factors, we limited the confirmatory analysis to a relatively small set of outcomes most central to the general theory behind HMRE programming for high school students and the goals of the *RQ+* curriculum.

As discussed later in this section of the appendix, 3 of the 10 outcomes we selected for the confirmatory analysis were scales constructed by combining students’ responses to multiple survey questions. For consistency, we followed a uniform approach in constructing these scales—that is, by averaging students’ responses across survey questions. For example, for the scale of students’ perceived general relationship skills, we calculated scale scores by averaging students’ responses across the six survey questions corresponding to that scale. To maximize the sample size available for the analysis, we calculated a scale score for any student who responded to at least two-thirds of the questions that made up the scale. For example, for a scale with six questions, we calculated a scale score for any students who responded to at least four of the six questions. We coded students as missing on the scale if they responded to fewer than two-thirds of the questions because we did not have enough information for these students to calculate a

score. For each scale, we checked the reliability of the scale for our study sample by calculating Cronbach's alpha (α) with data from the baseline survey.

Perceived general relationship skills

We measured students' perceived general relationship skills with a subset of items from the Relationship Deciding Scale, which was developed using a sample of college-age students (Vennum and Fincham 2011). For these items, the survey asked students to report their level of agreement with each of the following statements:

- I believe I will be able to effectively deal with conflicts that arise in my relationship.
- I feel good about my ability to make a romantic relationship last.
- I am very confident when I think of having a stable, long-term relationship.
- I have the skills needed for a lasting, stable romantic relationship.
- I am able to recognize the warning signs of a bad relationship.
- I know what to do when I recognize the warning signs of a bad relationship.

For each statement, the survey asked students to report their level of agreement on a 4-point scale, ranging from strongly agree to strongly disagree. For students who responded to at least four of the six questions, we calculated a scale score by taking the average value of the student's responses across the different questions. The resulting scale ranged from 1 to 4, with higher values indicating greater perceived relationship skills (six items, $\alpha = 0.82$ for our study sample based on data from the baseline survey).

Perceived conflict management skills

We measured students' perceptions of their own conflict management skills with a subset of items adapted from the Conflict Management Subscale of the Interpersonal Competence Scale (Buhrmester et al. 1988). This scale was used in a prior evaluation of *RQ+* for high school students (Kerpelman et al. 2009; Kerpelman et al. 2010). For these items, the survey asked students to report their level of perceived skill for each of the following five conflict management skills:

1. Admitting that you might be wrong during a disagreement
2. Avoiding saying things that could turn a disagreement into a big fight
3. Accepting another person's point of view even if you don't agree with it
4. Listening to another person's opinion during a disagreement
5. Working through problems without arguing

For each item, the survey asked students to report their level of perceived skill based on the following four response options: (1) I am extremely good at this, (2) I am good at this, (3) I am ok at this, or (4) I am bad at this. For students who responded to at least four of the five items, we calculated a scale score by taking the average value of the student's responses across the different items. The resulting scale ranged from 1 to 4, with higher values indicating greater perceived communication skills (five items, $\alpha = 0.75$ for our study sample based on data from the baseline survey).

Disagreement with unrealistic relationship beliefs

We measured disagreement with unrealistic relationship beliefs by using a subset of items from the Attitudes About Romance and Mate Selection Scale (Cobb et al. 2003). These same items were used in a prior evaluation of *RQ+* for high school students (Kerpelman et al. 2009). For these items, the survey asked students to report their level of disagreement with the following three statements:

1. There is only one true love out there who is right for me to marry.
2. In the end, feelings of love should be enough to sustain a happy marriage.
3. Living together before marriage will improve a couple's chances of remaining happily married.

For each item, the survey asked students to respond on a 4-point scale, ranging from strongly agree to strongly disagree. We assigned each response category a number ranging from 1 to 4, with higher values indicating stronger disagreement. We analyzed the items separately rather than as a scale for two reasons. First, each item comes from a different subscale of the Attitudes About Romance and Mate Selection Scale (Cobb et al. 2003). Second, the prior evaluation of *RQ+* by Kerpelman and colleagues (2009) analyzed each item separately. Conducting our impact analysis the same way enabled a more direct comparison of results.

Disapproval of teen dating violence

We measured disapproval of teen dating violence with the complete set of 12 items from the Acceptance of Couple Violence Scale (Dahlberg et al. 2005). This scale was used in a prior study of an HMRE program for high school-age youth (Antle et al. 2011). For these items, the survey asked students to report their level of disagreement with each of the following 12 statements about dating violence:

1. A boy angry enough to hit his girlfriend must love her very much.
2. Girls sometimes deserve to be hit by the boys they date.
3. A girl who makes her boyfriend jealous on purpose deserves to be hit.
4. A girl angry enough to hit her boyfriend must love him very much.
5. Boys sometimes deserve to be hit by the girls they date.
6. A boy who makes his girlfriend jealous on purpose deserves to be hit.
7. Violence between dating partners can improve the relationship.
8. There are times when violence between dating partners is okay.
9. It's okay to stay in a relationship even if you're afraid of your dating partner.
10. Sometimes violence is the only way to express your feelings.
11. Some couples must use violence to solve their problems.
12. Violence between dating partners is a personal matter and people should not interfere.

