The Influence of Relationship Context on
Relationship-Specific Contraceptive Behavior Among Youth*

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Abstract

Contraceptive behavior by an individual varies both across and within relationships, and the nature and characteristics of relationships can influence use and the type of method used. This study utilizes the retrospective sexual relationship histories of young adults available in the most recent wave (2001-2002) of the National Longitudinal Study of Adolescent Health (Add Health) to explore relationship-specific contraceptive method choice. Hierarchical generalized linear modeling is used to estimate the effects of both relationship-level and individual-level characteristics on the type of contraceptive method used at last sex. Four mutually exclusive categories for method use were constructed: condom only, hormonal method only, dual method (condom plus hormonal method), and no method. A number of relationship characteristics are significantly associated with contraceptive use even when controlling for individual characteristics. Moreover, the effects of relationship characteristics differ depending on the type of method examined. Significant between-individual variation in the type of contraceptive method used remains. Not only are the characteristics of the individuals forming the relationships of importance in determining contraceptive practices, but so too are the unique features of the relationship itself. Further investigation of other aspects of the relational context is warranted.

Introduction

Over the past fifty years, a number of important social, demographic, and economic changes have occurred in the United States that have had a profound impact on the sexual and romantic lives of young people. These changes have contributed, in part, to the lengthening of the adolescent period and the postponement of the transition to adulthood and more importantly, to the separation of sexual activity and childbearing from the institution of marriage (Casper & Bianchi, 2002; Furstenberg, 2000; Gagnon, 1990; Hogan & Astone, 1986) thereby increasing the length of time during which youth are sexually mature and unmarried. Onset of sexual activity, as well as the accumulation of romantic and sexual relationship experiences, occurs during the period of adolescence and young adulthood. The occurrence, timing, and sequencing of these transitions and experiences have implications for successful individual and social development (Elder, 1995; 1997; Dornbusch, 1989; Furstenberg, 2000; Graber, Brooks-Gunn, & Petersen, 1996). A number of health-risk behaviors, including having multiple partners, short-term relationships, unprotected sexual intercourse, and high-risk partners, that can result in outcomes such as unintended pregnancies and sexually transmitted diseases (STDs) including HIV/AIDS, are often established during adolescence and extend into young adulthood (Darroch et al., 2001; Finer, Darroch, & Singh, 1999; Miller et al., 1999; Santelli et al., 1998; Sonenstein et al., 1998; Ventura et al., 2000). Therefore, the sexual and contraceptive decisions that are made during adolescence and young adulthood can have long term consequences for the reproductive health and family formation behaviors of individuals and fundamentally shape the later life course.

The purpose of this study is to investigate the association between relationship characteristics and contraceptive method choice, specifically focusing on the method used at last sexual experience *within each relationship*. To do this, we use the retrospective sexual relationship histories of young adults available in the most recent wave (2001-2002) of the National Longitudinal Study of Adolescent Health (Add Health) and employ hierarchical generalized linear modeling to estimate the effects of both relationship-level and individual-level characteristics. Through the use of longitudinal data and multilevel techniques, we are able to examine individuals' multiple relationships that span mid-adolescence through young adulthood and to investigate the influence of relationship characteristics on relationship-specific contraceptive behavior. We examine multiple types of contraceptive methods because we believe that differential processes lead to different types of methods being used. In other words, we expect that the effect of relationship and individual characteristics will differ depending on the type of method examined. In addition, we believe that nonuse is among the set of youth's method choices and thus should be included in models that examine contraceptive behavior.

<center>Background and Conceptual Approach</center>

The transition to adulthood is a dynamic life stage comprised of important biological and age-related social changes and experiences. It is the period when youth begin to form identities and become autonomous individuals (Erickson, 1963; 1968). It is also during this time that norms and expectations pertaining to sexuality and sexual expression become part of the socialization process (DeLamater, 1981; Erickson, 1963; Gagnon & Simon, 1973). Youth attain reproductive maturation and establish relationships that may involve sexual activity. Becoming sexually experienced and

<center>4</center>

forming romantic and sexual relationships are socially and culturally defined transitions

with both personal and social meaning and consequences (Christopher, 2001; Coates,

1999; Collins, 2003; DeLamater, 1981; Furman & Wehner, 1994; Gagnon & Simon,

1973; Miller & Benson, 1999). Relationships provide a significant interpersonal context

for psychosocial and sexual development. Intimacy and sexuality, which often emerge as

these close relationships develop, are key components of identity formation and the

ability to interact with others and with the social surroundings (Connolly & Johnson,

1996; Erickson, 1963; Fischer, Munsch, & Greene, 1996; Herold & Marshall, 1996;

Miller & Benson, 1999; Miller, Christopherson, & King, 1993; Sullivan, 1953).

Relational patterns and behaviors learned during adolescence may also set the stage for

future relationships in young adulthood, including marital unions (Erikson, 1968;

Sullivan, 1953; Thornton, 1990). Consequently, an examination of youth's romantic and

sexual relationships is central to a greater understanding of their sexual and contraceptive

behaviors.

