

# The Trade-Off Between Hormonal Contraceptives And Condoms Among Adolescents

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**CONTEXT:** Adolescents' dual use of condoms and hormonal contraceptives is low, and the motivations underlying their decisions to combine contraceptives are not understood.

**METHODS:** To examine how pregnancy concerns, sexually transmitted disease (STD) concerns and type of sexual partner influence contraceptive use, we recruited 436 sexually experienced adolescents from two clinics. In structured interviews, we asked adolescents to describe their recent partners, their method use, and their pregnancy and STD concerns. Data were analyzed using logistic regression.

**RESULTS:** The odds that adolescents used condoms with main partners were significantly lower among those who used hormonal contraceptives than among nonusers of these methods (odds ratios, 0.4 for young women and 0.3 for young men). With casual partners, no association existed between adolescents' condom and hormonal contraceptive use. Concerns about pregnancy and STDs influenced this association for women with main partners. Among young women who perceived pregnancy as more negative, hormonal contraceptive users had reduced odds of using condoms (0.1). No association existed between use of the two methods among young women whose view of pregnancy was less negative. Young women who perceived themselves to be less at risk of acquiring an STD had reduced odds of using condoms if they were using hormonal contraceptives (0.2). Among young women who perceived themselves to be more at risk of acquiring an STD, no association existed.

**CONCLUSIONS:** Adolescents trade off between hormonal contraceptives and condoms according to partner type and perceived risks. Adolescents' dual-method use may improve if providers tailor counseling to adolescents' perceived risk of STDs and pregnancy, and if they address prevention of both as a related decision.

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Healthy People 2010, the national health objectives set out by the Department of Health and Human Services, recommends that sexually active adolescents use both condoms and hormonal contraceptives to prevent pregnancy and sexually transmitted disease (STD).<sup>1</sup> Condoms and hormonal contraceptives carry different, complementary benefits and risks. For pregnancy prevention, condoms have a failure rate of 15% during one year of typical use. The two most common types of hormonal contraceptives, pills and injectables, have significantly better efficacy, with failure rates of 5% and 0.3%, respectively, during one year of typical use.<sup>2</sup> From the mid-1980s through the late 1990s, adolescent condom use increased and hormonal contraceptive use decreased.<sup>3</sup> Unfortunately, rates of combined use of condoms and hormonal contraceptives remain low. In a nationally representative sample, only 7% of sexually active adolescent females and 5% of sexually active males reported having used the two methods in combination.<sup>4</sup>

An inverse association between condom and hormonal contraceptive use has been reproduced across many populations.<sup>5</sup> For example, a prospective study of adolescents receiving oral contraceptives at a family planning clinic found consistent condom use to be associated with inconsistent hormonal contraceptive use.<sup>6</sup> And in the National Survey

of Adolescent Males, those who said that their partner used the pill had lower levels of condom use than others.<sup>7</sup>

In the past, contraceptive decisions involved balancing the efficacy of pregnancy prevention with obstacles to using a particular method. The focus on STDs over the past decade has introduced another motivation. For example, rates of condom use rise as adolescent males become more sure or suspicious that their partners have an STD.<sup>8</sup> Today, adolescents must make decisions about contraceptive methods on the basis of pregnancy concerns, STD concerns and method characteristics. Several studies have examined the influence of motivations to prevent pregnancy and STDs on condom use among adolescents.<sup>9</sup> Yet little is known about the motivations underlying decisions to combine the use of condoms and hormonal contraceptives.

Given these interrelated motivations for method use, we reasoned that the apparent inverse correlation between condoms and hormonal contraceptives is an oversimplification, and that adolescents are actually making separate and independent decisions about condom and hormonal contraceptive use. For example, if adolescents are concerned only with pregnancy prevention, they may trade off the ease of condom use with the higher efficacy of hormonal contraceptives. But if adolescents have strong concerns about

STDs, they may not be willing to stop using condoms. And those with strong concerns about both STD and pregnancy prevention might be motivated to use both condoms and hormonal contraceptives.

Further complicating decisions about the use of condoms or hormonal contraceptives, individuals may be making these choices with different types of sex partners. Among adults, contraceptive behaviors are specific to the type of sexual partner.<sup>10</sup> Among adolescents, studies examining differences in contraceptive behaviors and partner types have yielded mixed results,<sup>11</sup> perhaps in part because of methodological differences. The studies that have shown no differences in contraceptive use by partner type have tended to categorize the adolescent (for example, as monogamous, nonmonogamous or serially monogamous) rather than the nature of the sex partner or relationship.<sup>12</sup>

