

The Social Context of Retrospective-Pro prospective Changes in Pregnancy Desire during the Transition to Adulthood: The Role of Fathers and Intimate Relationships

Abstract

BACKGROUND

Researchers have questioned the accuracy of a widely used measure asking women to retrospectively recall whether they wanted a pregnancy before it was conceived.

OBJECTIVE

We investigate whether pregnant women's retrospective recollections of their pre-conception desire for pregnancy were shaped by intimate relationships, and their and their partners' reactions to their pregnancies.

METHODS

We use the Relationship Dynamics and Social Life study, which included weekly survey interviews with 971 young women, of whom 175 experienced 203 pregnancies during the 2.5-year study period. We estimate logistic regression models of whether women's retrospective recollections of their pre-conception desire are stable, shift positive, or shift negative compared to their prospectively reported desires, along with formal mediation tests of potential mechanisms.

RESULTS

Women in serious intimate relationships at the time of conception are more likely to remember their undesired pregnancies as desired before conception because their partners react more happily to the pregnancy, which increases women's own happiness about the pregnancy.

CONCLUSION

Retrospective recollections of pre-conception desire at least partially represent women's current feelings about their pregnancy. Post-conception happiness about the pregnancy may be more useful for identifying mothers and children whose health and well-being are at risk, but prospective measures are necessary to evaluate whether women got what they wanted.

CONTRIBUTION

This paper extends the literature on undesired pregnancy by directly demonstrating that women's feelings about a specific pregnancy change over time alongside her experiences with the father of her pregnancy.

Keywords Pregnancy Desire * Pregnancy Intentions * Unintended Pregnancy * Undesired

Pregnancy * Intimate Partners * Young Adulthood

[REVISED MANUSCRIPT]

Introduction

Undesired pregnancy is widespread in the United States – women report that approximately 50% of their pregnancies were undesired (usually called “unintended”)¹ at the time of conception (Finer and Zolna 2016). Remembering a pregnancy as undesired is associated with delayed prenatal care, maternal complications and mortality, and morbidity and mortality among the infants themselves, relative to pregnancies that are remembered as desired, in many settings (Gipson, Koenig, and Hindin 2008; Hall et al. 2017). However, researchers have questioned whether these associations are causal (Joyce, Kaestner, & Korenman, 2000; Kost & Lindberg, 2015).

The National Survey of Family Growth (NSFG) is the most widely used dataset to study undesired pregnancy, and many other studies have based their own measures of pregnancy desire on the NSFG’s measures (e.g., Aiken and Potter 2013; Barber, Kusunoki, and Gatny 2011; Shreffler et al. 2014). Analyses of the NSFG have dramatically enriched our understanding of women’s feelings about their pregnancies. For example, although undesired birth rates have fallen over time (Finer and Zolna 2016), women who are socioeconomically disadvantaged, highly religious, or from underrepresented racial/ethnic minority women bear a greater burden of undesired births than others (Finer and Zolna 2016; Hartnett 2014; Hayford and Guzzo 2016; Hayford and Morgan 2008). The NSFG data has also been used to uncover several important paradoxes related to undesired pregnancies. For example, women classify only about two-thirds of pregnancies resulting from contraceptive failure as undesired (Trussell, Vaughan, and

¹ Our measures and other commonly used measures (e.g., the National Survey of Family Growth’s {NSFG} retrospective measures) ask whether women *wanted* to get pregnant; thus, we refer to this as pregnancy *desire*. Other researchers are beginning to use the word *desire* rather than *intention* to discuss this concept, as well (e.g., see Kost, Maddow-Zimet, and Kochhar 2018; Kost and Zolna 2019). This is especially important because referring to undesired pregnancies as *unintended* erroneously attributes a lack of planning to women who do not get what they want in terms of childbearing.

Stanford 1999), many women – especially Latinas – are happy about pregnancies they did not originally want (Aiken and Potter 2013; Hartnett 2012, 2014), and although women with unintended births tend to have subsequent unintended births (Guzzo and Hayford 2011) they also tend to use more effective post-partum contraceptive methods (Guzzo, Eickmeyer, and Hayford 2018) than women with desired births.

These paradoxes and others have spurred an intense focus on the measurement of pregnancy desire. One crucial feature of the repeated cross-sectional design of the NSFG is that it must assess women's desire for each of her pregnancies retrospectively, after the pregnancy (or birth) has occurred. It is unknown how accurately women can recall their pre-conception desire for a pregnancy after the conception (or birth) occurs, in part because their post-conception experiences may get in the way of accurately remembering their pre-conception feelings (Yeatman and Sennott 2015). This *ex post* rationalization hypothesis has led researchers to question whether mothers who have negative experiences – e.g., maternal or infant complications – remember their pregnancies as undesired as a result of those negative experiences, regardless of their actual desire for the pregnancy before it was conceived (Guzzo and Hayford 2014; Joyce, Kaestner, and Korenman 2002).

The paucity of longitudinal data on U.S. women's pregnancy desire has constrained researchers' ability to understand this potential bias and the dynamics of pregnancy desire more generally. In fact, few U.S. datasets have prospective or longitudinal measurement of pregnancy desire, and even fewer have repeated measures of pregnancy desire referring to the same pregnancy.² Three important longitudinal studies that focus on pregnancy desire are the

² The National Longitudinal Survey of Youth 1979 has prospectively measured fertility *expectations*, but not fertility *desires*. This difference is important because expectations ask women to combine what they want along with the barriers they expect to face in getting what they want. Although these data have been used for many

Continuity and Change in Contraceptive Use study, the National Survey of Fertility Barriers, and the Border Contraceptive Access Study, all of which have demonstrated that there is substantial individual-level change over time in pregnancy desire (Aiken and Potter 2013; Jones 2018; Ray et al. 2018). Although the first two studies explored change in women’s desire over time, and they investigated both stable and dynamic predictors of that desire, neither study focused on changing feelings about the same pregnancy. The third study compared prospective and retrospective measures of happy reactions to pregnancy among women who experienced contraceptive failure. We build on these studies with our specific focus on comparing retrospectively measured pregnancy desire – the most commonly used measure of undesired pregnancy – to prospectively measured desire for the same pregnancy, and the role of the intimate relationships, partners’ reactions, and women’s own happiness between interviews as predictors of change.

We use a newly available data set, the Relationship Dynamics and Social Life (RDSL) study, which longitudinally follows a population-based random sample of young women with weekly survey interviews for 2.5 years. For this random sample of pregnancies that occurred during the study period, the dataset includes both pre- and post-conception measures of women’s feelings about the pregnancy, as well as pre- and post-conception measures of their perceptions of their partners’ feelings about the pregnancy.³ It also includes information about the intimate relationship context in which the pregnancy was conceived.

important discoveries related to changing pregnancy expectations (e.g., Hayford, 2009; Rackin & Morgan, 2018), our focus is specifically on *desire* for pregnancy.

³ RDSL did not interview partners; thus, we use women’s perceptions of their partners’ desire for pregnancy. Previous research demonstrates that there are two major predictors of these perceptions: partners’ actual desire for pregnancy (accurate perception) and women’s own desire for pregnancy (projection) (Miller and Pasta 2002). Partners’ actual desire for pregnancy is the much stronger predictor of women’s perceptions, and further, our inclusion of women’s own pregnancy desire in the same model (by stratifying based on prospective desire) accounts (to some degree) for that component of women’s perceptions of their partners’ desire.

We address two specific research questions about the dynamics of pregnancy desire. First, after reporting a pregnancy, do women's retrospective recollections of their pre-conception pregnancy desire match their prospectively reported pre-conception desire for pregnancy? Second, how does a woman's relationship with the father and his reaction to the pregnancy shape how they remember those pre-conception feelings?

Background

Timing Issues

We make two important temporal distinctions in our hypotheses and analyses: the time when the question is asked (prospective vs. retrospective; i.e., before or after a specific conception) and the time frame for the pregnancy (potential pregnancy vs. actual pregnancy; i.e., feelings about a future pregnancy before it is conceived or feelings about an actual pregnancy after it is conceived). Thus, there are four potential measurement strategies, as illustrated in Figure 1. Also note that these strategies could be applied to women, their partners, or anyone else who has feelings about their potential or actual pregnancies (e.g., mothers, mother-in-laws, etc.)

In this analysis, our dependent variable represents the shift among pregnant women between boxes 1 and 2 – the difference between (2) her retrospective recollection of her pre-conception desire for a potential pregnancy and (1) her prospective desire for a potential pregnancy. Retrospectively measured post-conception reaction to the pregnancy (3) is a predictor variable in our models. The RDSL dataset does not contain a measure corresponding to (4), but for example the Border Contraceptive Access Study (Aiken and Potter 2013) asked women, “How would you feel if you became pregnant in the next three months?” (as well as how their partners would feel). We explicitly consider the linkages between these measures and how

experiences at the time of conception or after conception shape women's changing feelings about their pregnancies.

Conceptual Model

Figure 2 presents a heuristic diagram of our conceptual model of feelings about pregnancy. The model has four quadrants: the top half represents partners' feelings about pregnancy, the bottom half represents women's own feelings about pregnancy, the left half represents feelings before conception, and the right half represents feelings after conception.

In our conceptual model, women's and their partners' pre-conception desire for a potential pregnancy influence each other ($A \leftrightarrow B$) and are formed in the context of their intimate relationship ($F \begin{matrix} \nearrow A \\ \searrow B \end{matrix}$) (e.g., women have more desire for pregnancy in more serious relationships than in casual relationships). If a pregnancy occurs, these pre-conception desires and the intimate relationship context fuel both partners' reactions to an actual pregnancy in two ways: First, all else equal, a woman who wanted a pregnancy will have a more positive reaction to that pregnancy than a woman who did not want a pregnancy ($A \rightarrow C$), and the same for her partner ($B \rightarrow D$). Second, the partner's pre-conception desire for a potential pregnancy will affect a woman's reaction to her actual pregnancy ($B \rightarrow C$) and vice-versa ($A \rightarrow D$). The intimate relationship context may also affect women's and their partners' reactions to the pregnancy, regardless of whether they originally wanted it ($F \begin{matrix} \nearrow C \\ \searrow D \end{matrix}$).

