Healthy Marriage and Relationship Education for Expectant and New Mothers: The 30-Month Impacts of MotherWise

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Strengthening Relationship Education and Marriage Services

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Overview

Introduction

Many healthy marriage and relationship education (HMRE) programs serve individual adults rather than couples. Such programs aim to help participants form and maintain healthy romantic relationships and avoid unhealthy relationships, regardless of their relationship status. These programs serve a mix of populations and often cover such topics as how to choose a partner wisely, how to improve communication skills, how relationship choices may affect many aspects of life, and how to recognize unhealthy relationships and leave those relationships safely.

Although the prevalence of HMRE programs serving individual adults has grown over recent years, there is little rigorous evidence on the ability of HMRE programs for individual adults to impact participants' outcomes and none on the ability of these programs to improve outcomes over the longer term. The few existing studies of HMRE programs for individual adults either use quasi-experimental methods, examine short-term effects, or examine programs that serve populations or operate in settings that are dissimilar to those of federally funded HMRE programs.

To help build the evidence base on the diverse set of HMRE programs serving individual adults, this study examines MotherWise, a relationship skills program for women with low incomes who are pregnant or have just had a baby. The University of Denver in Colorado received a five-year grant from ACF's Office of Family Assistance in 2015 to deliver the program, which aims to empower women with the knowledge, skills, and attitudes they need to make informed decisions about healthy relationships. The program includes a core group workshop made up of six weekly four-hour sessions, individual case management, and an optional couples' workshop. An earlier report found that, after one year, MotherWise had improved women's relationship skills and attitudes and reduced the likelihood that a woman had an unintended pregnancy during the year after study enrollment (Patnaik and Wood 2021). This report examines the program's impacts on women's outcomes 30 months after study enrollment.

Primary research question

This report addresses the following primary research questions:

1. To what extent do the impacts of MotherWise on women's relationship skills and attitudes persist at 30 months?

2. What are the impacts of MotherWise on women's relationship outcomes at 30 months?

3. What are the impacts of MotherWise on the well-being of women and their children at 30 months?

Purpose

This report is the third in a series on the implementation and impacts of MotherWise. It describes the program's impacts 30 months after women enrolled in the study. These impacts were estimated by comparing the outcomes of women who were randomly assigned to either a group that was offered MotherWise services or a control group that was not. The report also provides information on program implementation and costs and documents the study methods. An earlier report presented findings on the program's one-year impacts, based on a follow-up survey of women one year after they enrolled in the study. Another report provided detailed information on the program's design and implementation during the first year of the study. Mathematica and Public Strategies conducted this study as part of the Strengthening Relationship Education and Marriage Services (STREAMS) evaluation for ACF.

What we learned

- MotherWise had persistent positive impacts on women's relationship skills and one of the two measures of relationship attitudes at the 30-month follow-up. Compared to women in the control group, those who were offered the MotherWise program reported significantly better romantic relationship skills and conflict management skills and higher levels of disapproval of couple violence at 30 months, consistent with the one-year impacts on these outcomes.

- MotherWise increased relationship stability at the 30-month follow-up. During the 30 months after study enrollment, women in the MotherWise group experienced fewer relationship transitions—the total of their relationship start-ups and breakups—than did women in the control group.

- The program had no impacts on other relationship outcomes measured in the study. Women in the MotherWise and control groups reported similar levels of intimate partner violence, co-parenting quality, and maternal and child well-being at the 30-month follow-up. Women in both groups were equally likely to have experienced at least one unintended pregnancy during the 30 months after study enrollment.

- Exploratory analyses suggest MotherWise did not affect the likelihood that women were in a romantic relationship with their child's father at the 30-month follow-up; among those who were, it did not improve their relationship quality. MotherWise also did not increase father involvement.

Methods

Between September 2016 through December 2018, 949 women enrolled in the study. To be eligible for the study, women had to be at least 18 years old and either be pregnant or have delivered a baby in the previous three months. The study team randomly assigned women to either (1) a group that was offered the MotherWise program or (2) a control group that was not offered the program but was free to seek other services available in the community. For the impact analysis presented in this report, we used data from a baseline survey that was administered at the time of enrollment and a 30-month follow-up survey. A total of 748 women responded to the 30-month follow-up survey, for a response rate of 79 percent. Response rates were similar between the program and control groups.

Considerations for HMRE programs and research

MotherWise took a unique approach to offering HMRE services to individual adults—serving exclusively expectant and new mothers with low incomes. The program aimed to empower these women to make healthy decisions about their relationships that would keep them and their children safe. The positive and persistent impacts on women's relationship skills and attitudes, and the emergent positive impacts on women's relationship stability over the 30-month follow-up period, suggest that this approach holds promise.

The 30-month impact findings offer encouraging results about the longer-term effects of MotherWise. At both the one-year and 30-month follow-ups, MotherWise improved women's relationship skills and attitudes—the outcomes it most directly aimed to affect. MotherWise largely succeeded in equipping women with the skills and attitudes needed to make more informed and healthy decisions about relationships—and this success lasted beyond the short term. It also increased women's relationship stability over the 30-month follow-up period. The program emphasized the importance of making deliberate and careful decisions about romantic relationships; its impact on relationship stability suggests

that this central program message was understood by participants and influenced the frequency with which they started and ended relationships.

MotherWise did not have persistent impacts on other outcomes. Although MotherWise reduced the likelihood that women experienced at least one unintended pregnancy in the first year after entering the program, it had no impact on this outcome at 30 months. MotherWise may have initially encouraged women to make more deliberate decisions about family planning; however, without continued programming to reenforce the lessons and support services, the lessons of MotherWise might have faded over time and thus had less influence. MotherWise did not affect intimate partner violence, co-parenting quality, or the measures of maternal and child well-being we examined.

Why did MotherWise succeed in improving relationship skills, attitudes, and stability 30 months after enrollment? The positive effects on relationship skills and attitudes might be due to the program's strong implementation, the program's focus on a well-defined service population, or delivering the program at a time in life when women might be particularly open to taking stock of their family and relationship choices and working on their relationship skills and attitudes. In turn, the program's impacts on relationship skills and attitudes could have helped women make more careful decisions about whether and with whom to begin or end a romantic relationship and to effectively navigate challenges within relationships that might otherwise have led to more transitions.

What factors might have limited the success of MotherWise in influencing other outcomes? Some outcomes—such as co-parenting quality, intimate partner violence, and relationship quality—might be difficult to improve without also working directly with co-parents or romantic partners. More intensive engagement with the partners and co-parents could potentially help programs have greater success in achieving sustained effects. Although MotherWise offered an optional couples' workshop, take-up was low for this program component. Future programs that plan to implement a model similar to MotherWise might consider strengthening this component. We also found that MotherWise did not improve the measures of maternal and child well-being we examined. We cannot rule out that positive impacts on maternal and child well-being could emerge at a later point, especially in light of the observed impacts on relationship stability. Even so, programs that aim to improve these well-being measures might need to offer services that directly address them. Finally, for many outcomes, we observed some fade-out between the one-year and 30-month follow-up. To increase the likelihood that program effects persist, programs could consider reengaging participants after they complete the core workshop.

The findings of this study suggest that programs like MotherWise hold promise because they can improve certain outcomes of expectant and new mothers with low incomes beyond the short term. These findings not only help expand what is known about the effectiveness of HMRE programs serving individual adults and those that specifically serve women, but they also add to a small body of evidence on the longer-term effects of HMRE programs for adults beyond one year. However, MotherWise represents only one approach to providing HMRE; HMRE programs can vary in their service population, focus, content, structure, and targeted outcomes. More research is needed to develop a more complete picture of how HMRE programs can improve the outcomes of participants and their families over the long term.

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Introduction

Many healthy marriage and relationship education (HMRE) programs serve individual adults rather than couples (Office of Family Assistance 2021). Although some HMRE programs for individual adults are designed for people who are not in a romantic relationship and others serve individuals regardless of their relationship status (Scott and Huz 2020), all aim to help participants form and maintain healthy romantic relationships and avoid unhealthy relationships (Stanley et al. 2020; Stanley and Rhoades 2009). They cover topics such as how to make sound relationship choices, how to improve communication and conflict management skills, and how to recognize dangerous relationships and leave them safely (Rhoades and Stanley 2011; Visvanathan et al. 2014).

Rigorous evidence on the effectiveness of HMRE programs for individual adults is limited. Some quasi-experimental studies have found that HMRE programs for individual adults might improve some short-term outcomes (Adler-Baeder et al. 2018; Bradford et al. 2016; Owen et al. 2017; Van Epp et al. 2008). In addition, a few small-scale random assignment studies have examined the effects for-credit courses about relationship issues have had on the college students who took them (Sharp and Ganong 2000; Braithwaite and Fincham 2009; Polanchek 2014). To date, only one random assignment study has examined an HMRE program for individual adults in noncollege settings (Nowlan et al. 2017). It found that an online HMRE curriculum for individual adults had positive impacts on participants' self-reported quality of life, work functioning, and perceived health at program exit; however, it did not examine whether the impacts persisted in the long term. In sum, there is little rigorous evidence on the ability of HMRE programs for individual adults to improve participants' outcomes and none on the ability of these programs to improve outcomes over the longer term.

To add to the growing evidence base on the effects of HMRE programs for individual adults, the Office of Planning, Research, and Evaluation (OPRE) within the Administration for Children and Families (ACF) at the U.S. Department of Health and Human Services engaged Mathematica and its partner Public Strategies to conduct a random assignment impact study of MotherWise, a relationship skills program for women who are pregnant or have recently had a baby. The University of Denver in Colorado received a five-year grant from ACF's Office of Family Assistance in 2015 to deliver the program. The study was part of the broader Strengthening Relationship Education and Marriage Services (STREAMS) evaluation conducted by Mathematica and Public Strategies for ACF.

MotherWise represents one approach to providing HMRE for individual adults. It includes a core group workshop designed around the *Within My Reach* curriculum, a commonly used HMRE curriculum for individuals who may or may not be in a relationship, and it was tailored to the needs of expectant and new mothers. MotherWise supplemented the workshop with case management and other support services as well as an optional couples' workshop. The program's primary goal is to empower women with the knowledge, skills, and attitudes they need to make informed decisions about healthy relationships. Findings from this study will help build the evidence base on the effectiveness of HMRE programs that focus on individual adults.

This report examines the impacts of MotherWise 30 months after women enrolled in the study. It is the third in a series on the implementation and impacts of MotherWise. An earlier report described the program's design and implementation during the first year of the study (Baumgartner and Paulsell 2019). Another report presented findings on the program's one-year impacts (Patnaik and Wood 2021). That report documented that, after one year, MotherWise had improved women's relationship skills and attitudes and reduced the likelihood that a woman had experienced an unintended pregnancy in the year

after study enrollment. This report presents findings from a 30-month impact analysis and addresses three questions of importance to HMRE program developers, providers, and policymakers:

1. To what extent do the impacts of MotherWise on women's relationship skills and attitudes persist at 30 months?

2. What are the impacts of MotherWise on women's relationship outcomes at 30 months?

3. What are the impacts of MotherWise on the well-being of women and their children at 30 months?

To answer these questions, we compared the outcomes of 949 women who were randomly assigned to either the MotherWise group or the control group that was not offered MotherWise services. This report was based primarily on follow-up survey data collected 30 months after women enrolled in the study. The report describes the women who participated in the study, provides information on program costs and implementation, and documents the study methods. The findings presented in this report provide evidence on the effectiveness of HMRE programs like MotherWise and more generally expand our understanding of the ability of HMRE programs for adults to have longer-term impacts.

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 the 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 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.◢

The MotherWise program

MotherWise was developed by researchers at the University of Denver. It aimed to empower women to make informed decisions about healthy relationships and other life choices, and to equip them with the relationship skills and attitudes that would enable them to do so. It emphasized the importance of making careful and deliberate decisions about relationships—including whom to have a child with—given the substantial consequences that relationship choices can have for participants and their children. The goal of the program was to improve relationship outcomes, family stability, and maternal and child well-being. The program served women who were pregnant or had had a baby within the past three months. Women receiving prenatal and postnatal services through Denver Health were recruited into the program. The program developers saw MotherWise as a complement to the perinatal health care that pregnant women often received, and which focused on the physical health of the mother and the baby.

MotherWise included three primary components: (1) a core group workshop made up of six weekly four-hour sessions, (2) individual case management, and (3) an optional couples' workshop. The core group

workshop used the *Within My Reach* curriculum (15 hours of content), which was supplemented with information on infant care and parenting (three hours of content), for a total of 18 hours of content. The program offered all its workshops and services in both Spanish and English.

MotherWise used *Within My Reach*, a popular HMRE curriculum that is tailored for individual adults who may or may not be in romantic relationships but who participate in HMRE without partners. One of the curriculum developers helped design the MotherWise program. Although similar curricula for couples aim to help partners communicate and plan for their future together, *Within My Reach* is designed to provide tools and skills to adult individuals so that they can make informed and healthy decisions about their personal and romantic relationships (Pearson et al. 2015). The curriculum content covers the characteristics of healthy relationships, communication and relationship skills, and common relationship challenges and how to resolve them. Table 1 provides an overview of the HMRE content covered in each of the six sessions of the MotherWise workshop.

The MotherWise workshop also included content on parenting, infant care, and self-care during the early months of parenthood. This content was intended to not only deliver important and relevant information to mothers but also provide cover for women who were in unsafe relationships and did not want their partners to know that they were in a program that included topics such as recognizing unhealthy relationships and how to leave them (Baumgartner and Paulsell 2019).

Table 1. Overview of the six MotherWise workshop sessions

Session	HMRE content covered
1	- The state of relationships today - Healthy relationships: What they are and what they aren't - Sliding versus deciding
2	- Sliding versus deciding (continued) - Smart love - Knowing yourself first
3	- Knowing yourself first (continued) - Making your own decisions - Danger patterns in relationships
4	- Where conflict begins - Smart communication - The speaker-listener technique
5	- The speaker-listener technique (continued) - Infidelity, distrust, and forgiveness - Two types of commitment: Why it matters to adults and children
6	- Two types of commitment: Why it matters to adults and children (continued) - Stepfamilies and the significance of fathers - Making the tough decisions - Reaching into your future

Source: MotherWise program documents.

MotherWise offered participants individual support in the form of case management, which was used to reinforce the skills and knowledge taught in the core workshop. Women met with their case managers about four times over the course of the six-week program for about one hour each time. Case managers tried to help the women apply the workshop concepts about healthy relationships to their own lives and to

set personal goals. They also provided referrals to community resources such as domestic violence and mental health services as well as Supplemental Nutrition Assistance Program (SNAP) and Temporary Assistance for Needy Families (TANF) offices.

MotherWise also included an optional couples' workshop that the program developers had designed to reinforce important HMRE concepts and communication skills. Women who had completed at least the first three sessions of the core workshop on their own had the choice to attend the optional couples' workshop with their romantic partners. The couples' workshop comprised an all-day Saturday session and a four-hour weeknight session; couples could choose to attend either or both sessions.

Study design

To evaluate the impacts of the MotherWise program, the study team used a random assignment design. We compared the outcomes of women who had been randomly assigned to one of two groups: (1) a group that was offered the MotherWise program and (2) a control group that was not. Because the study team assigned women to the two research groups at random and was able to collect follow-up data from a large share (nearly 80 percent) of women in both groups, any difference in average outcomes between the groups can be attributed to the MotherWise program. The rest of this section describes the design of the impact study.