By contrast, studies that have categorized the type of sex partner (for example, as main or casual partner) have shown that adolescents may use different pregnancy and STD prevention methods with different partner types; some show that adolescents report less condom use with main partners than with casual partners.<sup>13</sup> In addition, adolescents report different contraceptive behaviors when sexual relationships have different characteristics. For example, young women are less likely to use condoms in sexual relationships of longer duration than in those of shorter duration.<sup>14</sup> And young men report more condom use and less hormonal contraceptive use by partners early in a sexual relationship than they do later in the same relationship.<sup>15</sup>

The concerns and motivations underlying contraceptive behaviors are also likely to be different with different types of sex partners. Condom and hormonal contraceptive use in general (not specific to a particular partner type) have been associated with concerns about STDs and pregnancy. In the National Survey of Adolescent Males, worry about STDs, including AIDS, differentiated young men who combined use of condoms and hormonal contraceptives from those whose partners used hormonal contraceptives alone.<sup>16</sup> Differences according to partner type in the use of condoms alone have been associated with differences in concerns about pregnancy and STDs. In a sample of black young women, perceived invulnerability to STDs and concerns about pregnancy were associated with not using condoms with steady partners. However, these concerns were not associated with unprotected sex with casual partners.<sup>17</sup> Although these studies have linked partner-specific concerns about pregnancy and STDs to condoms and hormonal contraception separately, little is known about how these concerns affect the inverse relationship between the two.

In this article, we examine whether there is an inverse relationship between adolescents' condom and hormonal contraceptive use; whether adolescents' concerns about pregnancy and STDs influence this association; and whether the relationship between condom and hormonal contraceptive use in casual sexual relationships is different from that in relationships with a main partner. Specifically, we looked at how hormonal contraceptive use, an independent vari-

able, predicts condom use, the dependent variable.

When adolescents first begin using contraceptives, most start with condoms, then change to hormonal contraceptives.<sup>18</sup> We hypothesized that the inverse association between condoms and hormonal contraceptives would be strongest among adolescents with a high concern about preventing pregnancy, as these adolescents would be likely to give up condoms when they used hormonal contraceptives, a better pregnancy prevention method. We did not expect to see an inverse association between condoms and hormonal contraceptives among adolescents with a high concern for acquiring STDs, as this group needs condoms for STD protection in addition to pregnancy prevention. Finally, we hypothesized that the inverse association would occur with main partners, but not with casual partners.

## METHODS

### Sample Selection and Design

As part of a larger longitudinal study assessing adolescent sexual behavior, knowledge and attitudes, adolescents were recruited from a free municipal STD clinic and a large health maintenance organization (HMO) adolescent clinic in San Francisco. Adolescents recruited from the STD clinic were seeking reproductive health services, including STD checks (most without new symptoms), family planning services and yearly pelvic exams. Adolescents recruited at the HMO clinic were seeking either primary care, such as sports physicals, or reproductive health services. We recruited from these different sites so that we could study higher- and lower-risk adolescents.

From February 1997 through August 1998, all adolescents registering in the clinics were screened for eligibility by a research assistant. Adolescents were eligible if they were 14–19 years old, were English-speaking, had ever engaged in heterosexual intercourse and lived within the metropolitan area. We obtained written, informed consent from the adolescents. If an adolescent did not wish to participate, the research assistant requested verbal consent to ask a few demographic and sexual history questions so that we could compare these adolescents with study participants. All adolescents registering at the clinics were screened, and 82% of those who were eligible participated in the study. The proportions of adolescents who refused at each site were similar. The final sample consisted of 436 adolescents—141 young men and 295 young women.

A research assistant conducted structured interviews with adolescents in a private room. Before an adolescent was examined by a physician, the research assistant conducted a 15-minute interview to collect baseline information on contraceptive use and sexual behaviors, demographic factors and contact information. In a 30-minute interview after adolescents' exam, the research assistant collected information about their concerns about pregnancy and STDs. In a telephone interview six months after adolescents' clinic visit, they were asked again about their contraceptive use and sexual behaviors.

**TABLE 1. Percentage distribution of adolescents attending a municipal STD clinic and HMO adolescent clinic, by selected characteristics, according to sex**

Characteristic	Females (N=295)	Males (N=141)
<b>Race/ethnicity</b>		
White	20.0	12.8
Black	27.5	29.1
Hispanic	18.0	22.0
Asian/Pacific Islander	17.6	15.6
Mixed/other	16.9	20.6
<b>Site</b>		
STD clinic	41.7	48.9
HMO clinic	58.3	51.1
<b>Partner type</b>		
Main only	62.4	44.7
Main and casual	30.5	32.6
Casual only	7.1	22.7
<b>Method use with main partner</b>		
Condoms only	35.8	49.5
Hormonal contraceptives only	23.0	13.8
Both	13.9	10.1
None	27.4	26.6
<b>Method use with casual partner</b>		
Condoms only	52.3	71.8
Hormonal contraceptives only	5.4	1.3
Both	23.4	9.0
None	18.9	17.9
Total	100.0	100.0

In all, 83% of the sample participated in the six-month follow-up interview. The 17% lost to follow-up did not differ in age, ethnicity or sex from those who remained in the study. A larger proportion of participants were lost from the STD clinic than from the HMO clinic (21% vs. 11%,  $p < .01$ ).

