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## Pregnancy Intentions and Teenage Pregnancy Among Latinas: A Mediation Analysis

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### Abstract

**CONTEXT**—The extent to which pregnancy intentions mediate the relationship between individual, familial and cultural characteristics and adolescent pregnancy is not well understood. The role of intentions may be particularly important among Latina teenagers, whose attitudes toward pregnancy are more favorable than those of other groups and whose pregnancy rates are high.

**METHODS**—Prospective, time-varying data from 2001–2004 were used to investigate whether two measures of pregnancy intentions, wantedness and happiness, mediated associations between risk factors and pregnancy among 213 Latina adolescents in San Francisco. Participants were tested for pregnancy and interviewed about pregnancy intentions, partnerships, family characteristics and activities every six months for two years. Associations and mediation were examined using logistic regression.

**RESULTS**—Neither pregnancy intention variable mediated relationships between participant characteristics and pregnancy. After adjustment for other measures, wantedness was strongly associated with pregnancy (odds ratio, 2.6), while happiness was not. Having a strong family orientation was associated with happiness (3.7) but unrelated to pregnancy. Low sexual relationship power with a main partner was associated with an elevated risk of pregnancy (3.3). If the pregnancy intentions of all participants were changed to definitely not wanting pregnancy, the estimated decline in pregnancy risk would be 16%.

**CONCLUSIONS**—Pregnancy intentions were important not as mediators but rather as independent risk factors for pregnancy. Differences in pregnancy rates between groups of Latinas may be less a function of intentional choice than of situational factors. Interventions and research should focus on identifying and targeting factors that hinder effective contraceptive use among teenagers who want to avoid pregnancy.

More than half (53%) of Latinas in the United States become pregnant at least once before age 20.<sup>1–3</sup> In 2006, the pregnancy rate among adolescent Latinas was nearly double the national average (127 vs. 72 pregnancies per 1,000 women aged 15–19),<sup>4</sup> and Latina teenagers were twice as likely as others to give birth (83 vs. 42 births per 1,000).<sup>5</sup> Teenage childbirth may have substantial adverse health and social consequences for both mother and child,<sup>6</sup> and adolescents who have children have an elevated risk of dropping out of school, living in poverty and being single mothers.<sup>5,7</sup> In addition, high pregnancy rates are indicative of unprotected sexual behavior and risk for STDs.

Although numerous social, economic and cultural factors play a role in the high rates of teenage pregnancy among Latinas, increased desire for pregnancy may be one important contributing factor. In the 2002 National Survey of Family Growth, Latina adolescents were twice as likely as their non-Latino white and black counterparts to report that they would be “very pleased” if they became pregnant.<sup>8</sup> Analyses from the National Longitudinal Study of Adolescent Health<sup>9,10</sup> and several smaller scale studies<sup>11–13</sup> found similar ethnic differences in adolescents’ attitudes and intentions regarding pregnancy. Given the relatively favorable attitudes toward pregnancy and high pregnancy rates among Latina adolescents, a greater understanding of the relationship among pregnancy intentions, other risk factors and pregnancy itself would provide insight that could guide the design of interventions for reducing unintended pregnancy in this group.

The role that pregnancy intentions play in adolescent pregnancy has been a topic of much debate.<sup>14–18</sup> It is unclear whether underlying risk factors for teenage pregnancy influence attitudes toward pregnancy—which, in turn, affect pregnancy incidence—or whether pregnancy intentions are a risk factor in their own right. Studies of U.S. adolescents indicate that many predictors of pregnancy are also associated with favorable attitudes toward pregnancy; these include older age, lower socioeconomic status, having low educational aspirations or not being in school, and having a partner who is older or controlling.<sup>9,10,12,13,19–22</sup> Although these findings have been interpreted as evidence that pregnancy intentions mediate the relationship between other risk factors and teenage pregnancy, this causal pathway is only conjectured.

Alternatively, pregnancy intentions may operate independently of other risk factors, and differences in pregnancy rates between adolescents with different social and cultural backgrounds may be due to other influences, such as disparate access to contraceptives. Indeed, data from a racially diverse group of 3,070 females aged 14–19 participating in the National Longitudinal Surveys of Labor Market Experience of Youth revealed that birth intentions did not appreciably mediate the associations between various risk factors—including socioeconomic status, race and ethnicity, and family structure—and teenage pregnancy.<sup>17</sup> Similarly, an analysis of data on 2,812 non-Hispanic white women aged 19–39 from the National Survey of Families and Households found that although fertility intentions were a strong predictor of pregnancy, they did not mediate the apparent effects of the other predictors, including age, income, education, mother's education and school enrollment.<sup>23</sup>

Examining pregnancy intentions and attitudes poses challenges. The term “pregnancy intentions” has been defined and measured in myriad ways, including whether a woman is planning or wants pregnancy, and how happy or disappointed she would be if she became pregnant.<sup>24–26</sup> Furthermore, many women have ambivalent or conflicted attitudes about pregnancy, and they hold these attitudes with varying degrees of conviction.<sup>27–30</sup> In particular, teenagers may be less likely than older women to plan or time pregnancies consciously or to have clearly defined fertility objectives.<sup>31,32</sup> Teenagers also are likely to modify their attitudes toward a potential pregnancy as their life circumstances and sexual partnerships change.<sup>33</sup>

Despite these complexities, delineating the relationships among pregnancy intentions, other risk factors and pregnancy itself has important implications. Assessing the roles of factors thought to lie on a causal pathway can elucidate the mechanisms through which risk factors influence the outcome and thus can help identify causes of pregnancy.<sup>34</sup> Furthermore, an improved understanding of the relationship between pregnancy intentions and teenage pregnancy may address long-standing questions regarding the extent to which differences in pregnancy rates between groups are a function of choice or, alternatively, reflect differences in social, familial and personal factors that place some adolescents at risk of unintended pregnancy.<sup>14–16,18</sup>