For each item, the survey asked students to report their level of disagreement on a 4-point scale, ranging from strongly agree to strongly disagree. For students who responded to at least 8 of the 12 items, we calculated a scale score by taking the average value of the student's responses across the different items. The resulting scale ranged from 1 to 4, with higher values indicating greater disapproval of teen dating violence (12 items, $\alpha = 0.90$ for our study sample based on data from the baseline survey).

Desire to avoid teen pregnancy

We measured desire to avoid teen pregnancy with a subset of items from the Evaluation of Adolescent Pregnancy Prevention Approaches (Smith et al. 2012). For these items, the survey asked students to report their level of agreement with each of the following three statements:

1. [Getting pregnant/getting a girl pregnant] in the next year or two would hurt my chances of being successful in life.
2. If I [got pregnant/got a girl pregnant] in the next year or two, I would have to become a responsible adult before I wanted to.
3. If I [got pregnant/got a girl pregnant] in the next year or two, my life would become a lot better. (This item was reverse coded.)

For each item, the response categories ranged from strongly disagree to strongly agree. We assigned each response category a number ranging from 1 to 4, with higher values indicating a greater desire to avoid teen pregnancy.

Knowledge of pregnancy and STIs

We measured knowledge of pregnancy and STIs with a subset of items from the Evaluation of Adolescent Pregnancy Prevention Approaches (Smith et al. 2012). For these items, the survey asked students the following series of five true or false questions:

1. All sexually transmitted infections (STIs) can be cured. (False)
2. A sexually active girl can become pregnant if she forgets to take her birth control pills for several days in a row. (True)
3. Using a condom can help prevent HIV. (True)
4. You cannot tell if a person has HIV by looking at them. (True)
5. Latex condoms are 100 percent effective in preventing pregnancy and STIs (including HIV). (False)

The survey asked students to respond with true, false, or don't know for each item. We coded each student as having provided either a correct or an incorrect response for each item. We considered an answer of don't know and skipped questions as incorrect responses. We then totaled the number of correct responses across the five items for each student. Possible scores on the measure ranged from 0 to 5, with higher values indicating a greater number of correct responses.

Confirmatory analysis methods

For each confirmatory outcome, we estimated program impacts using *RCT-YES*, a publicly available statistical software tool (<https://www.rct-yes.com/>). *RCT-YES* uses estimation methods designed specifically for estimating program impacts with data from randomized controlled trials. For the present study, we used the estimation methods for what *RCT-YES* describes as Design 4: the clustered, blocked design. These methods account for the fact that we randomly assigned students in clusters (health classes) and used a blocked design by conducting random assignment separately for each school and in each of four consecutive semesters (fall 2016, spring 2017, fall 2017, and spring 2018).

For designs with three or more research groups, *RCT-YES* estimates impacts by comparing each possible pair of groups. For the present study, this approach resulted in three comparisons for each outcome: (1)

full versus control, (2) shortened versus control, and (3) full versus shortened. For each comparison, the software calculated the impact estimate as a regression-based weighted average across blocks of differences in outcomes for students in each pair of research groups. In the *RCT-YES* software, we specified the model assuming a finite population ($\text{SUPER_POP} = 0$), including fixed effects for random assignment blocks ($\text{BLOCK_FE} = 1$), and weighting each cluster (classroom) by the number of students.

We used data from the baseline survey to include covariates for students' grade level, gender, language spoken at home, and the baseline value of the outcome measure (when available). We included grade level as a covariate partly to adjust for a baseline difference in this characteristic in the analysis sample (see Table A.4). We included gender and spoken language as covariates partly because we used these variables for subgroup analyses (described later in this section of the appendix). We included the baseline value of the outcome measure as a covariate (when available) in an effort to improve the precision of the impact estimates (Orr 1999). For missing data, we used the default *RCT-YES* options of mean imputation for missing baseline covariates (based on the average value of the covariate for all non-missing respondents) and case deletion for missing outcome data (meaning that the impact estimates for a particular outcome excluded any students with missing data for that outcome). For all three research groups, fewer than 5 percent of students were missing outcome data for any one confirmatory outcome.

We deemed impact estimates as statistically significant if the associated p -value of the estimate fell below 10 percent based on a two-tailed hypothesis test. We further distinguished p -values that fell between 5 percent and 10 percent, between 1 percent and 5 percent, and below 1 percent. Because the estimation approach in *RCT-YES* involves making three comparisons for each outcome, the software reports both the unadjusted p -value for each test and, for any statistically significant impacts, whether the impact estimate remains statistically significant after adjusting for the total number of tests per outcome. The software makes this adjustment for multiple tests per outcome using the Benjamini-Hochberg procedure (Schochet 2016). To help interpret the magnitude of the impact estimates, we reported estimates of the standardized mean difference in outcomes (effect sizes) as calculated by *RCT-YES*.