Our conceptual approach proposes that characteristics of the individual and the

relationship influence contraceptive use within a given relationship. Social and

demographic characteristics of youth, such as age, gender, race, ethnicity, nativity status,

and family background, are markers of an individual's location in society. These factors

represent social position (Grusky, 2001) and thus fundamentally shape youth's life

experiences, the opportunities and resources available to them, and the choices they

make, including sexual and contraceptive ones. Furthermore, the social and cultural

significance of being sexually active, as well as the normative proscriptions and

prescriptions about the timing and appropriateness of sex and contraception often vary by

age, gender, race, ethnicity, nativity status, and family background. Additionally, we recognize that these factors may also partially determine whether and with whom youth form relationships and the characteristics of their relationships (Brown, 1999; Coates, 1999; Connolly & Johnson, 1996).

We view youth's sexual relationships as important contexts in themselves, positing that the characteristics of youth's partners and relationships (e.g., seriousness) contribute to shaping the sexual-decision making process (Graber et al., 1996; Miller & Benson, 1999). The decision to use a contraceptive method and which method to use often reflects the wants and needs of both individuals involved, independently and/or as a couple and therefore we must consider the relational context. We examine two important dimensions of the relationship: 1) commitment, operationalized as relationship status, how long the couple knew each other before first having sexual intercourse, duration of the sexual relationship, and frequency of sexual activity, and 2) couple homogamy, measured by the age difference and racial/ethnic difference between partners.

Individual characteristics and contraceptive behavior

Age has substantial cultural and social meaning and indicates to the youth and to society whether an individual is ready to engage in sexual activity, form romantic and/or sexual relationships, and what type of behaviors may or may not be appropriate (DeLamater, 1987; Gagnon, 1990). Additionally, age is important because it is related to changes in how an individual might view romantic and sexual relationships, and thus how an individual might experience and behave in these relationships (Furman, Brown, & Feiring, 1999). Age is also associated with cognitive development during adolescence and so may determine the extent to which youth are capable of processing information

and understanding the nuances of their behavior (Fischer et al., 1996). At a young age, youth may not be able to fully comprehend the consequences of engaging in unprotected sexual intercourse. Contraceptive use patterns may change over a youth's life course (Kahn, Rindfuss, & Guilkey, 1990). As they age, gain experience, and acquire a greater number of sexual partners, they may be better able to process and refine behaviors in their relationships, including contraceptive practices, which then influences how their behaviors may evolve within as well as across relationships (Furman & Simon, 1999). With increasing age, youth are also more likely to become emotionally involved with their partners and subsequently expand the types of behavior that are acceptable in more committed relationships (Brown, 1999; Connolly & Goldberg, 1999; Miller & Benson, 1999). We therefore hypothesize that the age of an individual at the beginning of a relationship has an effect on whether contraception is used and also which types of methods are used.

Explanations for the variation in contraceptive use by gender have centered on biological and maturational differences, variations in social controls, differences in the opportunity costs of having sex, and differences in the motivation to engage in sex (Cooper, Shapiro, & Powers, 1998; DeLamater, 1987; Gagnon, 1990; Gagnon & Simon, 1973; Lindsey, 1997; Maccoby, 1998; Moen, 1995; Oliver & Hyde, 1993; Udry, 1988; Udry & Billy, 1987). In addition, there may be normative expectations regarding the appropriate age and circumstances of sexual intercourse that also vary by gender (Aneshensel, Fielder, & Becerra, 1989; DeLamater, 1987; Flores, Eyre, & Millstein, 1998; Gagnon, 1990; Oliver & Hyde, 1993; Upchurch, Aneshensel, Mudgal, & McNeely, 2001). Moreover, romantic and sexual relationships themselves develop within the

context of existing gender-relations, which contributes to the formation of gender-differentiated attitudes and behaviors that then affect how individuals relate to and negotiate behaviors, such as contraception, with the other sex in heterosexual relationships (Feiring, 1999; Leaper & Anderson, 1997; Maccoby, 1998). An explanation for racial and ethnic differences in contraceptive behaviors suggests that these differences may be indications of subgroup normative differences in the acceptability of sexual intercourse and contraceptive use (Forrest & Singh, 1990; Furstenberg et al., 1987; Santelli et al., 2000; Sonenstein et al., 1989). Similar explanations have been posited for differences by nativity status (Flores, Eyre, & Millstein, 1998; Ford & Norris, 1993; Upchurch et al., 1998, 2002). Accordingly, we examine the role of these key individual factors on contraceptive behavior within relationships.

Age at first sexual intercourse is associated with a number of sexual risk taking behaviors. Youth with earlier ages at initiation of sexual intercourse are less likely to have used a contraceptive method at first sexual intercourse (Abma, Martinez, Mosher & Dawson, 2004) and at last sexual intercourse (Santelli et al., 1997). They are also more likely to have reported that their first sexual experience was nonvoluntary (Abma, Driscoll, & Moore, 1998). They tend to have a greater number of recent and lifetime sexual partners (Greenberg, Madger, & Aral, 1992; IOM, 1997; Santelli et al., 1998). Earlier sexual debut has also been shown to be associated with risk of STDs (Upchurch & Kusunoki, 2004; Upchurch, Mason, Kusunoki, & Kriechbaum, 2004). Thus, we conceptualize age at first sex as a key risk-related behavior and investigate the effect that age at first sex has on contraceptive behavior within relationships.