Women's reactions to an actual pregnancy and their partners' reactions are intertwined. Here, we distinguish between women's feelings about their actual pregnancies at two time points: upon learning of the pregnancy (C), and after experiencing others' (including the partners') reactions to the pregnancy (E). Partners will be more positive about pregnancies that

women themselves react positively to, and vice-versa ($C \leftrightarrow D$). In addition to women's ongoing consistent feelings (e.g., happy or unhappy) over time about a pregnancy ($C \rightarrow E$), partners' reactions to a pregnancy will affect women's subsequent feelings about their pregnancy, and can potentially change them ($D \rightarrow E$). In the following sections, we describe our hypotheses about how this happens, and how it may influence strategies to retrospectively elicit women's pre-conception feelings about their pregnancies.

The Dynamics of Pregnancy Desire

Although values (evaluations of concepts like free speech, individualism, or honesty) are relatively stable, attitudes (positive or negative feelings about a specific thing) are more malleable in the face of new situations and knowledge, particularly during late adolescence and young adulthood (Krosnick and Alwin 1989). In the case of undesired pregnancy, women's attitudes about their pregnancies may be influenced by experiences at the time of conception, such as their intimate relationship, or by experiences after conception, such as others' reactions to the pregnancy.

Researchers originally assumed that women would become more positive about their pregnancies after giving birth and would thus over-report the extent to which pregnancies were desired (Westoff and Ryder 1977). However, analyses of the National Longitudinal Survey of Youth revealed little systematic bias in either direction (Joyce, Kaestner, & Korenman, 2002). This is consistent with the idea that retrospective evaluations might instead reflect women's positive or negative experiences during pregnancy, birth, and motherhood. Trussell and colleagues' (Trussell, Vaughan, and Stanford 1999) discovery that contraceptive failures were not always reported as undesired pregnancies in the National Survey of Family Growth is

consistent with the idea that women who were trying to prevent conception, but who had reacted positively to pregnancy or motherhood, remembered themselves as having wanted to conceive.

Although retrospective measurement strategies like the NSFG's *ask* women to recall their pre-conception desire for pregnancy, this task is cognitively difficult if feelings about the pregnancy have changed. Schacter (1999) calls this phenomenon *consistency bias*—people tend to believe that how they feel *now* is how they have *always* felt. Women who are currently happy about their pregnancies are more likely to remember themselves as having wanted to get pregnant before they conceived, and women who are currently unhappy about their pregnancies are more likely to remember themselves and having not wanted to get pregnant before they conceived. Thus, we hypothesize that:

H1a: Women with prospectively undesired pregnancies who react happily to those pregnancies will be more likely than women who react unhappily to shift positive in their retrospective evaluation of whether their pregnancy was desired before conception.

And, correspondingly:

H1b: Women with prospectively desired pregnancies who react unhappily to their pregnancies will be more likely than women who react happily to shift negative in their retrospective evaluation of whether that pregnancy was desired before conception.

The Importance of Partners

Many of the models used to predict pregnancy and related behaviors share the assumption that it follows from a reasoned process in which individuals consider their options,

evaluate potential consequences, and decide which actions to take (Coale 1972; Fishbein, Ajzen, and Reading 1975; Johnson-Hanks et al. 2011; Miller 1994; Ronis 1992). The notion that individuals are more likely to perform behaviors that they feel positive toward and intend to pursue has a great deal of intuitive appeal. However, by definition, undesired pregnancies do not result from the desire to become pregnant.

Some undesired pregnancies can be attributed to structural factors that inhibit women from successfully controlling their fertility, such as lack of access to contraception (Bongaarts 1978; Miller et al. 2010). In addition to structural factors, according to many widely used demographic models of fertility—the cognitive-social model of fertility intention (Bachrach and Morgan 2013), the theory of reasoned action (Fishbein, Ajzen, and Reading 1975), and Warren Miller’s traits-desires-intentions-behavior (TDIB) framework (Miller 1994)—desire for future fertility is deeply embedded in young women’s social contexts.

The TDIB framework focuses on the influence of the sexual partner on reproductive motivations and behaviors (e.g., Miller, Severy, & Pasta, 2004). The framework posits that partners’ desires shape the translation (or not) of women’s own desire into subsequent intentions and behavior. Indeed, in addition to research by the TDIB’s authors (Miller, Barber, & Schulz, 2017; Miller & Pasta, 1995), foundational research using the National Survey of Families and Households demonstrated that a husband’s childbearing desire predicted his wife’s subsequent intention and birth, net of the wife’s own desire and intention (Thomson 1997). Thus, ample reason exists to believe that partners’ pregnancy desire affects women’s feelings and behaviors related to pregnancy.

Other researchers have reported related associations across study populations. One longitudinal study of Latino adolescents found that a young woman’s perception that her partner

wanted a pregnancy was a powerful predictor of subsequent pregnancy, regardless of her own desire to be pregnant (Rocca et al. 2010). Perceiving that a partner would be very upset about a pregnancy was a strong determinant of prospectively measured unhappiness about a potential pregnancy among adult Latina women (Aiken and Potter 2013). Edin and Kefalas (2005) demonstrated the powerful effect of a boyfriend saying, “I want to have a baby by you” on inconsistent contraceptive use among young, poor, urban women. And in a cross-sectional study of adolescents, the perceived attitude of a boyfriend was the only significant predictor of whether a girl wanted to get pregnant (Cowley and Farley 2001).

Existing research has also uncovered a great deal of discordance in pregnancy desire or intention within couples, at least cross-sectionally. In a study of Mexican-American couples in the Early Childhood Longitudinal Study-Birth Cohort (ECLS-B), Cabrera and colleagues (Cabrera et al. 2009) found only 58% agreement about pregnancy intentions between partners. In their study of Latino adolescents, Rocca et al. (2010) found that young men and young women alike rated their partners as more desirous of pregnancy than themselves. Miller and Pasta (Miller & Pasta, 2002) found only 65% agreement in committed couples’ desire to avoid pregnancy.

Given the strong association between partners’ pregnancy desire and women’s own pregnancy desire, women’s perceptions of their partners’ pregnancy desire and their continuing interactions with partners could potentially have a large influence on women’s *evolving* feelings about pregnancy. Thus, we additionally posit an *ongoing* influence—partners’ desires and interactions with partners as continually shaping women’s own evolving feelings about pregnancy, both before and after conception.

Because these studies tend to focus on a specific type of couple (e.g., cohabiting or

married, dating adolescents), they have not explored how different types of intimate relationships contribute to feelings about pregnancy. However, given that parenting is easier with a partner participating in child-rearing, it is likely that the seriousness of the relationship that produced the pregnancy would affect each partner's reaction to it.

Thus, we hypothesize that the probability of a positive shift in pregnancy desire will be higher (and the probability of a negative shift will be correspondingly lower) among women

H2: who prospectively perceived that their partner desired pregnancy, relative to those who perceived that their partner did not desire pregnancy.

In addition, regardless of whether they prospectively perceived their partner as wanting a pregnancy, we hypothesize that the probability of a positive shift in pregnancy desire will be higher (and the probability of a negative shift will be correspondingly lower) for women

H3: who were in serious intimate relationships with their partners, relative to those who were in less serious relationships; and

H4: whose partners reacted positively to news of the pregnancy, relative to those whose partners reacted less positively.

Data and Methods

Study Design

The Relationship Dynamics and Social Life (RDSL) study was based on a simple random sample of the population of young women, ages 18–19 years, residing in Genesee County, Michigan.

The sample of 1,003 young women was drawn from driver's license and personal ID card records. A 60-minute face-to-face baseline survey interview was conducted between March 2008 and July 2009 to assess sociodemographic characteristics, attitudes, and early experiences related

to pregnancy. The response rate was 84% of the randomly sampled individuals. (Among the sampled women who could be located, 94% agreed to participate). At the conclusion of the baseline interview, respondents were invited to participate in a 2.5-year follow-up study with weekly online or telephone surveys assessing intimate relationships, contraceptive use, pregnancy desire, and pregnancy experiences.

Respondents received a \$5 bill in an advance letter and received an additional \$30 to participate in the baseline interview. Additional incentives were given to participate in the weekly surveys: \$5 per interview for the first 4 weeks, and afterwards \$1 per interview with \$5 bonuses for on-time completion of five interviews in a row.

In all, 992 of the baseline interview respondents (99%) agreed to participate in the follow-up study, and 953 (96%) of those respondents completed at least one survey after the baseline interview. 84% remained in the study for at least 6 months, 79% continued for at least 12 months, and 75% continued for at least 18 months (Barber et al. 2016). The follow-up study concluded in January 2012 and yielded 58,594 weekly interviews. The study participants reported 233 pregnancies in total during the study period. However, 4 (1.7%) of the 233 pregnancies were already ongoing at the time of the baseline interview, and those women were not asked about their prospective desire for those pregnancies before they were conceived. We do not use those pregnancies in any of our analyses, resulting in a total of 229 eligible pregnancies.

Missing Data and Analytic Sample

Interviews completed up to 14 days after the prior interview referred to changes since the prior interview, but at 14 days the reference period was adjusted to solely the week before,

causing a period of missing data. 91% of interviews were completed before 14 days elapsed, and thus have no period of missing data. RDSL asked about all pregnancies (not just those discovered in the past 14 days), and thus only those pregnancies that began *and* ended between interviews were missed. Prospective measures of pregnancy desire refer to the upcoming month, and thus there is only missing data if the gap between interviews is greater than 30 days. The modal number of days between interviews was 8, and the median was 7 (not shown in tables).

Five (2%) of the 229 pregnancies were missing data on the dependent variable; the women never provided retrospective recollections of their pre-conception pregnancy desire after reporting those pregnancies. There is no missing data in the measures of women's reaction to their pregnancy or their prospective desire for pregnancy. However, three (1%) pregnancies could not be linked with a father. Eighteen (8%) additional pregnancies were missing some information about the father: six are missing data on the woman's perception of her partner's prospective desire for a potential pregnancy and twelve are missing data on his reaction to the actual pregnancy. We estimate our main models on the remaining 203 pregnancies, which were conceived by 175 women (147 had one pregnancy and 28 had two pregnancies). We also conducted two sensitivity analyses including the 18 pregnancies that could be linked to a father but are missing data on his prospective desire or reaction to the pregnancy. They are described in the Results section. Information about missing data for all other measures is described below.