## KEY PREDICTORS

A sizable literature has examined the cultural, familial and individual factors that may shape pregnancy intentions, sexual and reproductive behavior, and risk of pregnancy among Latinas.<sup>22,35</sup> Cultural explanations for Latino family patterns have focused on the important role of acculturation (the degree to which an immigrant adopts the norms and values of his or her new culture).<sup>36</sup> Acculturation is a complex process that can occur both within individuals, as they relinquish values and characteristics of their culture of origin and adopt those of a host culture, and over generations, as offspring of immigrants are further removed from influences from their parents' country of origin. While most studies have indicated that level of acculturation is positively associated with sexual risk-taking among Latino youth, research on other outcomes, such as fertility, pregnancy intentions and contraceptive use, has yielded conflicting results.<sup>22,36</sup>

Another aspect of Latino culture that is thought to play a large role in adolescent reproductive health is familism, an orientation that emphasizes the needs of the family unit over individual desires.<sup>36,37</sup> Ethnographic studies indicate that Latino culture can be supportive of early motherhood, and some young Latinas feel that they will gain respect from their families and communities by becoming pregnant.<sup>38–41</sup> The heightened sense of collective support and emphasis on traditional roles for women in Latino culture may make motherhood a favorable option for some Latina teenagers.<sup>41</sup>

Home and familial environment are important in shaping the sexual and reproductive behaviors of youth, including Latinos. Although social and economic disadvantage have consistently been linked to teenage fertility,<sup>22</sup> uncertainty remains regarding whether the relationship reflects a planned adaptation to disadvantage<sup>15,18</sup> or low reliance on contraception.<sup>14</sup> Prior studies have found that Latinas whose mothers had more permissive attitudes toward adolescent sexual behavior, or who had been pregnant as teenagers themselves, initiated sexual activity earlier, had more partners and engaged in riskier sexual behaviors than other Latinas.<sup>42–44</sup> However, whether low parental monitoring or having a mother who had children as a teenager shapes risk by fostering tolerance or acceptance of teenage childbearing is unclear.

Time-varying individual factors, including age, pregnancy history, relationship characteristics and activities, may affect pregnancy incidence through intentions. Older teenagers are more likely than younger ones to become pregnant,<sup>3</sup> although studies have yielded conflicting evidence regarding the relationship between age and intention.<sup>9,10,13,19,20</sup> Prior pregnancy is associated with increased risk of subsequent pregnancy, and the importance of positive pregnancy intentions as a risk factor for repeat pregnancy among teenagers who have already been pregnant is well documented.<sup>45–47</sup> Nonetheless, whether disparities in pregnancy rates by teenagers' pregnancy history can be attributed in part to differences in pregnancy attitudes after an initial pregnancy is uncertain.

Teenagers who consider themselves to be in a romantic relationship,<sup>10</sup> or to have a serious partner,<sup>33</sup> have more favorable attitudes toward pregnancy and a higher likelihood of intended pregnancy than do other teenagers. The level of commitment to a particular relationship or partner may influence a woman's intentions in several ways, such as by shaping her perception of future economic security and parental investment.<sup>33</sup> Whether the more favorable intentions in more committed partnerships account for increased pregnancy incidence is not known. Adolescents with little power in their sexual relationships are at particular risk for pregnancy. Evidence suggests that the association is primarily related to difficulties in negotiating sexual preferences and condom use;<sup>40,44,48</sup> whether intentions play a role has not been established. Finally, factors such as high school enrollment, educational aspirations and involvement in sports have been linked to reduced levels of sexual risk-taking, pregnancy and birth.<sup>28,49–52</sup> Although pregnancy intentions may be a mechanism by which school attendance and sports participation affect pregnancy, this has not been clearly established.<sup>49,51–53</sup>

In a longitudinal study of 213 Latina adolescents in San Francisco, we evaluated the mediating role of pregnancy intentions in the relationships between pregnancy and risk factors identified in previous research. We hypothesize that the associations between structural risk factors and pregnancy incidence may be explained, in part, by pregnancy intentions. In addition, we modeled the impact that hypothetically eliminating any degree of pregnancy wantedness would have on pregnancy rates in this population. Unlike other studies of pregnancy intentions, ours uses prospective data, considers time-varying predictors and assesses short-term pregnancy intentions.

## METHODS

### Sample

Data for this analysis were drawn from the Mission Teen Health Project, a prospective cohort study, conducted in 2001–2004, that assessed the roles of sexual and peer networks in sexual behavior, STD risk and pregnancy among adolescents recruited in San Francisco's Mission District.<sup>21,30,54</sup> The district serves as the cultural hub for the local Latino community, and half of its residents consider themselves Latino.<sup>55</sup>

We recruited 555 male and female participants, aged 15–19, from community locations and street venues, using purposive, venue-based sampling to target hard-to-reach teenagers who may not seek clinical services or attend high school. Recruitment locations were selected using data obtained through rigorous qualitative work, including focus groups and in-depth interviews with teenagers living in the Mission District, as well as quantitative assessment of potential participant yields at specific venues.<sup>56</sup> Participants also were recruited through community centers and referral by other participants. Eligibility criteria were fluency in English or Spanish, current residence in the San Francisco Bay Area, intention to live in the study area for the next two years and parental consent (if the participant was a minor). Pregnancy status did not affect females' eligibility.

Our analysis focused on female participants who had completed at least two consecutive study visits, which were conducted every six months during two years of follow-up; successive observations were necessary to assess the relationships between independent variables and pregnancy over the subsequent six months. Of the 230 Latinas enrolled in the project, 12 were lost to follow-up and five did not contribute data for two consecutive visits; thus, our analytic sample consisted of 213 participants, each of whom contributed up to four waves of data. Participants completed a total of 977 visits, contributing 735 waves of data for longitudinal analyses.