Family is central to youth's formation of sexual attitudes and behaviors as it

provides a social and economic environment, cultural values, and standards of sexual

conduct (Becker, 1981; Davis, 1976; DeLamater, 1981; Fox, 1981; Jencks & Mayer,

1990; Maccoby, 1992; Ramirez-Valles et al., 1998; Reiss, 1967). The family also

influences the attitudes and sexual and contraceptive practices of youth through role

modeling, social learning, control, monitoring, and supervision (DeLamater, 1981;

Hirschi, 1969; Maccoby & Martin, 1983; Parsons & Bales, 1955; Rossi & Rossi, 1980).

The effects that these resources and socialization processes have on sexual and

contraceptive practices may then carry forward into young adulthood through their

indirect influence on the future goals of youth, the selection of partners, and the types of

family formation behaviors desired. In the current study, we investigate the extent to

which family background factors having lasting effects on contraceptive behavior from

adolescence to young adulthood.

Relationship characteristics and contraceptive behavior

Our conceptual approach proposes two key dimensions of relationships that are

important for investigating contraceptive use: 1) commitment and 2) couple homogamy.

Relationship commitment and contraceptive behavior. Several measures have

been used to capture aspects of relationship commitment. These include relationship

status, amount of time that the couple knew one another before first having sex, duration

of the relationship, and frequency of sexual activity. In less committed relationships,

partners may know little about one another and therefore may be unable to assess the risk

associated with engaging in unprotected sexual intercourse and so may rely on barrier

methods such as condoms. As a relationship progresses and becomes more committed,

partners know more about each other and may also assume exclusivity, and thus may be less likely to use condoms and more likely to use hormonal contraception for pregnancy prevention. On the other hand, contraceptive use may be greater in more committed relationships because it may be easier to communicate about sensitive issues such as contraception thereby facilitating use.

There is a strong association between relationship status and the type of contraceptive method used, although the direction and magnitude of the effect has been mixed. Some studies have found that relationships that are new or casual are more likely to use condoms and to do so consistently, while relationships that are established or steady are less likely to include condom use and more likely to include hormonal methods (Catania et al., 1989; Cooper et al., 1998; Fortenberry et al., 2002; Katz et al., 2000; Ku, Sonenstein, & Pleck, 1994; Macaluso, Demand, Artz, & Hook, 2000; Seidman, Mosher, & Aral, 1992; Sheeran, Abraham, & Orbell, 1999; Upchurch et al., 1991; Wingood & DiClemente, 1998). Another set of studies finds the alternative; contraceptive use is more common in committed than in casual relationships (Abma, Driscoll, & Moore, 1998; Ford & Norris, 2000; Ford, Sohn, & Lepkowski, 2001; Manlove, Ryan, & Franzetta, 2003; Manning, Longmore, & Giordano, 2000; Norris, Ford, Shyr, & Schork, 1996). The discrepancies in the literature may be due to a number of factors. Most of the studies have either investigated condom use only or have combined method types and examined any use and/or use at first sex. This is problematic because there are potentially different motivations for using condoms as compared to other methods (particularly hormonal) and these motivations may change across time. Additionally, it is difficult to achieve a standardized definition for the status of a

relationship that can be used across studies to allow for more appropriate comparisons. Finally, the measures that have been used in past research may include too few distinctive categories to accurately evaluate the variability in individuals' assessments of their relationships and the extent to which this relates to contraceptive use. In the current study, we examine a comprehensive set of relationship types, including marriage and cohabitation, as well as various types of non-marital unions. We hypothesize that the status of a relationship is associated with contraceptive use but that there is variability in method choice across relationship types.

Research has also shown that the amount of time the couple knew one another prior to becoming sexually involved, the duration of a relationship, and the frequency of sexual activity are related to contraceptive use. Relationships in which the couple had known one another a greater amount of time before first having sex are more likely to have used contraception (Manlove et al., 2003; Sheeran et al., 1999). Contraceptive use, specifically condom use, becomes less consistent with increased duration of a relationship and is often not used within a relationship after a certain period of time (Fortenberry et al., 2002; Howard et al., 1999; Ku et al., 1994; Macaluso et al., 2000; Manlove et al., 2003). Individuals in relationships in which there is more frequent sexual intercourse are less likely to use condoms (Katz et al., 2000; Sheeran et al., 1999). We hypothesize that these additional markers of commitment will also be associated with contraceptive behavior.