Sample intake

Sample intake took place from September 2016 through December 2018, during which time 949 women were enrolled in the MotherWise study. To be eligible for the study, an individual had to meet the following criteria: (1) be female, (2) be at least 18 years old, and (3) either be pregnant or have delivered a baby (hereafter, referred to as the focal child) in the previous three months. The primary source of recruitment for the study was Denver Health, a large public hospital that is the primary health care provider for families with Medicaid-funded births in the Denver area. Program staff identified eligible women from the electronic medical record system of Denver Health and then approached them in exam rooms before their doctor's appointments. There, MotherWise staff described the program and study and scheduled an intake appointment if the women were interested. In addition to Denver Health, MotherWise staff sought referrals from other medical and social services agencies that served pregnant women and new mothers with low incomes in the Denver area.

Random assignment

Women who were eligible for the study, who consented to the study, and who completed a baseline survey (described below) underwent random assignment. For each eligible woman, a MotherWise staff member would conduct enrollment by using the study's computer system to randomly assign the participant to either the MotherWise group or the control group that was not eligible for MotherWise. As explained in the appendix to this report, the likelihood of being placed in the MotherWise group or the control group varied over time to ensure adequate enrollment in the program. Overall, 54 percent of study participants were assigned to the MotherWise group, and 46 percent were assigned to the control group.

Data collection

The impact analysis presented in this report relies primarily on data from two surveys:

1. **Baseline survey.** Members of the study team administered a baseline survey to all women in the study by telephone during the program intake appointment. The survey collected information on the women's demographic characteristics, family backgrounds, relationship attitudes and skills, relationship experiences, children, employment, and well-being.

2. **30-month follow-up survey.** About 30 months after study enrollment, the study team attempted to contact the women in both research groups to complete another follow-up survey, either online or by telephone. The survey collected information on similar items as the first follow-up survey, as well as additional items on topics such as children's well-being and father involvement. The 30-month follow-up survey had an overall response rate of 79 percent, with minimal difference in the response rates for the MotherWise and control groups.

To assess program impacts on unintended pregnancies since random assignment, we also used data from the one-year follow-up survey. That survey had an overall response rate of 84 present and is described in greater detail in the one-year impact report (Patnaik and Wood 2021). For both the one-year and 30-month follow-up surveys, because the program only served women and directly targeted their outcomes, the study team did not attempt to collect data from their romantic partners or co-parents. Readers should keep this in mind when interpreting findings for some outcomes related to relationships, which do not reflect the partner's or co-parent's perspectives.

Effects of the COVID-19 pandemic on the MotherWise study

Most aspects of the study were unaffected by the COVID-19 pandemic. All MotherWise services were delivered and the one-year follow-up survey was completed before the pandemic began. However, data collection for the 30-month follow-up occurred both before and during the pandemic. Respondents completed the follow-up surveys from May 2019 to September 2021. Approximately one-quarter of respondents completed the 30-month survey before the pandemic (before March 15, 2020), and three-quarters completed it during the pandemic (on or after March 15, 2020).

The pandemic affected some aspects of survey administration. In March 2020, the study team had to suspend the use of in-person locators to encourage women to complete the survey. To help ensure high response rates in the absence of in-person locating efforts, in June 2020, the study team increased the incentive payments for survey completion from $25 to $50. Overall response rates were strong for the 30-month follow-up, including for later cohorts of study participants who completed their surveys exclusively during the pandemic period. We also compared the impacts of MotherWise for women who completed the 30-month follow-up survey before and after the pandemic. We found that impacts were similar for most of our confirmatory outcomes. Additional information about data collected before and during the pandemic are presented in the report appendix.

Confirmatory analysis

We conducted both a confirmatory analysis and an exploratory analysis of the effects on MotherWise on participants' outcomes (Schochet 2009). We used the confirmatory analysis as the primary basis for answering the study's three research questions. For this analysis, we specified both the outcomes and methods before examining the data to avoid having the results influence what we reported, or the perception we might have done so.

For the study's first research question, we examined the extent to which impacts on women's relationship skills and attitudes found in the earlier one-year report persisted at 30 months. One of the MotherWise's main goals is to equip women with the skills and attitudes needed to make informed and healthy decisions about their personal and romantic relationships. The *Within My Reach* curriculum, which forms the basis of the program's core workshop, focuses directly on improving relationship skills and attitudes. For the 30-month impact analysis, we examined MotherWise's impact on outcomes in two domains: (1) relationship skills and (2) relationship attitudes (Table 2). Specifically, we examined four measures of skills and attitudes: perceived romantic relationship skills, perceived conflict management skills, support for going slow in relationships, and disapproval of couple violence. These are the same outcomes examined in the earlier one-year impact report.

Table 2. Outcomes for confirmatory analyses

Outcome	Measure
Relationship skills	
Perceived romantic relationship skills*	Continuous scale variable: Average of mother's responses to six survey questions. Each question asked participants 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 were a subset of items from the Relationship Deciding Scale (Vennum and Fincham 2011). Scale values ranged from 1 to 4, with higher values indicating greater perceived relationship skills.
Perceived conflict management skills*	Continuous scale variable: Average of mother's responses to five survey questions. Each question asked women 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. Questions were adapted from the Conflict Management Subscale of the Interpersonal Competence Scale (Buhrmester et al. 1988). Scale values ranged from 1 to 4, with higher values indicating greater perceived skills.
Relationship attitudes	
Support for going slow in romantic relationships*	Degree to which mother agreed with the following statement: "People are more likely to succeed in their relationships if they take things slowly." Values ranged from 1 to 4, with higher values indicating greater agreement. This measure was recommended by the *Within My Reach* curriculum developers.
Disapproval of couple violence*	Continuous scale variable: Average of responses to 12 survey questions. Each question asked women to report their level of disagreement with a statement such as, "Violence between dating partners can improve the relationship" and "There are times when violence between dating partners is okay." Questions were a subscale of the Acceptance of Couple Violence Scale (Dahlberg et al. 2005). Scale values ranged from 1 to 4, with higher values indicating greater disapproval of couple violence.
Exposure to intimate partner violence	
Any psychological abuse*	Whether mother reported that in the past year a romantic partner tried to keep her from seeing or talking with friends, made her feel stupid, kept money from her or took her money without asking, or made her feel afraid that the partner might hurt her. This measure was adapted from similar measures used in the Supporting Healthy Marriage evaluation (Hsueh et al. 2012). The measure had a value of 1 for women who reported any exposure to psychological abuse and 0 for women who reported no exposure.

Outcome	Measure
Any physical abuse*	Whether mother reported that in the past year a romantic partner pushed, shoved, slapped, punched, kicked, or beat her up. This measure was based on two items of the Physical Assault Scale of the Conflict Tactics Scale—Short Form (Straus and Douglas 2004). The measure had a value of 1 for women who reported any exposure to physical abuse and 0 for women who reported no exposure.
Unintended pregnancy	
Had an unintended pregnancy since study enrollment*	Whether mother reported having had at least one recent unintended pregnancy (she did not want to become pregnant or the pregnancy came sooner than intended) at either the one-year or 30-month follow-up. This measure was based on survey questions drawn from the National Survey of Family Growth 2015–2017 (National Center for Health Statistics n.d.).
Co-parenting	
Quality of co-parenting relationship with child's father*	Continuous scale variable: Average of responses to 10 survey questions. Each question asked women to report their level of agreement with positive statements about co-parenting with the father of the child such as, "I feel good about [father]'s judgment about what is right for our children/child." Questions were a subset of items from the Parenting Alliance Inventory (Abidin and Brunner 1995). Scale values ranged from 1 to 4, with higher values indicating greater co-parenting quality.
Relationship stability	
Number of relationship transitions	Continuous variable: The number of relationship transitions (beginnings or endings) the mother reported since random assignment.
Mother's well-being	
Depressive symptoms*	Continuous scale variable: Sum of responses to eight survey questions. Each question asked women to report how frequently they experienced a depressive symptom in the past two weeks. Questions were from the Patient Health Questionnaire (Kroenke et al. 2009). Scale values ranged from 0 to 24, with higher values reflecting more frequent depressive symptoms.
Material hardship	Continuous scale variable: Sum of responses to four survey questions. Each question asked women to report whether they had experienced a type of material hardship in the past year. Scale values range from 0 to 4, with higher values indicating more material hardship in the past year.
Child well-being	
Child social-emotional and behavioral problems	Continuous scale variable: Sum of responses to 31 survey questions. Each question asked women to report whether or how often the focal child displayed various problem behaviors. These questions were drawn from the Brief Infant Toddler Social Emotional Assessment (Briggs-Gowan and Carter 2006). Scale values ranged from 0 to 62, with higher values indicating more social-emotional and behavioral problems.
Child social-emotional competence	Continuous scale variable: Sum of responses to 11 survey questions. Each question asked women to report how often the focal child displayed various behaviors indicating social-emotional competence. These questions were drawn from the Brief Infant Toddler Social Emotional Assessment (Briggs-Gowan and Carter 2006). Scale values ranged from 0 to 22, with higher values indicating greater social-emotional competence.

* Outcome was examined in the one-year impact analysis.

For the study's second research question, we examined the program's 30-month impacts on relationship outcomes in four domains: (1) intimate partner violence, (2) unintended pregnancy, (3) co-parenting, and (4) relationship stability (see Table 2). MotherWise teaches skills for making sound relationship choices and emphasizes how these choices could have consequences for participants and their children. For

relationship stability, we assessed the program's impact on the number of relationship transitions experienced during the follow-up period, reasoning that the program's focus on making careful, deliberate choices about relationships could reduce relationship transitions. Similarly, because the program's emphasis on relationship choices could make women think carefully about whether and with whom to have a child, we also examined whether MotherWise affected the likelihood of having an unintended pregnancy during the 30-month follow-up period. For intimate partner violence, the program "sought to teach women how to recognize the signs of unhealthy or dangerous dynamics in their relationships and how to safely remove themselves and their children from them" (Baumgartner and Paulsell 2019).[1] We therefore examined whether MotherWise affected participants' likelihood of experiencing physical or psychological abuse from any romantic partner. We also examined the quality of mothers' co-parenting relationships with the child's father, because MotherWise teaches communication and conflict management skills that can potentially improve co-parenting. We examined all these outcomes except relationship stability in the earlier one-year impact report. We did not examine relationship stability in the one-year impact analysis because the short follow-up period covered by the one-year survey did no allow enough time for a substantial number of relationship transitions to occur.

For the study's third question, we examined the program's 30-month impacts on maternal and child well-being (see Table 2). In the domain of mothers' well-being, we examined depressive symptoms and material well-being. MotherWise could affect women's mental well-being through its messages about personal empowerment; by helping new mothers avoid feelings of isolation; and through its potential effects on relationship outcomes, such as reduced exposure to intimate partner violence. MotherWise could affect material hardship through its potential effects on unintended pregnancies and relationship transitions, which can cause economic instability. In addition, improved communication with partners and co-parents might help participants manage their finances more effectively and potentially avoid material hardship. Because potential effects on material hardship would likely be indirect and take time to unfold, we did not measure this outcome at the one-year follow-up. In the domain of child well-being, we focused on socio-emotional well-being because it is the dimension of child well-being MotherWise is most likely to affect. It could affect child social-emotional well-being through its effects on other outcomes such as relationship stability and maternal depression. We examined two measures: (1) children's social-emotional and behavioral problems and (2) children's social-emotional competence. We did not examine child well-being in the one-year impact analysis; most children were younger than 1 year old at the one-year follow-up, and measuring the social and emotional development of very young children is challenging (Darling-Churchill and Lippman 2016).

Exploratory analysis

To supplement the confirmatory analyses, we conducted exploratory analyses that focused on outcomes related to the father of the focal child. We categorized these analyses as exploratory because they examined outcomes that are not as central to the MotherWise program's goals and might not apply to all sample members but are nonetheless of substantive and policy significance. We examined MotherWise's impacts on three domains (Table 3):

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[1] Although the program aimed to help participants protect themselves from intimate partner violence by teaching women how to recognize signs of unhealthy relationships and by including messages of personal empowerment, the program developers also recognize that perpetrators, not their victims, are responsible for intimate partner violence.

1. **Relationship status with the child's father.** Most MotherWise participants (about 83 percent) were in a romantic relationship with their child's father at study enrollment. Because MotherWise aims to improve relationship outcomes, its impact on relationship status is of interest. We examined the program's impact on two relationship status measures after 30 months: (1) whether the mother is in a romantic relationship (married or in a steady or on-again, off-again romantic relationship) with the child's father and (2) whether the mother is married to the child's father. We also examined these measures in the one-year impact analysis.

Table 3. Outcomes for exploratory analyses

Outcome	Measure
Relationship status with child's father	
Romantically involved with child's father	Whether mother reports that she is married to or in a romantic relationship with the child's father at the time of the 30-month follow-up survey
Married to child's father	Whether mother reports that she is married to the child's father at the time of the 30-month follow-up survey
Relationship quality with child's father (only mothers romantically involved with child's father at 30-month follow-up)	
Support and affection	Continuous scale variable: Average of mothers' responses across 12 survey items about her relationship with the father of the child. Designed to measure positive relationship traits such as support, intimacy, friendship, commitment, and trust. Values range from 1 to 4, with higher values indicating greater support and affection.
Relationship commitment	Continuous scale variable (ranges from 1 to 10), where 1 is not at all committed and 10 is completely committed to the romantic relationship with the child's father, with higher values indicating that the mother is more committed to her relationship.
Relationship happiness	Continuous scale variable (ranges from 1 to 10), where 1 is not at all happy and 10 is completely happy, with higher values indicating that the mother has greater happiness in the romantic relationship with the child's father.
Use of constructive conflict behaviors	Continuous scale variable: Average frequency with which the mother reports using constructive conflict behaviors with the child's father, such as, "When [father] and I have a serious disagreement, we work on it together to find a solution." Scale values range from 1 to 4, with higher values indicating greater use of constructive conflict behaviors.
Avoidance of destructive conflict behaviors	Continuous scale variable: Average frequency with which the mother reports avoiding destructive conflict behaviors with the child's father, such as, "When [father] and I argue, past hurts get brought up again." Scale values range from 1 to 4, with higher values indicating greater avoidance of destructive conflict behaviors.
Father involvement	
Father spends time with focal child on a daily basis	Whether mother reported that the father spent an hour or more with the focal child "every day or almost every day" in the past month
Father's financial support of focal child	Whether mother reports that the father covered at least half the costs of raising the focal child at the time of the 30-month survey
Father's engagement with focal child	Continuous scale variable: Average of responses to seven survey questions. Each question asked the mother to report the average frequency with which the father engaged in certain activities such as singing songs or playing games with the focal child. Scale values range from 1 to 6, with higher values indicating greater engagement.

2. **Quality of relationship with the child's father.** We also examined the program's impact on the quality of the mother's romantic relationship with the child's father, among women who reported being in a romantic relationship with the father at 30 months. We examined the five aspects of relationship quality: (1) support and affection, (2) commitment, (3) happiness, (4) use of constructive conflict management behaviors, and (5) avoidance of destructive conflict management behaviors. Only mothers who were romantically involved with their child's father at the time of the 30-month follow-up survey were included in this analysis. We also examined these measures in the one-year impact analysis.

3. **Father involvement.** MotherWise could influence father involvement through potential impacts on co-parenting or on the mother's romantic relationship with the child's father. We examined three measures of father involvement: (1) whether a father spends time with the child on a daily basis, (2) whether a father covers at least half the costs of raising the child, and (3) the father's engagement with the focal child. We did not examine measures of father involvement in the one-year impact analysis. To provide a more complete picture of MotherWise's potential effects on fathers, we include these measures as part of our 30-month exploratory analysis.