## Procedures

At baseline and follow-up visits, teenagers completed a questionnaire assessing social and demographic characteristics, familism, parental monitoring, current school attendance, participation in organized sports, sexual history (STDs and pregnancy), pregnancy intentions, partnership status and the power dynamics of their main relationship. Participants were randomly selected to have their questionnaires administered either by a trained interviewer or by audio computer-assisted self-interview (ACASI), because one goal of the overall study was to assess differences in results by measurement mode. At each follow-up visit, all females were asked if they had become pregnant in the previous six months and were tested for pregnancy, regardless of self-reported pregnancy status. We offered participants with a confirmed pregnancy comprehensive pregnancy options counseling and provided appropriate referrals.

Questionnaires were administered and pregnancy tests performed primarily at the study headquarters, a private office space adjacent to an adolescent reproductive health clinic. Participants who had concerns about mobility and safety because of the gang boundaries in the neighborhood could complete study visits in their homes or at a community center. The study protocol was approved by the institutional review boards at the University of California, San Francisco, and RTI International.

## Measures

•**Outcome**—Pregnancy was defined as having a positive pregnancy test, reporting a current pregnancy or reporting having been pregnant since the last study visit.

•**Potential mediators**—We used two items to measure pregnancy intentions. Pregnancy wantedness was measured prospectively at each visit with the question “Do you want to get pregnant in the next six months?” Response options were “definitely no,” “probably no,” “probably yes” and “definitely yes.” For analyses, the variable was treated dichotomously—“definitely no” versus any other response. We chose this categorization because our aim was to compare teenagers who expressed any degree of wantedness (including ambivalent feelings) with those who stated that they did not want a pregnancy at all.

The second measure of intentions, pregnancy happiness, was included because happiness about a potential pregnancy likely captures a different dimension of intentions, encompassing socially and culturally based attitudes toward motherhood.<sup>26,57</sup> Participants were asked how happy they would be if they were to become pregnant in the next six months (“very unhappy,” “somewhat unhappy,” “somewhat happy” or “very happy”). For analyses, responses were categorized as either “very unhappy” or any other option. We opted for this dichotomy because we wanted to compare teenagers expressing any happiness with those expressing none at all. In addition, we felt that the “somewhat happy” and “somewhat unhappy” groups might contain participants who held similar attitudes (i.e., “a little bit happy”).

To determine whether results were sensitive to our coding choice, we repeated analyses using alternative dichotomies.\* Although some findings changed, as one would expect, our overall conclusions did not.

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\*Footnote A

Specifically, for the wantedness variable, we grouped “definitely yes” with “probably yes,” and “probably no” with “definitely no”; for the happiness variable, we grouped “very happy” with “somewhat happy,” and “somewhat unhappy” with “very unhappy.”

**Independent variables**—We examined independent variables that have been shown to be associated with adolescent pregnancy, particularly among Latinas, and that may be mediated by pregnancy intentions.<sup>22</sup> These variables fell into three broad domains: cultural influences, home and family characteristics, and time-varying individual factors.<sup>22</sup>

We included two cultural factors. As a proxy for acculturation, we used the participant's immigrant generation (i.e., whether she was a first-, second- or third-generation immigrant).<sup>\*</sup> We also included a validated familism scale, which was developed from 12 items assessing the participant's degree of obligation to, orientation toward and feelings of support from her family (range 0–3).<sup>58</sup>

We examined several factors related to the teenager's familial and home environment. Socioeconomic status was measured using two dichotomous items: whether the participant's mother had completed high school and whether the participant lived in crowded housing conditions (defined by the U.S. Census Bureau as having more than one household resident per room<sup>59</sup>). We also assessed whether the participant's mother had been a teenage mother. The participant's perception of parental monitoring was measured using a five-item scale that assessed, for instance, the degree to which her parents expected her to call if she was going to be late or knew what she was doing when away from home.<sup>60</sup> On the basis of exploratory analyses that showed a nonlinear relationship between monitoring and pregnancy, we categorized the respondent as having a low score, a moderate score, a high score or no adult caregiver.

Finally, at each study visit, we assessed a variety of individual-level characteristics that vary over time. We included measures of the participant's age and whether she had had a prior pregnancy. We also examined two factors we hypothesized as being protective against teenage pregnancy: school enrollment and involvement in organized sports in the previous six months. Because few participants who were not in school played organized sports, we categorized teenagers into three groups: “not in school,” “in school but not playing sports” and “in school and playing sports.” Finally, we examined whether the participant had a main partner and, if so, assessed her level of power within that relationship. A main partner was defined as someone with whom the participant had had sex in the past six months and whom she considered to be “like a boyfriend.” We used a 23-item measure of relationship power dynamics that included questions such as “Who usually decides what you do when you are together?” and asked the participant whether she agreed with such statements as “you put more time and effort into the relationship than your boyfriend.” The scale has been validated in a predominantly Latina population and categorizes respondents according to whether they have low, moderate or high power.<sup>48</sup> Because only participants who had a main partner at a visit provided relationship power data, we created an ordinal categorical variable for partnership factors: “no main partner,” “low power with main partner,” “moderate power with main partner” and “high power with main partner.”

## Analyses

Participants were included in analyses regardless of whether they were sexually active or experienced, because sexual activity and pregnancy wantedness in the target population varied over time.<sup>\*30</sup> However, participants who were pregnant at any study visit, including

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\*Footnote B

First-generation participants were those who were born in a foreign country. Second-generation participants were those born in the United States to a foreign-born mother. Third-generation participants were born in the United States to a mother who also was born in the United States.

\*Footnote C

Eighteen percent and 41% of responses to the wantedness and happiness questions, respectively, changed between six-month assessments.

baseline, were excluded from analyses until they were again at risk for pregnancy (i.e., had a negative pregnancy test).