Couple homogamy and contraceptive behavior. Drawing from homogamy theory developed in the marriage literature, our framework proposes that the more similar partners are the more likely they will be to use contraception. Although individuals tend

to form and maintain relationships with those of similar characteristics (Laumann, Gagnon, Michael, & Michaels, 1994), relationships in which partners differ by age and race/ethnicity are not unusual (Ford, Sohn, & Lepkowski, 2003). Age and racial/ethnic differences between partners have implications for contraceptive behavior. Differences between partners on social and demographic factors, such as age and race/ethnicity, may reflect differences in maturity, sexual experience, social and sexual networks, resources, and status. These differences may increase the likelihood of an imbalance in the power dynamics in a relationship, making it particularly difficult to negotiate sexual activity and contraceptive use.

Adolescent women involved in a relationship with someone who is older experience a higher likelihood of engaging in sexual intercourse compared to adolescent women with partners who are the same age (Kaestle, Morisky, & Wiley, 2002). Young women with older partners are less likely to report using a contraceptive method in that relationship; this association has been found for both first and current sexual partners (Abma et al., 1998; Darroch, Landry, & Oslak, 1999; Glei, 1999; Manning et al., 2000; Miller, Clark, & Moore, 1997). A negative association of age difference between partners on contraceptive use has also been found for a sample that includes both young men and women (Ford, Sohn, & Lepkowski, 2002; Manlove et al., 2003). We hypothesize that the extent to which partners are similar on defined features such as age and race/ethnicity will be associated with contraceptive behavior. Specifically, we expect that relationships in which partners differ by age and race/ethnicity will be less likely to use a contraceptive method. Further, we hypothesize that the effect of age difference on contraceptive use will vary by gender.

Measurement and Methodological Issues

The studies reviewed here provide evidence supporting the importance of relational contexts. However, they are limited in a number of ways. First, most of the research that has examined the influence of relationship characteristics has focused on condom use. This research priority resulted from the necessity to better understand the factors that influence condom use as an effective method to reduce the risk of HIV transmission and acquisition. However, given that youth form a variety of relationships, many of which may be precursors to long-term commitments such as marriage and cohabitation, it is important that a more comprehensive examination of other methods of contraception be conducted. Second, these studies have relied on simple categorizations of relationship status (e.g. casual vs. steady), which reduces the ability to capture variability in how individuals may describe their relationships and the effect that this may have on contraceptive use. Third, they have been limited by the available types and number of relationship-specific measures. Finally, few studies have investigated relationship-specific contraceptive method use. Fewer still have examined act-specific method use within a relationship.

Much of the prior reproductive health research has used a *between person* design. This approach allows the researcher to study how people who differ along certain theoretically defined dimensions behave on variables of interest, or how people in general respond to situational variables (Gable & Reis, 1999). This approach, while useful, does not make use of an important source of variability and covariability: people have multiple sexual relationships with different partners, they interact with the same partner in different contexts and roles, and relationships evolve and change over time. A *within*

person approach reflects this conceptually important reality. Ignoring variability across relationships of a specific individual ignores a central principle of relationship theorizing, which is that individuals behave differently with different partners.

Our study extends the existing literature by examining the differential patterns of relationship-specific contraceptive method choice among youth. We incorporate a more detailed description of relationship type, including marital and cohabiting unions, and investigate other important relationship characteristics. Additionally, because relationships change across time thereby making to difficult to relate an individual's retrospective description of the relationship to contraceptive use that occurred at the beginning of a relationship, we examine method used at last sexual intercourse. We argue that a respondent's assessment of characteristics such as relationship type will be more closely aligned with behavior that occurred during the most recent sexual experience. Further, we adopt a within person approach and make use of information on individuals' multiple relationships, which allows us to examine the effect of relational contexts within individuals.

Data and Methods

Study Design and Sample

The data are from Wave III of the National Longitudinal Study of Adolescent Health (Add Health). A detailed explanation can be found on the study's website (http://www.cpc.unc.edu/projects/addhealth/). The original sample is nationally representative of students enrolled in grades 7-12 during the 1994-1995 academic year and consists of 20,745 teens ages 11 to 21. The response rate for Wave I is 78.9%. The Wave II survey was conducted in 1996 and consists of 14,738 teens; the response rate for

Wave II is 88.2%. In 2001 and 2002, Wave I respondents (and 27 Wave II respondents),

now young adults (ages 18-27), were reinterviewed, resulting in a total sample of 15,197.

The response rate for Wave III is 77.4%.