Characteristics of women in the study

MotherWise aimed to serve expectant and new mothers facing economic disadvantage. The characteristics of women in the study indicated that MotherWise reached this population (Table 4). Most women were expecting a baby at study enrollment (83 percent); the other women who enrolled had delivered a baby in the previous three months. For approximately four in 10 women (37 percent), the expected or new baby was their first child. The women's average age at study enrollment was 28. Approximately two-thirds (67 percent) of women identified as Hispanic, 16 percent identified as non-Hispanic White, 11 percent identified as non-Hispanic Black, and 6 percent identified as another non-Hispanic race. Approximately four in 10 women were born outside of the United States, and a similar share of women primarily spoke Spanish at home. About one-quarter (26 percent) of women had less than a high school education, and 9 percent had a college degree. Just under four in 10 women reported they had worked for pay in the month before the baseline survey, and about three-quarters had accessed government benefits such as the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) or SNAP or TANF in the past 30 days.

Although MotherWise served expectant and new mothers regardless of their relationship status, most women were in a relationship with the child's father at the time of study enrollment. About three-quarters (76 percent) of women were in a steady romantic relationship with the child's father, and an additional 7 percent were in an on-and-off relationship with the child's father. Another 3 percent of women were in a relationship with someone other than the child's father (either a steady or on-and-off relationship). Nearly 40 percent of women reported that they had experienced psychological abuse by a romantic partner in the past year, and 16 percent of women had experienced physical abuse by a romantic partner.

Table 4. Women's characteristics at baseline (percentage unless otherwise specified)

Baseline characteristics	Mean or percentage
Demographics	
Average age (years)	28
Race and ethnicity	
Hispanic	67
Black, non-Hispanic	11
White, non-Hispanic	16
Other, non-Hispanic	6
Born outside the United States	37
Language spoken at home	
English	58
Spanish	41
Other	1
Family and relationships	
Number of biological and adopted children (average)	1.6
Expecting a baby at study enrollment	83
Expected or new baby is their first child	37
Relationship status	
In a steady romantic relationship with the baby's father	76
In an on-again, off-again relationship with the baby's father	7
In a steady romantic relationship with someone else	2
In an on-again, off-again relationship with someone else	1
Not in a romantic relationship	15
Intimate partner violence	
Any psychological abuse by a romantic partner in the past year	39
Any physical abuse by a romantic partner in the past year	16
Well-being	
At risk for moderate or severe depression	24
Socioeconomic status	
Highest educational level	
Less than high school	26
High school diploma or GED	37
Some college or vocational technical school	28
College degree	9
Worked for pay in past month	39
Earnings in past 30 days ($)	517
Receipt of SNAP, TANF, or WIC in past 30 days	73
Sample size	**949**

Source: STREAMS baseline survey conducted by Mathematica.

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

SNAP = Supplemental Nutrition Assistance Program; TANF = Temporary Assistance for Needy Families; WIC = Special Supplemental Nutrition Program for Women, Infants, and Children.

Program implementation and costs

An earlier implementation study of MotherWise found that the program was well implemented (Baumgartner and Paulsell 2019). The study found that the *Within My Reach* curriculum was suitably tailored to be relevant and engaging for the intended population of expectant and new mothers. Data entered by program facilitators into the Information, Family Outcomes, Reporting, and Management (nFORM) system—including information about participants' attendance at workshops and case management meetings as well as self-assessments from MotherWise facilitators about their ability to deliver planned content and engage participants—indicated that MotherWise staff achieved high fidelity to the curriculum.

Among women assigned to the MotherWise group, levels of engagement with the program were high. Most participants (87 percent) engaged in at least one program activity (Figure 1). About eight in 10 participants engaged with the main program components offered to all participants, including the core group workshop sessions (82 percent) and the case management (83 percent). Fewer women participated in the optional couples' workshop. Only 16 percent of participants attended at least one couples' workshop with their partner. The core group workshop offered 18 hours of content. Across all participants, women participated in the workshop for 12 hours, on average. Two-thirds of participants completed the program—defined by the program as completing at least five of the six workshop sessions within four months of enrollment.

Figure 1. Engagement in program services
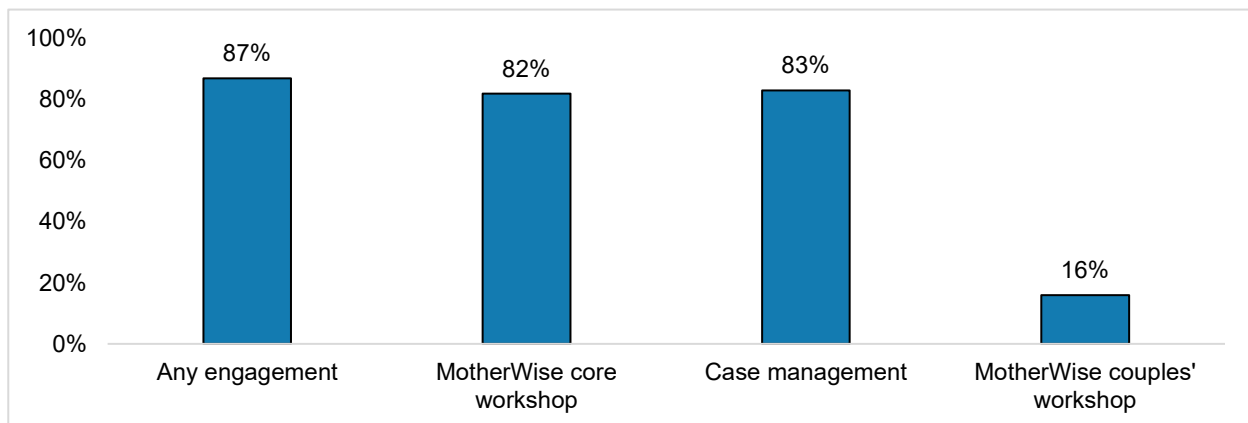
Source: Information, Family Outcomes, Reporting, and Management (nFORM) system.

The study team also collected data on the cost of delivering the MotherWise program over a one-year period. We estimated the total annual program cost of MotherWise to be $4,350 per participant. This cost accounts for the women who participated in MotherWise but does not account for women's romantic partners who may have participated in the optional couples' workshop. This cost estimate also excludes start-up costs. The study team also calculated the percentage of the total cost apportioned to each of five resource categories: (1) personnel; (2) contracted services; (3) supplies, equipment, and other direct costs; (4) facilities costs; and (5) overhead. Personnel costs—including costs for program coordinators, facilitators, and other program and administrative staff—accounted for the majority of program costs (60 percent). Overhead costs—such as shared administrative personnel and information technology support—accounted for approximately one-fifth of program costs (21 percent).

The per-participant cost of MotherWise is similar to the estimated per-participant cost of prior HMRE programs for couples. For example, the estimated average cost of the Supporting Healthy Marriage

(SHM) program was about $9,000 per couple (about $4,500 per participant) (Gaubert et al. 2012), while the estimated average cost of the Building Strong Families (BSF) program was about $11,000 per couple (about $5,500 per participant) (Wood et al. 2012).

Summary of one-year impacts

In an earlier report, we presented findings on the one-year impacts of MotherWise on participant outcomes (Patnaik and Wood 2021). At the one-year follow-up, MotherWise had improved the outcomes it most directly aimed to affect—that is, participants' perceived relationship skills and attitudes about healthy relationships. The program had impacts on all four measures of skills and attitudes we examined. These impacts indicate that the program succeeded in equipping women with the skills and attitudes to make informed and healthy decisions about their personal and romantic relationships. MotherWise also reduced the likelihood that women experienced an unintended pregnancy one year later, cutting this rate by about one-third, from 11 percent in the control group to 7 percent in the MotherWise group. Women in the MotherWise and control groups reported similar levels of intimate partner violence, co-parenting quality, and emotional well-being at the one-year follow-up. In exploratory analyses, the study team examined impacts on the romantic relationships of the three-quarters of women who entered the study while they were in a steady romantic relationship with their child's father. The program had no impact on the status of that relationship after one year but it did improve the quality of relationships among the women who remained in that relationship a year later. MotherWise had a positive impact on three of the five dimensions of relationship quality examined—relationship commitment, relationship happiness, and the use of constructive conflict behaviors.

Program impacts at 30 months

In this section, we report our findings from the confirmatory analysis of MotherWise's impact on participants' outcomes 30 months after study enrollment. We also compare these findings to the one-year impacts reported previously (Patnaik and Wood 2021).

MotherWise had persistent positive impacts on women's relationship skills and one of the two measures of relationship attitudes at 30 months.

The positive impacts of MotherWise on women's perceived relationship skills found at the one-year follow-up (Patnaik and Wood 2021) persisted at the 30-month follow-up. Compared to women in the control group, those who were offered the MotherWise program reported significantly better romantic relationship skills and conflict management skills at 30 months (Table 5). On a scale from 1 to 4, with higher values indicating greater perceived romantic relationship skills, women in the MotherWise group had an average value of 3.34 compared with an average of 3.25 for women in the control group. This measure represented the respondent's level of agreement with statements such as, "I believe I will be able to effectively deal with conflicts that arise in my relationship." The impact of 0.09 on this scale is equivalent to having about one in 11 women move up one value on the four-point scale. For our measure of conflict management skills, which used a similar 1 to 4 scale, women in the MotherWise group had an average value of 2.73, while women in the control group had an average value of 2.63. The impact of 0.10 on this scale is equivalent to having one in 10 women move up one value on the four-point scale.

Table 5. Impacts of MotherWise on confirmatory outcomes

Outcome	MotherWise group	Control group	Impact	Effect size
Relationship skills				
Perceived romantic relationship skills (range = 1 to 4)	3.34	3.25	0.09**	0.19
Perceived conflict management skills (range = 1 to 4)	2.73	2.63	0.09*	0.15
Relationship attitudes				
Support for going slow in romantic relationships (range = 1 to 4)	3.32	3.31	0.01	0.02
Disapproval of couple violence (range = 1 to 4)	3.65	3.57	0.08*	0.17
Exposure to intimate partner violence				
Any psychological abuse	27	26	0	0.02
Any physical abuse	8	8	0	0.02
Unintended pregnancy				
Had an unintended pregnancy since study enrollment	20	20	-1	-0.02
Co-parenting				
Quality of co-parenting relationship (range = 1 to 4)	3.06	3.10	-0.04	-0.05
Relationship stability				
Number of romantic relationship transitions since random assignment (range = 0 to 18)	0.68	1.10	-0.42**	-0.21
Mother's well-being				
Depressive symptoms (range = 0 to 24)	4.52	4.56	-0.04	-0.01
Material hardship (range = 0 to 4)	0.86	0.79	0.07	0.06
Child's well-being				
Child social-emotional and behavioral problems (range = 0 to 62)	10.82	10.98	-0.16	-0.03
Child social-emotional competence (range = 0 to 22)	18.32	18.28	0.04	0.01
Sample size	**403**	**344**		

Source: Baseline and 30-month follow-up surveys conducted by Mathematica.

Note: The numbers in the MotherWise group and control group columns are regression-adjusted predicted values of outcomes.

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

MotherWise also had positive impacts on two measures of women's relationship attitudes at the one-year follow-up; one of these impacts persisted at the 30-month follow-up. Women in the MotherWise group reported significantly higher levels of disapproval of couple violence relative to the control group. Disapproval of couple violence was measured on a scale from 1 to 4, with higher values indicating greater disapproval of couple violence. Women in the MotherWise group had an average value of 3.65 compared with an average of 3.57 for women in the control group. The impact of 0.09 on this scale is equivalent to having about one in 11 women move up one value on the four-point scale. This measure represented women's level of disagreement with statements such as, "Violence between dating partners can improve the relationship."

We found some evidence of impacts fading between the one-year and the 30-month follow-ups. For both measures of relationship skills as well as the measures of disapproval of couple violence, the estimated effects sizes were smaller at the 30-month follow-up survey than at the one-year survey. For example, the

effect size of the impact on relationship skills is about three-quarters of the effect size observed at the one-year follow-up, and the effect size of the impact on disapproval of couple violence is about half of that observed at the one-year follow-up. In addition, although MotherWise had a positive impact on women's support for going slow in romantic relationships at the one-year follow-up (Patnaik and Wood 2021), there was no impact at 30 months. At the 30-month follow-up, women in both groups reported similar levels of support for going slow in romantic relationships (an average score of about 3.3 on a single-item scale that ranged from 1 to 4). This suggests that the initial impact faded over time.

MotherWise increased relationship stability during the 30-month follow-up period; it had no impacts on other relationship outcomes.

During the 30 months after study enrollment, women in the MotherWise group experienced fewer relationship transitions—the total of their relationship start-ups and breakups—and thus more relationship stability than did women in the control group. On average, women in the control group experienced 1.10 relationship transitions during the 30-month follow-up period. In contrast, women in the MotherWise group experienced 0.68 relationship transitions over that period. This indicates that participation in MotherWise reduced the number of relationship transitions by more than a third during the 30-month period.

To further investigate this finding, we separately examined the program's impacts on the number of relationship start-ups and the number of breakups as well as for different subgroups of participants. We found that MotherWise led to similarly sized reductions in both the number of relationship start-ups and breakups (Appendix Table A.8). However, we also found that the impact of MotherWise on relationship stability was concentrated entirely on women whose primary language was English; there was no impact on this measure for participants whose primary language was Spanish (Appendix Table A.6). The number of relationship transitions among English-speaking participants was more than double the number among Spanish-speaking participants, which may have played a role in this pattern.

Although MotherWise reduced the share of women who had experienced an unintended pregnancy during the first year after random assignment, we found no difference in the share of women who had experienced an unintended pregnancy between the MotherWise and control groups at the 30-month follow-up. Approximately one in five women in both research groups reported that they had experienced an unintended pregnancy during the 30 months after enrollment.

Women in the two groups were equally likely to have experienced intimate partner violence: about one-quarter of women in each group experienced psychological abuse, and about one in 10 experienced physical abuse. Women in both groups also reported similar levels of co-parenting quality. The average value of 3 on a scale of co-parenting quality that ranged from 1 to 4 corresponded with mothers typically reporting that they agreed with statements about positive co-parenting behaviors such as, "[Father] and I communicate well about our children/child." These results are similar to the earlier findings that MotherWise had no impacts on intimate partner violence and co-parenting quality at the one-year follow-up (Patnaik and Wood 2021).

Women in the MotherWise and control groups reported similar levels of maternal and child well-being at 30 months.

Women in both the MotherWise and control groups reported similarly low levels of depressive symptoms and similar levels of material hardship. On a scale of 0 to 24 that measured the frequency with which they experienced depressive symptoms in the previous two weeks, women in both the MotherWise and control

groups reported an average score between 4 and 5. For comparison, a score of 10 or higher can be considered to indicate current depression (Kroenke et al. 2009). These results are similar to the earlier findings that MotherWise did not affect women's depressive symptoms at the one-year follow-up (Patnaik and Wood 2021). At 30 months, we also measured the number of material hardships (out of a total possible four hardships) that women had experienced in the past year, such as whether they cut the size of their meals or skipped meals because they could not afford enough food. Women in both groups experienced approximately one hardship on average in the year before the survey.

Women in the MotherWise and control groups reported similar levels of social-emotional and behavioral problems and social-emotional competencies in their children. On a scale from 0 to 22 that measured whether the child displayed 11 social-emotional competencies, with higher scores indicating the child displayed more competencies or displayed competencies more frequently, mothers in both groups reported an average score of 18. This average score is equivalent to mothers reporting that their focal child often displayed nine of the 11 competencies. On a scale from 0 to 62 that measured whether children displayed 31 problem behaviors, with higher scores indicating that children displayed more problem behaviors or displayed them more frequently, mothers in both groups reported an average score of 11. This average score is equivalent to mothers reporting their child often displayed about six of the 31 problem behaviors, or that the child sometimes displayed 11 of the 31 problem behaviors. A child who had the average scores for these two measures would be considered not at risk of social-emotional problems or delayed competence (Briggs-Gowan et al. 2004).