Measures

Pregnancy

In each weekly survey, respondents were asked, "Do you think there might be a chance that you are pregnant right now?" Respondents who answered "yes" were asked, "Has a

pregnancy test indicated that you are pregnant?” Respondents who answered “yes” to the question about the pregnancy test are coded as pregnant.

Prospectively Measured Pregnancy Desires

In each weekly survey, non-pregnant respondents were asked, “How much do you want to get pregnant during the next month?” They were given response options of 0 through 5, with 0 labeled “not at all want” and 5 labeled “really want.” They were asked a parallel question about how much their current intimate partner wanted them to get pregnant, “How much do you think ___ wants you to get pregnant during the next month?” with the same response options.⁴

We use responses to these questions from the interview prior to the estimated week the pregnancy was conceived. (The estimated week of conception is based on when the pregnancy was reported, the due date {which was updated during the weekly interviews}, the weeks in which the woman had sex with the father, and/or the birth date {if during the study period}).

Seven respondents were not asked these questions in the interview prior to conception because they already thought they were pregnant (two respondents), or they *might* be pregnant (five respondents). For three of those respondents, we use the interview before they suspected or thought they were pregnant. The other four respondents likely conceived their pregnancy shortly before their first interview; in these cases, because they could not have yet known they were pregnant, we use prospective desire at the first interview.

⁴ Women were also asked a separate question about how much they wanted to avoid pregnancy, “How much do you want to *avoid* getting pregnant during the next month, with response options from 0 (not at all) through 5 (really want to avoid), and the parallel question about their partner. Because the prospective and retrospective measures of desire *for* pregnancy match well and the prospective question about desire to avoid pregnancy does not have a parallel retrospective measure, we do not use the prospective measure of desire to avoid pregnancy in these analyses. However, previous research demonstrates that desire for pregnancy and desire to avoid pregnancy are highly correlated and are associated with the same individual-level predictors (Weitzman et al. 2017).

Retrospectively Measured Pregnancy Desire

Retrospective recollection of pre-conception pregnancy desire is coded 1 for desired and 0 for undesired. The measure is constructed from two questions asked during the interview when respondents first reported their pregnancy, based on the measure in the NSFG. It is coded as depicted in Figure 3.

Pre- to Post-Conception Change in Pregnancy Desire

Our dependent variable is the difference between a pregnant woman's prospective desire for a potential pregnancy and her retrospective recollection of that pre-conception desire. To facilitate comparison of these two measures, we recode the prospective measure into two categories: desired and undesired. Past research demonstrates that any non-zero prospective desire for pregnancy is a strong predictor of subsequent pregnancy (Miller, Barber, and Gatny 2013), so we code zero as undesired and anything other than zero (1 to 5) as desired.⁵

Because the dependent variable is based on dichotomous measures, women who were prospectively positive cannot shift in a positive direction, and women who were prospectively negative cannot shift in a negative direction. For this reason, we code the measure of change as follows: Prospectively undesired pregnancies are coded as either (a) stably undesired or (b) positive shift (undesired → desired), and prospectively desired pregnancies are coded as either (a) stably desired or (b) negative shift (desired → undesired). As a result, we cannot directly include prospective pregnancy desire as a covariate in our models. Thus, we present all models

⁵ As a sensitivity analysis, we re-estimated our models using a measure where the bottom half of the responses (0, 1, 2) are coded undesired and the top half (3, 4, 5) are coded desired. Coefficients and p-values were similar and did not change our interpretation. For parsimony, we present only the models using the zero vs. non-zero measure.

stratified by whether the pregnancy was prospectively undesired ($n = 148$ pregnancies) or desired ($n = 55$ pregnancies).

Reactions to the Pregnancy

The *woman's happiness about her pregnancy* is measured retrospectively with the following question: "If on a scale of one to ten, a 1 means that you were very unhappy to be pregnant and a 10 means that you were very happy to be pregnant, tell me which number on the scale best describes how you felt when you found out you were pregnant." The question was asked in the interview in which she reported her pregnancy. Because the distribution among the response categories is sparse for our small sample, to maximize variance we dichotomize this measure; it is coded 1 for a reaction to the pregnancy that is above the median (> 6) and 0 otherwise.⁶ The point-biserial correlation between the continuous and dichotomous measure is .86 (see Appendix Table 1).

In the interview when the respondent first reported that she had told her partner about the pregnancy, which sometimes corresponded to when she reported the pregnancy and sometimes came later, she was asked to recall her *partner's reaction to the pregnancy*: "How did [partner name] react to you getting pregnant?" Response options were 0 (not at all positive) through 5 (extremely positive). Because the distribution among the response categories is sparse for our small sample, and the measure is highly skewed positive (44% responded with a "5"), we dichotomize this measure; it is coded 1 for a reaction to the pregnancy that is above the median

⁶ As a sensitivity analysis, we re-estimated our models using the mid-point of the response options (1-5 vs. 6-10) to dichotomize responses. Coefficients and p-values were similar and did not change our interpretation; for parsimony, we present only the models using the median-divided measure.

(> 3) and 0 otherwise.⁷ The point-biserial correlation between the continuous and dichotomous measures is .84 (see Appendix Table 1).

Seriousness of the Relationship at Conception

In each interview, respondents were asked a series of questions to ascertain whether they had an intimate partner *of any kind* during the prior week. These partners ranged from spouse, fiancé, cohabiter, or romantic partner, to someone with whom the respondent had physical and/or emotional contact (“such as kissing, dating, spending time together, sex, or other activities”). Very rarely (<1% of weeks), respondents reported having more than one partner during the prior week; in this case, they identified the most important or most serious each week.

Relationship Type. If they identified a partner, respondents were asked a series of questions about their relationship with that partner, including whether they were engaged or married. We use a dichotomous indicator of whether the couple was married or engaged at the time of conception.⁸ There is no missing data on this measure.

Duration. Each week, respondents were asked if their partner was the same as the prior week’s partner. If not, they were asked whether they had ever mentioned the partner before. If the partner differed from the prior week, but was previously mentioned, they chose from a list of names or initials to identify that partner. Thus, RDSL has a continuous record of the relationship with each unique partner during the study period, regardless of whether the relationship was

⁷ We attempted to run a sensitivity analysis with a measure using the mid-point of the response options (0-2 vs. 3-5) to dichotomize responses. There were fewer than ten cases in the bottom half of the response options; the model would not converge.

⁸ A sensitivity analysis instead used a four-category variable: married/engaged, cohabiting, exclusive dating, and other; only married/engaged differed from the other categories. Women were also asked whether they would marry their partner if they got pregnant in the upcoming month. Another sensitivity analysis instead used a three-category variable: (1) married or engaged, (2) not married/engaged but would marry the partner if pregnant, or (3) not married/engaged and would not marry the partner. The second and third categories were not statistically different from each other in any model. We present only the models including the dichotomous indicator.

continuous or involved break-ups. Respondents who were in an ongoing relationship at the baseline interview were asked the date the relationship began. We compute total duration (in months) with the father of the pregnancy by summing the number of days since he was first identified, dividing that sum by 365, and multiplying by 12. There is no missing data for this variable in the 221 pregnancies that can be linked to a father.

Control Variables

Undesired pregnancy rates differ by race and level of socioeconomic disadvantage, and these factors also affect intimate relationship experiences (Finer and Zolna 2016; Kusunoki et al. 2016). Therefore, we include the following control variables in our models.

In response to the question, “Which of the following groups describe your racial background? Please select one or more groups: American Indian or Alaska Native, Asian, Native Hawaiian or Other Pacific Islander, Black or African American, or White.” A preceding question about Hispanic ethnicity yielded 80 Latinas, who were coded according to their answer to the race question, with 28 selecting African American. Because only seven respondents reported another race, we combined this group with white women, matching other published research using the RDSL dataset (Barber, Yarger, and Gatny 2015; Hayford et al. 2016; Kusunoki et al. 2016). Our measure is coded 1 for *African Americans* and 0 for other groups. There is no missing data for this measure. (Two respondents did not select a race category; interviewers identified both as white. For these two cases, we use the interviewer’s perception of race.)

We use one dichotomous indicator of childhood disadvantage: biological mother did not graduate from high school. Four percent of cases were missing this information; they are coded at the mode, 0. We also include an indicator of whether the respondent ever had a pregnancy

before the current conception. Less than 1% of cases were missing data for this variable; they are coded at the mode, 0. Other indicators of childhood disadvantage and adolescent experiences with sex were not statistically significant in any models. For parsimony, we do not include them.

Analytic Strategy

We first present descriptive statistics to describe the analytic sample of women who got pregnant. Next, we describe young women's feelings about their pregnancies and present crosstabulations comparing the prospective and retrospective measures of pre-conception desire. We then describe their perceptions of their partners' prospective pregnancy desires and reactions to their pregnancies. Finally, we present unadjusted and adjusted logistic regression models ("logit" in Stata) predicting prospective-retrospective change over time in pre-conception desire for the same pregnancy. We adjust for the clustering of pregnancies within women using the "cluster" option in Stata. We begin with the unadjusted models so that we can compare those coefficients to the models that adjust for other independent variables, and also conduct formal mediation analyses ("ldecomp" in Stata) to test whether the decrease in coefficients across columns represents a statistically significant indirect effect.

Results

Table 1 presents descriptive statistics for the measures used in our analyses of the 203 pregnancies. In all, 32% of the women were married or engaged when they got pregnant. On average, their relationships had been ongoing for slightly over 16 months (1.34 years) at the time of conception. The relationships that led to pregnancy were more serious – more likely to be engaged/married, and longer-lasting – on average than RDSL women's relationships in general

(Barber et al. 2017). The non-pregnancy relationships lasted an average of 8.15 months and only 7% were marriages or engagements (Barber et al. 2017)

In all, 39% of the 203 pregnancies were conceived by African-American women and 12% by women whose mothers had less than a high school education. More than half of the pregnancies were preceded by a past pregnancy.

Other published research compared the RDSL sample to the nationally representative sample of the National Survey of Family Growth (Ela and Budnick 2017). African-American women are overrepresented in the RDSL sample (34%) compared to the U.S. population (16%). Correspondingly, compared to the NSFG, a higher proportion of RDSL women experienced teen pregnancy (26% vs. 19%).