The relationship-level and individual-level data from the Wave III in-home

interview are the primary source of data for this study.[1] At Wave III, respondents were

asked to identify romantic and/or sexual relationships that they were involved in since the

summer of 1995, including relationships that began before 1995 if they continued until at

least June 1995. Respondents answered a short list of questions pertaining to each of the

relationships identified. Respondents then provided more detailed information regarding

both partner and relationship characteristics for a *subset* of all of the relationships they

listed at the beginning. Different versions of the questionnaire comprised of more

detailed questions were administered to the respondents according to defined features of

the relationship (i.e., whether sexual relations had occurred, whether it was a marital

union, whether the couple had ever lived together, etc.). (Refer to sect19 descriptions.pdf

located at http://www.cpc.unc.edu/projects/addhealth/codebooks/wave3 for additional

information on how relationships were selected for the more detailed questions). Due to

this study design, the degree of detailed information varies and is available for only a

subset of the respondents who were interviewed at Wave III and then for a subset of the

relationships identified by the respondents. Of the 15,197 respondents interviewed at

Wave III, 12,431 identified romantic and/or sexual relationships since 1995 for a total of

42,334 relationships. Of the 42,334 relationship identified, 3,959 relationships did not go

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[1] We do not include the relationship information obtained at Waves I and II in this study but are in the process of linking all three waves to examine all sources of relationship-level information.

on to the more detailed section, resulting in a total of 38,375 relationships and 11,934

individuals. [2]

> We limit the analysis to those relationships that were defined as sexual and then

subset on heterosexual relationships[3] in which vaginal intercourse had occurred and

exclude relationships that are missing information on type of contraceptive method and

relationship characteristics.[4] This resulted in an additional loss of 10,930 relationships

and 1,705 individuals. Because we are also interested in the effects of family background

during adolescence, we also exclude the respondents who were not interviewed at Wave

I. This additional exclusion results in a sample of 10,229 individuals and 27,445

relationships. Almost 40 percent of respondents identified only one relationship

(N=4,032). Preliminary findings indicate that there are systematic differences in the

characteristics of these individuals, the characteristics of their relationships, and the type

of contraceptive method used (these results are available upon request; additional work

on this sample is in progress). As such, we have also excluded these individuals from the

current analyses. Our final analytic sample is comprised of N=6,197 individuals and

N=23,413 relationships.

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[2] The interview was initially designed to obtain more detailed information for up to three of the most recent relationships in which sexual relations occurred (sexual relations was defined as vaginal, oral, or anal sex). Due to a programming change that occurred early in the field, respondents were instead asked to provide detailed information for all sexual relationships since 1995. Accordingly, detailed information is not available for all sexual relationships among those respondents who were interviewed prior to the programming change.

[3] Homosexual behavior and relationships do occur during adolescence and are important. However, we limit our research to heterosexual behavior and relationships because the vast majority of youth engage in heterosexual activity (Laumann et al., 1994) and we are also interested in the proximate determinants of pregnancy.

[4] Less than five percent of all relationships were missing information on type of contraceptive method used and relationship characteristics, with less than one percent missing information on the majority of these variables.

Variable Description and Measurement

Dependent variable. Respondents were asked by audio-CASI (Computer Assisted Self-Interview) about their relationship-specific sexual and contraceptive histories. Several questionnaire items were used to determine relationship-specific type of contraceptive method used at last sex. For relationships in which the respondent and the partner were not the same sex, the respondent was asked, "Have you ever had vaginal intercourse with <PARTNER>? By vaginal intercourse, we mean when a man inserts his penis into a woman's vagina." If the respondent answered affirmatively, they were asked questions regarding act-specific contraceptive use. The following methods were queried and multiple responses were allowed: (a) condom, (b) withdrawal, (c) rhythm, (d) birth control pill, (e) vaginal sponge, (f) foam, jelly, creme, suppositories, (g) diaphragm, with or without jelly, (h) IUD, (i) Norplant, (j) ring, (k) Depo Provera, (l) contraceptive film, (m) some other method. If a respondent did not mention condoms as a method of birth control, he or she was given another opportunity to report condom use. The final outcome variable measures contraceptive use at last sex and is coded into the following categories: (a) no method, (b) condom only, (c) hormonal only (birth control pills, IUD, Norpant, Depo Provera), and (d) condom and hormonal.[5]

Individual-level independent variables. The included social and demographic attributes of the young adults are gender, race/ethnicity, and nativity status. Gender is a

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[5] The condom category also includes those who used a condom and any of the following: withdrawal or rhythm, other barrier method, or some other method. The hormonal category also includes those who used a hormonal method and any of the following: withdrawal or rhythm, other barrier method, or some other method. The condom plus hormonal category also includes those who used a condom plus a hormonal method with any of the following: withdrawal or rhythm, other barrier method, or some other method. There was also a category for "other" methods that included withdrawal or rhythm only, other barrier method only, or some other method only or some combination of these three types. However, because only one percent of the sample of relationships fell into the "other" method category, we had to exclude these relationships in order to conduct multilevel analysis. In addition, in preliminary models, very few of the relationship characteristics were associated with using "other" methods relative to no method.

dichotomous variable and is coded as 1 for males and 0 for females. For race/ethnicity

we give priority to any mention of being Hispanic, with groups defined as non-Hispanic

white, non-Hispanic black, or non-Hispanic other. The other category combines Asians

and Native Americans due to small sample sizes.[6] Non-Hispanic white is the reference.