Findings from exploratory analyses

In this section, we report our findings from the exploratory analysis of MotherWise's impact on participants' outcomes 30 months after study enrollment. As with the confirmatory analysis, we also compare these findings to the one-year impacts reported previously (Patnaik and Wood 2021).

MotherWise did not affect the likelihood that women were in a romantic relationship with their child's father at the 30-month follow-up; among those who were, MotherWise did not improve the quality of their relationships.

At the 30-month follow-up, about seven in 10 women in the MotherWise and control groups were romantically involved with the child's father (Table 6), and MotherWise did not affect this. This is consistent with the finding from the one-year impact study that MotherWise did not affect the status of romantic relationships with the father among women who were in a steady relationship with the father when they enrolled in the study (Patnaik and Wood 2021).

Among the 70 percent of women who were in a romantic relationship with the child's father at the 30-month follow-up, the MotherWise and control groups reported similar average scores for five measures of the quality of that relationship. For example, on a measure of support and affection that ranged from 1 to 4, with higher values indicating greater agreement with statements about positive relationship traits such as support, intimacy, friendship, commitment, and trust, the average score for women in both groups was about 3. This contrasts with the one-year impact finding that MotherWise had positive impacts on relationship commitment, relationship happiness, and use of constructive conflict management behaviors among the 90 percent of women who remained in a romantic relationship with the father (Patnaik and Wood 2021). However, for the relationship quality measures we examined at 30 months, we assessed that there was a moderate risk of bias in the estimated impacts as a result of sample attrition and baseline

differences in characteristics between the MotherWise and control groups (see the appendix to this report).Thus, these findings should be interpreted with caution.

Table 6. Impacts of MotherWise on the relationship with child's father (exploratory outcomes)

Outcome	MotherWise group	Control group	Impact	Effect size
Relationship status with child's father				
Romantically involved (percentage)	69	71	-2	-0.06
Married (percentage)	39	40	-1	-0.03
Relationship quality with child's father[a]				
Support and affection (range = 1 to 4)	3.27	3.24	0.03	0.05
Relationship commitment (range = 1 to 10)	9.21	9.02	0.20	0.11
Relationship happiness (range = 1 to 10)	8.10	7.98	0.12	0.06
Use of constructive conflict behaviors (range = 1 to 4)	3.23	3.19	0.04	0.06
Avoidance of destructive conflict behaviors (range = 1 to 4)	2.74	2.70	0.03	0.04
Father involvement				
Father spends time with child on a daily basis	63	63	0	0.00
Father financially supports child	67	66	0	0.01
Father's engagement with child (range = 1 to 6)	3.73	3.76	-0.03	-0.02
Sample size for relationship status and father involvement outcomes	**399**	**342**		
Sample size for relationship quality outcomes	**287**	**233**		

Source: Baseline and 30-month follow-up surveys conducted by Mathematica.

Note: The numbers in the MotherWise group and control group columns are regression-adjusted predicted values of outcomes.

[a] These outcomes were only defined for women who were in a relationship with child's father at follow-up.

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

MotherWise did not increase father involvement.

We found no evidence that MotherWise increased fathers' involvement with the focal child. In both the MotherWise and control groups, about three in every five women reported that the father spends time with the focal child on a daily basis, and about two in every three women reported that the father provides substantial financial support for the focal child. On a measure of father engagement that ranged from 1 to 6, with higher values indicating that the father engaged more frequently in activities such as singing songs and reading with the focal child, women in both groups reported an average score of about 4. This average value corresponds with mothers typically reporting that the father engaged in such activities with the focal child a few times a month. For all three measures of fathers' involvement with the focal child, we found no statistically significant differences between the MotherWise and control groups at the 30-month follow-up. These measures were not examined in the one-year impact analysis.

Discussion and lessons learned

This study examined the 30-month impacts of MotherWise, an HMRE program for expectant and new mothers with low incomes living in the Denver metropolitan area. MotherWise offered a six-session relationship skills workshop based on *Within My Reach*, a commonly used HMRE curriculum tailored for

individuals. The workshops were supplemented with one-on-one case management and an optional couples' workshop for participants and their partners. MotherWise aimed to empower women to make informed decisions about their romantic relationships so that they could experience better relationship outcomes, which in turn could support their well-being and that of their children.

To conduct the study, Mathematica partnered with staff at the University of Denver who developed and operated the program. The study team randomly assigned 949 women to one of two research groups: (1) a group that was offered the MotherWise program or (2) a control group that was not. To estimate the impacts of MotherWise, we compared the outcomes of these two groups. We collected data through a baseline survey conducted at the time of study enrollment and two follow-up surveys conducted one year and 30 months after study enrollment. An earlier report from the study documented that, after one year, MotherWise improved women's relationship skills and attitudes, reduced unintended pregnancy, and improved relationship quality among women who remained in romantic relationships with the child's father (Patnaik and Wood 2021). The program did not affect co-parenting quality, the likelihood of experiencing intimate partner violence, or the frequency of depressive symptoms after one year. This report presents the estimated impacts of the program at 30 months and discusses how program impacts changed from the one-year to the 30-month follow-up.

MotherWise succeeded in having persistent impacts on relationship skills and attitudes that could help women make more informed and healthy decisions about relationships.

At both the one-year and 30-month follow-ups, we found evidence that MotherWise improved women's relationship skills and attitudes—the outcomes it most directly aimed to affect. MotherWise had positive effects on women's perceived relationship and conflict management skills at both follow-ups, as well as their disapproval of couple violence. For a fourth measure, women's support for going slow in relationships, the program only had an impact at the one year-follow-up. Although there was some fade-out in the program's impacts on these four outcomes over time, it is notable that MotherWise had impacts on three of these four outcomes that persisted two and a half years after participants enrolled in the program. The findings suggest that MotherWise largely succeeded in what it aimed most directly to do—equip women with the skills and attitudes needed for healthy relationships. Moreover, this success lasted beyond the short term.

MotherWise increased women's relationship stability over the 30-month follow-up period; it had limited success in creating persistent or long-term improvements in other relationship outcomes.

At the 30-month follow-up, we examined impacts on relationship stability—an outcome domain that requires a longer time period to observe and thus one we did not examine at 12 months. We found that MotherWise increased the relationship stability that women experienced over the 30-month follow-up. Specifically, the program reduced the number of relationship transitions (the total number of relationship start-ups and breakups) participants experienced over this period by a third—from an average of 1.1 transitions for the control group to 0.7 transitions for the MotherWise group. The *Within My Reach* curriculum at the center of the MotherWise program placed a particular emphasis on the importance of making deliberate and careful decisions about romantic relationships (Baumgartner and Paulsell 2019). MotherWise's impact on relationship stability suggests that this central program message was understood by participants and influenced the frequency with which they started and ended relationships. Subgroup analyses suggest that this finding was driven by impacts on relationship stability among women whose primary language was English; there was no impact on this measure for participants whose primary language was Spanish (Table A.7). One possible explanation for this difference in the impact by primary

language spoken is that English-speaking women had more than twice as many relationship transitions than Spanish language speakers over the follow-up period, on average. Therefore, there was more room for improvement on this measure for English speakers than Spanish speakers.

Although MotherWise reduced the likelihood that women experienced at least one unintended pregnancy in the first year after entering the program, it had no impact on this outcome at 30 months. MotherWise emphasized the importance of making careful decisions about relationships and family formation—including when to have a child and with whom. The findings suggest that MotherWise may have initially encouraged women to make more deliberate decisions about family planning; however, without continued programming to reenforce the lessons and support services, the lessons of MotherWise might have faded over time and thus had less influence. Prior research has found that unintended pregnancies are associated with adverse outcomes for the mother and infant and result in substantial public costs (Shah et al. 2011; Sonfield et al. 2011; Abajobir et al. 2016). We did not measure the number of unintended pregnancies that women experienced over the 30-month period; it is possible that MotherWise reduced the total number of unintended pregnancies that women experienced (and thus prevented some adverse outcomes and costs) without affecting the share of women who experienced at least one unintended pregnancy.

MotherWise did not have an impact on intimate partner violence or co-parenting quality at 30 months, consistent with the one-year findings. In exploratory analyses, we found that MotherWise did not affect the likelihood that women were in a romantic relationship with the father of the focal child at 30 months, and that its initial positive impacts on relationship quality among women in a romantic relationship with their child's father at the one-year follow-up had faded completely by 30 months.

MotherWise did not improve women's or children's well-being during the 30-month follow-up; impacts on well-being could emerge later as a result of increased relationship stability.

MotherWise did not affect the four measures of maternal well-being or child socio-emotional well-being that we examined at 30 months. The absence of an impact on maternal depression is consistent with the one-year findings; maternal well-being and children's socio-emotional and behavioral problems and competencies were not previously examined. Women in the control group reported relatively few depressive symptoms, material hardships, or children's socio-emotional and behavioral problems, which might have limited the potential for the program to improve these outcomes. In exploratory analyses, we also found that MotherWise did not increase father involvement, which has been linked to child well-being (Cavadel et al. 2022; Jeynes 2015).

However, positive impacts on maternal and child well-being could still emerge at a later point, especially in light of the program's impact on women's relationship stability. There is strong evidence that family instability, especially during early childhood, negatively influences children's socio-emotional development and behavior (Sandstrom and Huerta 2013; Lee and McLanahan 2015; Briggs et al. 2019), and that the detrimental impacts of family instability are worse for children in families with low incomes (Cavanagh and Huston 2006, 2008). Prior research suggests that the number of maternal relationship transitions can have important implications for child well-being. For example, studies have found that, for children ages 3 to 5, maternal relationship transitions are associated with increases in children's behavioral problems and decreases in their verbal abilities (Cooper et al. 2011; Osborne and McLanahan 2007). Other research indicates negative effects of maternal relationship transitions for older children as well, with these transitions associated with decreases in children's emotional and behavioral functioning at ages 6 to 9 and increases in delinquency at ages 10 to 17 (Bachman et al. 2011; Goodnight et al. 2013).

Thus, MotherWise's impact of increasing relationship stability could lead to longer-term impacts on child well-being, particularly among families who might otherwise experience the most instability.

The findings from the MotherWise impact study help build the evidence that some HMRE programs for adults can improve some participant outcomes beyond the short term; they also suggest key lessons for HMRE programs and research.

Before the MotherWise study, few large-scale, rigorous studies of HMRE programs for adults had examined participants' outcomes beyond one year (Hawkins et al. 2022). Two large, multisite random assignment studies of two federally funded HMRE programs for adult couples had previously found mixed evidence on the programs' long-term effects. The SHM evaluation found small positive effects on relationship quality among the couples that remained together, and these effects were sustained at both one year and 30 months after random assignment (Hsueh et al. 2012; Lundquist et al. 2014). The BSF evaluation found that one program in Oklahoma City had positive effects on couples' relationship status and quality one year later, but most of these effects did not persist at 36 months, although a new impact on family stability emerged (Wood et al. 2010, 2012). MotherWise represents a different model because it serves expectant and new mothers rather than couples. Nevertheless, the findings in this report add to a small body of evidence showing that HMRE programs for adults can have impacts on participant outcomes beyond one year. It is also the first rigorous evidence that an HMRE program for individual adults can have longer-term impacts.

Why did MotherWise succeed in improving relationship skills, attitudes, and stability 30 months after enrollment? As noted in the one-year impact report, the positive effects on relationship skills and attitudes might be due to the program's strong implementation, the program's focus on a well-defined service population, or delivering the program at a time in life when women might be particularly open to taking stock of their family and relationship choices and working on their relationship skills and attitudes. In turn, the program's persistent impacts on relationship skills and attitudes could have helped women make more careful decisions about whether and with whom to begin or end a romantic relationship and to effectively navigate challenges within relationships that might otherwise have led to more transitions.

What factors might have limited the success of MotherWise? Some outcomes—such as co-parenting quality, intimate partner violence, and relationship quality—might be difficult to persistently improve without also working directly with co-parents or romantic partners. This limitation might have been particularly relevant for impacts on intimate partner violence, because the perpetrators who were responsible for such violence would not have been directly served by the program. More intensive engagement with the partners and co-parents could potentially help programs have greater success in achieving sustained effects. Although MotherWise offered an optional couples' workshop, take-up was low, with only 16 percent of women participating in this program component. Future programs that plan to implement a model similar to MotherWise might consider strengthening this component, for example, by offering more hours of programming for couples and encouraging greater participation. We also found that MotherWise did not improve the measures of maternal and child well-being we examined. We cannot rule out that positive impacts on maternal and child well-being could emerge at a later point, especially in light of the observed impacts on relationship stability. Even so, programs that aim to improve these well-being measures might need to offer services that directly address them. Finally, for many outcomes, we observed some fade-out between the one-year and 30-month follow-up. To increase the likelihood that program effects persist, programs could consider reengaging participants after they complete the core workshop. For example, programs could host events to bring past participants together for a refresher

course that reiterates the key curriculum lessons or could offer booster content virtually and use text message reminders or other outreach to encourage participants to access it.

The findings presented in this report suggest that programs like MotherWise hold promise because they can improve certain outcomes of expectant and new mothers with low incomes beyond the short term. These findings not only help expand what is known about the effectiveness of HMRE programs serving individual adults and those that specifically serve women, but they also add to a small body of evidence on the longer-term effects of HMRE programs for adults beyond one year (Wood et al. 2012; Lundquist et al. 2014). However, MotherWise represents only one approach to providing HMRE; HMRE programs can vary in their service population, focus, content, structure, and targeted outcomes. More research is needed to develop a more complete picture of how HMRE programs can improve the outcomes of participants and their families over the long term.

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Technical Appendix

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This technical appendix supplements the report on the impacts of the MotherWise program after 30 months. The first section details the study's sample intake and random assignment procedures. The second section describes the study's survey administration procedures and response rates for the follow-up surveys. The third section briefly explains the study team's methods for estimating program costs. The fourth and fifth sections discuss our confirmatory and exploratory impact analyses, respectively.

Sample intake and random assignment

MotherWise staff recruited women for the study from September 2016 through December 2018. During this 27-month recruitment period, they enrolled 949 participants. The study team randomly assigned 512 women to the MotherWise group (offered the MotherWise program) and 437 women to the control group (not offered the program but free to seek other services in the community). Below, we describe the processes that MotherWise staff and the study team followed to conduct sample intake and random assignment.

The University of Denver partnered with Denver Health to identify potential study participants. Denver Health is a large public hospital that is the primary health care provider for families with Medicaid-funded births in the Denver area. MotherWise staff primarily recruited study participants from three Denver Health locations: the main hospital campus and two community health centers that offered perinatal care. They also sought referrals from other medical and social service agencies that served pregnant women and new mothers with low incomes in the Denver area. MotherWise staff identified eligible women through Denver Health's electronic medical record system, and approached these women at their doctors' offices before their appointments to describe the MotherWise program and the study. If women were interested in participating in the study, MotherWise staff scheduled an intake appointment.

The intake appointment took place at the program office. When a potential study participant arrived at her intake appointment, a MotherWise staff member first verified the participant's eligibility and then connected her by telephone to a trained Mathematica interviewer. The interviewer completed the consent process and administered the baseline survey. The MotherWise staff member then finalized the participant's enrollment in the study and used the study's computer to randomly assign the participant to either the MotherWise group or to the control group.

The study used a stratified random assignment design. Throughout most of the recruitment and enrollment period, random assignment occurred within language group (English or Spanish). This stratification process was introduced one month after study enrollment began to ensure that the MotherWise group and the control group had the same proportion of Spanish-speaking women (who might be more likely to attend the Spanish-language version of the MotherWise workshop).