[Table 1]

Table 2 shows that the pregnant women in the sample had low desire for their pregnancies, regardless of whether it is measured prospectively or retrospectively. The mean prospective desire for a future pregnancy was only .93 on a 0 to 5 scale. Only 27% of women had non-zero prospective desire for pregnancy before they conceived. If we re-code pregnancies as prospectively desired if women responded at the top half of the scale (3, 4, 5) rather than anything but zero, that decreases to 20%.

Women retrospectively remembered 82% of their pregnancies as undesired before conception and 18% remembered their pregnancies as desired. This is slightly higher than the national prevalence of undesired pregnancy (measured with this same question) – 76% of pregnancies to women ages 15-19, and 59% of pregnancies to women ages 20-24 (Finer and Zolna 2016) – but this is not surprising because of the RDSL's larger proportion of African-American women than the national population and the higher fraction of their pregnancies that

are retrospectively undesired (Finer and Zolna 2016).

On average, pregnant women rated their happiness about their pregnancy as 6.11 (on a 10-point scale), with 56% of women above the mid-point of the response options, and 49% of women above the median response.

[Table 2]

To assess the amount of stability and change between the prospective and retrospective measures of pre-conception pregnancy desire, Figure 4 summarizes the cross-tabulation of retrospective recollections of pre-conception pregnancy desire with prospective pregnancy desire for the 203 pregnancies in the sample. (The full cross-tabulation is presented in Appendix Table 2.) We focus first on stability and change relative to prospective reports in Panel A. In the prospectively undesired group, which represents 73% of pregnancies, 89% ($\frac{132}{148}$) of pregnancies were stably undesired – women also retrospectively remembered those pregnancies as being undesired.

[Figure 4]

There is less stability for pregnancies that were prospectively desired – only about two-fifths ($38\%; \frac{21}{55}$) were stably desired (p -value for two-tailed t -test $< .001$). Note that this fraction is higher for women whose pregnancies were more strongly desired (not shown): when prospective desire was 4 or 5 on the 0 to 5 scale, 56% and 59% of women remembered those pregnancies as desired, respectively. Further, this group represents only 27% ($\frac{55}{203}$) of pregnancies, so overall there is still a relatively high level of stability – 75% ($\frac{132+21}{203}$).

Overall, despite the substantial level of temporal mismatch, women who were prospectively desirous of a pregnancy were much more likely to retrospectively remember their

pregnancy as desired $\left(38\%; \frac{21}{55}\right)$ than women who were prospectively undesirous of a pregnancy $\left(11\%; \frac{16}{148}\right)$ (p -value for two-tailed t -test $< .001$), and those who were prospectively undesirous were more likely to remember their pregnancy as undesired $\left(89\%; \frac{132}{148}\right)$ than those who were prospectively desirous $\left(62\%; \frac{34}{55}\right)$ (p -value for two-tailed t -test $< .001$).

Looking in the other direction (Panel B), among the women who retrospectively remembered their pregnancies as undesired before conception, 80% $\left(\frac{132}{166}\right)$ had prospectively reported no desire for pregnancy before they conceived, while 20% $\left(\frac{34}{166}\right)$ had reported some desire for pregnancy. Among those who retrospectively remembered their pregnancies as desired before conception, the distribution was more equal – slightly less than half $\left(43\%; \frac{16}{37}\right)$ had prospectively reported no desire for pregnancy, but slightly more than half $\left(57\%; \frac{21}{37}\right)$ had prospectively reported desire for pregnancy. Thus, the reports matched relatively well for the large group ($n = 166$) whose pregnancies were retrospectively undesired, and less well for the smaller group whose pregnancies were retrospectively desired (p -value for two-tailed t -test = .004).

Table 3 describes pregnant women's perceptions of their partners' prospective desire for and reaction to their pregnancies. Overall, before their pregnancies were conceived, young women perceived a moderate desire for pregnancy from their partners: a mean of 1.56 on the 0 to 5 desire for pregnancy scale. More importantly, they prospectively perceived *more* desire from their partners than they felt themselves – they perceived non-zero desire for pregnancy from their partners for 43% of the pregnancies (versus only 27% for themselves), and desire in the top half of the response options in 33% of the pregnancies (versus only 20% for themselves). On average,

women interpreted the reactions of the men who fathered their pregnancies to be positive: 3.76 on a scale from 0 to 5, with 84% above the mid-point of the response options and 64% above the median response.

[Table 3]

Table 4 presents unadjusted (columns 1 and 4) and adjusted (columns 2, 3, 5, and 6) logistic regression models of change between prospectively measured and retrospectively measured desire for the same pregnancy over time. Columns 1 through 3 focus only on the 148 pregnancies that were prospectively undesired. The dependent variable for these pregnancies is a *positive* shift (from undesired to desired) relative to no change (stably undesired). Columns 4 through 6 include only the 55 pregnancies that were prospectively desired, and the dependent variable for the prospectively desired pregnancies is a *negative* shift (from desired to undesired) relative to no change (stably desired). Thus, our hypotheses predict opposite signs on the coefficients in the two sets of models (increased log-odds of a positive shift and correspondingly decreased log-odds of a negative shift).

[Table 4]

Because the RDSL study measures do not correspond exactly to the conceptual model in Figure 2, Figure 5 provides a similar heuristic diagram, but using the measures available in the RDSL study. To facilitate interpretation, the diagram illustrates *undesired* pregnancies, and it is laid out similarly to Figure 2, with four quadrants representing the woman and her partner, and the interviews before and after conception. The dependent variable is indicated by the dashed line between the prospective indicator of pregnancy desire (women does not desire pregnancy) and the retrospective indicator of pre-conception desire (woman remembers undesired pregnancy as desired). However, these concepts are theoretically difficult to disentangle, and given that all

feelings after conception were measured in the same survey interview, they are impossible to empirically disentangle. Note that although our conceptual model hypothesizes many links among these measures, our models are not designed to test all of these associations. The arrows labeled A, B, C, and D in Figure 5 correspond to the significant coefficients in Table 4, and are presented only to guide our discussion of those models, not to indicate a measurement model or path analysis.

[Figure 5]

The unadjusted coefficients in column 1 show that three variables are significantly associated with a positive shift in pregnancy desire: whether the woman felt happy about her pregnancy, whether her partner reacted positively to the pregnancy, and the seriousness of the intimate relationship in which the pregnancy was conceived. In other words, women who were married or engaged to be married, women whose partners reacted positively to their pregnancies, and/or women who felt happy about their pregnancies have higher log-odds of a positive shift – remembering their undesired pregnancies as desired – than women who were neither engaged nor married, who didn't feel happy about their pregnancies, or whose partners did not react positively to their pregnancies. Column 2 shows that the association between being married or engaged and experiencing a positive shift in pregnancy desire is actually stronger once we account for the control variables.⁹

Column 3 shows that women's happiness about their pregnancies is associated with a much higher log-odds of experiencing a positive shift in pregnancy desire. In other words, women who reacted happily to their undesired pregnancies are more likely to remember them as

⁹ This is because women with prior pregnancies are more likely to be married or engaged, but less likely to shift positive. Thus, married/engaged women are surprisingly likely to shift positive once we account for their overrepresentation among women with prior pregnancies.

desired before conception, relative to women who were less happy about their undesired pregnancies (arrow A). This is regardless of whether they were married/engaged or whether their partners reacted positively, or any of the control variables in the model.

Column 3 also shows that the association between the partner's positive reaction to the pregnancy and a positive shift in desire is much smaller once we account for its association with the woman's own reaction to her pregnancy (arrow C) its association with a positive shift in desire (arrow A). A formal mediation test indicates that this represents a significant indirect effect. Being married or engaged at the time of conception is also associated with a positive shift in pregnancy desire regardless of the other variables in the model, and it is partially mediated by its association with the partner's reaction to the pregnancy (arrows B and C).

Column 3 shows that African-American women and those whose mothers did not graduate from high school are more likely to experience a positive shift in pregnancy desire once we account for their less happy reactions to their pregnancies. In other words, African-American women and women whose mothers did not graduate from high school react less happily to their pregnancies, yet are not correspondingly less likely than white women and/or women whose mothers graduated from high school to experience a positive shift in desire.

The models for the 55 pregnancies that were prospectively desired are similar in many ways. Overall, the direction of the coefficients is consistent (i.e., opposite) with the coefficients for undesired pregnancies, and there are some specific coefficients and patterns that are very similar. First, women in serious relationships who desired their pregnancies are less likely to experience a negative shift in pregnancy desire than women in less serious relationships, and this is net of the other factors in the model. Second, women who react happily to their desired pregnancies are less likely to experience a negative shift in pregnancy desire than women who

react less happily. Third, being in a serious relationship when a desired pregnancy is conceived and having a partner who reacts positively to that pregnancy are intertwined. And fourth, women with desired pregnancies whose mothers did not graduate from high school react less happily to their pregnancies but are surprisingly unlikely to experience a negative shift in desire.

However, the coefficients also differ in several ways. First, only one woman with a prospectively desired pregnancy perceived her partner to be undesirous of the pregnancy before it was conceived. Due to this lack of variance, this measure cannot be included in the models, but it suggests that women's own desires and their perceptions of their partners' desires are particularly strongly related in this group. Second, the unadjusted coefficient for whether partners reacted positively to the pregnancy is not a statistically significant predictor of shifting pregnancy desire for prospectively desired pregnancies. However, this is due to the standard error of these estimates, not due to the magnitude of the coefficients themselves, which are actually larger than for undesired pregnancies. And, as in the first set of models, the magnitude of the coefficient decreases dramatically between the first and third columns. Third, for prospectively desired pregnancies, the length of the relationship predicts whether there will be a negative shift in desire, but being married or engaged does not. However, the overall point, that the seriousness of the relationship predicts whether women remain positive about their pregnancies, holds across both models. Fourth, African-American women who prospectively wanted their pregnancies do not significantly differ from white women in their log-odds of experiencing a negative shift in desire, unlike African-American women compared to white women who prospectively did not want their pregnancies, but again the pattern across columns is similar to the pattern for undesired pregnancies.

Sensitivity Analysis

We also conducted a sensitivity analysis with the additional 18 pregnancies missing information about the father's prospective pregnancy desire or reaction to the pregnancy ($n = 221$ pregnancies). For these models, we did not include these variables with missing data. The analyses show the same pattern of results as described above – women who felt happier than most women about their undesired pregnancies were more likely to experience a positive shift in their pregnancy desire, and the coefficient for being married or engaged was smaller in model 3 than in model 2, suggesting mediation.