### Measures

- **Demographic characteristics.** We collected baseline information on gender, age, race, ethnicity, socioeconomic status and clinic site. Maternal education was used to approximate socioeconomic status.

- **Partner type.** At baseline and at the six-month follow-up, adolescents were asked to categorize all partners in the past six months as main or casual, following established definitions of adolescent sexual partners:<sup>19</sup> Main sex partners were defined as “someone that you have sex with and you consider to be the person that you are serious about.” Casual partners were defined as “someone you’ve had sex with only once, or a few times, or you have sex with them on an ongoing, casual basis. The important thing, however, is that this person is not a main partner to you.”

- **Relationship characteristics.** At the six-month follow-up, additional relationship measures included the length of relationship with the last main partner and the last casual partner. Adolescents reporting main partners were asked about the presence of a casual partner, and adolescents reporting casual partners were asked about the presence of main partners. We examined these additional relationship characteristics because they may confound partner type.

- **Partner-specific contraceptive behavior.** At baseline and at

the six-month follow-up, participants were asked whether they had used condoms and hormonal contraceptives during their last sexual encounter with their last main partner and with their last casual partner. We used behavior at last sex with last partner, because it referred to a specific, recent event.

- **Concerns about pregnancy and STDs.** Measures of how severe a problem it would be for adolescents to become pregnant or contract an STD and their perceived level of risk of experiencing either of these events were based on the Theory of Planned Behavior.<sup>20</sup> Three items asked participants how “worried,” “upset” or “happy” they would be if they became pregnant by a main partner in the next six months ( $\alpha = 0.83$ ). Three items measured adolescents’ perceptions of “how likely” it is and what “the chance out of 100” is that they will become “pregnant in the next six months,” and what their risk is of becoming “pregnant in the next six months” if they have unprotected sex with an unspecified partner type ( $\alpha = 0.82$ ). Five items measured how adolescents would react to contracting gonorrhea or chlamydia from a nonspecific partner type ( $\alpha = 0.93$ ): We asked how worried they would be, how bad they would consider it, how much it would bother them, how upset they would be and how serious it would be. Five items measured perceptions of risk of acquiring an STD with a main ( $\alpha = 0.90$ ) or casual ( $\alpha = 0.86$ ) partner: We asked how likely it is and what the chance out of 100 is that they will acquire gonorrhea or chlamydia from a partner, what their risk is of acquiring either STD from a partner and whether they think they will acquire these STDs from a partner. The development of the STD risk measure is described elsewhere.<sup>21</sup>

The items were combined into scales expressed as continuous variables measuring adolescents’ negative view of pregnancy; perception that they (or their partner) are at risk of becoming pregnant; negative view of acquiring an STD; and perceived risk of acquiring an STD. When presenting and discussing interactions, we express these scales as dichotomous variables, using the median scores on the scaled items as the split point.

### Data Analysis

We analyzed the data using SPSS 10.0. We stratified by sex and examined separately contraceptive behaviors with main and casual partners. The two samples overlapped: Analyses with main partners included both adolescents with main partners only and those with main and casual partners, and analyses with casual partners included both adolescents with casual partners only and those with main and casual partners.

We analyzed categorical data using chi-square tests. Continuous scales were analyzed using independent sample t-tests. We used logistic regression to examine the relationship between condom and hormonal contraceptive use, with condom use as the dependent variable. We tested whether adding hormonal contraceptive use decreases condom use by adding hormonal contraceptives as an independent variable. We examined this relationship in the context of different pregnancy and STD concerns by exploring

interactions between hormonal contraceptive use and these concerns. The dependent and independent variables were chosen because most adolescents start with condoms, then change to hormonal contraceptives. A clinician starting a young woman on hormonal contraception will need to address how to maintain condom use to prevent STDs.

We chose to use adolescents' reported contraceptive behavior at the six-month follow-up as the outcome of interest because we were concerned about reverse causality. For example, if we used only adolescents' responses to questions about their behavior at baseline, when they also responded to questions about their perceptions of risk of and their probable reaction to pregnancy and STDs, we could not be sure whether they perceived their risk to be high because they did not use a condom at last intercourse or whether they used a condom at last intercourse because they perceived a high risk. By examining their baseline responses about perceptions and their responses six months later about their contraceptive behavior, we could be more certain of the direction of causality—the perception led to the behavior, rather than the behavior's leading to the perception. We analyzed condom use at follow-up both controlling for baseline condom use (which captures change in behavior) and not controlling for baseline condom use.