Nativity status is binary for whether an adolescent was born in the United States or not

(reference category is U.S. born). We also include age at first sex (asked at Wave III),

which is measured in years and is included as a linear term. Missing values on age at

first sexual intercourse were imputed using conditional mean imputation. Family

background during adolescence is also included as an individual-level measure. We used

the information in the Add Health household roster at Wave I to construct a detailed

family structure variable categorized as two biological parents, biological mother with

stepfather, biological father with stepmother, biological mother only, biological father

only, and all other situations (e.g., living with relatives other than parents). The two

biological parents category is the reference. Mother's and father's education are

separately coded as years of schooling completed. For a resident parent whose education

was not reported, the missing value was imputed using conditional mean imputation.[7]

Household income for 1994 was available only from information obtained from the Wave

I Parent questionnaire. Approximately 17,000 of the Wave I respondents had a parent

who was also interviewed at Wave I. For missing cases, log-income is imputed from a

number of family characteristics as reported by the adolescent, using OLS regression.

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[6] We recognize that combining these two groups is problematic, however due to the small sample size of
both of these groups we opted to combine rather than drop them. Given that this is now a heterogeneous
group, we will not make much of the results for this contrast.
[7] Nonresident parents were coded zero on education. Any constant would be valid; zero is convenient.
Interpretation of contrasts between family types without a defined parent and family types with both
parents requires post-estimation calculation.

Relationship-level independent variables. Indicators of relationship commitment include relationship status, length of time that the couple knew one another before first having sexual intercourse, duration of the sexual relationship, and frequency of sexual intercourse. Relationship status was created using several questions. For each relationship, respondents were asked whether they were currently living together or had ever lived together and whether they were currently married or had ever married; responses for each of these two questions were never, currently, or previously. For relationships that did not involve a current marriage or current cohabitation, respondents were asked to describe their relationships from a list of responses. [8] The final relationship status variable is a combination of the responses to this question and the questions on marriage and cohabitation and thus includes the following mutually exclusive categories: (a) married, (b) cohabiting, (c) dating exclusively, (d) dating frequently, but not exclusively, (e) dating once in a while, and (f) only having sex. Dating exclusively is normative during this part of the life course and is the most common type of relationship in the sample and is therefore treated as the reference category. The length of time that the couple knew one another before having sexual intercourse was created using a question that asked how long the respondent had known the partner when they first had vaginal sex. The final variable includes the following categories: (a) less than or equal to two weeks (b) two to four weeks, (c) one to five months, (d) six months to a year, and (e) a year or more.[9] The reference category is less than or equal to two weeks. Duration is

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[8] Former marriages and cohabitations were allowed to answer the question regarding the description of the relationship but are recoded to either married or cohabiting.

[9] Respondents were allowed to choose from additional response categories for a day or less, two to seven days, or one to two weeks. Preliminary analyses indicated that relationships in which the couple knew each other for two to seven days or one to two weeks were not significantly different from relationships in which the couple knew each other for one day or less and therefore we combined these three categories.

measured as the length of the sexual relationship.[10] Respondents were asked to provide

both a unit and measure of time (years, months, or days) representing how long the

sexual relationship lasted.[11] Duration is coded in months and categorized into quintiles

representing: (a) one month or less, (b) two to four months, (c) five to 12 months, (d) 13-

27 months, and (e) 28 months or more. The reference category is one month or less.

Frequency of sexual intercourse was asked of relationships in which sex occurred on

more than one occasion. Respondents were asked to provide both a unit and measure of

time (per day, per week, per month, or per year). Frequency of sex is coded as number of

times per week and categorized into quintiles representing: (a) one time per week or less,

(b) two times per week, (c) three times per week, (d) four to seven times per week, and

(e) eight or more times per week. An additional category is created for those

relationships in which sex occurred on one occasion. The reference category is one time

per week or less.

Relationship-specific variables used to evaluate couple homogamy were also

constructed. Specifically, we created variables indicating differences by age and

race/ethnicity. Age difference between partners is measured in years and is based on the

response to a question that asked the respondent how many years older or younger the

partner was. The final age difference variable is categorical and includes the following:

(a) partner is three or more years older, (b) partner is within two years of age, and (c)

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[10] This question was not asked for those relationships that were current. For current relationships, we
created duration using information on when the sexual relationship began and the date of interview.
[11] Respondents were not asked to provide the month and year of first vaginal intercourse with each partner.
Instead, respondents were asked to provide the month and year that the sexual relationship began (sexual
was defined as vaginal, oral, or anal intercourse).

partner is three or more years younger. [12] The reference category is "partner is within two years of age of the respondent." Difference by race/ethnicity was constructed by comparing the respondent's race and ethnicity with the partner's race and ethnicity (partner's race and ethnicity was created similarly to respondent's race and ethnicity, with priority given to any mention of Hispanic). This variable is coded 1 if the couple is a different race and ethnicity and 0 otherwise.

Additional relationship-level variables include whether the relationship is current, whether a pregnancy occurred in the relationship, and age of the respondent at the beginning of the relationship. Current status is coded 1 if current and 0 otherwise. Pregnancy status is coded 1 if a pregnancy had ever occurred in the relationship and 0 otherwise. We also include age of the respondent at the beginning of the relationship as a relationship-level measure because it varies across relationships. This variable is measured in years and is included as a linear term.