Details of impacts on confirmatory outcomes

For 9 of the 10 confirmatory outcomes, we found that students in all three research groups had similar average outcomes at the one-year follow-up survey (Table A.5). Observed effect sizes for these outcomes were no greater than 0.08. For one of the 10 confirmatory outcomes, we found a statistically significant difference at the one-year follow-up between students in the full RQ^+ group and students in the control group. Specifically, we found that students in the full RQ^+ group reported a higher average level of disagreement with the belief that feelings of love should be enough to sustain a happy marriage. On a scale from 1 to 4, students in the full RQ^+ group had an average score of 2.54 for this outcome, while students in the control group had an average score of 2.42. However, the impact did not remain statistically significant after adjusting for the increased number of statistical tests that resulted from comparing outcomes across all three research groups.

Table A.5. Impacts on confirmatory outcomes

Measure	Outcomes by study group			Full RQ+ versus control group			Shortened RQ+ versus control group			Full RQ+ versus shortened RQ+		
	Full RQ+ group	Shortened RQ+ group	Control group	Impact	Effect size	p-value	Impact	Effect size	p-value	Impact	Effect size	p-value
Relationship skills												
Perceived general relationship skills (range = 1 to 4)	3.07	3.09	3.08	-0.01	-0.02	0.80	0.01	0.03	0.71	-0.02	-0.05	0.51
Perceived conflict management skills (range = 1 to 4)	2.67	2.70	2.67	-0.00	-0.01	0.91	0.02	0.04	0.43	-0.03	-0.04	0.37
Relationship attitudes and knowledge												
Disagreement with unrealistic relationship beliefs (ranges = 1 to 4)												
Belief in only one true love	2.57	2.50	2.49	0.07	0.08	0.15	0.01	0.01	0.83	0.07	0.08	0.12
Belief that love is enough to sustain a happy marriage	2.54	2.44	2.42	0.12**	0.14	0.04	0.02	0.02	0.72	0.10	0.13	0.14
Belief that cohabiting will improve the chances of a happy marriage	2.34	2.41	2.35	-0.01	-0.01	0.86	0.06	0.08	0.24	-0.07	-0.09	0.12
Disapproval of teen dating violence scale (range = 1 to 4)	3.59	3.61	3.59	-0.00	-0.00	0.99	0.02	0.03	0.47	-0.01	-0.03	0.49
Desire to avoid teen pregnancy scales (ranges = 1 to 4)												
Teen pregnancy would hurt my chances of being successful	3.09	3.06	3.08	0.02	0.02	0.79	-0.01	-0.01	0.88	0.03	0.03	0.68
Teen pregnancy would make me become a responsible adult before I wanted to	3.19	3.23	3.23	-0.04	-0.05	0.50	-0.00	-0.00	0.99	-0.04	-0.05	0.53
Teen pregnancy would make my life a lot better (reverse coded)	3.29	3.29	3.33	-0.03	-0.05	0.49	-0.03	-0.05	0.56	-0.00	-0.00	0.96
Knowledge of pregnancy and STIs index (range = 0 to 5)	2.99	2.89	2.94	0.05	0.03	0.61	-0.05	-0.03	0.65	0.11	0.07	0.30
Sample size	513	552	517									

Source: Baseline and one-year follow-up surveys conducted by Mathematica.

Note: The numbers in the three Outcomes by Study Group columns are regression-adjusted predicted values.

***/**/* Impact is statistically significant from zero at the .01/.05/.10 levels, respectively, two-tailed test.

^a Difference remains statistically significant at the .10 level, two-tailed test after applying the Benjamini-Hochberg correction for multiple hypothesis testing for pairwise contrasts across the research groups.

HMRE = healthy marriage and relationship education; RQ+ = *Relationship Smarts PLUS*.

Robustness checks

Our confirmatory impact findings were robust to alternative specifications of the model used to estimate impacts. As described earlier in this appendix, we specified our confirmatory impact model in *RCT-YES* to weight each cluster (classroom) by the number of students and to include covariates for students' grade level, gender, and language spoken at home, as well as the baseline value of the outcome measure (when available). To test the robustness of our results to alternative specifications of the model, we repeated the confirmatory analysis when (1) alternatively weighting each cluster (classroom) equally rather than by the number of students (Table A.6), (2) excluding covariates from the model (Table A.7), or (3) expanding the list of covariates to also include variables that showed a statistically significant difference at baseline (specifically the variables for conflict management skills and whether students attended a class on dating violence in the past year) (Table A.8). In the model that weighted clusters equally, we found one additional statistically significant difference between students in the full and shortened *RQ+* groups. Specifically, students in the full *RQ+* group reported a higher average level of disagreement in the belief that love was enough to sustain a happy marriage than students in the shortened *RQ+* group. In the model that excluded covariates, we found one additional statistically significant difference between students in the full *RQ+* group and students in the control group. We found that students in the full *RQ+* group reported a higher average level of disagreement in the belief that there was only one true love who was right to marry. The impact findings for all other outcomes and model specifications were otherwise similar to those of our confirmatory analysis.