Because the amount of responsibility for hormonal contraceptive and condom use is different for males and females, we analyzed data separately according to sex.<sup>22</sup> In past research, adolescent males and females have reported different sexual and contraceptive behaviors, as well as different motivations and attitudes related to those behaviors.<sup>23</sup>

## RESULTS

### Descriptive Data

The mean age of the participants was 17.0 years—16.9 for females and 17.2 for males. The sample was racially and ethnically diverse (Table 1). We recruited 192 adolescents from the municipal STD clinic and 244 from the HMO adolescent clinic. Adolescents from the two sites differed in a number of respects (not shown): Those from the STD clinic were older than those from the HMO clinic (18 vs. 17 years,  $p < .001$ ). Although both clinics recruited adolescents from a range of racial and ethnic backgrounds, the STD clinic sample included a higher proportion of black teenagers than the HMO clinic sample (35% vs. 27%,  $p < .05$ ), and the HMO clinic sample included a higher proportion of Hispanic adolescents than the STD clinic sample (22% vs. 14%,  $p < .05$ ). The HMO clinic adolescents scored higher on maternal educational attainment, an indicator of socioeconomic status.\*

During the six-month period following their initial interview, 62% of young women reported having only main partners, 31% reported both main and casual partners, and 7% reported having only casual partners (Table 1). By contrast, 45% of young men reported having only main partners, 33% both main and casual partners, and 23% only casual partners.

Both females and males reported less condom use and more hormonal contraceptive use with main partners than

**TABLE 2. Percentage of adolescents who used condoms at last intercourse with a main partner, by selected characteristics; and mean age and relationship length (and standard deviations) of adolescents, by whether condoms were used—all according to sex**

Variable	Females (N=274)	Males (N=109)
<b>PERCENTAGES</b>		
<b>Used hormonal contraceptives</b>		
Yes	37.6**	42.3*
No	56.6	65.1
<b>Site</b>		
STD clinic	43.5	49.1*
HMO clinic	53.6	71.2
<b>Partner type</b>		
Main and casual	56.7	69.6
Main only	46.2	52.4
<b>MEANS</b>		
<b>Age</b>		
Used condoms	16.6 (1.3)**	16.9 (1.5)**
Did not use condoms	17.1 (1.3)	17.9 (1.2)
<b>Relationship length (mos.)</b>		
Used condoms	15.8 (17.7)	12.0 (11.3)*
Did not use condoms	18.9 (15.7)	18.2 (17.8)

\* $p < .05$ . \*\* $p < .01$ .

with casual partners. Among females with main partners, 50% used condoms and 37% hormonal contraceptives. Among females with casual partners, 76% used condoms and 29% used hormonal contraceptives. Among males with main partners, 60% used condoms and 24% hormonal contraceptives. Among males with casual partners, 81% used condoms and 10% hormonal contraceptives. A higher proportion of females with casual partners than of those with main partners reported combined use of condoms and hormonal contraceptives (23% vs. 14%); for males, the proportions were about the same in both groups (9–10%).

### Use with Main Partners

As predicted, condom use and hormonal contraceptive use with main partners were inversely related in bivariate analyses (Table 2). Among young women, 38% of hormonal contraceptive users reported condom use, compared with 57% of nonusers of hormonal methods. Among young men, 42% of those whose partners used hormonal contraceptives reported condom use, compared with 65% of those whose partners did not use hormonal contraceptives.

The relationship between condom use with a main partner and potentially confounding demographic and relationship variables differed slightly for males and females. For young women, age was the only predictor of condom use; users were significantly younger than nonusers (16.6 vs. 17.1). For young men, clinic site, age and length of relationship were predictors of condom use. Young men who used condoms were more likely to come from the HMO

\*At both sites, adolescents who refused to participate were significantly older than participants (17.4 years vs. 17.0 years,  $p < .01$ ), but were similar to participants with respect to race and ethnicity. Males were more likely to decline participation (30%) than were females (12%).