The results for models 4, 5, and 6 were also similar and did not change our interpretation. Women in long-term relationships were less likely to shift negative than women in shorter-term relationships. However, the unadjusted coefficient for woman's happiness about their pregnancy was in the same direction but smaller, and was only significant at $\alpha = .10$ rather than $\alpha = .05$.

We also re-estimated the models on the same sample, using multiple imputation ("mi" in Stata) to fill values for the father's prospective desire for pregnancy and the father's reaction to the pregnancy, so we could include those variables in the models. These analyses were extremely similar to those presented in Table 4, with all key coefficients of similar magnitude and statistical significance, and key decreases consistent with our mediation interpretation.

Discussion

Our analyses support the following interpretation: Regardless of whether they prospectively desired their pregnancies, women in serious relationships are more likely to shift positive or remain positive – to remember their undesired pregnancy as desired or to remember their desired pregnancy as desired – because their partners react more positively to the

pregnancy, which in turn increases their own happiness about their pregnancy. In other words, this retrospective evaluation of pre-conception pregnancy desire is affected by the social context at the time of conception and by what happens after the pregnancy is conceived.

Clearly, women's reactions to their pregnancies are associated with whether they retrospectively remember their pregnancies as desired, regardless of their prospectively measured pregnancy desire (H1). In fact, in a model pooling all pregnancies but predicting retrospective pregnancy desire rather than change in desire, whether they felt happy about their pregnancy was the strongest predictor, at least as strong as the pregnancy desire they reported before they conceived the pregnancy (not shown in tables; available from authors on request). This is important because, as many others have argued, it suggests that the long-standing measure of "unintended" pregnancy based on the NSFG is not an accurate indicator of whether a pregnancy was undesired before it was conceived. Rather, it also reflects the social context of its conception and the reactions of important other people in young women's lives. This is consistent with calls for using a different indicator of whether pregnancies are acceptable or welcomed. Others have demonstrated that women can be happy about their prospectively undesired pregnancies (Aiken 2015; Aiken and Trussell 2017; Hartnett 2012). We add to this large and growing body of research by suggesting that women's post-conception level of happiness about their pregnancies is likely to bias any attempt to retrospectively measure pre-conception feelings about the pregnancy.

Although net of their own pregnancy desire, women's perception of their partner's prospective desire for pregnancy is not associated with whether their own pregnancy desires shift or remain stable after a pregnancy is conceived (H2), women's and their partners' prospective pregnancy desires are clearly intertwined. Women whose pregnancies were prospectively desired

were very unlikely to have perceived their partners as undesirous before they conceived.

However, RDSL is not well suited to examining how women's pregnancy desires are influenced by their partners' desires; future research should use longitudinal data with direct assessments from both partners to address this important issue.

Pregnant women in serious relationships with the fathers are more likely to shift positive about their undesired pregnancies and are less likely to shift negative about their desired pregnancies, regardless of whether they prospectively desired their pregnancies (H3). Although this appears to be in part because those fathers react more positively to undesired pregnancies, it is also net of those reactions. Clearly, the intimate relationship in which a pregnancy is conceived is an important determinant of how the mothers and fathers feel about it. Further research should investigate the qualitative differences in more versus less serious relationships that explain their link to parents' feelings about their pregnancies.

Finally, the reason that pregnant women whose partners react positively to their pregnancies are more likely to shift positive and less likely to shift negative than women whose partners react less positively appears to be that partners' reactions affect women's own happiness about their pregnancies, which in turn affects their ability to accurately recall their pre-conception pregnancy desire. This supports our hypothesis about temporal consistency bias – it is cognitively difficult for women who are currently happy about their pregnancies to remember them as being undesired before they were conceived. RDSL did not ask women how other important people in their lives reacted to the news of their pregnancy, but they are likely to be important determinants of women's current feelings about their pregnancies, and thus their ability to accurately recall pre-conception feelings, as well. Other research should investigate the role of important others' reactions.

Limitations

Pregnancies reported during (and before) the RDSL study are likely to be an undercount because women are unlikely to report pregnancies that they aborted or plan to abort (Groves et al. 2013; Lindberg and Scott 2018). This underreporting has two likely effects on our analysis: a positively biased distribution of pregnancy desire (aborted pregnancies are likely to be undesired), and an overestimate of the extent to which women shift their feelings in a positive direction after conception or corresponding underestimate in negative shifting. If a past abortion is associated with increased propensity for a negative shift or decreased propensity for a positive shift in desire, then our models may overestimate the associations in our models because we have under-controlled for that unobserved heterogeneity. On the other hand, if the associations are stronger for unreported pregnancies that were aborted than for those that were not aborted, then our models may provide a conservative test of these associations.

Unfortunately, the RDSL study did not interview the fathers of the pregnancies that occurred during the study period. Thus, our models rely on women's perceptions of their intimate partners' pre-conception desire for a potential pregnancy and reactions to an actual pregnancy. We recognize that women's own feelings likely play a role in how they perceive their partners' feelings. We hope that our models will spur future research that measures pre- and post-conception feelings about pregnancies among both partners.

The RDSL sample itself also has important limitations that we hope will encourage further research. The narrow geographic focus (a single county in Michigan) of the RDSL study is notable. However, this focus also minimizes geographic variance in factors that are outside the current analysis (e.g., labor markets, educational opportunities). In addition, although the sample

is not nationally representative, Michigan falls around the national median in measures of cohabitation, marriage, age at first birth, completed family size, non-marital childbearing, and teenage childbearing (Lesthaeghe and Neidert 2006). We do not suggest that the RDSL study is nationally representative; it is not. However, it is also not an outlier with regard to the family formation behaviors we are analyzing.

Although the RDSL study randomly sampled 1,003 young women, this group had only 233 pregnancies during the 2.5-year study period. Either a larger sample of women or a longer period of follow-up will be required to generate a larger random population-based sample of pregnancies with information before and after conception. To make either of these approaches financially feasible, a “shared sampling” approach might be fruitful. For example, The National Social Life, Health, and Aging Project (NSHAP) sample was selected from the Health and Retirement Study’s (HRS) nationally representative household screening – HRS only sampled respondents who were ages 51-56, while NSHAP’s sample consisted of older adults ages 57 to 85. Or, existing large-scale studies, particularly those that are cross-sectional and no longer require respondent cooperation (e.g., the NSFG or the General Social Survey), could release contact information for follow-up studies of a select sample of respondents who agreed and meet some specific criteria.

The problem of the relatively small sample is exacerbated in the analysis of sub-group differences, such as those between pregnant African-American and white women. Although 79 of the 203 (39%) pregnancies in our analytic sample occurred among African-American women, this number of pregnancies is small for models that include multiple covariates. We hope that these analyses spur further research on the important race differences in these processes.

The relatively small sample of pregnancies used in these analyses results in a higher

probability of error (in terms of magnitude or sign) than estimates using larger samples (Gelman and Carlin 2014). Although we do not directly interpret the magnitude of our coefficients, our mediation models rely on the magnitude of the change in those coefficients. Our interpretations rely heavily on the sign of the coefficients. If the mediation tests are incorrect, or the sign of any coefficient is incorrect, it would change our overall conclusions.

Another key weakness of the RDSL sample is that the women are young – ages 18 and 19. Given the different nature of undesired pregnancy among older women (e.g., lower rates, unwanted rather than mistimed pregnancies), coupled with age differences in intimate relationships (e.g., higher proportion of older women are married), the role of the intimate relationship context in women’s feelings about their pregnancies is likely to be quite different among older women. We focus on young women for the same reason the RDSL focused on young women – the high rates of unintended pregnancy at these ages, and the density of important decisions during this period of the life course. Future research should investigate these processes among older women.

Finally, another aspect of the RDSL’s study design is crucially important in interpreting our results: women were asked to retrospectively report their pre-conception desire for pregnancy very soon after they conceived. This may affect our conclusions in two ways. First, although women have had relatively few post-conception experiences that could affect their memory of their feelings before conception, others’ reactions to their pregnancies may be especially prominent in their minds at this point. It could be that women’s feelings “settle in” after a longer period of being pregnant, and partners’ reactions become less prominent determinants of their own feelings. Second, the opposite process could be at work – partners’ reactions to women’s pregnancies may be cumulatively more important over time. Because the

RDSL only retrospectively assessed these pre-conception feelings during the interview in which women first reported their pregnancies, future research should address these longer-term processes.

Conclusions

Picture a young woman in a non-marital relationship whose partner told her, “I want to have a baby with you,” but did not mean it literally. Thinking her partner wanted her pregnant, however, she is surprised by his negative reaction when a pregnancy occurs. She may quickly come to feel that the pregnancy was a mistake and be unable to recall wanting to be pregnant. In other words, retrospective recollections of pre-conception desires are dependent on the social context in which the pregnancy occurred – including the intimate relationship at the time of conception – and on events occurring after the conception – including the partner’s (and likely others’) reaction to news of the pregnancy. Considering how strongly women’s retrospective recollections of their pre-conception desire are predicted by their and their partners’ post-conception reactions to the pregnancy, our typical measure of unintended pregnancy, assessed after conception or even after birth, is an inaccurate indicator of pre-conception desire for pregnancy.

The extent to which post-conception feelings about pregnancy are reliant on the social context in which those pregnancies play out suggests that retrospective measures probably better capture the emotional environments into which young pregnancies are born than the emotional environments before they were conceived. If the goal is to identify pregnancies with a high risk of negative maternal and child outcomes, why not ask about women’s and their partner’s feelings about the pregnancy *after* it was conceived, or even after it is born (Blake et al. 2007; Waller and

Bitler 2008)? After all, 62% of young women who wanted a pregnancy shifted negative before their baby was born. Given how rapidly intimate relationships and material circumstances change at these ages (Barber et al. 2017; Burton and Tucker 2009), some women were likely responding to those changes when they remembered a prospectively desired pregnancy as undesired. This is consistent with recent calls for replacing the long-standing measure of pregnancy “intendedness” with “supportability,” an assessment that incorporates dynamic micro-level (e.g., partner, family, school, health care) and macro-level (e.g., religion, culture, policy) support in determining which pregnancies are at high risk for negative outcomes (Macleod 2016). It is also consistent with growing calls for measuring whether pregnancies are “acceptable” or “welcomed” (Aiken et al. 2016; Gomez et al. 2018; Gómez et al. 2019). And it is consistent with recent calls for better ways to identify pregnancies that may present challenges for infant and maternal health and well-being (Kost and Zolna 2019).