Table A.6. Impacts on confirmatory outcomes: Clusters weighted equally

Measure	Outcomes by study group			Full RQ+ versus control group			Shortened RQ+ versus control group			Full RQ+ versus shortened RQ+		
	Full RQ+ group	Shortened RQ+ group	Control group	Impact	Effect size	p-value	Impact	Effect size	p-value	Impact	Effect size	p-value
Relationship skills												
Perceived general relationship skills (range = 1 to 4)	3.06	3.09	3.09	-0.03	-0.06	0.42	-0.00	-0.00	0.94	-0.03	-0.06	0.39
Perceived conflict management skills (range = 1 to 4)	2.67	2.70	2.68	-0.01	-0.02	0.77	0.02	0.02	0.61	-0.03	-0.04	0.40
Relationship attitudes and knowledge												
Disagreement with unrealistic relationship beliefs (ranges = 1 to 4)												
Belief in only one true love	2.57	2.50	2.49	0.07	0.08	0.15	0.01	0.01	0.88	0.08	0.08	0.10
Belief that love is enough to sustain a happy marriage	2.56	2.44	2.42	0.13** ^a	0.16	0.03	0.01	0.02	0.78	0.12*	0.15	0.09
Belief that cohabiting will improve the chances of a happy marriage	2.36	2.40	2.34	0.02	0.02	0.72	0.06	0.08	0.24	-0.04	-0.06	0.35
Disapproval of teen dating violence scale (range = 1 to 4)	3.59	3.67	3.60	-0.00	-0.01	0.84	0.02	0.03	0.51	-0.02	-0.04	0.39
Desire to avoid teen pregnancy scales (ranges = 1 to 4)												
Teen pregnancy would hurt my chances of being successful	3.08	3.07	3.09	-0.01	-0.01	0.90	-0.03	-0.03	0.74	0.02	0.02	0.81
Teen pregnancy would make me become a responsible adult before I wanted to	3.18	3.24	3.24	-0.07	-0.08	0.32	-0.01	-0.01	0.89	-0.06	-0.07	0.38
Teen pregnancy would make my life a lot better (reverse coded)	3.28	3.29	3.33	-0.05	-0.08	0.30	-0.05	-0.07	0.37	-0.00	-0.01	0.91
Knowledge of pregnancy and STIs index (range = 0 to 5)	2.97	2.92	2.95	0.01	0.01	0.91	-0.04	-0.03	0.68	0.07	0.05	0.54
Sample size	513	552	517									

Source: Baseline and one-year follow-up surveys conducted by Mathematica.

Note: The numbers in the three Outcomes by Study Group columns are regression-adjusted predicted values.

***/**/* Difference between the full RQ+ group and the control group is statistically significant from zero at the .01/.05/.10 levels, respectively, two-tailed test.

†††/††/† Difference between the shortened RQ+ group and the control group is statistically significant from zero at the .01/.05/.10 levels, respectively, two-tailed test.

^a Difference remains statistically significant at the .10 level, two-tailed test after applying the Benjamini-Hochberg correction for multiple hypothesis testing for pairwise contrasts across the research groups.

HMRE = healthy marriage and relationship education; RQ+ = Relationship Smarts PLUS; STIs = sexually transmitted infections.

Table A.7. Impacts on confirmatory outcomes: Models without covariates

Measure	Outcomes by study group			Full RQ+ versus control group			Shortened RQ+ versus control group			Full RQ+ versus shortened RQ+		
	Full RQ+ group	Shortened RQ+ group	Control group	Impact	Effect size	p-value	Impact	Effect size	p-value	Impact	Effect size	p-value
Relationship skills												
Perceived general relationship skills (range = 1 to 4)	3.07	3.09	3.08	-0.02	-0.03	0.64	0.01	0.2	0.75	-0.03	-0.05	0.41
Perceived conflict management skills (range = 1 to 4)	2.66	2.67	2.67	-0.02	-0.03	0.63	-0.00	-0.00	0.95	-0.02	-0.03	0.63
Relationship attitudes and knowledge												
Disagreement with unrealistic relationship beliefs (ranges = 1 to 4)												
Belief in only one true love	2.59	2.52	2.49	0.10*	0.11	0.07	0.03	0.03	0.57	0.07	0.08	0.14
Belief that love is enough to sustain a happy marriage	2.52	2.44	2.42	0.10*	0.12	0.09	0.01	0.02	0.80	0.09	0.11	0.20
Belief that cohabiting will improve the chances of a happy marriage	2.34	2.39	2.35	-0.01	-0.01	0.90	0.04	0.05	0.37	-0.05	-0.06	0.26
Disapproval of teen dating violence scale (range = 1 to 4)	3.60	3.60	3.59	0.01	0.01	0.82	0.01	0.02	0.70	-0.00	-0.01	0.86
Desire to avoid teen pregnancy scales (ranges = 1 to 4)												
Teen pregnancy would hurt my chances of being successful	3.09	3.07	3.08	0.02	0.02	0.79	-0.00	-0.00	0.98	0.02	0.02	0.76
Teen pregnancy would make me become a responsible adult before I wanted to	3.19	3.24	3.23	-0.04	-0.05	0.48	0.01	0.01	0.87	-0.05	-0.06	0.44
Teen pregnancy would make my life a lot better (reverse coded)	3.29	3.30	3.33	-0.03	-0.05	0.47	-0.03	-0.04	0.59	-0.01	-0.07	0.89
Knowledge of pregnancy and STIs index (range = 0 to 5)	2.99	2.89	2.94	0.05	0.03	0.58	-0.05	-0.03	0.65	0.10	0.07	0.36
Sample size	513	552	517									

Source: Baseline and one-year follow-up surveys conducted by Mathematica.