**TABLE 3. Odds ratios (and 95% confidence intervals) from logistic regression analyses predicting the effects of various characteristics and perceptions on the likelihood of condom use at last intercourse with a main partner, by sex**

Variable	Females	Males
<b>Characteristic</b>		
Used hormonal contraceptive at last intercourse	0.42 (0.24–0.74)**	0.26 (0.09–0.77)*
STD clinic	1.41 (0.78–2.54)	1.66 (0.59–4.66)
Age	0.74 (0.60–0.92)**	0.74 (0.50–1.09)
Relationship length	1.00 (0.98–1.01)	0.98 (0.95–1.01)
$\chi^2$	24.1**	20.8**
<b>Perception</b>		
Negative view of becoming pregnant	1.08 (0.99–1.18)	1.13 (0.96–1.33)
At risk of becoming pregnant	1.06 (0.93–1.21)	0.99 (0.75–1.29)
Negative view of acquiring STD	1.08 (1.00–1.16)	1.16 (1.00–1.34)*
At risk of acquiring STD	1.06 (1.02–1.11)**	1.07 (0.99–1.17)
$\chi^2$	20.0**	13.5**
<b>Two-way interactions</b>		
Hormonal contraceptive use x pregnancy negative	0.75 (0.62–0.91)**	0.82 (0.56–1.19)
Hormonal contraceptive use x at risk of acquiring STD	1.17 (1.05–1.30)**	1.05 (0.82–1.33)
Pregnancy negative x at risk of acquiring STD	1.00 (0.98–1.01)	0.97 (0.94–1.00)†
$\chi^2$	17.8**	4.1
<b>Three-way interaction</b>		
Hormonal contraceptive use x pregnancy negative x at risk of acquiring STD	0.95 (0.91–0.99)*	0.82 (0.69–0.99)*
$\chi^2$	6.3*	7.5**
$\chi^2$ for model	68.2**	45.9**

\*p<.05. \*\*p<.01. †p<.10.

clinic than from the STD clinic; on average, male condom users were younger than nonusers (16.9 vs. 17.9) and were in shorter-term relationships (12.0 vs. 18.2 months).

We used logistic regression to assess the effect of hormonal contraceptive use with last main partner at six-month follow-up on condom use with that partner. The analyses controlled for demographic and relationship variables found to be significant in the bivariate analyses. Hormonal contraceptive use with last main partner at six-month follow-up was the independent variable.

Among young women, those who used hormonal contraceptives had significantly lower odds of condom use than those who did not use hormonal contraceptives (odds ratio, 0.4), even after we controlled for age, clinic site and length of relationship (Table 3). This finding confirms the inverse relationship between condom use and hormonal contraceptive use with main partners. Age was also a predictor of

condom use: The odds of using condoms declined with female adolescents' increasing age (odds ratio, 0.7).

Among young men, the odds of using condoms were significantly lower among those whose main partners used hormonal contraceptives than among those whose partners did not use hormonal contraceptives (odds ratio, 0.3). No other characteristics were predictive of condom use among male adolescents.

When we repeated the analysis with an added control for baseline condom use, we found similar results among females (not shown). The odds of using condoms among hormonal contraceptive users were significantly lower than the odds among those who did not use hormonal contraceptives (odds ratio, 0.4). Among males, the relationship between condom and hormonal contraceptive use was not statistically significant. For both males and females, baseline condom use was, by far, the strongest predictor of condom use at the six-month follow-up. Young women who reported using condoms at the initial interview had substantially higher odds of using condoms six months later than young women who were not condom users at baseline (odds ratio, 4.0). The result was similar for males (odds ratio, 6.3).

**Influence of Pregnancy and STD Concerns**

To examine whether the inverse relationship between condom and hormonal contraceptive use is influenced by adolescents' concerns about pregnancy and STDs, we tested interactions among hormonal contraceptive use, perceptions of risk of and probable reaction to becoming pregnant, and perceptions of risk of and probable reaction to acquiring an STD. (For example, if the relationship differed for people who perceived pregnancy as more negative and those who perceived pregnancy as less negative, we would see an interaction between hormonal contraceptive use and how negatively adolescents perceived pregnancy.) We use the dichotomous variables high or low risk of STD and more negative or less negative view of pregnancy, with the median scores on the scales being the split point.

To test interactions, we first looked at main effects, adding perceptions of risk and probable reaction to the logistic regression model (Table 3). None of adolescents' perceptions of risk or their probable reaction strongly influenced their condom use. Adolescent women's perception of being at a high risk of acquiring an STD and adolescent men's response that they would react negatively to acquiring an STD were associated with slightly increased odds of using condoms. While the odds ratios are statistically significant, they are close to one, suggesting a weak effect at best.