Analytic Strategy

We first provide descriptive statistics of the sample of young adults and their current and/or past sexual relationships. We then utilize a multilevel approach to investigate the effects of both individual and relationship factors on the type of contraceptive method used at last sex.[13] Multilevel analysis was conducted using HLM 6.0 (Raudenbush, Bryk, & Congdon, 2004). We employ a hierarchical generalized linear model (HGLM), using a multinomial model and a logit link function (Raudenbush &

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[12] Preliminary analyses indicated that relationships in which the partner was one or two years older or younger than the respondent were not significantly different from those in which the partner and respondent were the same age and thus we have combined these categories.

[13] All results presented are unweighted. We have conducted weighted analyses and there are a few modest changes (these results are available upon request). However, because we are concerned about the computation with weights given the multilevel nature of the data, we are in the process of conducting additional analyses to better understand the substantive relevance of the variables used to construct the weights and how they may or may not affect the results.

Bryk, 2002). In our models, level-1 represents relationships and level-2 represents individuals (i.e., relationships are nested within individuals). The subscript j is for individuals ($j = 1…J$) and the subscript i is for relationships ($i = 1… n_j$).

Following the notation used by Raudenbush and Bryk (2002), the multilevel multinomial model is as follows. The level-1 model in HGLM is comprised of three parts: a sampling model, a link function, and a structural model. The level-1 sampling model for our outcome is multinomial:

$$\text{Prob}(R_{ij} = m) = \varphi_{ij}, \tag{1}$$

such that the probability that relationship i for individual j falls in category m is φ_{ij}, for categories $m = 1,…, M$, where M is the number of possible categories. For our outcome, $M = 4$. When the level-1 sampling model is multinomial, HGLM uses the logit link function. For each category $m = 1,…, M − 1$, we have

$$\eta_{mij} = \log\left(\frac{\varphi_{mij}}{\varphi_{Mij}}\right). \tag{2}$$

η_{mij} is defined as the log-odds of being in the mth category relative to the Mth category, which is known as the reference category. The reference category for our analysis is no method. The level-1 structural or within-individual model represents separate regression equations for each individual and is expressed as:

$$\eta_{mij} = \beta_{0j(m)} + \sum_{q=1}^{Q_m} \beta_{qj(m)} X_{qij}, \text{ for } m = 1,…, M − 1. \tag{3}$$

For $M = 4$, there would be three level-1 equations, one for each method relative to no method. The level-2 or between-individual model has a similar form and is expressed as:

$$\beta_{qj(m)} = \gamma_{q0(m)} + \sum \gamma_{qs(m)} W_{sj} + u_{qj(m)}, \text{ for } q = 0,\ldots, Q_m \text{ and } s = 1,\ldots.S_m. \qquad (4)$$

Similarly, for $M = 4$, there would be three level-2 equations. We hypothesize that, in

addition to the individual-level variables that we have included in our model, there are

other individual-level variables that may explain between-individual variation in

contraceptive behavior. For the current analysis, we allow for such additional effects by

letting the individual-specific intercepts, $\beta_{0j(m)}$, vary randomly across individuals.

Because we do not have substantive rationale for anticipating that the effects of

relationship-level variables will vary randomly across individuals, we treat all other level-

1 coefficients as fixed. The full model, which includes both relationship and individual

characteristics, is as follows:

Level-1:

$$\eta_{mij} = \beta_{0j(m)} + \sum_{q=1}^{Q_m} \beta_{qj(m)} X_{qij}, \text{ for } m = 1,\ldots, M - 1 \qquad (5)$$

Level-2:

$$\beta_{0j(m)} = \gamma_{00(m)} + \sum \gamma_{0s(m)} W_{sj} + u_{0j(m)}, \text{ for } m = 1,\ldots, M - 1 \qquad (6)$$

Results

The first panel of Table 1 presents the individual-level characteristics of the

young adults (N=6,197 individuals). The mean age of the respondents at Wave III is 22

years. The majority of young adults are female (56.5 percent). Almost two-thirds of the

youth are white (60.3 percent), followed by blacks (19.6 percent), Hispanics (13.9

percent), and the remainder are Native American or Asian. About 5 percent are foreign

born. The average age at first intercourse for is about 16 years. Fifty-four percent of

young adults lived with two biological parents at the Wave I interview date, and almost

26 percent lived with their biological mother only; the remainder lived in stepfamilies,

with their biological father only or in other situations. Among youth who had a mother,

maternal education as of the Wave I interview date was about 13.4 years and among

those who had a father, paternal education as of the Wave I interview date was 13.6

years. The mean 1994 household income of youth was $45,949.

Table 1 here

The second panel of Table 1 shows the relationship-level characteristics of young

adults (N=23,413 relationships). The majority of relationships are described as

exclusively dating relationships (35.3 percent), followed by relationships described as

only having sex (24.0 percent), cohabiting relationships (15.1 percent), frequently but not

exclusively dating relationships (12.6 percent), and relationships in which the couple

dated once in a while (8.4 percent). Less than five percent of relationships are marriages.