On the other hand, if the goal is to help women get what they want in terms of childbearing, or to understand whether women got what they wanted in terms of childbearing, then it is important to understand that retrospective assessments of their pre-conception desires (and likely their intentions) are biased by their subsequent experiences. Thus, although some women will adjust to something they did not want – 11% of women with an undesired pregnancy remembered it being desired – asking them retrospectively does not provide an accurate indication of whether they got what they wanted. Controlling one’s own reproductive behavior is a human right, and exploring whether and how some women achieve that control and others do not should be a high priority topic for researchers and policy-makers.

The two groups of women in our analyses require different policy approaches to helping them get what they want in terms of childbearing. First, consider young women who do not want

a pregnancy – 78% of the pregnant women who were prospectively undesirous also perceived their partners as undesirous (not shown in tables), they perceived their partners reactions to the pregnancy as negative (Appendix Table 1), they were less happy themselves (Appendix Table 1), and the vast majority of them (89%) remembered not wanting to become pregnant before they conceived (Figure 4 Panel A). Although these women were much less likely to get pregnant than women who prospectively wanted a pregnancy, they are such a large group that they represent 73% of the pregnancies. This is a group that should be targeted for improved contraceptive use.

Second, consider young women who want a pregnancy – nearly all ($98\%; \frac{54}{55}$) of the pregnant women who prospectively wanted their pregnancy also perceived that their partner wanted a pregnancy (not shown in tables). But after conceiving, nearly two-thirds ($62\%; \frac{34}{55}$) of them remembered their pregnancies as having been undesired (Figure 5 Panel A). One-quarter ($\frac{22}{87}$) of the fathers who women perceived as desirous reacted negatively to the pregnancy (not shown in tables), and when the fathers reacted negatively, the vast majority ($82\%; \frac{60}{74}$) of women were unhappy about their pregnancy (not shown in tables). This group is unlikely to benefit from interventions that attempt to increase contraceptive use – they want a pregnancy and they think their partner wants a pregnancy. However, for many of these women, it did not turn out like they hoped it would. Although some women will subsequently find the social support they need to successfully raise their children, some will not (Biggs et al. 2017). Access to abortion is crucial for women in this group who do not want to have a baby.

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Table 1 Descriptive Statistics for Measures Used in the Analyses

Measure	n = 203 pregnancies			
	Mean	Std. Dev.	Min.	Max.
Seriousness of the Relationship at Conception				
Married or engaged	.32		0	1
Total Duration (in exact months)	16.11	18.37	0	75.70
Control Variables				
African American	.39		0	1
Mother's education less than high school graduate	.12		0	1
Any prior pregnancy	.51		0	1

Table 2 Descriptive Statistics for Measures of Young Women's Feelings about Pregnancy (n = 203 pregnancies)

Measure	Mean	Std. Dev.	Min.	Max.
Prospective Desire for Pregnancy				
Desire for pregnancy (0 = not at all; 5 = very much)	.93	1.68	0	5
Any desire for pregnancy (0 = no; 1 = yes)	.27		0	1
Desire for pregnancy in top half of response options	.20		0	1
Retrospective Recollection of Pre-Conception Pregnancy Desire				
Undesired	.82		0	1
Desired	.18		0	1
Reaction to the Pregnancy				
Happiness about the pregnancy (0 = very unhappy; 10 = very happy)	6.11	3.12	1	10
Happiness about pregnancy above midpoint of response options	.56		0	1
Felt happier than most women about the pregnancy (0 = below median; 1 = above median)	.49		0	1

Table 3 Descriptive Statistics for Measures of Partner's Feelings about Pregnancy (n = 203 pregnancies)

Measure	Mean	Std. Dev.	Min.	Max.
Partner's Prospective Desire for Pregnancy (woman's perception)				
Desire for pregnancy	1.56	2.01	0	5
Any desire for pregnancy	.43			
Desire for pregnancy in top half of response options	.33			
Partner's Reaction to Pregnancy (woman's perception)				
Reaction to the pregnancy (0 = not at all positive; 5 = extremely positive)	3.76	1.51	0	5
Reaction to the pregnancy in top half of response options	.84			
Reacted more positively to the pregnancy than most partners (0 = below median; 1 = above median)	.64		0	1

Table 4 Logistic Regression Models of the Log-Odds of Prospectively Measured → Retrospectively Measured Shift in Pre-Conception Desire for Pregnancy (coefficients; standard errors in parentheses)

	Prospectively Undesired Pregnancies (n = 148)			Prospectively Desired Pregnancies (n = 55)		
	Positive Shift (Prospectively Undesired → Retrospectively Desired) vs. Stable Undesired			Negative Shift (Prospectively Desired → Retrospectively Undesired) vs. Stable Desired		
	unadjusted 1	adjusted 2	adjusted 3	unadjusted 4	adjusted 5	adjusted 6
Reactions to Actual Pregnancy						
Woman felt happier than most women about their pregnancies	3.37 ** (1.06)		4.25 ** (1.58)	-1.89 * (.83)		-1.73 (1.12)
Partner reacted more positively to pregnancy than most partners (woman's perception)	1.28 * (.59)		0.24 † (.66)	-2.12 (1.11)		-0.36 (1.26)
Seriousness of the relationship at the time of conception						
Married or engaged	1.27 * (.55)	1.42 * (.47)	1.39 *‡ (.68)	-0.84 (.58)	-0.43 (.67)	-0.24 (.68)
Total duration (in exact months)	0.01 (.02)	-0.0004 (.02)	-0.002 (.02)	-0.06 ** (.02)	-0.06 * (.03)	-0.06 * (.02)
Partner's Prospective Desire for Pregnancy						
Partner had any desire for pregnancy (woman's perception)	-0.76 (.80)	-0.71 (.83)	-0.84 (.92)	a	a	a
Control Variables						
African American	0.49 (.60)	0.98 (.62)	1.65 * (.78)	-0.19 (.68)	-1.35 (.74)	-1.56 (.95)
Woman's mother's education less than high school graduate	1.03 (.75)	1.05 (.86)	2.60 * (1.06)	-1.61 (.90)	-1.93 * (.91)	-2.40 * (1.03)
Any prior pregnancy	-0.40 (.59)	-0.80 (.61)	-1.32 (.77)	-0.33 (.56)	-0.56 (.72)	-0.58 (.83)
Constant		-2.76	-6.29		2.85	4.40
pseudo-R ²		0.12	0.38		0.23	0.29

Notes:

The 148 prospectively undesired pregnancies were conceived by 129 women (110 women had 1 pregnancy; 19 women had 2 pregnancies each). The 55 prospectively desired pregnancies were conceived by 53 women (51 women had 1 pregnancy; 2 women had 2 pregnancies each). Seven women who had one undesired and one desired pregnancy are in both groups.

^a Of the 55 pregnancies that were prospectively desired, only 1 perceived her partner as *not* wanting her to become pregnant; that pregnancy was retrospectively undesired. Thus, there are zero pregnancies where the woman prospectively desired the pregnancy, she perceived her partner as undesiring of her becoming pregnant, and she retrospectively remembered the pregnancy as desired.

* p < .05; ** p < .01; *** p < .001; two-tailed t-tests.

† Coefficient is mediated (between columns 1 and 3) by woman's own reaction to the pregnancy (p < .05).

‡ Coefficient is mediated (between columns 2 and 3) by partner's reaction to the pregnancy (p < .10).

Figure 1 Strategies for Measuring Pregnancy Desire

		Timing of Question	
		Prospective (Before Conception)	Retrospective (After Conception)
Time Referent for the Pregnancy	Potential Pregnancy (Before Conception)	(1) e.g., How much <i>do</i> you want to get pregnant <i>in the future</i> ?	(2) e.g., How much <i>did</i> you want to get pregnant, <i>before you got pregnant</i> ?
	Actual Pregnancy (After Conception)	(3) e.g., How <i>would</i> you react <i>if you get pregnant</i> ?	(4) e.g., How <i>did</i> you react <i>when you found out</i> you were pregnant?