To assess if the hypothesized relationship between independent variables and pregnancy was mediated in part by pregnancy intentions, we followed three steps.<sup>61</sup> First, we fit bivariate logistic models to examine the relationship between each pregnancy intention variable and subsequent pregnancy. Second, we examined the independent cross-sectional relationship between each independent variable and pregnancy intention variable by fitting bivariate logistic regression models and then full multivariate models; we assessed correlations among independent variables to ensure that we did not include two highly correlated variables in one model. Third, we examined the association of each explanatory variable with pregnancy. To do this, we fit, in succession, a multivariate model with all independent variables, a model adjusted for pregnancy wantedness and then a model adjusted for pregnancy happiness. This approach allowed us to assess how associations between each factor and pregnancy changed when intentions were included.

For all analyses, we used a generalized estimating equation approach,<sup>62</sup> reporting robust standard errors with exchangeable working correlation matrices, because each participant contributed multiple observations, a situation that violates the independence assumption of traditional regression methods. To assess the significance of associations across each pair of response categories, we conducted postestimation tests after each model. Results of all analyses were unchanged when we controlled for mode of questionnaire administration (ACASI vs. face-to-face interview).

We considered the data to support a mediating role for pregnancy wantedness and pregnancy happiness if three criteria<sup>61</sup> were met: the intentions variable was associated with subsequent pregnancy (because a variable would not be considered a mediator unless it was associated with the outcome measure); the independent variable was associated with pregnancy intentions; and the strength of the relationship between the independent variable and pregnancy changed when pregnancy intentions were added to the model. If intentions contribute significantly to pregnancy risk differentials between teenagers with different social and personal experiences, we would expect these risk differentials to be attenuated when we control for intentions. Because of sample size limitations, the precision of some odds ratio estimates was suboptimal, even though the estimates were of sufficient magnitude to suggest a relationship. As a result, we discuss relationships that were significant at the  $p < 0.10$  level, but we present 95% confidence intervals to clearly indicate the precision limitations.

To estimate the proportion of pregnancies that would be averted if, hypothetically, all pregnancy wantedness were removed, we used a population intervention model approach to calculate the causal attributable risk.<sup>63,64\*</sup> This provided an estimate of what the pregnancy risk in the population would be in a counterfactual study population with the same covariate structure as the original one, but with no wantedness. Unlike conditional estimating approaches that generate conditional effect estimates, this approach produces a marginal, causal effect estimate.

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\*Footnote D

In a traditional attributable risk calculation, one uses the prevalence of the outcome among unexposed individuals as a proxy for the prevalence one would find if the exposure were removed. In a causal attributable risk calculation, one instead calculates the prevalence of the outcome in a counterfactual study population that has the same covariate structure as the original study population, but has no exposure.

## RESULTS

### Sample Characteristics

Twenty-seven percent of participants had been born outside of the United States (Table 1). On average, participants were 16 years old at baseline; 60% had ever had vaginal sex (not shown), and 14% had had a pregnancy. Some 90% were attending school, and 29% participated in organized sports.

### Pregnancy Intentions and Pregnancy

During the two-year observation period, a total of 53 pregnancies occurred among 46 teenagers; the one-year pregnancy risk was 16%. The corresponding annual pregnancy rate (155 per 1,000) is comparable to the 2004 national average for Latina teenagers (133 per 1,000<sup>3</sup>). The odds of pregnancy among youth who had expressed any degree of wanting pregnancy in the next six months (14% of responses—Table 2) were more than twice those among teenagers who definitely did not want pregnancy (odds ratio, 2.8; 95% confidence interval [CI], 1.3–5.9;  $p < .01$ —not shown). However, 70% of pregnancies occurred among teenagers who had reported at their previous visit that they definitely did not want to become pregnant (not shown). Participants who had expressed any happiness about having a pregnancy in the next six months (59% of responses—Table 3) had a slightly elevated risk of pregnancy (odds ratio, 1.7; 95% CI, 0.9–3.3;  $p < 0.10$ —not shown).

### Predictors of Pregnancy Intentions

•**Wantedness**—In the bivariate models, the odds of wanting pregnancy at all were positively associated with age (odds ratio, 1.2 per year—Table 2) and prior pregnancy (1.6). Participants who were in school and playing organized sports had about 40% lower odds of expressing any wantedness for pregnancy than those who were not in school and did not play sports (0.6). Teenagers who had low or moderate levels of power in their relationship with their main partner were more likely than those with no main partner to want pregnancy (2.6 and 1.8, respectively).

In the multivariate models, teenagers who were attending school and playing sports were less likely to want pregnancy to any degree than were their peers who were enrolled in school but not playing sports (odds ratio, 0.4). The associations between low or moderate relationship power in a main relationship and pregnancy wantedness were weakened in the multivariate models, and the association between prior pregnancy and wantedness disappeared completely.

•**Happiness**—In the bivariate model, familism was positively and strongly associated with happiness about a potential pregnancy (odds ratio, 3.7—Table 3). Participants who had had a prior pregnancy were slightly more likely to express any happiness than were their counterparts who had never been pregnant (1.6). Teenagers with a main partner, regardless of their degree of power within the relationship, were more likely to indicate any happiness than were those with no main partner (1.8–2.5). In contrast to the findings in the wantedness model, participation in sports was not associated with pregnancy happiness. The multivariate model showed a similar pattern: Familism remained strongly associated with happiness about a potential pregnancy, as did having moderate or high (but not low) power within a sexual relationship with a main partner. In addition, having moderate or high power within a main sexual relationship was associated with greater odds of happiness about a potential pregnancy compared with having low power.



## Predictors of Pregnancy

In multivariate analyses, wanting pregnancy to any degree remained strongly associated with pregnancy after adjustment for teenagers' characteristics (odds ratio, 2.6–Table 4). However, the association between pregnancy happiness and pregnancy risk weakened after adjustment for other factors and was no longer significant.