Note: The numbers in the three Outcomes by Study Group columns are regression-adjusted predicted values.

***/**/* Difference between the full RQ+ group and the control group is statistically significant from zero at the .01/.05/.10 levels, respectively, two-tailed test.

†††/††/† Difference between the shortened RQ+ group and the control group is statistically significant from zero at the .01/.05/.10 levels, respectively, two-tailed test.

^a Difference remains statistically significant at the .10 level, two-tailed test after applying the Benjamini-Hochberg correction for multiple hypothesis testing for pairwise contrasts across the research groups.

HMRE = healthy marriage and relationship education; RQ+ = *Relationship Smarts PLUS*; STIs = sexually transmitted infections.

Table A.8. Impacts on confirmatory outcomes: Models adding covariates for all statistically significant baseline differences

Measure	Outcomes by study group			Full RQ+ versus control group			Shortened RQ+ versus control group			Full RQ+ versus shortened RQ+		
	Full RQ+ group	Shortened RQ+ group	Control group	Impact	Effect size	p-value	Impact	Effect size	p-value	Impact	Effect size	p-value
Relationship skills												
Perceived general relationship skills (range = 1 to 4)	3.07	3.10	3.08	-0.01	-0.02	0.77	0.01	0.03	0.71	-0.03	-0.06	0.44
Perceived conflict management skills (range = 1 to 4)	2.67	2.69	2.67	-0.00	-0.01	0.92	0.02	0.04	0.46	-0.03	-0.04	0.41
Relationship attitudes and knowledge												
Disagreement with unrealistic relationship beliefs (ranges = 1 to 4)												
Belief in only one true love	2.56	2.50	2.48	0.07	0.08	0.17	0.01	0.01	0.82	0.07	0.08	0.14
Belief that love is enough to sustain a happy marriage	2.54	2.45	2.42	0.12**	0.14	0.04	0.03	0.03	0.60	0.10	0.12	0.16
Belief that cohabiting will improve the chances of a happy marriage	2.34	2.41	2.35	-0.01	-0.01	0.85	0.06	0.09	0.21	-0.06	-0.08	0.18
Disapproval of teen dating violence scale (range = 1 to 4)	3.59	3.61	3.59	0.00	0.00	1.00	0.02	0.05	0.36	-0.02	-0.03	0.48
Desire to avoid teen pregnancy scales (ranges = 1 to 4)												
Teen pregnancy would hurt my chances of being successful	3.09	3.07	3.08	0.01	0.01	0.84	-0.00	-0.00	0.96	0.03	0.03	0.70
Teen pregnancy would make me become a responsible adult before I wanted to	3.18	3.23	3.23	-0.05	-0.06	0.45	0.00	0.00	0.95	-0.05	-0.06	0.48
Teen pregnancy would make my life a lot better (reverse coded)	3.28	3.30	3.33	-0.04	-0.06	0.38	-0.03	-0.04	0.61	-0.00	-0.01	0.91
Knowledge of pregnancy and STIs index (range = 0 to 5)	2.98	2.89	2.94	0.04	0.03	0.70	-0.04	-0.03	0.70	0.10	0.07	0.36
Sample size	513	552	517									

Source: Baseline and one-year follow-up surveys conducted by Mathematica.

Note: The numbers in the three Outcomes by Study Group columns are regression-adjusted predicted values.

***/**/* Difference between the full RQ+ group and the control group is statistically significant from zero at the .01/.05/.10 levels, respectively, two-tailed test.

+++/++/† Difference between the shortened RQ+ group and the control group is statistically significant from zero at the .01/.05/.10 levels, respectively, two-tailed test.

^a Difference remains statistically significant at the .10 level, two-tailed test after applying the Benjamini-Hochberg correction for multiple hypothesis testing for pairwise contrasts across the research groups.

HMRE = healthy marriage and relationship education; RQ+ = Relationship Smarts PLUS; STIs = sexually transmitted infections.

Subgroup analyses

For our confirmatory outcomes, we found a generally consistent pattern of results when estimating impacts separately for subgroups of students based on their primary language spoken at home (Table A.9). As discussed in the main impact report, one challenge MTCI faced was a lack of Spanish-speaking facilitators to work with the substantial proportion of students whose primary language was Spanish. Although MTCI made several efforts to address this challenge during the study period, we conducted a subgroup analysis to examine the possibility that program impacts varied based on students’ primary language spoken at home. For this analysis, we looked only at differences in outcomes between the full *RQ+* group and the control group (without the shortened *RQ+* group). For 9 of the 10 confirmatory outcomes, we found no statistically significant differences in impacts between students who reported English as their primary language spoken at home and students who reported primarily speaking Spanish or another language at home (Table A.9). For the remaining confirmatory outcome (disapproval of teen dating violence), we found a statistically significant difference in impacts between the two groups. However, for each group of students, the magnitude of the impact was too small to reach statistical significance relative to zero.