Within each language group, the likelihood of being placed in the MotherWise group or the control group varied over time (Table A.1). Random assignment began in September 2016. Initially, applicants had an equal chance of being placed into either research group. But the pace of study recruitment was slower than anticipated in the early months of enrollment, and placing half of the study participants into the control group made it difficult for the program to create participant cohorts large enough to run the MotherWise workshops. In November 2016, the study team adjusted the random assignment ratio for both language groups so that two-thirds of applicants were assigned to the MotherWise group and one-third of applicants were assigned to the control group. After several months, the study began meeting the recruitment targets for English-speaking participants. Therefore, in June 2017, the study team adjusted the random assignment ratio for English speakers back to the initial 50:50 ratio. As the recruitment of

Spanish-speaking participants remained slow, the study team maintained the ratio for Spanish speakers at two-thirds for the MotherWise group and one-third for the control group. In January 2018, the study also began meeting recruitment targets for Spanish-speaking participants and adjusted the random assignment ratio for Spanish speakers back to the initial 50:50 ratio for the final year of recruitment.

Table A.1. Random assignment probabilities, by language

Date	English speakers	Spanish speakers
09/01/2016–11/12/2016	• MotherWise: 50% • Control: 50%	• MotherWise: 50% • Control: 50%
11/13/2016–06/04/2017	• MotherWise: 67% • Control: 33%	• MotherWise: 67% • Control: 33%
06/05/2017–01/16/2018	• MotherWise: 50% • Control: 50%	• MotherWise: 67% • Control: 33%
01/17/2018–12/19/2018	• MotherWise: 50% • Control: 50%	• MotherWise: 50% • Control: 50%

For the impact analysis presented in this report, we adjusted for the study's random assignment design by using base weights that accounted for the varying probabilities of assignment to the MotherWise group and the control group. We calculated the base weight of a sample as the inverse of the probability with which sample members were randomly assigned to the MotherWise and control groups. Random assignment was conducted independently for each of four enrollment periods and based on language, so we calculated base weights within each enrollment period and language. We classified sample members into 1 of the 16 cells presented in the second and third columns of Table A.1. We calculated the base weight for sample members in each of those 16 cells to be the inverse of the probability of random assignment to that cell.

As expected, given the study's random assignment design, women in the MotherWise and control groups were similar at baseline (Table A.2). In Table A.2, the full sample represents the 949 women who enrolled in the study and underwent random assignment. The analytic sample represents the subset of 748 women who responded to the 30-month follow-up survey. We compared women who were randomly assigned to the MotherWise and control groups on 21 baseline characteristics. We found three statistically significant differences between these two groups in the full sample. First, women in the MotherWise group were more likely than women in the control group to be married or in a steady relationship with the child's father at baseline. Second, there were differences in the romantic relationship status reported by women at baseline more generally—for example, a smaller share of women in the MotherWise group were single compared with women in the control group. Third, we also found differences in women's education level—for example, women in the MotherWise group were more likely to have at least a high school diploma or GED compared with women in the control group. Other than these three characteristics, women in the MotherWise and control groups were similar in demographics, family and relationships, well-being, socioeconomic status, and baseline measures of confirmatory outcomes.

Table A.2. Baseline characteristics for women in the full and analytic samples, by study group (percentage, unless otherwise specified)

Baseline characteristics	Full sample			Analytic sample		
	MotherWise group	Control group	Difference	MotherWise group	Control group	Difference
Demographics						
Average age (years)	28	28	1	28	28	0
Race and ethnicity						
Hispanic	67	67	1	68	65	2
Black, non-Hispanic	11	11	-1	11	12	-1
White, non-Hispanic	16	15	1	16	16	-0
Other, non-Hispanic	6	7	-1	6	7	-1
Born outside the United States	35	39	-4	35	39	-4
Language spoken at home						
English	59	57	3	59	56	3
Spanish	40	42	-2	40	42	-1
Other	1	2	-1	1	2	-1
Family and relationships						
Number of biological and adopted children	1.6	1.5	0.1	1.6	1.5	0.1
Expecting a baby at study enrollment	84	83	2	83	83	-0
Expected or new baby is their first child	35	39	-4	36	39	-3
Married or in a steady relationship with the father of new/expected baby	79	72	6*	80	73	7*
Relationship status			◊			◊◊
Married or engaged	54	51	3	56	51	5
In a steady relationship	26	23	3	25	23	2
In an on-again, off-again relationship	8	8	-0	8	8	1
Not in a relationship	12	18	-6	11	18	-8
Well-being						
At risk for moderate or severe depression	25	22	4	24	22	2
Socioeconomic status						
Highest educational level			◊			
Less than high school	23	29	-6	22	28	-6
High school diploma or GED	40	34	6	39	33	6
Some college or vocational technical school	27	29	-2	29	31	-3
College degree	10	8	2	10	8	2

Baseline characteristics	Full sample			Analytic sample		
	MotherWise group	Control group	Difference	MotherWise group	Control group	Difference
Worked for pay in past month	40	39	2	41	38	4
Earnings in past 30 days ($)	545	489	56	573	476	97
Receipt of SNAP, TANF or WIC in past 30 days	72	74	-3	70	74	-4
Baseline measures of confirmatory outcomes						
Perceived romantic relationship skills (range = 1 to 4)	3.19	3.22	-0.02	3.20	3.22	-0.02
Perceived conflict management skills (range = 1 to 4)	2.47	2.50	-0.03	2.46	2.52	-0.06
Support for going slow in romantic relationships (range = 1 to 4)	3.29	3.30	-0.01	3.30	3.28	0.02
Disapproval of couple violence (range = 1 to 4)	3.63	3.61	0.02	3.63	3.62	0.00
Any psychological abuse by a romantic partner in the past year	39	38	1	38	39	-1
Any physical abuse by a romantic partner in the past year	15	17	-1	14	18	-4
Depressive symptoms	6.34	5.96	0.38	6.27	6.02	0.25
Samaple size	**512**	**437**		**403**	**345**	

Source: Baseline and 30-month follow-up surveys conducted by Mathematica.

Note: Full sample refers to all women who were randomly assigned. The data were weighted to account for differences in random assignment probabilities. Analytic sample refers to all women who responded to the 30-month follow-up survey. These data were weighted to account for differences in random assignment probabilities and probability of survey response. Percentages might not sum to 100 due to rounding.

[a] Baseline versions of co-parenting quality and unintended pregnancy were not available for all women.

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

◊◊◊/◊◊/◊ Difference is significantly different from zero at the .01/.05/.10 level using a chi-square test.

SNAP = Supplemental Nutrition Assistance Program; TANF = Temporary Assistance for Needy Families; WIC = Special Supplemental Nutrition Program for Women, Infants, and Children.

Survey administration and nonresponse

Overview of procedures and nonresponse

The study team administered three rounds of surveys: (1) a baseline survey at study enrollment, (2) a one-year follow-up survey about 12 months after enrollment, and (3) a longer-term follow-up survey about 30 months after enrollment. The analysis in the current report primarily uses data from the baseline and 30-month follow-up surveys; we use data from the one-year follow-up survey to construct one of our outcome measures. An earlier report presents evidence on the shorter-term impacts of MotherWise using data from the 12-month survey (Patnaik and Wood 2021).

The study team administered the baseline survey via telephone during women's intake appointments before study enrollment, and administered the one-year follow-up survey about 12 months after enrollment. The procedures for administering the one-year follow-up survey are described in the earlier report (Patnaik and Wood 2021). For the 30-month follow-up survey, respondents could either complete a self-administered web survey on a smart phone or tablet or complete a computer-assisted telephone survey with a trained Mathematica interviewer. Of the 748 respondents to the 30-month follow-up survey, 43 percent completed the self-administered version, and 57 percent completed a computer-assisted telephone survey. All surveys were available in both English and Spanish. Study participants received a $30 gift card for enrolling in the study and completing the baseline survey, and a $25 or $50 gift card for completing the 30-month follow-up survey. At the start of data collection for the 30-month follow-up, the study team offered a $25 gift card incentive. Partway through data collection, the team increased the incentive for completing the survey to $50, following a change to survey administration procedures in response to the COVID-19 pandemic (described below).

Response rates for the baseline and follow-up surveys were high. Because the study team administered the baseline survey before study enrollment, all study participants completed the baseline survey. The 30-month follow-up survey had an overall response rate of 79 percent, which was only somewhat lower than the 84 percent response rate for the 12-month follow-up survey (Patnaik and Wood 2021). The difference in the response rates at the 30-month follow-up for the MotherWise and control groups was negligible: 79 percent of respondents in both groups completed the follow-up survey.

For the impact analysis, we constructed survey nonresponse weights to account for women who did not respond to the 30-month follow-up survey. We followed the same procedures used to create the nonresponse weights in the 12-month impact analysis (Patnaik and Wood 2021). We estimated a logistic regression model that predicted survey response—that is, whether the woman was located for the 30-month follow-up survey, agreed to respond to the 30-month follow-up survey, and was able to respond. Each survey respondent was assigned an adjustment factor corresponding to the probability of survey response. Nonrespondents were assigned an adjustment factor equal to zero. The final weight for our main impact analysis model was the product of the base weight (described earlier in the technical appendix) and the adjustment factor.

Accounting for survey nonresponse by applying the nonresponse weights did not substantively affect the similarity of women in the MotherWise and control groups (Table A.2). Among women who completed the 30-month follow-up survey, women in the MotherWise and control groups were similar in demographics, well-being, socioeconomic status, and baseline measures of confirmatory outcomes. We generally found the same differences in the family and relationships for survey respondents as we found in the full sample of women who underwent random assignment. Survey respondents were more likely to be married (and less likely to be single) and more likely to be in a relationship with the focal child's father at baseline, compared with survey respondents in the control group. We accounted for these two differences by controlling for baseline relationship status and relationship with the focal child's father at baseline in the main regression models used to estimate program impacts. The baseline difference in women's education found for the full sample was not statistically significant for the analytic sample.

Effects of the COVID-19 pandemic on survey administration

Data collection for the 30-month follow-up survey occurred before and during the COVID-19 pandemic. Respondents completed the surveys from May 2019 to September 2021. About one-quarter of respondents completed the 30-month survey before the start of the pandemic (before March 15, 2020), and three-quarters completed it during the pandemic (on or after March 15, 2020).

The pandemic affected some aspects of survey administration. When the pandemic began in March 2020, the study team had to suspend the use of in-person locators to encourage women to complete the survey. To help ensure high response rates in the absence of in-person locating efforts, in June 2020, the study team increased the incentive payments for survey completion from $25 to $50, after receiving permission from the Office of Management and Budget (OMB) for this change.

To understand whether the pandemic might have affected responses to the follow-up survey, we compared response rates among women who were expected to complete the survey before and during the pandemic. Women entered the study between September 2016 and December 2018, and were invited to complete the follow-up survey 30 months after enrollment. As a result, women who entered the study later in the enrollment period were more likely to complete the survey during the pandemic. We compared response rates to the follow-up surveys for women who entered the study before September 15, 2017 (30 months before March 15, 2020) with those of women who entered after this date.

Response rates were generally high regardless of when women entered the study (Table A.3). We found no evidence that response rates were lower during the COVID-19 period. In fact, response rates were higher for women enrolled after September 15, 2017 (82 percent) compared with women enrolled before that date (72 percent). This pattern might have developed because most women in later cohorts were offered the higher incentive for survey completion—$50 instead of $25. Women who experienced economic hardship because of the pandemic might have found the additional incentive particularly helpful. In addition, the pandemic forced many mothers with small children out of the workforce. Therefore, these mothers might have had more availability at the time they were contacted to the complete the survey. As we described in detail below, we used analysis weights that account for the overrepresentation of later study enrollees in our analysis sample because of the higher response rate for this group. We also compared response rates between women in the MotherWise and control groups within both time periods, and found they were generally similar. Taken together, these results suggest that pandemic did not depress response rates to the 30-month follow-up survey, and did not lead to differential response rates between the MotherWise and control groups.

Table A.3. Response rates for the 30-month follow-up survey, by study enrollment date

Study enrollment date	Sample size	Overall response rate	MotherWise group response rate	Control group response rate
Before September 15, 2017	294	72%	73%	70%
On or after September 15, 2017	655	82%	82%	82%

Program cost estimates

We estimated the cost of implementing MotherWise using the "ingredients" or resource method (Levin and McEwan 2001). First, we identified all of the resources necessary for grantees to deliver their HMRE programs—such as program staff, workshop facilitators, and curriculum materials. Second, we assigned a dollar value to each resource, using amounts taken directly from accounting records or estimated the value using market prices or publicly available sources. We relied primarily on information about resources and costs reported by MotherWise staff. We adjusted those data to (1) estimate the cost of rent-free office space; (2) calculate the annual value of equipment- and facilities-related expenses; and (3) standardize local costs to national levels.

To estimate the cost of providing services, we calculated (1) the total annual program cost and (2) the per participant cost (defined as the average cost to serve one participant). We first calculated the resources the University of Denver required to deliver MotherWise for one year from October 2017 to September 2018. Next, we calculated the cost of serving one participant for one month by dividing the total annual program cost by the number of months each mother participated in services during the one-year period. Finally, we calculated the average length of program participation (in months) for all mothers offered services throughout the entire study period, and multiplied this average length of program participation by the estimated cost of serving one participant for one month. We also calculated the percentage of the total cost apportioned to each of five resource categories: (1) personnel; (2) contracted services; (3) supplies, equipment, and other direct costs; (4) facilities costs; and (5) overhead.

Our cost estimates reflect the cost of implementing MotherWise over a one-year period of typical operations. These estimates do not include resources required to develop or launch a new program. They also reflect only the perspective of the organization implementing the program, and not the perspectives of program participants, taxpayers, or the federal government. See Patnaik and Wood (2021) for further details about our approach to estimating costs.

Details of the confirmatory analysis

Before conducting the 30-month impact analysis, we specified the confirmatory outcomes and analysis methods we planned to use answer the study's main research questions. By specifying this confirmatory analysis in advance, we avoid focusing the assessment of the program's effectiveness 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 30-month confirmatory analysis as part of the study's registry on the website ClinicalTrials.gov (identifier: NCT02792309).

Confirmatory outcomes

We focused the confirmatory analysis on a set of 13 outcomes across 8 domains tied to the study's main research questions. Of the 13 outcomes, 8 were scales constructed by combining women's responses to multiple survey questions. To maximize the sample size available for the analysis, we constructed a scale score for any woman 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 woman who reported to at least four of the six questions. We coded women as missing on the scale if they responded to fewer than two-thirds of the questions, because we did not have enough information to calculate a score. For each scale score, we checked the reliability of the scale for our study sample by calculating Cronbach's alpha (α) with control group data from the 30-month follow-up survey.

Perceived romantic relationship skills

We measured perceived general relationship skills with a subset of items from the Relationship Deciding Scale (Vennum and Fincham 2011). For these items, the survey asked women 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 early on 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 women to report their level of agreement on a 4-point scale, ranging from strongly agree to strongly disagree. For women who responded to at least four of the six questions, we calculated a scale score by taking the average value of the woman's responses across the questions. The resulting scale ranged from 1 to 4, with higher values indicating greater perceived relationship skills (six items, $\alpha = 0.85$ for our study sample based on control group data from the follow-up survey).

Perceived conflict management skills

We measured women's 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). For these items, the survey asked women 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 women 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 women who responded to at least four of the five items, we calculated a scale score by taking the average value of their responses across the different items. The resulting scale ranged from 1 to 4, with higher values indicating greater perceived conflict management skills (five items, $\alpha = 0.77$ for our study sample based on control group data from the follow-up survey).

Support for going slow in romantic relationships

We measured support for going slow in romantic relationships through a single-item scale that reflected the woman's level of agreement—from strongly disagree (1) to strongly agree (4)—with the following statement: People are more likely to succeed in their relationships if they take things slowly. This single-item scale was recommended by the *Within My Reach* curriculum developers as an appropriate example of the kind of relationship attitude the curriculum aims to influence.