In the multivariate model that excluded pregnancy intentions, having a mother who had been a teenage mother was not significantly associated with pregnancy (odds ratio, 1.7).<sup>\*</sup> However, the relationship grew stronger when in the models that included wantedness (2.3; not significant) or happiness (2.4).

In all three models, the risk of pregnancy among teenagers with the lowest and highest levels of parental monitoring was about half that of teenagers with moderate monitoring. However, these relationships were not statistically significant (with the exception of the difference between low and moderate monitoring in the model with wantedness), and the relationship between monitoring and pregnancy did not change substantially when either intentions variable was introduced into the model.

The odds of pregnancy among teenagers who reported having a main partner (regardless of relationship power level) were greater than those among teenagers without a partner, in both the models with and without intentions. For example, in the multivariate model without wantedness or happiness, the odds of pregnancy were among teenagers who had low power within a relationship with a main partner were three times those among participants without a main partner (3.3); this relationship was stable in both intentions models (3.2–3.4). The odds ratios for low power were almost twice those for moderate power across all three models, although the differences did not reach statistical significance in post-test estimation analyses.

## Assessment of Mediation

Although bivariate models indicated that pregnancy wantedness and, to a lesser degree, happiness were associated with subsequent pregnancy, neither intention measure met both of the other requirements for mediation of any underlying factor (i.e., that the factor was associated with pregnancy intentions, and the factor's association with pregnancy changed when intentions were included in the model). For instance, having a main partner was associated with both pregnancy wantedness and happiness, at least for certain levels of relationship power; however, multivariate associations between the partner measure and pregnancy did not change when we added pregnancy intentions to the model.

## Causal Attributable Risk

Although wanting pregnancy was not a mediator, it was independently associated with pregnancy. If the pregnancy intentions of all teenagers in our sample changed to “definitely not wanting” pregnancy, the risk of pregnancy would decline by 16%, from 15.6% to 13.1% per year (not shown).

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<sup>\*</sup>Footnote E

We do not present the results for the bivariate models examining relationships between independent variables and pregnancy because they were generally similar to those from the multivariate models. The exception was prior pregnancy, which was strongly associated with pregnancy in the bivariate model (odds ratio, 2.4; 95% CI, 1.2–4.7;  $p < .01$ ) but not in the multivariate models.

## DISCUSSION

This analysis provides insight into the role that pregnancy intentions play in shaping pregnancy risk among adolescent Latinas. The odds of pregnancy were more than doubled among participants who had any level of wanting pregnancy, after adjustment for other factors, although no such relationship emerged among respondents who expressed any happiness over a potential pregnancy. However, neither wantedness nor happiness appeared to mediate the associations of other risk factors with pregnancy. Our results corroborate those from two previous studies indicating that pregnancy intentions may serve more as independent risk factors than as intermediary variables.<sup>17,23</sup>

Our finding that familism was strongly associated with pregnancy happiness, but not with wantedness or subsequent pregnancy, is intriguing. Although teenagers who adhere to traditional family norms may hold more favorable attitudes toward a potential pregnancy and motherhood than do less familistic peers, such attitudes may not translate into actually wanting pregnancy or lead to pregnancy itself. Further research is needed to disentangle the mechanisms by which the various dimensions of intentions, such as having favorable attitudes towards the concept of childbearing (as opposed to actually desiring pregnancy), may contribute to pregnancy occurrence. We did not find a significant relationship between immigrant generation and pregnancy, although our sample may have been underpowered to detect such an association. Prior studies have found that children of immigrants may be at particular risk for adverse outcomes.<sup>65</sup> Acculturation may occur at different paces for different aspects of culture; for instance, immigrant teenagers may rapidly adopt the riskier behaviors of the United States, while cultural norms that discourage parents from discussing contraception may be slower to change.<sup>66</sup>

This study investigated acculturation and familism among Latinas only. These factors may play a more important role in explaining differences in intentions and pregnancy risk among racial and ethnic groups than among subgroups of Latinos. Future research should examine the roles of cultural context and intentions in an ethnically heterogeneous teenage population. Similarly, socioeconomic status, which was not associated with either intentions or pregnancy in this study, may be a more important factor in explaining differences in intentions and pregnancy rates among racial and ethnic groups. In fact, prior research has suggested that teenage motherhood and other family formation patterns may vary less by socioeconomic status among Latinas than among white or black women.<sup>51,67</sup>

We found that having a mother who had given birth as a teenager was associated with elevated pregnancy risk (in the model with pregnancy happiness) but not with pregnancy happiness or wantedness. These findings are consistent with evidence that women who were teenage mothers may hold relatively permissive attitudes toward adolescent sexual behavior,<sup>42,44</sup> which are adopted by their daughters, but do not necessarily endorse early motherhood. However, one qualitative study found that the simultaneous emphasis on educational attainment and celebration of motherhood displayed by many Latino parents and communities send conflicting messages to teenage women.<sup>68</sup> More research is needed concerning the mechanisms through which having a mother who gave birth as a teenager influences teenagers' risk of pregnancy.

Parental monitoring was not associated with pregnancy intentions in our sample. In the multivariate analysis that controlled for pregnancy wantedness, teenagers who reported moderate monitoring levels were more likely than those with low or high levels to become pregnant. Research on the relationship between parental monitoring and sexual behavior among Latina teenagers has yielded mixed results.<sup>22,42,43</sup> We suspect that levels of parental monitoring are influenced by parents' perception of their teenagers' risk for sexual activity;

teenagers perceived to be at high risk may be closely monitored, thereby reducing their risk of pregnancy. However, because the causal relationship between risk behavior and parental monitoring is likely bidirectional, we do not draw any strong conclusions from our finding.

While age was not associated with wantedness in this sample, a marginally significant positive association between age and pregnancy happiness emerged when we controlled for other factors. This finding is consistent with evidence that age is associated with attitudinal dimensions of intention,<sup>9,10</sup> but not with actual planning of pregnancy.<sup>13</sup> More specifically, it suggests that teenagers may adopt increasingly favorable attitudes toward the notion of childbearing over time, but that factors such as partnership types (which may change with age) are more important than age in influencing whether a teenager wants or plans a pregnancy.