Next we added the interaction products between pregnancy perception and STD perception and hormonal contraceptive use (Table 3). We kept in the model only interactions that were significant at p<.10. Among adolescent women, perceiving pregnancy with a main partner as negative and perceiving oneself to be at risk of acquiring an STD from a main partner each modified the association between condom use and hormonal contraceptive use with main part-

**TABLE 4. Odds ratios (and 95% confidence intervals) from logistic regression analyses predicting the likelihood of female adolescents' condom use at last intercourse with a main partner, by selected characteristics, according to adolescents' perceptions about becoming pregnant and their risk of acquiring an STD**

Variable	Negative view of becoming pregnant		Risk of acquiring STD	
	More (N=128)	Less (N=146)	Higher (N=131)	Lower (N=143)
Used hormonal contraceptive at last intercourse	0.14 (0.06–0.36)**	0.79 (0.39–1.61)	0.86 (0.38–1.94)	0.21 (0.09–0.46)**
STD clinic	3.55(1.37–9.23)**	1.02 (0.49–2.14)	1.70 (0.77–3.75)	1.58 (0.70–3.55)
Age	0.68 (0.48–0.95)*	0.77 (0.58–1.01)	0.81 (0.61–1.07)	0.74 (0.54–1.02)
Relationship length	1.00 (0.97–1.03)	1.00 (0.98–1.02)	1.00 (0.98–1.02)	0.98 (0.95–1.00)
$\chi^2$	29.5**	5.5	6.0	26.1**

\*p<.05. \*\*p<.01.

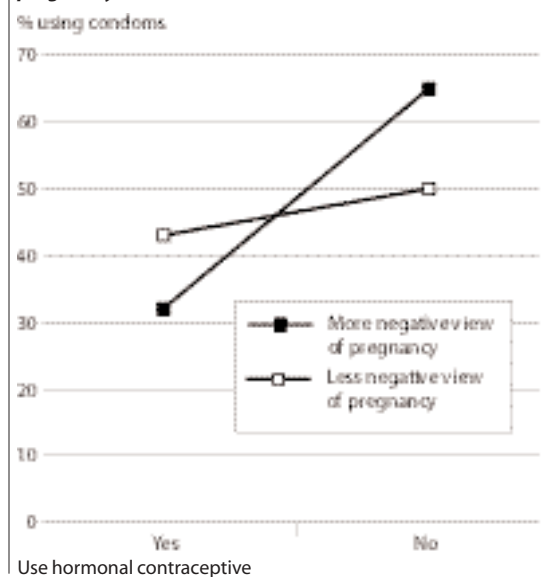
ners. For women, adding these two interactions improved the overall significance of the model. Among adolescent men, perceiving pregnancy with a main partner as negative and perceiving oneself to be at risk of acquiring an STD from a main partner had a marginally significant interaction.

For both males and females, we found a significant three-way interaction between hormonal contraceptive use, perceiving pregnancy as negative, and perceiving oneself to be at risk of acquiring an STD (Table 3).

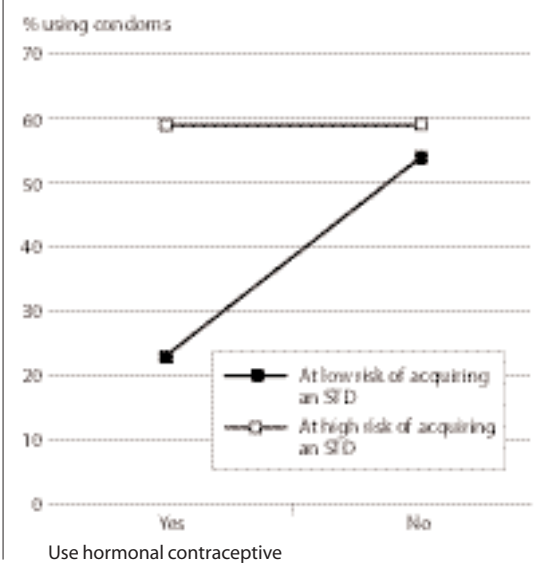
• **Influence of women's pregnancy concerns.** Among young women who perceived pregnancy with a main partner to be more negative, their condom and hormonal contraceptive use were inversely associated (Table 4). Among young women who perceived pregnancy as more negative, the odds of using condoms were significantly lower for those who used hormonal contraceptives than for those who did not, even after we controlled for clinic site, age and length of relationship (odds ratio, 0.1). Among those who viewed pregnancy less negatively, the odds of using condoms did not differ between users and nonusers of hormonal contraceptives. Figure 1 shows that whereas condom use is inversely associated with hormonal contraceptive use among young women who perceive pregnancy as more negative, no association is evident among those who perceive pregnancy as less negative.

• **Influence of women's STD concerns.** Results of the regression analyses also show that among young women who perceived themselves to be at a lower risk of acquiring STDs with a main partner, the odds of using condoms were lower among those who used hormonal contraceptives than among nonusers of these methods (odds ratio, 0.2–Table 4). Among females who perceived the STD risk with main partners to be high, the odds of using condoms did not differ by hormonal contraceptive use. Figure 2 illustrates how perceptions of STD risk affect the relationship between condom and hormonal contraceptive use.