Figure 2 Conceptual Model of Feelings about Pregnancy

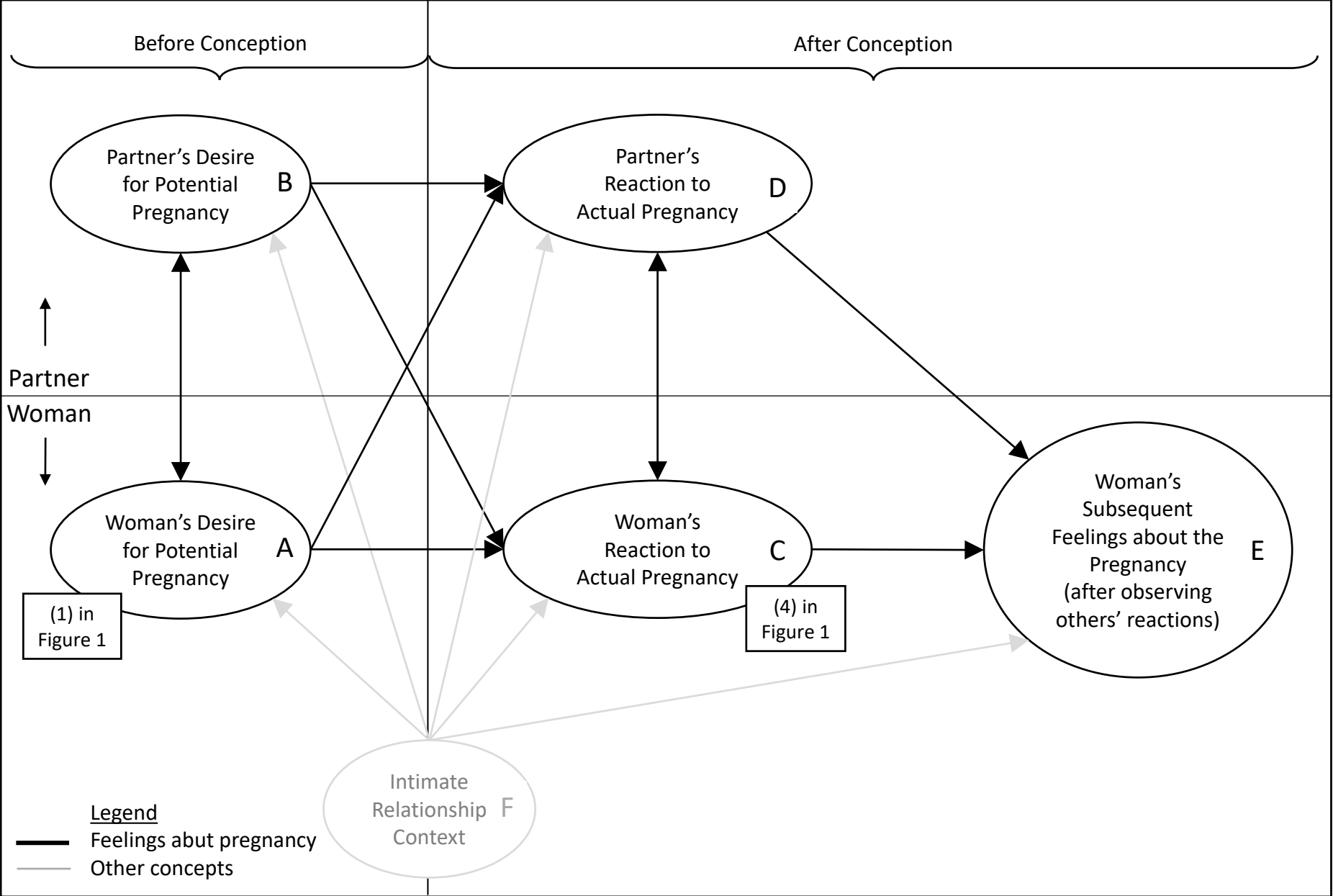


Figure 3 Coding of Retrospective Recollection of Pre-Conception Pregnancy Desire

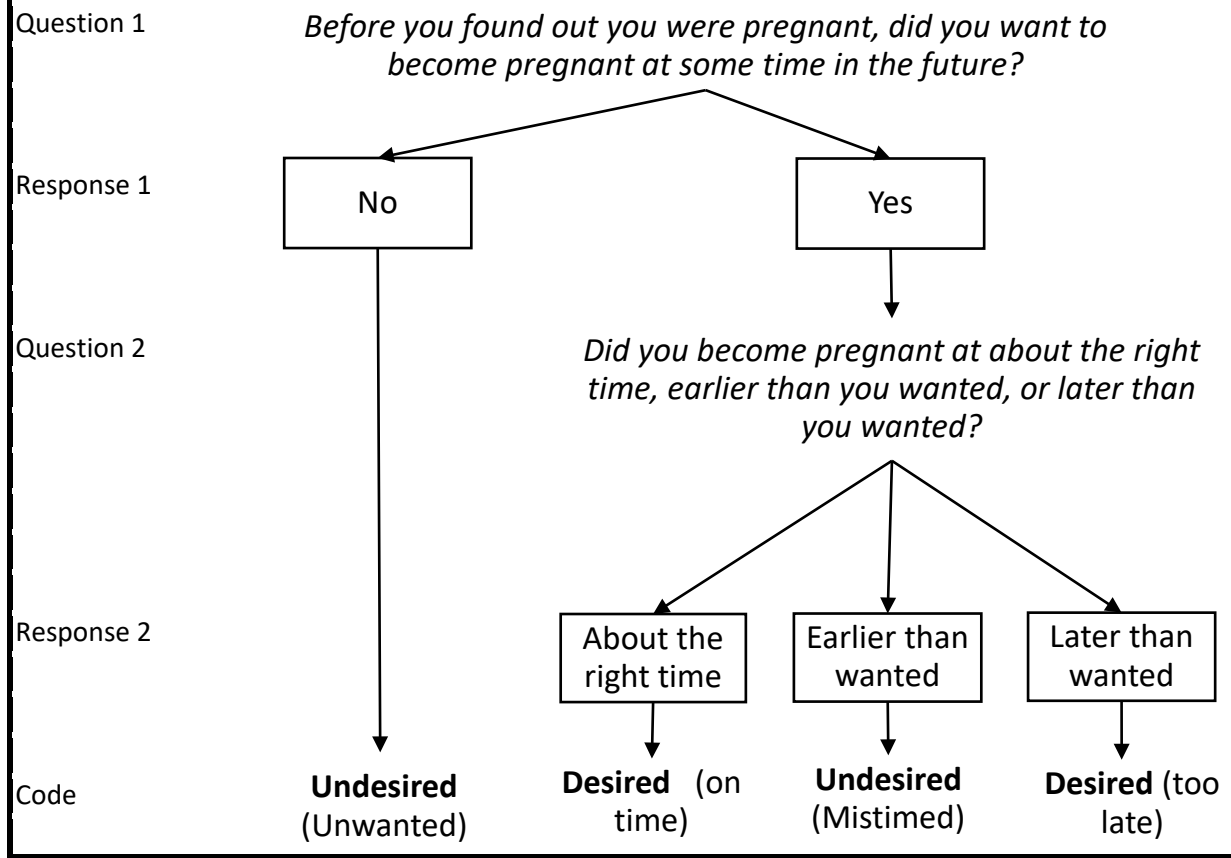


Figure 4 Stability and Change in Pregnancy Desires
(n = 203 pregnancies)