Although prior pregnancy was positively associated with both intentions variables in bivariate models, these associations disappeared after adjustment for other explanatory factors, suggesting that other characteristics explain the relationship. Similarly, prior pregnancy was associated with new pregnancy only in the bivariate analysis, likely for the same reason. Larger longitudinal studies are needed to tease apart the complex, time-varying effects of pregnancy experiences on subsequent risk factors, pregnancy intentions and repeat pregnancy.

School enrollment was unrelated to both pregnancy intentions and pregnancy itself. Enrollment in school may not necessarily translate into higher expectations for future employment opportunities or, thereby, motivation to delay pregnancy.<sup>18</sup> Alternatively, teenagers may recommit to school as they anticipate mothering,<sup>69</sup> suggesting that they do not necessarily see remaining in school and initiating motherhood as incompatible goals. Another possibility for the lack of an association is that our measure of education was too imprecise and that an assessment of attendance or school performance would have yielded different results.

Young women involved in sports had lower levels of wantedness than those who did not play a sport; however, athletic participation was not associated with significantly reduced odds of pregnancy. Factors such as self-efficacy and positive body image may be important in explaining the apparent protective effects of sports participation observed in other studies.<sup>49,53</sup>

The odds of pregnancy among teenagers with low sexual relationship power in a main relationship were twice those of teenagers with moderate power. Although the difference did not reach statistical significance, the findings are consistent with research indicating that teenage women with little decision-making ability in their relationships may have a difficult time negotiating sex and contraceptive use and are at increased risk for unintended pregnancy.<sup>40,44,48</sup> That teenagers with low relationship power were also the least likely of those with a main partner to express happiness about a potential pregnancy points to the need to empower young females with low decision-making power and to provide appropriate interventions for young males.

Our analyses indicate that an intervention that could eliminate all wantedness, even without modifying other risk factors, could be expected to yield a 16% reduction in pregnancy rates. Although wanting pregnancy was an important risk factor for pregnancy, the proportion of teenagers who expressed any pregnancy wantedness was small (14%); thus, the large majority (84%) of pregnancies would likely occur even if wantedness for pregnancy were removed. We do not intend to suggest that removing pregnancy wantedness would be a desirable, or even feasible, pursuit; the calculation is merely a theoretical exercise to examine the influence of this dimension of intention on pregnancy.

## Limitations and Strengths

Several limitations and strengths of this analysis should be noted. One drawback, which applies to most research on intentionality, lies in the measurement of pregnancy intentions. Our measures of intentions probably captured only limited dimensions of the construct. For instance, the wantedness measure is likely to have assessed only conscious aspects of desire for pregnancy.<sup>25,28,57</sup> In addition, because teenagers may assume or perceive that researchers view teenage pregnancy negatively, participants may have underreported pregnancy intentions. Another limitation is that sample size constraints compromised the precision of some estimates that were suggestive of an association.

Finally, because of our sampling approach and unique target population, our results may not be generalizable to other predominantly Latino communities in California or elsewhere. Also, data collection for this study concluded in 2004; results may not apply to later cohorts. However, we know of no major changes in legislation concerning health insurance, access to contraceptives or education that might have affected the target population. We thus believe it unlikely that the relationships between the variables we examined have changed substantially during the intervening years since the study ended, particularly because our research question is not inherently time-sensitive.

In spite of these limitations, this mediation analysis had several methodological strengths. By following teenagers over time, we were able to measure intentions prior to the occurrence of pregnancy, thus avoiding recall bias.<sup>57,70</sup> Furthermore, by conducting interviews every six months, we were able to measure short-term intentions repeatedly, thereby capturing pregnancies soon after assessment of intentions and avoiding the need to assume that intentions are consistent over time,<sup>33</sup> a drawback of larger scale studies.<sup>17,23</sup> Our ability to assess the roles of time-varying predictors and our use of two intentions measures are also strengths. Finally, we measured pregnancy using both urine pregnancy tests and self-report, thereby capturing pregnancies that girls may not have been aware of.

## Conclusion

Some have argued that childbearing intentions are necessary and sufficient for predicting fertility, regardless of social circumstances, cultural norms or availability of contraceptives.<sup>71</sup> Under such a strict rational choice model, the effects on pregnancy of all structural risk factors should be strongly reflected in intentions. In this study of Latina adolescents, intentions were indeed a risk factor for pregnancy, even if they were a weaker predictor than might have been expected. Yet intentions were not important in mediating the relationships between a participant's life circumstances and pregnancy; instead, they mattered in addition to those circumstances. This finding supports previous studies suggesting that intentions should be considered independent risk factors for pregnancy.<sup>23</sup> Our results suggest that differentials in teenage pregnancy rates between groups of Latinas may be less a function of intentional choice and more of circumstances, such as inability to use hormonal contraception, that place some adolescents at risk of early pregnancy. Furthermore, the vast majority of participants who became pregnant had not wanted the pregnancy. Our results call for an increased focus, in both research and programs, on factors that hinder effective contraceptive use among teenagers who want to avoid pregnancy.