Disapproval of couple violence

We measured disapproval of couple violence with a subscale of the Acceptance of Couple Violence Scale (Dahlberg et al. 2005). For these items, the survey asked women to report their level of disagreement with each of the following five statements about dating violence:

- Violence between dating partners can improve the relationship.

- There are times when violence between dating partners is okay.

- Sometimes violence is the only way to express your feelings.

- Some couples must use violence to solve their problems.

- Violence between dating partners is a personal matter and people should not interfere.

For each item, the survey asked women to report their level of disagreement on a 4-point scale, ranging from strongly agree to strongly disagree. For women who responded to at least four of the five items, we calculated a scale score by taking the average value of the women's responses across the items. The resulting scale ranged from 1 to 4, with higher values indicating greater disapproval of couple violence (five items, $\alpha = 0.82$ for our study sample based on control group data from the follow-up survey).

Any psychological abuse

We measured psychological abuse using a binary indicator adapted from the Supporting Healthy Marriage evaluation (Hsueh et al. 2012). The survey asked women if a romantic partner had done any of the following in the past year:

- Tried to keep them from seeing or talking with their friends

- Made them feel stupid

- Kept money from them or took their money without asking

- Made them feel afraid that they might hurt them

We created a binary indicator that took the value of 1 if the woman reported yes to any of the four items and a value of 0 if the woman reported no to all four items. The measure was coded as missing if data on at least one of the items was missing while the woman had not reported yes to any of the items.

Any physical abuse

We measured exposure to physical abuse by using two victimization measures of the Physical Assault Scale of the Conflict Tactics Scale—Short Form (Straus and Douglas 2004). For example, the survey asked women whether any romantic partner in the past year had punched, kicked, or beaten them. As recommended by the scale developers, we created a binary indicator that took the value of 1 if the woman reported yes to either of the two items and a value of 0 if the woman reported no to both items. The measure was coded as missing if data on at least one of the items was missing while the woman had not reported yes to any of the items.

Unintended pregnancy

We measured unintended pregnancy using information from both the 12-month and 30-month follow-up surveys to determine whether women had experienced an unintended pregnancy since random

assignment. In both follow-up surveys, we measured unintended pregnancy with questions drawn from the National Survey of Family Growth 2015–2017 (National Center for Health Statistics n.d.). The survey asked women whether they had experienced a pregnancy since random assignment and, if they had, the number of times they had experienced a pregnancy since random assignment. The survey also asked follow-up questions about their most recent pregnancy. The survey asked, "Right before the pregnancy, did you want to have a baby?" Women could respond on a 4-point scale: definitely yes, probably yes, probably no, definitely no. If the woman responded definitely no, the survey then asked, "Would you say this pregnancy came sooner than you wanted, at about the right time, or later than you wanted?"

For both the 12-month and 30-month surveys, we first constructed intermediate binary variables equal to 1 if the mother reported that she did not want to become pregnant before her most recent pregnancy, or the most recent pregnancy was sooner than intended. Then, to construct our final measure of unintended pregnancy at the 30-month follow-up—that is, whether women had an unintended pregnancy since random assignment—we constructed a binary variable equal to 1 if the woman reported that she had a recent unintended pregnancy at either the 12-month or 30-month follow-up. Our measure might undercount unintended pregnancies if a women experienced more than one pregnancy between the 12-month and 30-month follow-up but the most recent pregnancy was intended.

Of the 748 women who responded to the 30-month follow-up survey, 679 (91 percent) completed the 12-month follow-up survey. For this subgroup, we constructed the binary variable as follows:

- We set the binary variable to 0 if women (1) did not report an unintended pregnancy at the 12-month survey *and* (2) did not report an unintended pregnancy at the 30-month survey.

- We set the binary variable to 1 if women (1) reported an unintended pregnancy at the 12-month survey *or* (2) reported an unintended pregnancy at the 30-month survey.

- We set the binary variable to missing if women (1) did not respond to questions about unintended pregnancy in the 30-month survey *and* (2) did not report an unintended pregnancy at the 12-month survey.

In a small number of cases (6), women reported the same number of pregnancies since random assignment across 12-month and 30-month surveys but provided inconsistent information on whether the most recent pregnancy was unintended. In these cases, we used the information from the 12-month survey to construct the measure of unintended pregnancy, because these reports are closer to when the most recent pregnancy would have occurred.

Of the 748 women who responded to the 30-month follow-up survey, 69 women (9 percent) did not complete the 12-month follow-up survey. For this subgroup, we constructed the final measure of unintended pregnancy using information from the 30-month survey only as follows:

- We set the binary variable to 0 if women (1) had not become pregnant since random assignment *or* (2) had experienced one pregnancy since random assignment and their most recent pregnancy was not unintended.

- We set the binary variable to 1 if women reported at least one pregnancy since random assignment and their most recent pregnancy was unintended.

- We set the binary variable to missing if women reported that she had experienced two or more pregnancies since random assignment and their most recent pregnancy was not unintended.

If women did not complete the 30-month follow-up survey, the measure of unintended pregnancy was set to missing. As we describe below, we examined the sensitivity of our results to using alternative measures of the unintended pregnancy outcome.

Co-parenting quality

We measured the quality of the co-parenting relationship using a single summary measure of 10 items from the Parenting Alliance Inventory, a well-established, 20-item scale of the quality of the co-parenting relationship created by Abidin and Brunner (1995). These items indicated whether respondents thought that they and the child's father communicated well in their co-parenting roles and were a good co-parenting team. For each statement, the survey asked women to report their level of agreement 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 agreement. For women who responded to at least 7 of the 10 questions, we calculated a scale score by taking the average value of our assigned number across the questions. The resulting scale ranged from 1 to 4, with higher values indicating better co-parenting quality (10 items, α = 0.98 for our study sample based on control group data from the follow-up survey).

Number of relationship transitions

We measured relationship stability using a continuous variable representing the number of relationship transitions women experienced since random assignment. We defined a relationship transition as occurring each time a romantic relationship began or ended. The baseline survey asked women whether they were in a romantic relationship at the time of study enrollment. The 30-month follow-up survey asked women whether they were in a relationship at the time of the follow-up survey, and asked women about the number of romantic partners they had been involved with since random assignment. We combined information from the follow-up survey about women's relationship status at 30 months and their number of romantic partners since random assignment, with information about women's relationship status at study enrollment from the baseline survey, to construct a continuous measure of the number of times a woman experienced a relationship initiation or exit since random assignment.

To construct this measure, we assumed that a woman's relationship with one romantic partner ended before her relationship with another romantic partner began. For example, if a woman reported she was in a romantic relationship at baseline and not in a romantic relationship at follow-up, and she reported having one romantic partner since random assignment, we set the number of relationship transitions equal to 1 (one romantic relationship ended). If a woman reported she was in a romantic relationship at baseline and at follow up, and reported having two romantic partners since random assignment, we set the number of relationship transitions equal to 2 (one romantic relationship ended and another romantic relationship began). If a woman reported she was in a romantic relationship at baseline and at follow-up, and reported having one romantic partner since random assignment, we set the number of relationship transitions equal to 0 (no romantic relationships started or ended). The number of maternal relationship transitions has been used in the literature to measure the extent to which increased relationship stability is associated with improvements in child outcomes (Bachman et al. 2011; Bzostek and Beck 2011; Cooper et al. 2011). The measure ranged from 0 to 18 among respondents to the 30-month follow-up survey.

Depressive symptoms

We measured women's depressive symptoms with questions from the Patient Health Questionnaire Eight-Item Depression Scale, which has been shown to be a valid diagnostic and severity measure of depressive symptoms in research (Kroenke et al. 2009). For these items, the survey asked women to report the frequency—from not at all (0) to nearly every day (3)—with which she was experiencing some types of depressive symptoms, such as trouble falling or staying asleep or sleeping too much. For women who responded to at least six of the eight items, we calculated a scale score by taking the sum of the responses across the items. The resulting scale ranged from 0 to 24, with higher values indicating greater frequency of depressive symptoms (eight items, $\alpha = 0.88$ for our study sample based on control group data from the follow-up survey).

Material hardship

We measured women's material hardship using a summary measure of four items that asked women about the types of material hardship they experienced in the past year. The survey asked women whether they had done any of the following things in the past year because they did not have enough money:

- Cut the size of their meals or skipped meals because they couldn't afford enough food

- Moved in with other people, even for a little while, because of financial problems

- Sold or pawned their belongings, or taken a payday loan or auto title loan

- Thought about going to the doctor, dentist, or hospital but decided not to because of the cost

We calculated a summary score equal to the number of hardships women had experienced in the past year. We constructed this score for women who responded to at least three of the four questions. The resulting variable ranged from 1 to 4, with higher values indicating a woman had experienced more types of material hardship in the past year.

Child social-emotional and behavioral problems

We measured the mother's report of the focal child's social-emotional and behavioral problems using a 31-item subscale of the Brief Infant Toddler Social Emotional Assessment (BITSEA), a well-established measure of children's problem behaviors (Briggs-Gowan and Carter 2006). These items asked women whether or how often their child displayed various problem behaviors. For each statement, the survey asked women to report their level of agreement on a 3-point scale, ranging from not true/rarely to very true/often. We assigned each response category a number ranging from 0 to 2, with higher values indicating greater agreement that the child displayed the problem behavior or that the child displayed the problem behavior more frequently. For women who responded to at least 21 of the 31 questions, we calculated a scale score by taking the sum across the questions. The resulting scale ranged from 0 to 62, with higher values indicating more social-emotional and behavioral problems (31 items, $\alpha = 0.82$ for our study sample based on control group data from the follow-up survey).

Child social-emotional abilities

We measured the mother's report of the focal child's social-emotional abilities using an 11-item subscale of the BITSEA, a well-established measure of children's social-emotional competence (Briggs-Gowan and Carter 2006). These items asked women whether or how often the child demonstrated social-emotional competencies such as empathy, prosocial behaviors, and compliance. For each statement, the

survey asked women to report their level of agreement on a 3-point scale, ranging from not true/rarely to very true/often. We assigned each response category a number ranging from 0 to 2, with higher values indicating greater agreement that the child displayed the social-emotional competency or that the child displayed the social-emotional competency more frequently. For women who responded to at least 8 of the 11 questions, we calculated a scale score by taking the sum across the questions. The resulting scale ranged from 0 to 22, with higher values indicating more social-emotional abilities (11 items, $\alpha = 0.71$ for our study sample based on control group data from the follow-up survey).

Confirmatory analysis methods

We used the same methods to conduct the confirmatory analysis as the 12-month impact analysis of MotherWise (Patnaik and Wood 2021). For each confirmatory outcome, we used multivariate weighted least squares regression models to estimate the impact of MotherWise. We used analysis weights to account for probability of assignment to the research groups and for survey nonresponse. This approach accounted for the features of the study's random assignment design, such as stratification and varying random assignment probabilities, and allowed for adjustments for the few differences in baseline characteristics between respondents in the MotherWise group and the control group.

We included three types of covariates in the regression models. First, all models included a covariate to capture the respondent's primary language. This covariate was a stratification factor for random assignment. Second, to improve the statistical precision of our impact estimates, the model for each outcome measure included baseline versions of all confirmatory outcome measures that were available. To the extent that any of the covariates correlated with the outcome measure, including them in the regression model could improve the precision of the impact estimates by reducing the residual variation in the outcome measure (Orr 1999). Third, we included covariates to account for women's relationship status and whether women were married to or in a steady relationship with the child's father at baseline, since we found statistically significant differences in these characteristics between survey respondents in the MotherWise and control groups.

We had a small amount of missing data on survey items. For any cases with missing baseline data for one or more covariates, we used dummy variable adjustment. This involves setting any missing values for baseline covariates to a single constant value and indicating indicator variables for missing values as additional covariates in the regression model (Puma et al. 2009). For missing outcome data, we used the nonresponse weights described earlier to account for survey nonresponse—that is, women who did not complete the 30-month follow-up survey. We used case deletion to account for item nonresponse—that is, the impact estimates for any particular outcome excluded women who did not respond to the survey questions for that particular outcome. For both the MotherWise and control groups, rates of item nonresponse among survey respondents were less than 7 percent for all confirmatory outcomes.

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 and 10 percent, between 1 and 5 percent, and below 1 percent. To help interpret the magnitude of the impact estimates, we calculated and reported an effect size for each outcome. For continuous outcomes, the effect size was calculated by dividing the impact estimate from the regression model by the unadjusted pooled standard deviation of the outcome for women across both the MotherWise and control groups (Hedges 1981). We calculated the effect size for dichotomous outcomes by dividing the log odds ratio of the two study groups by 1.65 (Cox 1970).

Details of impacts on confirmatory outcomes

We present the impacts on the 13 confirmatory outcomes in Table 5 of the impact study report. For four of the 13 confirmatory outcomes, we found statistically significant differences in the average outcomes of women in the MotherWise and control groups. Table A.4 presents the same results as Table 5 of the impact study report, but adds the corresponding p-values.

Table A.4. Impacts of MotherWise on confirmatory outcomes

Outcome	MotherWise group	Control group	Impact	Effect size	P-value
Relationship skills					
Perceived romantic relationship skills (range = 1 to 4)	3.34	3.25	0.09**	0.19	0.007
Perceived conflict management skills (range = 1 to 4)	2.73	2.63	0.09*	0.15	0.028
Relationship attitudes					
Support for going slow in romantic relationships (range = 1 to 4)	3.32	3.31	0.01	0.02	0.802
Disapproval of couple violence (range = 1 to 4)	3.65	3.57	0.08*	0.17	0.013
Exposure to intimate partner violence					
Any psychological abuse	27	26	0	0.02	0.872
Any physical abuse	8	8	0	0.02	0.927
Unintended pregnancy					
Had an unintended pregnancy since study enrollment	20	20	-1	-0.02	0.862
Co-parenting					
Quality of co-parenting relationship (range = 1 to 4)	3.06	3.10	-0.04	-0.05	0.486
Relationship stability					
Number of romantic relationship transitions since random assignment (range = 0 to 18)	0.68	1.10	-0.42**	-0.21	0.003
Mother's well-being					
Depressive symptoms (range = 0 to 24)	4.52	4.56	-0.04	-0.01	0.905
Material hardship (range = 0 to 4)	0.86	0.79	0.07	0.06	0.382
Child's well-being					
Child social-emotional and behavioral problems (range = 0 to 62)	10.82	10.98	-0.16	-0.03	0.731
Child social-emotional abilities (range = 0 to 22)	18.32	18.28	0.04	0.01	0.858
Sample size	**403**	**344**			

Source: STREAMS baseline and 30-month follow-up surveys conducted by Mathematica.

Note: The numbers in the MotherWise group and control group columns are regression-adjusted predicted values of outcomes. Data were weighted to account for differences in random assignment probabilities and survey nonresponse.

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

Robustness checks

Our confirmatory impact findings were mostly robust to alternative specifications of the regression model that we used to estimate impacts (Table A.5). To verify that the findings from our confirmatory analysis were not overly sensitive to our specific analytic decisions, we repeated the confirmatory analysis with different analytic choices. Specifically, we compared the results from our primary model with the results of three regression model specifications. First, we analyzed a model without weights that adjusted for survey nonresponse. The model still used weights to adjust for the varying probabilities of the stratified random assignment. Second, we analyzed a bivariate regression model that did not use any covariate adjustment. Third, we replicated the analysis while accounting for multiple comparisons within an outcome domain. Five of our 8 outcome domains included more than one confirmatory outcome. For these domains, we conducted multiple hypothesis tests, which increased the risk of finding a statistical result by chance. To correct for this risk, we used the Benjamini-Hochberg method (Benjamini and Hochberg 1995).