Panel A

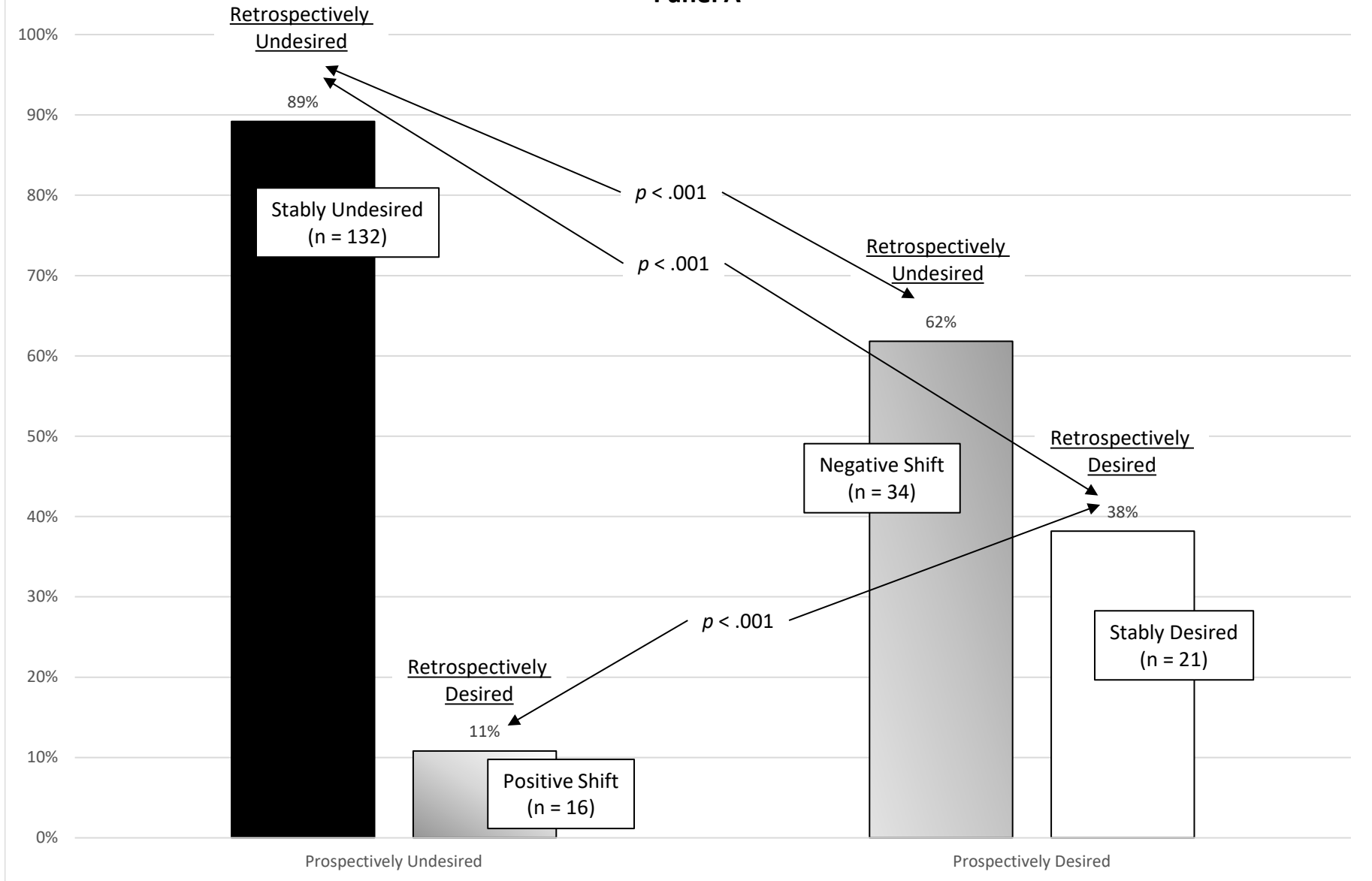


Figure 4, Panel B

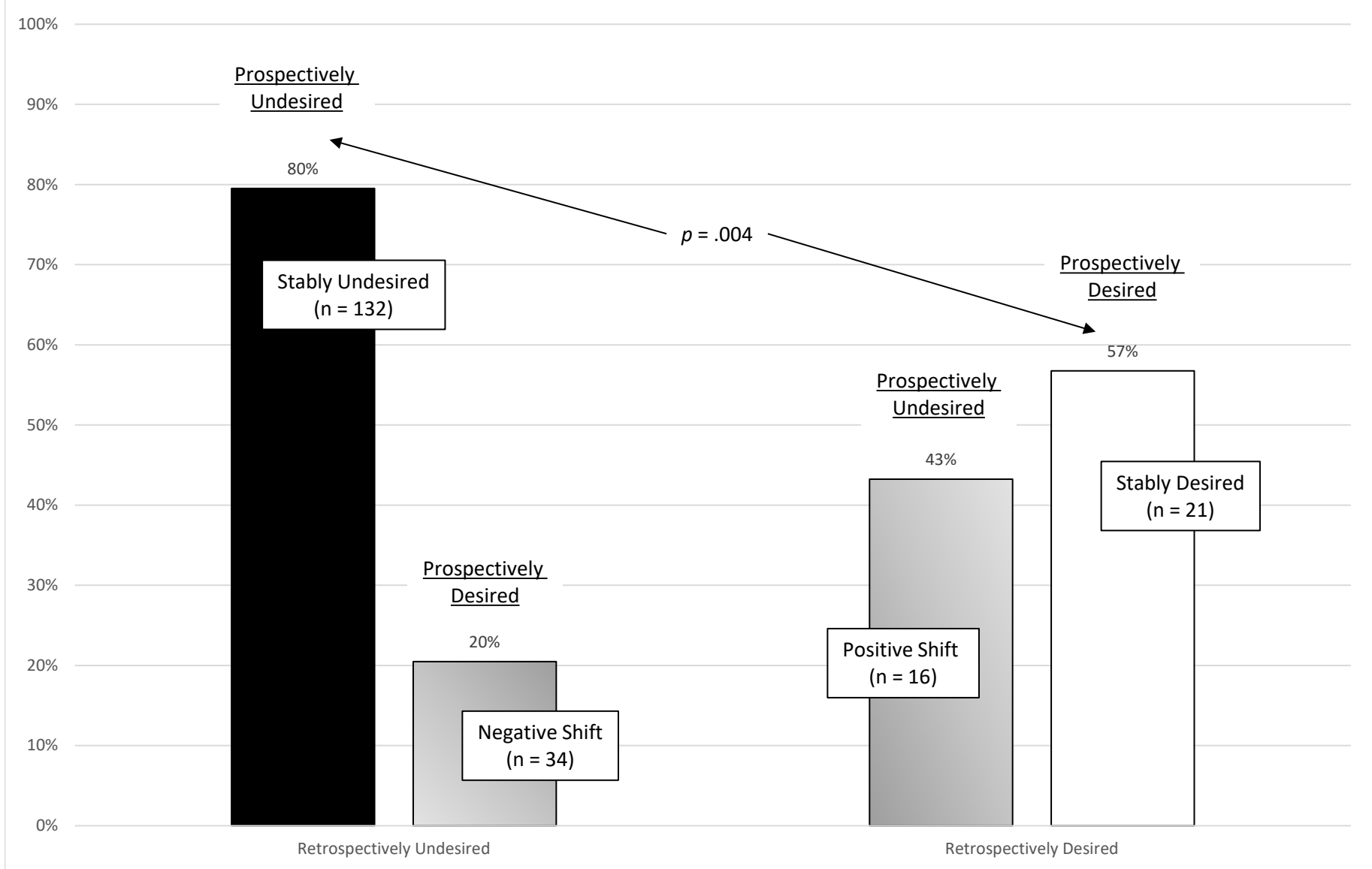
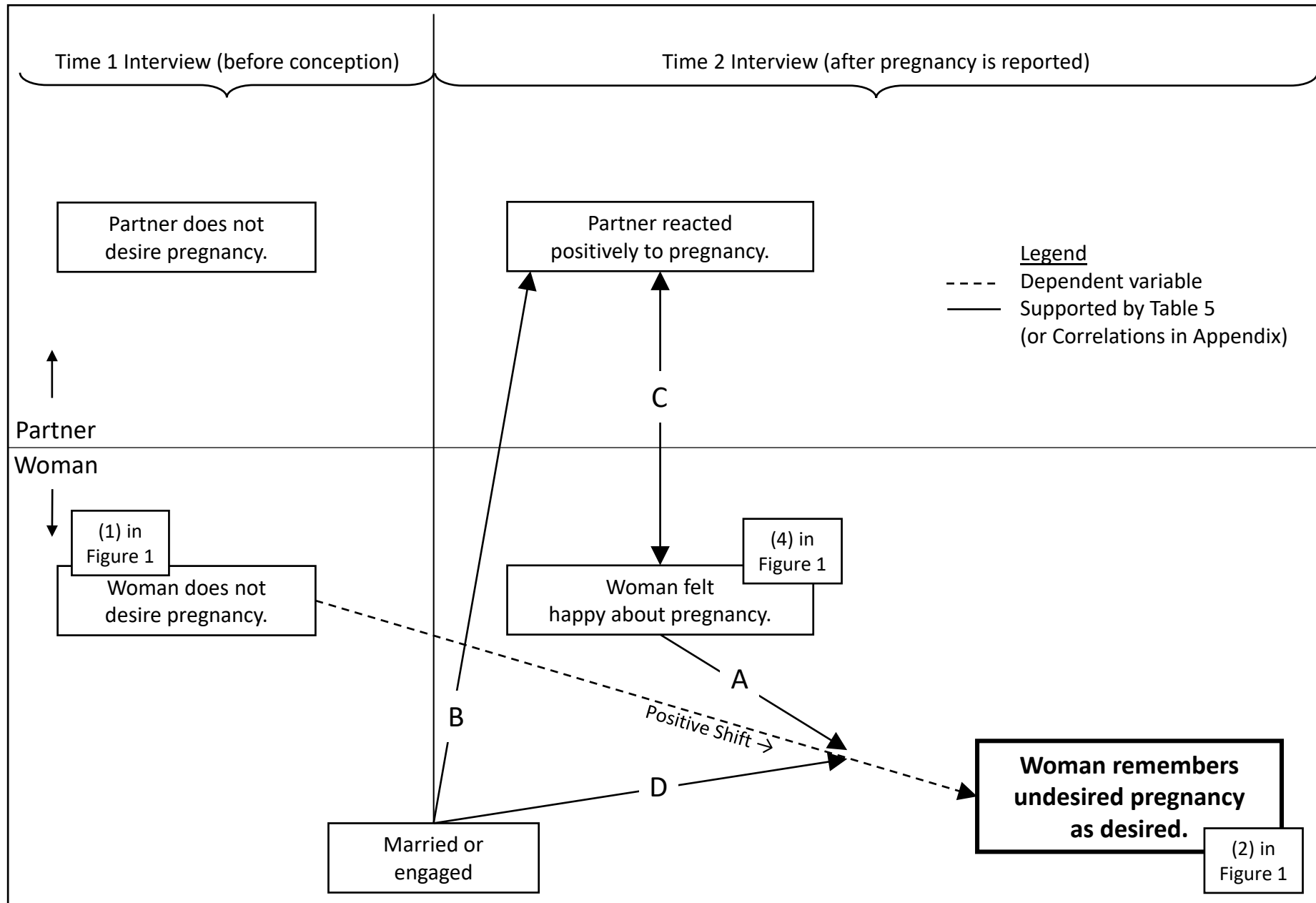


Figure 5 Heuristic Diagram of Empirical Results for Pregnant Women who did not Prospectively Desire Their Pregnancies



Appendix Table 1 Correlation Matrix of all Variables Used in Analyses (n = 203, Relationship Dynamics and Social Life)

	Retrospective Recollection of Pre-Conception Pregnancy Desire	Woman's Reaction to the pregnancy	Partner's Reaction to the pregnancy	Seriousness of the Relationship at Conception	Women's Prospective Desire for Pregnancy	Perception of Partner's Prospective Desire for Pregnancy	Controls	African American	Mother's education less than high school graduate	Any prior pregnancy			
	Desired	Happiness about the pregnancy (0 to 10)	Felt happier than most women about the pregnancy (0/1)	Reaction to the pregnancy (0 to 10)	Reacted more positively to the pregnancy than most partners (0/1)	Married or engaged	Total Duration (in years)	Any desire for pregnancy	Any desire for pregnancy				
Retrospective Recollection of Pre-Conception Pregnancy Desire	Desired	1.00											
	Woman's reaction to the pregnancy												
	Happiness about the pregnancy (0 to 10)	.43^b	1.00										
	Felt happier than most women about the pregnancy (0/1)	.74^a	.86^b	1.00									
	Partner's reaction to the pregnancy												
	Reaction to the pregnancy (0 to 5)	.27^b	.54^c	.45^b	1.00								
	Reacted more positively to the pregnancy than most partners (0/1)	.52^a	.49^b	.67^a	.84^b	1.00							
	Seriousness of the Relationship at Conception												
	Married or engaged	.44^a	.26^b	.37^a	.22^b	.35^a	1.00						
	Total Duration (in years)	.19^b	.21^c	.17^b	.12^c	.05^b	.24^b	1.00					
	Woman's Prospective Desire for Pregnancy												
	Any desire for pregnancy	.53^a	.30^b	.44^a	.21^b	.37^a	.38^a	.09^b	1.00				
	Perception of Partner's Prospective Desire for Pregnancy												
	Any desire for pregnancy	.33^a	.23^b	.24^a	.21^b	.32^a	.23^a	.02^b	.95^a	1.00			
	Controls												
	African American	-.02^a	-.15^b	-.21^a	-.01^b	-.04^a	-.25^a	-.17^b	-.37^a	.00^a	1.00		
	Mother's education less than high school graduate	.34^a	.01^b	-.07^a	.11^b	.21^a	.26^a	.07^b	.03^a	-.24^a	-.15^a	1.00	
	Any prior pregnancy	-.04^a	.01^b	.07^a	-.02^b	.00^a	.22^a	.13^b	-.02^a	-.02^a	.11^a	-.05^a	1.00

Bold numbers indicate p < .05.

^a Tetrachoric correlation (two dichotomous variables)

^b Point-biserial correlation (one continuous variable, one dichotomous variable)

^c Pearson's r (two continuous variables)

Appendix Table 2 Crosstabulation of Prospective and Retrospective Desire (before conception) for Pregnancy (n = 203)

		Retrospective		Row Totals	Total % for each Row	Percentaged down columns	
		Recollection of Desire (before conception) for Actual Pregnancy					
		Undesired	Desired				
Prospective Any Desire (before conception)	Undesired	<u>Stably Undesired</u>	<u>Positive Shift</u>				
	0	65%	8%				
		132	16	148	73%	80%	43%
	Desired	<u>Negative Shift</u>	<u>Stably Desired</u>				
1	17%	10%					
		34	21	55	27%	20%	57%
	Column Totals	166	37	203			
	Total % for each Column	82%	18%		100%		
	Percentaged across rows	89%	11%				
		62%	38%				