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TABLE 1

Selected baseline characteristics of Latina adolescents, Mission Teen Health Project, San Francisco, 2001–2004

Characteristic	% or mean (N=213)
<b>CULTURAL</b>	
<b>Immigrant generation</b>	
First	27.2
Second	61.0
Third	11.7
<b>Mean familism score<sup>‡</sup></b>	1.6 (0.4)
<b>HOME/FAMILIAL</b>	
<b>Mother has &lt;high school education</b>	39.2
<b>Lives in crowded conditions</b>	39.4
<b>Mother was a teenage mother</b>	52.4
<b>Parental monitoring</b>	
Low	28.3
Moderate	30.2
High	31.1
No adult caregiver	10.4
<b>INDIVIDUAL</b>	
<b>Mean age<sup>§</sup></b>	16.1 (1.5)
<b>Had prior pregnancy</b>	13.7
<b>School enrollment/sports participation</b>	
Not in school	10.3
In school/not playing sports	60.6
In school/playing sports	29.1
<b>Partner</b>	
Main partner only	34.6
≥1 casual partner <sup>††</sup>	21.0
None	44.4
<b>Power in relationship with main partner<sup>‡‡</sup></b>	
Low	36.0
Moderate	55.0
High	9.0

Note: Figures in parentheses are standard deviations; all other values are percentages unless otherwise indicated.

<sup>‡</sup>Range, 0–3; median, 1.6; interquartile range, 1.4–1.9.

<sup>§</sup>Median, 16; interquartile range, 15–17.

<sup>††</sup>May also have a main partner.

<sup>‡‡</sup>Among respondents with a main partner.

TABLE 2

Percentage of survey responses in which Latina adolescents expressed any pregnancy wantedness, by selected characteristics, and odds ratios (and 95% confidence intervals) from logistic regression analyses<sup>†</sup> assessing predictors of pregnancy wantedness

Characteristic	% with any pregnancy wantedness	Bivariate	Multivariate
<b>All</b>	14.4	na	na
<b>CULTURAL</b>			
<b>Immigrant generation</b>			
First	17.8	1.6 (0.9–3.1)	1.2 (0.7–2.3)
Second (ref)	11.9	1.0	1.0
Third	16.4	1.4 (0.6–3.5)	1.6 (0.6–3.9)
<b>Familism</b>	na	1.3 (0.7–2.4)	1.1 (0.6–2.1)
<b>HOME/FAMILIAL</b>			
<b>Mother has &lt;high school education</b>			
No (ref)	15.1	1.0	1.0
Yes	12.2	0.8 (0.4–1.5)	0.7 (0.4–1.3)
<b>Lives in crowded conditions</b>			
No (ref)	11.7	1.0	1.0
Yes	17.8	1.6 (0.9–2.9)	1.4 (0.8–2.6)
<b>Mother was a teenage mother</b>			
No (ref)	13.1	1.0	1.0
Yes	14.5	1.1 (0.6–2.0)	1.5 (0.7–2.9)
<b>Parental monitoring</b>			
Low (ref)	12.8	1.0	1.0
Moderate	11.4	0.9 (0.4–2.0)	1.2 (0.6–2.5)
High	14.3	1.2 (0.6–2.6)	1.3 (0.6–2.8)
No adult caregiver	21.6	1.7 (0.7–3.9)	1.6 (0.7–3.9)
<b>INDIVIDUAL</b>			
<b>Age</b>	na	1.2 (1.0–1.4) <sup>†</sup>	1.0 (0.9–1.2)
<b>Had prior pregnancy</b>			
No (ref)	12.2	1.0	1.0
Yes	21.6	1.6 (0.9–3.1) <sup>†</sup>	1.0 (0.4–2.1)
<b>School enrollment/sports participation</b>			
Not in school	20.3	1.5 (0.8–2.8)	0.8 (0.4–1.7)
In school/not playing sports (ref)	14.1	1.0	1.0
In school/playing sports	10.2	0.6 (0.3–1.3) <sup>§</sup>	0.4 (0.2–1.0) <sup>*</sup>
<b>Power in relationship with main partner</b>			
No main partner (ref)	8.2	1.0	1.0
Low power	23.7	2.6 (1.2–5.5) <sup>*</sup>	1.8 (0.9–3.5) <sup>†</sup>
Moderate power	15.0	1.8 (1.0–3.2) <sup>*</sup>	1.6 (1.0–2.7) <sup>†</sup>
High power	16.0	1.7 (0.7–3.7)	1.7 (0.8–3.5)

*Notes:* Pregnancy wantedness refers to a pregnancy in the next six months. All variables are dichotomous or categorical except familism and age, which are continuous. na=not applicable. ref=reference group.

\*  
p<.05.

†  
p<.10.

‡ A generalized estimating equation approach was used to account for the multiple observations per participant.

§ Differs from “not in school” at p<.10.

**TABLE 3**

Percentage of survey responses in which Latina adolescents stated they expected to have any degree of happiness if pregnant, by selected characteristics, and odds ratios (and 95% confidence intervals) from logistic regression analyses<sup>‡</sup> assessing predictors of pregnancy happiness

Characteristic	% with any pregnancy happiness	Bivariate	Multivariate
<b>All</b>	59.3	na	na
<b>CULTURAL</b>			
<b>Immigrant generation</b>			
First	58.3	1.1 (0.6–2.0)	1.0 (0.5–1.9)
Second (ref)	59.3	1.0	1.0
Third	50.7	0.8 (0.3–1.7)	1.1 (0.5–2.3)
<b>Familism</b>	na	3.7 (2.1–6.8)***	3.7 (2.0–6.7)***
<b>HOME/FAMILIAL</b>			
<b>Mother has &lt;high school education</b>			
No (ref)	56.3	1.0	1.0
Yes	59.4	1.2 (0.7–2.0)	1.3 (0.8–2.2)
<b>Lives in crowded conditions</b>			
No (ref)	54.2	1.0	1.0
Yes	64.2	1.4 (0.9–2.4)	1.4 (0.8–2.3)
<b>Mother was a teenage mother</b>			
No (ref)	60.0	1.0	1.0
Yes	54.9	0.9 (0.5–1.4)	1.0 (0.6–1.7)
<b>Parental monitoring</b>			
Low (ref)	57.8	1.0	1.0
Moderate	54.6	0.8 (0.4–1.5)	1.0 (0.5–1.9)
High	52.2	0.8 (0.4–1.6)	0.7 (0.4–1.4)
No adult caregiver	75.5	1.3 (0.6–2.9)	1.7 (0.7–3.8) <sup>§</sup>
<b>INDIVIDUAL</b>			
<b>Age</b>	na	1.1 (1.0–1.3)	1.1 (1.0–1.3) <sup>†</sup>
<b>Had prior pregnancy</b>			
No (ref)	55.6	1.0	1.0
Yes	72.1	1.6 (0.9–2.9) <sup>†</sup>	1.0 (0.6–1.8)
<b>School enrollment/sports participation</b>			
Not in school	66.1	1.1 (0.7–1.8)	0.7 (0.4–1.1)
In school/not playing sports (ref)	59.1	1.0	1.0
In school/playing sports	50.0	1.0 (0.7–1.5)	0.8 (0.5–1.3)
<b>Power in relationship with main partner</b>			
No main partner (ref)	43.3	1.0	1.0
Low power	63.9	1.8 (1.1–2.8)*	1.3 (0.8–2.0) <sup>††</sup>
Moderate power	64.7	2.1 (1.5–3.0)***	1.9 (1.3–2.6)***
High power	71.4	2.5 (1.5–4.2)***	2.0 (1.2–3.3)**