Table A.9. Subgroup impacts by primary language spoken at home (full *RQ+* group versus control group)

Measure	All languages	English	Spanish or other language
Relationship skills			
Perceived general relationship skills (range = 1 to 4)	-0.01	0.01	-0.03
Perceived conflict management skills (range = 1 to 4)	-0.00	0.01	-0.02
Relationship attitudes and knowledge			
Disagreement with unrealistic relationship beliefs (ranges = 1 to 4)			
Belief in only one true love	0.07	0.10	0.04
Belief that love is enough to sustain a happy marriage	0.12**	0.08	0.14*
Belief that cohabiting will improve the chances of a happy marriage	-0.01	-0.02	0.00
Disapproval of teen dating violence scale (range = 1 to 4) [†]	-0.00	0.05	-0.04
Desire to avoid teen pregnancy scales (ranges = 1 to 4)			
Teen pregnancy would hurt my chances of being successful	0.02	0.01	-0.00
Teen pregnancy would make me become a responsible adult before I wanted to	-0.04	-0.04	-0.06
Teen pregnancy would make my life a lot better (reverse coded)	-0.03	-0.01	-0.07
Knowledge of pregnancy and STIs index (range = 0 to 5)	0.05	0.06	0.04
Sample size	1,025	471	554

Source: Baseline and one-year follow-up surveys conducted by Mathematica.

***/**/* Impact estimates are statistically significant at the .01/.05/.10 levels, respectively, two-tailed test.

†††/††/† Difference in impacts between subgroups is statistically significant at the .01/.05/.10 levels, respectively, two-tailed test.

RQ+ = *Relationship Smarts PLUS*; STIs = sexually transmitted infections.

We found less consistency when estimating impacts separately by gender (Table A.10). For 4 of the 10 confirmatory outcomes—perceived conflict management skills, disagreement in the belief of finding one true love to marry, and two of three measures of desire to avoid teen pregnancy—we found statistically significant differences in impacts between girls and boys. The pattern of the differences suggested more favorable program impacts for girls than for boys. For the other 6 confirmatory outcomes, however, the differences in impacts between girls and boys did not reach statistical significance. In addition, for girls, the impact for only 1 of the 10 confirmatory outcomes reached statistical significance relative to zero. For this one outcome, we found that girls in the full *RQ+* group reported a higher level of disagreement than girls in the control group with the unrealistic relationship belief of finding one true love to marry. For girls, impacts for most other confirmatory outcomes were in the same direction but did not reach statistical significance.

Table A.10. Subgroup impacts by gender (full *RQ+* group versus control group)

Measure	Both genders	Girls	Boys
Relationship skills			
Perceived general relationship skills (range = 1 to 4)	-0.01	0.04	-0.05
Perceived conflict management skills (range = 1 to 4) [†]	-0.00	0.05	-0.05
Relationship attitudes and knowledge			
Disagreement with unrealistic relationship beliefs (ranges = 1 to 4)			
Belief in only one true love ^{††}	0.07	0.21**	-0.06
Belief that love is enough to sustain a happy marriage	0.12**	0.12	0.12*
Belief that cohabiting will improve the chances of a happy marriage	-0.01	-0.04	0.03
Disapproval of teen dating violence scale (range = 1 to 4)	-0.00	-0.03	0.03
Desire to avoid teen pregnancy scales (ranges = 1 to 4)			
Teen pregnancy would hurt my chances of being successful	0.02	0.13	-0.10
Teen pregnancy would make me become a responsible adult before I wanted to ^{††}	-0.04	0.09	-0.17**
Teen pregnancy would make my life a lot better (reverse coded) [†]	-0.03	0.04	-0.11*
Knowledge of pregnancy and STIs index (range = 0 to 5)	0.08	0.04	0.05
Sample size	1,026	485	541

Source: Baseline and one-year follow-up surveys conducted by Mathematica.

***/**/* Impact estimates are statistically significant at the .01/.05/.10 levels, respectively, two-tailed test.

†††/††/† Difference in impacts between subgroups is statistically significant at the .01/.05/.10 levels, respectively, two-tailed test.

RQ+ = *Relationship Smarts PLUS*; STIs = sexually transmitted infections.

Details of exploratory analysis

For our exploratory analysis, we estimated impacts on six outcomes from the program exit survey and nine additional outcomes from the one-year follow-up survey (Table A.11). The six outcomes from the program exit survey comprised measures of students’ relationship attitudes. Previous research has found impacts on such outcomes at program exit (Simpson et al. 2018). We compared the findings from this

analysis with our confirmatory impact findings measured after one year to aid interpretation of our results. For the exploratory analysis of additional outcomes from the one-year follow-up survey, we estimated impacts on measures of students’ relationship expectations and relationship experiences. Prior research provides little evidence on whether HMRE programs for high school students are achieving their broader goal of improving the trajectory of students’ relationship behaviors and experiences in adolescence and adulthood. Although data from a one-year follow-up survey cannot provide a definitive answer to this question, this analysis can speak to the potential for such impacts to emerge in the future. For all exploratory outcomes, we estimated impacts using the same methods and statistical software as we used in the confirmatory analysis.