**FIGURE 1. Percentage of adolescent women using condoms with a main partner, by whether they use hormonal contraceptives, according to how negatively they would view a pregnancy**



**FIGURE 2. Percentage of adolescent women using condoms with a main partner, by whether they use hormonal contraceptives, according to their perceived risk of acquiring an STD**



• **Influence of men's concerns.** Among young men, negative perceptions about pregnancy moderated the relationship between perceptions about STD risk and condom use. Among young men who perceived pregnancy to be less negative, those who used condoms had perceptions of higher STD risk; those who did not use condoms had perceptions of lower STD risk. Among young men who perceived pregnancy to be more negative, there was no difference between perceptions of STD risk and condom use.

Another way to examine this interaction is to dichotomize both perceptions of STD risk and perceptions of pregnancy, and look at condom use in each of the four groups. Among young men who reacted less negatively to the idea of their partner's becoming pregnant, 46% of those who perceived their risk of acquiring an STD to be low used condoms, compared with 68% of those who perceived their risk to be high, suggesting that STD risk drives condom use for those whose pregnancy concerns are relatively low. By contrast, among men who reacted more negatively to the possibility of a pregnancy, the proportions who used condoms did not differ significantly according to perceived risk of STDs—65% who perceived themselves to be at low risk of STDs and 70% of those who perceived themselves to be at high risk used condoms.

**Use with Casual Partners**

In bivariate analyses, female and male adolescents' condom use and hormonal contraceptive use with casual partners were not related. For young men, age was the only characteristic associated with condom use. Condom users were younger than nonusers (17 vs. 18 years, on average). There were no differences by age for females. Age was added as a control variable in the logistic regression.

In contrast to the results for main partners, with casual partners, adolescents' hormonal contraceptive use was not

**TABLE 5. Odds ratios (and 95% confidence intervals) from logistic regression analyses predicting the likelihood of female adolescents' condom use with main and casual partners, by selected characteristics, according to partner type**

Variable	Main partner (N=90)	Casual partner (N=90)
Used hormonal contraceptive at last intercourse	0.27 (0.09–0.80)*	2.02 (0.62–6.61)
STD clinic	0.45 (0.15–1.30)	1.04 (0.34–3.20)
Age	0.70 (0.48–1.02)	0.84 (0.57–1.23)
Relationship length	1.00 (0.97–1.03)	1.05 (0.98–1.13)
$\chi^2$	14.7**	4.7

\*p&lt;.05. \*\*p&lt;.01.

a significant predictor of condom use in the logistic regression models.

We directly compared the relationship between condom and hormonal contraceptive use with main versus casual partners by analyzing the subgroup of female adolescents who reported both partner types. We did not conduct a similar analysis for young men, as the subgroup was too small (46 young men) to yield meaningful results. Young women with both serial and concurrent partners were included. This analysis allowed us to compare the contraceptive behaviors of each adolescent across partner types and thus to assess whether differences in contraceptive behavior with main versus casual partners were the result of group differences.

Among young women with both main and casual partners, the subgroup analysis results were similar to those of the overall analyses (Table 5). The odds of using condoms with their main partner were significantly lower among women who used hormonal contraceptives than among those who did not, after clinic site was taken into account (odds ratio, 0.3). Condom use was not related to hormonal contraceptive use with casual partners.

## DISCUSSION

Our results suggest that there is an inverse association between adolescents' condom use and hormonal contraceptive use that varies as a function of type of sexual partner, and as a function of adolescents' perceptions of pregnancy and STD risk. With main partners, adolescents traded condoms for hormonal contraceptives. With casual partners, they did not. Among females with main partners, the odds of using hormonal contraceptives and not condoms were elevated for those with the most negative view of pregnancy or with the lowest estimation of their risk of acquiring an STD. For young women with other perceptions, condom use and hormonal contraceptive use were not linked.

This inverse association is another way to look at the combined use of condoms with hormonal contraceptives. The stronger an inverse relationship between condom and hormonal contraceptive use, the lower the rates of combined use. Because of the low number of users of both condoms and hormonal contraceptives in our sample, we were unable to examine combined use directly.

Adolescents' perceptions of the risk of becoming preg-

nant and acquiring STDs and their probable reactions to experiencing either of these events were important moderators of the relationship between condom and hormonal contraceptive use with main partners. We believe that young women who perceive pregnancy with main partners as more negative use condoms primarily for pregnancy prevention, and are likely to abandon condoms if they begin using a more effective hormonal contraceptive method. Similarly, young women who perceive themselves to be at a low risk of acquiring an STD may also be using condoms primarily for pregnancy prevention and, again, are likely to abandon condoms if they begin using a more effective hormonal method. By contrast, we expect that adolescents with strong concerns about STDs will use condoms primarily for STD prevention, and may be reluctant to abandon condoms even when they begin to use hormonal contraceptives. Among young women in our sample, this group reported the highest rate of dual use (22%).