*Notes:* Pregnancy happiness refers to a pregnancy in the next six months. All variables are dichotomous or categorical except familism and age, which are continuous. na=not applicable. ref=reference group.

\*  
p<.05.

\*\*  
p<.01.

\*\*\*  
p<.001.

†  
p<.10.

‡ A generalized estimating equation approach was used to account for the multiple observations per participant.

§ Different from “high” at p<.10.

†† Different from “moderate power” and “high power” at p<.10.

TABLE 4

Percentage of six-month intervals in which Latina adolescents became pregnant, by selected characteristics, and odds ratios (and 95% confidence intervals) from logistic regression analyses<sup>‡</sup> assessing predictors of pregnancy, by pregnancy intentions

Characteristic	% pregnant	Multivariate	Multivariate with wantedness	Multivariate with happiness
<b>All</b>	7.8	na	na	na
<b>INTENTIONS</b>				
<b>Pregnancy wantedness</b>				
Definitely no (ref)	6.3	na	1.0	na
Any yes	16.3	na	2.6 (1.1–6.1)*	na
<b>Pregnancy happiness</b>				
Very unhappy (ref)	5.5	na	na	1.0
Any happiness	9.2	na	na	1.4 (0.7–2.7)
<b>CULTURAL</b>				
<b>Immigrant generation</b>				
First	7.4	0.7 (0.3–1.8)	0.6 (0.3–1.5)	0.7 (0.3–1.7)
Second (ref)	8.5	1.0	1.0	1.0
Third	2.6	0.3 (0.1–1.4)	0.4 (0.1–1.7)	0.4 (0.1–1.8)
<b>Familism</b>				
na	na	1.2 (0.6–2.4)	1.3 (0.6–2.7)	1.2 (0.6–2.7)
<b>HOME/FAMILIAL</b>				
<b>Mother has &lt;high school education</b>				
No (ref)	7.5	1.0	1.0	1.0
Yes	7.4	0.7 (0.3–1.3)	0.8 (0.4–1.8)	0.7 (0.3–1.6)
<b>Lives in crowded conditions</b>				
No (ref)	6.4	1.0	1.0	1.0
Yes	9.2	1.6 (0.7–3.6)	1.5 (0.6–3.7)	1.5 (0.6–3.7)
<b>Mother was a teenage mother</b>				
No (ref)	5.2	1.0	1.0	1.0
Yes	9.3	1.7 (0.7–4.2)	2.3 (0.8–6.1)	2.4 (0.9–6.7) <sup>‡</sup>
<b>Parental monitoring</b>				
Low (ref)	5.1	1.0	1.0	1.0
Moderate	11.6	1.9 (0.8–4.7)	2.2 (0.8–6.1) <sup>‡</sup>	2.1 (0.7–5.7)
High	4.7	1.0 (0.3–3.2)	1.1 (0.3–3.5)	1.2 (0.4–4.1)
No adult caregiver	10.3	1.4 (0.3–5.6)	1.1 (0.2–4.6)	1.3 (0.3–5.6)
<b>INDIVIDUAL</b>				
<b>Age</b>				
na	na	0.9 (0.7–1.2)	0.9 (0.7–1.2)	0.9 (0.7–1.2)
<b>Had prior pregnancy</b>				
No (ref)	6.0	1.0	1.0	1.0
Yes	13.6	1.4 (0.5–4.1)	1.3 (0.5–4.0)	1.2 (0.4–3.8)
<b>School enrollment/sports participation</b>				
Not in school	8.8	0.9 (0.2–3.3)	0.9 (0.2–3.7)	0.7 (0.2–3.0)
In school/not playing sports (ref)	8.0	1.0	1.0	1.0

Characteristic	% pregnant	Multivariate	Multivariate with wantedness	Multivariate with happiness
In school/playing sports	5.6	0.6 (0.2–1.6)	0.5 (0.2–1.5)	0.5 (0.2–1.5)
<b>Power in relationship with main partner</b>				
No main partner (ref)	4.0	1.0	1.0	1.0
Low power	14.3	3.3 (1.3–8.4)**	3.2 (1.1–9.0)*	3.4 (1.2–9.7)*
Moderate power	8.2	1.8 (0.7–4.5)	1.7 (0.6–4.9)	1.7 (0.6–5.0)
High power	11.8	2.2 (0.5–9.5)	2.4 (0.5–10.8)	2.4 (0.5–10.7)

Notes: Pregnancy wantedness and pregnancy happiness refer to a pregnancy in the next six months. All variables are dichotomous or categorical except familism and age, which are continuous. ref=reference group. na=not applicable.

\* p<.05.

\*\* p<.01.

† p<.10.

‡ A generalized estimating equation approach was used to account for the multiple observations per participant.