Table A.11. Exploratory outcomes

Outcome	Measure
Program exit survey	
Marriages are happy or unhappy and there is not much you can do to change it	Continuous scale variable: Response corresponds to students’ reported level of disagreement with the following statement: Marriages are happy or unhappy and there is not much you can do to change it. Values range from 1 to 4, with higher values indicating greater disagreement.
If you are happily married, you don’t need to work on your relationship	Continuous scale variable: Response corresponds to students’ reported level of disagreement with the following statement: If you are happily married, you don’t need to work on your relationship. Values range from 1 to 4, with higher values indicating greater disagreement.
It is ok to live with a boyfriend/girlfriend without being married	Continuous scale variable: Response corresponds to students’ reported level of disagreement with the following statement: It is okay to live with a boyfriend/girlfriend without being married. Values range from 1 to 4, with higher values indicating greater disagreement with the statement.
Disapproval of teen dating violence scale	<p>Continuous scale variable: Average of responses to the following three statements included on the survey:</p> <ol style="list-style-type: none"> 1. A person who makes their partner angry on purpose deserves to be hit. 2. Sometimes physical violence, such as hitting or pushing, is the only way to express your feelings. 3. Violence between dating partners is a personal matter and people should not interfere. <p>For each statement, the survey asked students to respond on a 4-point scale ranging from strongly agree to strongly disagree. These questions were adapted from the Acceptance of Couple Violence Scale (Dahlberg et al. 2005).</p>
Disapproval of unhealthy relationship behaviors	<p>Continuous scale variable: Average of responses to the following four statements included on the survey:</p> <ol style="list-style-type: none"> 1. In a healthy relationship, how important is it that couples do not cheat on each other? 2. In a healthy relationship, how important is it that couples do not call each other names? 3. In a healthy relationship, how important is it that couples do not threaten each other? 4. In a healthy relationship, how important is it that couples do not push, shove, hit, slap, or grab each other? <p>For each item, the survey asked students to respond on a 4-point scale ranging from not at all important to very important.</p>

Outcome	Measure
Beliefs about relationship communication	<p>Continuous scale variable: Average of responses to the following three statements included on the survey:</p> <ol style="list-style-type: none"> 1. In a healthy relationship, it is essential for couples to talk about things that are important to them. 2. Even in a good relationship, couples will occasionally have trouble talking about their feelings. 3. A relationship is stronger if a couple doesn't talk about their problems. (Reverse coded) <p>For each statement, the survey asked students to respond on a 4-point scale ranging from strongly disagree to strongly agree.</p>
One-year follow-up survey	
Expects to get married	Binary variable: Equals 1 if student reported he or she is almost certain or has a good chance of getting married; equals 0 if student reported a fifty-fifty chance, some chance, or almost no chance of getting married.
Expects to be married to one person for life	Binary variable: Equals 1 if student reported he or she is almost certain or has a good chance of being married to one person for life; equals 0 if student reported a fifty-fifty chance, some chance, or almost no chance of being married to one person for life.
Expects to live with a partner outside marriage	Binary variable: Equals 1 if student reported he or she is almost certain or has a good chance of living with a partner without being married; equals 0 if student reported a fifty-fifty chance, some chance, or almost no chance of living with a partner without being married.
Expects to have children outside marriage	Binary variable: Equals 1 if student reported he or she is almost certain or has a good chance of having a child outside of marriage; equals 0 if student reported a fifty-fifty chance, some chance, or almost no chance of having a child outside of marriage.
In a relationship	Binary variable: Equals 1 if student reported currently being in a romantic relationship; equals 0 if student reported not currently being in a relationship.
In an unhealthy relationship	Binary variable: Equals 1 if students reported currently being in a romantic relationship and having experienced any of the following: their partner has tried to keep them from seeing friends; their partner has made them feel stupid; they have felt their partner might hurt them. Equals 0 if student reported not currently being in a relationship or currently being in a romantic relationship without any of these experiences.
Ever had sex	Binary variable: Equals 1 if student reported ever having sexual intercourse; equals 0 if student reported never having sexual intercourse.
Relationship quality with parents	<p>Continuous scale variable: Average of responses to the following three statements included on the survey:</p> <ol style="list-style-type: none"> 1. In the past month, how often did you feel like you could count on at least one of your parents to be there when you needed them? 2. In the past month, how often did you feel like you could talk with your parent(s) about things that really matter? 3. In the past month, how often did you feel like you could share your thoughts and feelings with your parent(s)? <p>For each statement, the survey asked students to respond on a 4-point scale ranging from none of the time to all of the time. These questions were drawn from the Parent-Adolescent Relationship Inventory (Lippman et al. 2014).</p>

Outcome	Measure
Relationship quality with friends	<p>Continuous scale variable: Average of responses to the following three statements included on the survey:</p> <ol style="list-style-type: none"> 1. In the past month, how often did you feel like you could count on your friends to be there when you needed them? 2. In the past month, how often did you feel like you could talk with your friends about things that really matter? 3. In the past month, how often did you feel like you could share your thoughts and feelings with your friends? <p>For each statement, the survey asked students to respond on a 4-point scale ranging from none of the time to all of the time. These questions were adapted from the Parent-Adolescent Relationship Inventory (Lippman et al. 2014).</p>

Findings from our exploratory analysis differed for the program exit survey and one-year follow-up survey. For the program exit survey, we found statistically significant differences for four of six exploratory outcomes (Table A.12). We found that students in both the full and shortened *RQ+* groups reported a higher average level of disagreement than students in the control group with the view that marriages were either happy or unhappy and there was not much you could do to change it. Students in the shortened *RQ+* group also reported a higher average level of disagreement than students in the control group with the view that it was okay to live with a boyfriend or girlfriend without being married. We found that students in the full *RQ+* group had higher average scores than students in the control group on a scale of disapproval of unhealthy relationship behaviors. Finally, we found that students in the shortened *RQ+* group had lower average scores than students in the control group on a scale of beliefs about relationship communication. In comparison, for the one-year follow-up survey, we found that students in all three research groups had similar averages for eight of the nine exploratory outcomes (Table A.13). For one of the nine outcomes, we found a statistically significant difference at the one-year follow-up between students in the full versus shortened *RQ+* groups. Specifically, we found that students in the full *RQ+* group were significantly more likely than students in the shortened *RQ+* group to expect to get married in the future.