We found an important interaction between concerns about pregnancy, concerns about STDs and condom use among young men. The majority of men who perceived pregnancy as more negative reported condom use (65–70%), regardless of their STD concerns, suggesting that they used condoms primarily for pregnancy prevention. Among young men who perceived pregnancy as less negative, larger proportions of those who were also concerned about STDs than those who were not as concerned used condoms, suggesting that STD risk drives condom use only when pregnancy concerns are lower.

For both males and females, the three-way interaction between hormonal contraceptive use, perceiving pregnancy as negative and perceiving oneself to be at risk for STDs was also significant, demonstrating the complex interplay between condom and hormonal contraceptive use, pregnancy concerns and STD concerns.

Consistent with previous research, we found contraceptive behavior to vary by type of sexual partner.<sup>24</sup> With main partners, adolescents used either condoms alone or hormonal contraceptives alone, suggesting that the decision to use one method affects the use of the other method. With casual partners, condom and hormonal contraceptive use were not associated, suggesting two unrelated decisions. The inverse relationship between condom and hormonal contraceptive use with main partners, with concomitant low rates of dual use, is of concern because most sexually active adolescents are in relationships with a main partner,<sup>25</sup> and teenagers' unintended pregnancies and STDs occur in the context of such relationships.

The reasons adolescents behave differently with main and casual partners are not completely understood. Previous work has shown that adolescents perceive casual partners to represent a greater risk for STDs than main partners.<sup>26</sup> We suspect that the decision to use condoms with a casual partner is based on STD concerns, and is not necessarily linked to hormonal contraceptive use or pregnancy concerns. Another possibility is that the easy availability of condoms makes them the preferred method for casual re-

relationships, which characteristically involve less planning than relationships with a main partner. By contrast, we suspect that adolescents with a main partner perceive a low enough risk for STDs that their decision whether to use condoms is driven mostly by their concerns about pregnancy. Thus, couples who desire an effective method of pregnancy prevention will stop using condoms if they start using hormonal contraceptives.

Differences in contraceptive behavior resulted from differences in an individual's sexual relationships rather than from differences between individuals. In our subgroup analysis, the same individual made different contraceptive choices with different types of sexual partners. This suggests that providers cannot deliver the same contraceptive counseling to all adolescents, but must tailor it to the type of relationship in which an adolescent is engaged.

Other relationship and demographic variables did not influence the association between condom use and hormonal contraceptive use. These results suggest that there is something intrinsically different between main and casual sexual relationships that cannot be captured by one-dimensional constructs such as length of relationship.

Different factors moderated the inverse association between hormonal contraceptives and condoms, and different factors predicted condom use for males and females. This is consistent with male-female differences in other contraceptive behaviors, such as condom use alone, documented elsewhere in the literature.<sup>27</sup> Our models were better at predicting female behavior than male behavior. Several reasons may explain this: the smaller number of young men in our sample, which limited statistical power; measurement problems inherent in asking young men to report on their partner's behavior; issues related to sex-specific contraceptive methods, such as the lack of control that males have over hormonal contraceptive use or the lack of information they may have about their partner's hormonal contraceptive use; or true sex differences in motivation to use a particular method.

Other limitations of our study were our use of a clinic-based sample recruited from two sites, a conceptual design that did not directly examine dual users and nonusers, and a sample size that limited power in certain analyses. Clinic-based samples may have different contraceptive use patterns and different perceptions of STD and pregnancy risks than the population as a whole. To understand the biases as best we could, we looked for differences between adolescents who participated in the study and those who refused to participate, and examined whether differences in clinic site exerted either a main effect or an interaction effect on contraceptive use. Finally, sample size and limited power prevented us from examining how other contributors to adolescent contraceptive use, such as actual risk, drug use and parental characteristics, affect the trade-off between hormonal contraceptives and condoms.

Awareness of the interplay between types of sex partners, pregnancy and STD concerns, and contraceptive use will help clinicians counsel adolescents. Our findings suggest

that prevention programs will need to target relationships with main partners to improve dual-method use in accordance with the Healthy People 2010 recommendations. Clinicians should focus counseling on maintaining condom use when starting adolescents in such relationships on hormonal contraceptive use. They also may want to assess young people's perceptions of pregnancy and STD risk, and provide targeted counseling about these risks. It is often simplest for clinicians to address STD protection and pregnancy prevention as separate decisions, but given the link we found between condoms and hormonal contraceptive use with main partners, clinicians may want to address them as one related decision. Explicitly addressing adolescents' perceptions of risk and their probable responses to becoming pregnant or acquiring an STD may increase combined condom and hormonal contraceptive use.

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