For all but one of the confirmatory outcomes, these alternative specifications led to results that did not differ in statistical significance or substantive importance. For perceived conflict management skills, we found a significant impact using our primary model, an unweighted model, and accounting for multiple comparison adjustment, but we did not observe an impact on perceived conflict management skills using a bivariate model that did not use any covariate adjustment.

Table A.5. Impacts of MotherWise on confirmatory outcomes, using alternative methods

Outcome	Primary method	No weights	No covariate adjustment	Multiple comparison adjustment
Relationship skills				
Perceived romantic relationship skills (range = 1 to 4)	0.09**	0.10**	0.09*	0.09*
Perceived conflict management skills (range = 1 to 4)	0.09*	0.10*	0.07	0.09+
Relationship attitudes				
Support for going slow in romantic relationships (range = 1 to 4)	0.01	0.02	0.03	0.01
Disapproval of couple violence (range = 1 to 4)	0.08*	0.09**	0.08*	0.08*
Exposure to intimate partner violence				
Any psychological abuse	0	0	0	0
Any physical abuse	0	-0	0	0
Unintended pregnancy				
Had an unintended pregnancy since program enrollment	-1	-1	-0	n.a.
Co-parenting				
Quality of co-parenting relationship with child's father (range = 1 to 4)	-0.04	-0.05	0.02	n.a.
Relationship stability				
Number of romantic relationship transitions since random assignment (range = 0 to 18)	-0.42**	-0.38**	-0.58**	n.a.
Mother's well-being				
Depressive symptoms (range = 0 to 24)	-0.04	0.02	0.08	-0.04
Material hardship (range = 0 to 4)	0.07	0.09	0.08	0.07

Outcome	Primary method	No weights	No covariate adjustment	Multiple comparison adjustment
Child's well-being				
Child social-emotional and behavioral problems (range = 0 to 62)	-0.16	-0.23	-0.17	-0.16
Child social-emotional abilities (range = 0 to 22)	0.04	0.06	0.11	0.04
Sample size	**747**	**747**	**747**	**747**

Source: STREAMS baseline and 30-month follow-up surveys conducted by Mathematica.

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

n.a. = not applicable (because there was only one outcome in the domain).

Our impact findings were also robust to alternative measures of the confirmatory outcomes (Table A.6). For some (but not all) of the outcomes selected for the confirmatory analysis, the 30-month follow-up survey either included more than one measure of the underlying construct or included items that enabled us to construct the outcome measure in more than one way. For example, for relationship attitudes, in addition to the confirmatory outcome that measured support for going slow in relationships, the follow-up survey also included a question about women's support for cooperation in relationships. Similarly, in addition to the confirmatory outcomes that measured exposure to psychological abuse and physical abuse, the survey included questions on exposure to sexual coercion and physical injury.

Table A.6. Impacts of MotherWise on alternative measures of confirmatory outcomes

Outcome	MotherWise group	Control group	Impact	Effect size
Relationship attitudes				
Support for cooperation in relationships (range = 1 to 4)	2.72	2.72	-0.00	-0.00
Exposure to intimate partner violence				
Any sexual coercion	2	5	-3+	-0.47
Any physical injury	2	3	-1	-0.12
Unintended pregnancy				
Reported a recent unwanted pregnancy since program enrollment at the 30-month survey	10	11	-1	-0.05
Reported a recent unintended pregnancy since program enrollment at the 30-month survey	17	19	-2	-0.09
Had an unintended pregnancy since random assignment (respondents in both the 12-month and 30-month surveys only)	19	20	-1	-0.04
Relationship stability				
Number of romantic partners since random assignment	1.17	1.38	-0.21**	-0.23
Two or more romantic partners since random assignment	13	21	-8**	-0.36
Number of romantic relationship exits	0.37	0.58	-0.21**	-0.21
Number of romantic relationship starts	0.31	0.53	-0.21**	-0.21

Outcome	MotherWise group	Control group	Impact	Effect size
Mother's well-being				
Whether mother is at moderate or severe risk of depression	17	14	2	0.11
Any reliance on public assistance	66	68	-2	-0.06
Child's well-being				
Mother's engagement with focal child	1.97	2.03	-0.06	-0.08
Sample size	**403**	**345**		

Source: STREAMS baseline and 30-month follow-up surveys conducted by Mathematica.

Note: The numbers in the MotherWise group and control group columns are regression-adjusted predicted values of outcomes. Data were weighted to account for differences in random assignment probabilities and survey nonresponse.

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

To assess the extent to which the findings from our confirmatory analysis were sensitive to the specific measures that we chose, we conducted the analyses with alternative measures of our confirmatory outcomes. We examined 13 alternative outcome measures in five domains. Alternative measures were not available for the confirmatory outcomes that measured relationship attitudes, relationship skills, or co-parenting. The pattern of findings was similar for most outcomes with one exception. Although we did not find impacts on women's exposure to psychological abuse and physical abuse, we found an impact on whether women experienced sexual coercion that was statistically significant at the .10 level. Women in the MotherWise group were less likely to experience sexual coercion than women in the control group (2 and 5 percent, respectively).

Subgroup analyses

We explored whether the impacts of MotherWise were significantly larger or smaller for subgroups of women. We estimated impacts separately for subgroups of women based on the following two characteristics: (1) primary language (women who spoke Spanish as their primary language versus women who did not), and (2) relationship status with the child's father (women who were in a steady relationship with the child's father at the time of study enrollment versus women who were not). We limited the subgroup analyses to only confirmatory outcomes.

We found two statistically significant differences in confirmatory outcome impacts between women who spoke Spanish as their primary language versus women who did not (Table A.7). The impact of MotherWise on disapproval of couple violence was larger for women who spoke Spanish than for women who did not, even though the average scores for women in the control group was similar for both subgroups. In contrast, the impact on the number of romantic relationship transitions was driven by women who did not speak Spanish as their primary language. Notably, this subgroup of women also experienced more relationship transitions in the absence of MotherWise, so there might have been more room for the program to affect this outcome.

We found no statistically significant differences in impacts between women who were in a steady romantic relationship with the child's father at the time of enrollment and women who were not (Table A.8). However, for one confirmatory outcome, the difference in the size of impacts between the subgroups was substantively meaningful. The impact of on the number of relationship transitions was more than three times as large for women who were not in a steady relationship with the child's father at

baseline compared with the impact for women who were. Notably, the small sample of women who were not in a steady relationship with the child's father at baseline might have provided insufficient statistical power to detect statistically significant differences between the two subgroups.

Table A.7. Impacts of MotherWise, by mother's primary language

| | Is mother's primary language Spanish? | | | | P-value for subgroup difference |
| | Yes | | No | | |
Outcome	Control group	Impact	Control group	Impact	
Relationship skills					
Perceived romantic relationship skills (range = 1 to 4)	3.31	0.08	3.22	0.10*	0.725
Perceived conflict management skills (range = 1 to 4)	2.56	0.07	2.66	0.10+	0.784
Relationship attitudes					
Support for going slow in romantic relationships (range = 1 to 4)	3.32	0.02	3.31	0.01	0.944
Disapproval of couple violence (range = 1 to 4)	3.50	0.17**	3.60	0.04	0.065◊
Exposure to intimate partner violence					
Any psychological abuse	24	-6	27	3	0.118
Any physical abuse	5	1	9	-0	0.750
Unintended pregnancy					
Had an unintended pregnancy since program enrollment	9	0	23	-3	0.533
Co-parenting					
Quality of co-parenting relationship with child's father (range = 1 to 4)	3.23	-0.15+	3.04	0.01	0.184
Relationship stability					
Number of romantic relationship transitions since random assignment (range = 0 to 18)	0.55	0.17	1.34	-0.68**	0.000◊◊◊
Mother's well-being					
Depressive symptoms (range = 0 to 24)	3.74	-0.32	4.92	0.05	0.580
Material hardship (range = 0 to 4)	0.68	0.01	0.84	0.09	0.638
Child's well-being					
Child social-emotional and behavioral problems (range = 0 to 62)	12.32	-0.54	10.40	0.03	0.563
Child social-emotional abilities (range = 0 to 22)	18.49	0.16	18.18	-0.01	0.719
Sample size		229		519	

Source: STREAMS baseline and 30-month follow-up surveys conducted by Mathematica.

Note: The numbers in the two control group columns are regression-adjusted predicted values of outcomes for each subgroup. Data were weighted to account for differences in random assignment probabilities and survey nonresponse.

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

◊◊◊/◊◊/◊ Statistically significant differences among the subgroup impact estimates at the .01/.05/.10 levels, respectively.

Table A.8. Impacts of MotherWise, by whether the mother was in a steady romantic relationship with the child's father at time of enrollment

| Outcome | Was the mother in a steady romantic relationship with the child's father at time of enrollment? | | | | P-value for subgroup difference |
| | Yes | | No | | |
	Control group	Impact	Control group	Impact	
Relationship skills					
Perceived romantic relationship skills (range = 1 to 4)	3.34	0.08*	2.96	0.13+	0.525
Perceived conflict management skills (range = 1 to 4)	2.66	0.11*	2.55	0.03	0.430
Relationship attitudes					
Support for going slow in romantic relationships (range = 1 to 4)	3.37	0.00	3.11	0.04	0.677
Disapproval of couple violence (range = 1 to 4)	3.57	0.09**	3.56	0.03	0.347
Exposure to intimate partner violence					
Any psychological abuse	22	2	39	-5	0.353
Any physical abuse	5	0	17	0	0.976
Unintended pregnancy					
Had an unintended pregnancy since program enrollment	20	-3	13	2	0.454
Co-parenting					
Quality of co-parenting relationship with child's father (range = 1 to 4)	3.26	-0.04	2.55	-0.06	0.911
Relationship stability					
Number of romantic relationship transitions since random assignment (range = 0 to 18)	0.61	-0.30*	2.70	-0.83*	0.194
Mother's well-being					
Depressive symptoms (range = 0 to 24)	5.08	-0.05	2.84	0.06	0.900
Material hardship (range = 0 to 4)	0.95	0.04	0.25	0.20	0.410
Child's well-being					
Child social-emotional and behavioral problems (range = 0 to 62)	11.78	-0.23	8.57	-0.01	0.854
Child social-emotional abilities (range = 0 to 22)	18.34	-0.14	18.09	0.66	0.118
Sample size		580		164	

Source: STREAMS baseline and 30-month follow-up surveys conducted by Mathematica.

Note: The numbers in the two control group columns are regression-adjusted predicted values of outcomes for each subgroup. Data were weighted to account for differences in random assignment probabilities and survey nonresponse.

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

◊◊◊/◊◊/◊ Statistically significant differences among the subgroup impact estimates at the .01/.05/.10 levels, respectively.

To examine whether the COVID-19 pandemic could have affected the estimated impacts of MotherWise, we compared the program's impacts on confirmatory outcomes for women who completed the 30-month follow-up survey before the pandemic (before March 15, 2020) and during the pandemic (on or after March 15, 2020). For all but one of the confirmatory outcomes, we found no statistically significant difference in the impacts of MotherWise between the two groups (Table A.9). However, the impact on the number of relationship transitions was larger for women who completed the survey during the pandemic, compared with earlier respondents.

Several factors could have contributed to the difference in the program's impact on relationship stability between early and later survey respondents. The impact of MotherWise on relationship stability might have been larger in the pandemic context, because the additional economic and mental stressors introduced by the pandemic might have strained women's relationships. The relationship skills taught in MotherWise might have been more relevant in this context. However, other factors could also explain the differential impacts on relationship stability for early and later respondents, such as differences in the characteristics of these two groups. Compared with earlier respondents, later respondents were less likely to speak English at home (56 versus 64 percent) and less likely to be expecting a baby (79 versus 95 percent). On average, later respondents also had lower perceived relationship skills (3.19 versus 3.28) and conflict management skills (2.47 versus 2.57) at baseline, compared with earlier respondents.

Table A.9. Impacts of MotherWise, by whether women completed the follow-up survey before March 15, 2020

| | Respondent completed follow-up survey before March 15, 2020? | | | | P-value for subgroup difference |
| | Yes | | No | | |
Outcome	Control group	Impact	Control group	Impact	
Relationship skills					
Perceived romantic relationship skills (range = 1 to 4)	3.27	0.11	3.24	0.09*	0.759
Perceived conflict management skills (range = 1 to 4)	2.68	-0.00	2.62	0.12**	0.213
Relationship attitudes					
Support for going slow in romantic relationships (range = 1 to 4)	3.36	0.03	3.29	0.01	0.850
Disapproval of couple violence (range = 1 to 4)	3.58	0.06	3.57	0.08*	0.756
Exposure to intimate partner violence					
Any psychological abuse	23	-2	27	1	0.589
Any physical abuse	9	-5	8	2	0.149
Unintended pregnancy					
Had an unintended pregnancy since program enrollment	16	4	22	-2	0.359
Co-parenting					
Quality of co-parenting relationship with child's father (range = 1 to 4)	3.03	-0.02	3.12	-0.05	0.861

| Outcome | Respondent completed follow-up survey before March 15, 2020? | | | | P-value for subgroup difference |
| | Yes | | No | | |
	Control group	Impact	Control group	Impact	
Relationship stability					
Number of romantic relationship transitions since random assignment (range = 0 to 18)	0.69	0.09	1.24	-0.59**	0.022◊◊
Mother's well-being					
Depressive symptoms (range = 0 to 24)	3.50	0.39	4.91	-0.19	0.440
Material hardship (range = 0 to 4)	0.63	0.05	0.85	0.07	0.869
Child's well-being					
Child social-emotional and behavioral problems (range = 0 to 62)	11.40	-0.79	10.85	0.03	0.461
Child social-emotional abilities (range = 0 to 22)	18.18	-0.17	18.31	0.10	0.633
Sample size		177		570	

Source: STREAMS baseline and 30-month follow-up surveys conducted by Mathematica.

Note: The numbers in the two control group columns are regression-adjusted predicted values of outcomes for each subgroup. Data were weighted to account for differences in random assignment probabilities and survey nonresponse.

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

◊◊◊/◊◊/◊ Statistically significant differences among the subgroup impact estimates at the .01/.05/.10 levels, respectively.

Details of the exploratory analysis

In addition to the confirmatory analyses presented in the main body of the report, we also conducted exploratory analyses of the impacts of MotherWise on several outcome measures related to the child's father, including women's relationship status with their child's father, relationship quality with their child's father, and father involvement. We considered these analyses exploratory, because these outcomes are not as central to the MotherWise program's goals as the confirmatory outcomes, and because the program did not serve fathers directly.

In addition, some of these outcomes were defined only for a subgroup of women. For measures of relationship quality with the father, the analysis was limited to women who responded to the 30-month follow-up survey and reported being in a relationship with their child's father at the 30-month follow-up. To maximize the sample size for this analysis, this subsample included all women in a relationship with their child's father at follow-up (either a steady or on-and-off relationship) regardless of whether they reported being in a relationship with the child's father at baseline.

Exploratory outcomes

We describe the outcome measures for the exploratory analysis below. We followed the same rules for missing data for the exploratory outcome measures that we used for the confirmatory outcome measures. In addition, for relationship quality outcomes, we coded women as missing if they did not meet the definition of the analysis sample. That is, women were coded as missing for relationship quality outcomes if they were not a relationship with their child's father at the 30-month follow-up.

Romantically involved

We measured relationship status with the child's father using a binary indicator for whether the mother reported on the 30-month follow-up survey that she was married to or in a romantic relationship—including a steady relationship or an on-and-off relationship—with the child's father.

Married

We measured relationship status with the child's father by using a binary indicator for whether the mother reported on the 30-month follow-up survey that she was married to the child's father.