Table A.12. Impacts on relationship attitudes at program exit

Measure	Outcomes by study group			Full RQ+ versus control group			Shortened RQ+ versus control group			Full RQ+ versus shortened RQ+		
	Full RQ+ group	Shortened RQ+ group	Control group	Impact	Effect size	p-value	Impact	Effect size	p-value	Impact	Effect size	p-value
Marriages are happy or unhappy and there is not much you can do to change it (reverse coded; range = 1 to 4)	2.82	2.80	2.80	0.02	0.03	0.69	-0.00	-0.00	0.95	0.03	0.04	0.57
If you are happily married, you don't need to work on your relationship (reverse coded; range = 1 to 4)	3.00	3.00	2.86	0.14***, a	0.18	0.00	0.13***, a	0.17	0.01	0.00	0.00	0.96
It is ok to live with a boyfriend/girlfriend without being married (reverse coded; range = 1 to 4)	2.15	2.16	2.07	0.08	0.11	0.11	0.09*	0.13	0.08	-0.01	-0.02	0.083
Disapproval of teen dating violence scale (range = 1 to 4)	3.41	3.37	3.36	0.05	0.07	0.28	0.01	0.01	0.89	0.05	0.07	0.18
Disapproval of unhealthy relationship behaviors (range = 1 to 4)	3.56	3.49	3.49	0.07*	0.12	0.08	-0.00	-0.00	0.95	0.08*	0.14	0.06
Beliefs about relationship communication (range = 1 to 4)	3.11	3.08	3.16	-0.05	-0.09	0.16	-0.08**	-0.13	0.03	0.02	0.04	0.55

Source: Baseline, program exit, and one-year follow-up surveys conducted by Mathematica.

Note: The numbers in the three Outcomes by Study Group columns are regression-adjusted predicted values.

***/**/* Impact is statistically significant from zero at the .01/.05/.10 levels, respectively, two-tailed test.

^a Difference remains statistically significant at the .10 level, two-tailed test after applying the Benjamini-Hochberg correction for multiple hypothesis testing for pairwise contrasts across the research groups.

HMRE = healthy marriage and relationship education; RQ+ = *Relationship Smarts PLUS*.

Table A.13. Impacts on relationship expectations and experiences after one year

Measure	Outcomes by study group			Full RQ+ versus control group			Shortened RQ+ versus control group			Full RQ+ versus shortened RQ+		
	Full RQ+ group	Shortened RQ+ group	Control group	Impact	Effect size	p-value	Impact	Effect size	p-value	Impact	Effect size	p-value
Relationship expectations one year after program												
Expects to get married (%)	60	52	56	3	0.07	0.35	-4	-0.08	0.19	7**	0.14	0.04
Expects to be married to one person for life (%)	60	58	61	-1	-0.01	0.83	-3	-0.06	0.26	2	0.04	0.42
Expects to live with a partner outside marriage (%)	30	27	32	-1	-0.02	0.68	-4	-0.10	0.22	2	0.05	0.47
Expects to have children outside marriage (%)	12	12	13	-1	-0.04	0.61	-1	-0.02	0.75	-1	-0.02	0.75
Relationship experiences one year after program												
In a relationship (%)	35	34	36	-1	-0.02	0.70	-2	-0.03	0.61	0	0.00	0.95
In an unhealthy relationship (%)	13	10	11	1	0.04	0.49	-1	-0.04	0.52	3	0.08	0.14
Ever had sex (%)	22	23	23	-1	-0.02	0.66	0	0.00	0.94	-1	-0.03	0.70
Relationship quality with parents (range = 1 to 4)	2.96	3.00	3.03	-0.07	-0.08	0.13	-0.03	-0.04	0.51	-0.04	-0.05	0.37
Relationship quality with friends (range = 1 to 4)	2.77	2.80	2.78	-0.01	-0.01	0.86	0.02	0.02	0.79	-0.03	-0.03	0.61

Source: Baseline, program exit, and one-year follow-up surveys conducted by Mathematica.

Note: The numbers in the three Outcomes by Study Group columns are regression-adjusted predicted values.

***/**/* Impact is statistically significant from zero at the .01/.05/.10 levels, respectively, two-tailed test.

^a Difference remains statistically significant at the .10 level, two-tailed test after applying the Benjamini-Hochberg correction for multiple hypothesis testing for pairwise contrasts across the research groups.

HMRE = healthy marriage and relationship education; RQ+ = *Relationship Smarts PLUS*.

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