Support and affection

We measured support and affection by using a single summary measure of 12 items. The follow-up survey asked respondents the degree to which they agreed with 12 statements regarding their relationship with their romantic partner. The statements reflected positive relationship traits such as support, intimacy, friendship, commitment, and trust. For example, "[Partner] is honest and truthful with me" and "[I feel appreciated by [partner]." The source of these questions was the Building Strong Families (BSF) study (Wood et al. 2012). For each statement, the survey asked women to report their level of agreement 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 agreement. For women who responded to at least eight of the 12 questions, we calculated a scale score by taking the average value of our assigned number across the questions. The resulting scale ranged from 1 to 4, with higher values indicating more support and affection (α = 0.96 for our study sample based on control group data from the follow-up survey). This measure was defined only for women who were in a romantic relationship with their child's father at follow-up.

Relationship commitment

We measured relationship commitment by using a continuous variable that ranged from 0 to 10, with higher values indicating that the mother was more committed to her romantic relationship with the child's father. This measure was based on the response to a question on the follow-up survey that asked, "On a scale from 0 to 10, where 0 is not at all committed and 10 is completely committed, how committed are you to your [marriage/relationship] with [partner]?" This measure was adapted from one used in the BSF study (Moore et al. 2012). It was defined only for women who were in a romantic relationship with their child's father at follow-up.

Relationship happiness

We measured relationship happiness by using a continuous variable ranging from 0 to 10, with higher values indicating the mother's reports of greater happiness in her romantic relationship with the child's father. This measure was based on the response to a question on the follow-up survey that asked, "On a scale from 0 to 10, where 0 is not at all happy and 10 is completely happy, taking all things together, how happy would you say your relationship with [partner] is?" The measure was adapted from one used in the BSF study (Moore et al. 2012). This measure was defined only for women who were in a romantic relationship with their child's father at follow-up.

Use of constructive conflict behaviors

We measured the use of constructive conflict behaviors in the relationship with the child's father by using a single summary measure of seven items. The follow-up survey asked respondents seven questions about the frequency with which they used constructive conflict behaviors with their partner. For example, respondents were asked about their level of agreement with the following statements:

- During arguments, we are good at taking breaks when we need them.

- Even when arguing we can keep a sense of humor.

The statements were drawn or adapted from the Gottman Sound Relationship House Questionnaires (Gottman 1999). For each statement, the survey asked women to report whether this never happens, hardly ever happens, sometimes happens, or often happens. We assigned each response category a number ranging from 1 to 4, with higher values indicating higher frequency. For women who responded to at least five of the seven questions, we calculated a scale score by taking the average value of our assigned number across the questions. The resulting scale ranged from 1 to 4, with higher values indicating more frequent use of constructive conflict behaviors (α = 0.87 for our study sample based on control group data from the follow-up survey). This measure was defined only for women who were in a romantic relationship with the child's father at follow-up.

Avoidance of destructive conflict behaviors

We measured avoidance of destructive conflict behaviors in the relationship with the child's father by using a single summary measure of seven items. The follow-up survey asked respondents about the frequency with which they and their partners engaged in eight negative conflict behaviors. The statements were also drawn from the Gottman Sound Relationship House Questionnaires (Gottman 1999). They reflected criticism or contempt that the partners demonstrate toward each other, their tendency to escalate or withdraw from arguments or engage in personal attacks, and other harmful behaviors associated with conflict. For example, "When [partner] and I argue, past hurts get brought up again." For each statement, the respondent was provided with four response options: (1) never, (2) hardly ever, (3) sometimes, or (4) often. We assigned each response category a number ranging from 1 to 4, with higher values indicating higher frequency. For women who responded to at least six of the eight questions, we calculated a scale score by taking the average value of our assigned number across the questions. The resulting scale ranged from 1 to 4, with higher values indicating more avoidance of destructive conflict behaviors (α = 0.87 for our study sample based on control group data from the follow-up survey). This measure was defined only for women who were in a romantic relationship with their child's father at follow-up.

Father spends time with child on a daily basis

We measured whether the father spends time with the child on a daily basis using a binary indicator for whether the mother reported that father spent an hour or more with the focal child every day or almost every day in the past month.

Father's financial support of child

We measured father's financial support of the child using a binary indicator for whether the mother reported that the father covered at least half of the costs of raising the focal child. The follow-up survey

asked mothers what portion of the expenses associated with raising the child—such as food, clothing, medical expenses, diapers, and any other related costs—were covered by the father.

Father's engagement with child

We measured father's engagement with the child by using a single summary measure of seven items. The follow-up survey first asked respondents whether the father had seen the child in the past month. If women reported the father had seen the child in the past month, the follow-up survey asked respondents about the frequency with which the father did seven activities with the child, such as whether the father and child played games like "peek-a-boo" or "gotcha," or sang songs together. For each statement, the respondent was provided with six response options ranging from "not at all" to "more than once a day." We assigned each response category a number ranging from 1 to 6, with higher values indicating higher frequency. For women who responded to at least five of the seven questions, we calculated a scale score by taking the average value of our assigned number across the questions. The resulting scale ranged from 1 to 6, with higher values indicating more father engagement ($\alpha = 0.94$ for our study sample based on control group data from the follow-up survey). For women who reported that the father had not seen the child in the past month, we assumed the father had not done any of the seven activities with the child and set the scale to 1, the lowest possible value.

Exploratory analytic samples

The exploratory analysis included different samples of survey respondents for different outcome domains. For relationship status with the child's father and father involvement, the analysis included all survey respondents. For relationship quality, the analysis was limited to the subgroup of women who reported being in a relationship with the child's father at the 30-month follow-up survey (including women in a steady or on-and-off relationship with the father). This subgroup included 287 of 403 women in the MotherWise group (71 percent) and 233 of 245 women in the control group (68 percent). As we discuss in detail below, we assessed whether there was risk of bias due to attrition or truncation for this subgroup using the What Works Clearinghouse (WWC) standards (U.S. Department of Education 2020).

We examined the baseline characteristics of women in the subsample used for the exploratory analyses of relationship quality outcomes (Table A.10). Within this subsample, women in the MotherWise group and women in the control group were generally similar in terms of demographics, family and relationships, exposure to intimate partner violence, well-being, socioeconomic status, and baseline measures of relationship quality. However, there were three exceptions. First, among women in a relationship with the father at follow-up, women in the MotherWise group were less likely to be born outside the United States than women in the control group. Second, we found differences in women's education level. For example, within this subsample, women in the MotherWise group were more likely to have at least a high school diploma or GED than women in the control group. Third, we observed a statistically significant difference in women's avoidance of destructive conflict behaviors. To account for these differences, we included the following additional covariates in the regression models for the exploratory analyses of relationship quality outcomes: whether women were born outside the United States, education level, and all available measures of baseline relationship quality.

Details of impacts on exploratory outcomes

We presented the impacts on our exploratory outcomes in Table 6 of the impact study report. We found no statistically significant differences in any of our exploratory outcome measures between the

MotherWise and control groups. Table A.11 presents the same results as Table 6 of the impact study report, but adds the corresponding p-values.

Table A.10. Baseline characteristics for women, by relationship status and study group (percentage unless otherwise specified)

Baseline characteristics	In a romantic relationship with child's father at follow-up		
	MotherWise group	Control group	Difference
Demographics			
Average age (years)	29	28	0
Race and ethnicity			
Hispanic	71	72	-1
Black, non-Hispanic	8	6	2
White, non-Hispanic	17	17	-0
Other, non-Hispanic	3	5	-1
Born outside the United States	40	48	-7+
Language spoken at home			
English	52	49	3
Spanish	47	48	-1
Other	1	3	-2
Family and relationships			
Number of biological and adopted children	1.5	1.5	0.0
Expecting a baby at study enrollment	84	83	1
Expected or new baby is their first child	35	41	-6
Married or in a steady relationship with the father of new/expected baby	93	90	4
Relationship status			
Married or engaged	69	66	3
In a steady relationship	24	24	0
In an on-again, off-again relationship	5	5	0
Not in a relationship	1	5	-4
Intimate partner violence			
Any psychological abuse by a romantic partner in the past year	32	29	4
Any physical abuse by a romantic partner in the past year	9	9	-0
Well-being			
At risk for moderate or severe depression	24	20	4
Socioeconomic status			
Highest educational level			◊◊
Less than high school	21	33	-11
High school diploma or GED	36	33	3
Some college or vocational technical school	30	25	5
College degree	13	10	3
Worked for pay in past month	40	37	3

	In a romantic relationship with child's father at follow-up		
Baseline characteristics	**MotherWise group**	**Control group**	**Difference**
Earnings in past 30 days ($)	595	464	130
Receipt of SNAP, TANF or WIC in past 30 days	65	70	-5
Baseline relationship status with child's father			
Romantically involved with child's father	93	90	4
Married to child's father	46	47	-1
Baseline relationship quality with child's father			
Support and affection (range = 1 to 4)	3.32	3.41	-0.08
Fidelity	15	12	3
Relationship happiness (range = 1 to 10)	8.23	8.46	-0.23
Use of constructive conflict behaviors (range = 1 to 4)	3.29	3.30	-0.01
Avoidance of destructive conflict behaviors (range = 1 to 4)	2.33	2.16	0.17*
Sample size	**287**	**233**	

Source: STREAMS baseline survey conducted by Mathematica.

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

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

◊◊◊/◊◊/◊ Difference is significantly different from zero at the .01/.05/.10 level using a chi-square test.

SNAP = Supplemental Nutrition Assistance Program; TANF = Temporary Assistance for Needy Families; WIC = Special Supplemental Nutrition Program for Women, Infants, and Children.

Assessing potential truncation bias

Our measures of relationship quality are available only for the subsample of 30-month survey respondents who were in a relationship with the child's father at the 30-month follow-up. Because the relationship status with the child's father might itself be influenced by the program, this introduces a risk of bias in the estimated impacts on relationship quality. Random assignment creates research groups that are similar at baseline, so that differences in outcomes between the groups can be attributed to the intervention. However, if some outcomes are available only for a subsample (for example, women in a relationship with the child's father at follow-up) and the likelihood of being in that subsample can be affected by the intervention, then the estimated impacts of the intervention on these outcomes might be biased. This issue is also referred to as a "truncation" problem (McConnell et al. 2008). Although MotherWise did not affect the share of women who were in a relationship with the focal child's father at follow-up, the estimated impacts on relationship quality could still be biased if MotherWise affected which women were in such relationships. For example, if MotherWise made it less likely that relationships with lower-than-average quality ended, then the program's impacts on relationship quality would be underestimated.

Table A.11. Impacts of MotherWise on relationship with child's father (exploratory)

Outcome	MotherWise group	Control group	Impact	Effect size	P-value
Relationship status with child's father					
Romantically involved (percentage)	69	71	-2	-0.06	0.505
Married (percentage)	39	40	-1	-0.03	0.695
Relationship quality with child's father[a]					
Support and affection (range = 1 to 4)	3.27	3.24	0.03	0.05	0.566
Relationship commitment (range = 1 to 10)	9.21	9.02	0.20	0.11	0.253
Relationship happiness (range = 1 to 10)	8.10	7.98	0.12	0.06	0.494
Use of constructive conflict behaviors (range = 1 to 4)	3.23	3.19	0.04	0.06	0.454
Avoidance of destructive conflict behaviors (range = 1 to 4)	2.74	2.70	0.03	0.04	0.566
Father involvement					
Father spends time with child on a daily basis	63	63	0	0.00	0.986
Father financially supports child	67	66	0	0.01	0.884
Father engagement with child (range = 1 to 6)	3.73	3.76	-0.03	-0.02	0.800
Sample size for relationship status and father involvement outcomes	**399**	**342**			
Sample size for relationship quality outcomes	**287**	**233**			

Source: STREAMS baseline and 30-month follow-up surveys conducted by Mathematica.

Note: The numbers in the MotherWise group and control group columns are regression-adjusted predicted values of outcomes.

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

[a] These outcomes were defined only for women who were in a relationship with the child's father at follow-up.

To assess potential bias due to truncation in our analysis of relationship quality measures, we followed the two-step procedure developed by the WWC (U.S. Department of Education 2020). First, we analyzed overall attrition and differential attrition between the MotherWise and control groups in the analytic sample for relationship quality measures, including attrition due to either truncation or survey nonresponse. For all relationship quality outcomes, the combination of overall attrition and differential attrition in the analytic sample was not low enough to meet the conservative WWC standard (Table A.12). The analysis would not be eligible for the WWC's highest rating for group design studies, "Meets WWC Group Design Standards Without Reservations."

Next, we tested whether the MotherWise and control groups in the analytic sample for relationship quality measures had similar characteristics at baseline. We examined all available baseline measures of relationship quality outcomes, all available baseline measures of our confirmatory outcomes, whether women were in a steady relationship with the child's father at baseline, and women's race and ethnicity and socioeconomic status. Within the analytic sample for relationship quality outcomes, the baseline characteristics for the MotherWise and control groups differed by more than 0.25 standard deviations (based on variation in the pooled sample) in two cases: (1) whether women were in a steady relationship with the child's father at baseline and (2) whether women had less than a high school education (Table A.13). According to WWC standards, this finding indicates that the two groups are considered non-equivalent. Notably, we also observed differences in baseline relationship status and education when we

examined the full sample of randomly assigned women (Table A.2), making it unlikely that these differences are entirely because of truncation of the analytic sample for relationship quality measures. Nevertheless, the high attrition in combination with the baseline non-equivalence for this analytic sample indicate a moderate risk of bias in the estimated impacts on relationship quality outcomes, and these findings should be interpreted with caution.

Table A.12. Attrition and equivalence for relationship quality measures

Outcome	Overall attrition (%)	Differential attrition (%)	High/low attrition[a]
Relationship quality with child's father[b]			
Support and affection	45.3%	2.5%	High
Relationship commitment	45.3%	2.5%	High
Relationship happiness	45.3%	2.5%	High
Use of constructive conflict behaviors	45.3%	2.5%	High
Avoidance of destructive conflict behaviors	45.3%	2.5%	High

Source: STREAMS baseline and 30-month follow-up surveys conducted by Mathematica.

[a] High or low attrition is in reference to the conservative WWC standard (U.S. Department of Education 2020).

[b] These outcomes were defined only for women who were in a relationship with the child's father at follow-up.

Table A.13. Standardized mean differences for baseline characteristics among women in a relationship with their child's father at follow-up

Outcome	Standardized mean difference
Relationship quality with child's father[a]	
Support and affection	-0.15
Fidelity	0.18
Relationship happiness	-0.14
Use of constructive conflict behaviors	-0.03
Use of destructive conflict behaviors	0.23
Baseline measures of confirmatory outcomes	
Perceived romantic relationship skills	-0.09
Perceived conflict management skills	-0.11
Support for going slow in romantic relationships	-0.02
Disapproval of couple violence	0.03
Any psychological abuse	0.10
Any physical abuse	-0.01
Depressive symptoms	0.14
Demographics	
Race and ethnicity	
Hispanic	-0.03
Black, non-Hispanic	0.22
White, non-Hispanic	-0.01
Other, non-Hispanic	-0.17
Family and relationships	
Married or in a steady relationship with the father of new/expected baby	0.30
Socioeconomic status	
Highest educational level	
Less than high school	-0.35
High school diploma or GED	0.07
Some college or vocational technical school	0.16
College degree	0.20
Worked for pay in past month	0.08
Earnings in past 30 days ($)	0.12
Receipt of SNAP, TANF or WIC in past 30 days	-0.14

Source: STREAMS baseline and 30-month follow-up surveys conducted by Mathematica.

Note: Includes women who were in a relationship with their child's father at the 30-month follow-up. Data were weighted to account for differences in random assignment probabilities and survey nonresponse.

[a] These outcomes were defined only for women who were in a relationship with the child's father at baseline.