About 20 percent of the relationships are current as of the Wave III interview date. A

pregnancy had occurred in almost 13 percent of the relationships. About 10 percent of

couples had known each other for a day or less before first having sex. Over one-quarter

of couples had known each other for more than one month but less than six months.

Slightly more than 20 percent knew each other for a year or more. Almost one-quarter of

the sexual relationships lasted a month or less, less than half lasted more than a month but

less than or equal to one year, and over one-quarter of relationships lasted for more than a

year. Sex had occurred on only one occasion for over 20 percent of the relationships.

Among relationships in which sex occurred on more than one occasion, the majority of

relationships involved sexual activity about 1 or fewer times per week, followed by

relationships in which sex occurred about 4-7 times per week, 2 times per week, 3 times per week, and 8 or more times per week.

Over 25 percent of relationships involved a partner who was three or more years older than the respondent, about one-fifth of partners were the same age as respondents, and less than seven percent of relationships involved a partner who was three or more years younger than the respondent. Over seventy-five percent of relationships involved a partner who was the same race/ethnicity as the respondent. The mean age of respondents at the beginning of the relationship is 18.75 years. Almost 50 percent of the relationships began when the respondent was 18 years old or younger (not shown). The majority of relationships used a condom at last sex (40.6 percent), followed by no method (29.7 percent), dual method (15.7 percent), and a hormonal method (13.9 percent).

Table 2 presents the multilevel multinomial logistic regression including both individual and relationship characteristics.[14] Males are less likely than females to report hormonal or dual method use at last sex compared to no method; there is no difference in condom use. Compared to whites, blacks are more likely to have used a condom at last sex and less likely to have used a hormonal method relative to no method. Compared to whites, Hispanics are less likely to use a hormonal or a dual method relative to no method; there is no difference in condom use. Compared to U.S. born, foreign born are less likely to use a hormonal or dual method versus none; there is no difference in condom use. The later the onset of sexual activity, the greater is the likelihood of using any method relative to no method. Age at first sex is also positively associated with the likelihood of using a dual relative to a hormonal method. The effects of family structure

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[14] In order to examine the results of all the possible contrasts (6 non-redundant comparisons), we re-estimated the models two additional times using hormonal and dual methods as references.

at W1 are modest[15]; but measures of family SES are significant. As maternal education increases, the likelihood of using any method relative to no method increases. Paternal education is significant and positive for using a hormonal method relative to no method. Household income is positive and significant for hormonal use versus no method.

For a given individual, compared to exclusively dating relationships, married, cohabiting, and sex only relationships are less likely to have used any of the methods at last sex relative to no method. All of the coefficients for relationship status are significant when comparing each method to no method except for frequently dating and dating once in a while relationships. The coefficients for each relationship status contrast show relative differences in method type among users. For example, married and cohabiting relationships are more likely to use a hormonal method at last sex relative to a condom or a dual method. In contrast, relationships described as only having sex are more likely to use a condom at last sex than a hormonal or dual method. Compared to past relationships, those that are current are less likely to have used a condom or a dual method relative to no method and more likely to have used a hormonal method relative to no method. Relationships in which a pregnancy had ever occurred are less likely to have used any method relative to no method.

The amount of time that the couple knew each other before first having sex is positively associated each type of method considered compared to no method. Relationships that lasted two to four months are more likely than relationships that lasted a month or less to have used a condom relative to no method. Beyond five months,

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[15] The significant contrasts are the biological father only and the other situation. These two groups are small and select. In addition, post-estimation computation is required to accurately evaluate the family contrasts without a mother and/or a father. The model coefficients cannot be interpreted without taking parental education into consideration.

however, duration is not associated with using a condom relative to no method. When comparing condom use at last sex to hormonal or dual method use, however, relationships that have lasted five months or more are less likely to have used a condom than are relationships that lasted a month or less. As the length of the relationship increases, the likelihood of using a hormonal or a dual method relative to no method increases. Relationships in which sex occurred on one occasion are more likely to have used a condom relative to no method and less likely to have used a hormonal method relative to no method than are relationships in which sex occurred on more than one occasion. As the frequency of sexual activity increases, the likelihood of using a condom or a dual method significantly decreases, whereas the likelihood of using a hormonal method relative to no method increases.

Relationships in which the partner is three or more years older are less likely to have used any of the methods considered relative to no method than are relationships in which the partner is within 2 years of age. In addition, relationships in which the partner is three or more years younger are less likely to have used a hormonal or a dual method relative to no method.[16] Relationships in which the partner is a different race/ethnicity are not significantly different from those in which the partner is the same race/ethnicity in terms of using any method relative to no method.[17]

The older the individual was at the beginning of the relationship, the more likely hormonal and dual method and the less likely condoms were used at last sex compared to no method. Age at the beginning of the relationship is negatively associated with using a

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[16] Because we posited that the effect of age difference would vary by gender, we allowed the effect of age difference at level-1 to vary nonrandomly as a function of an individual's gender (level-2). The effect of this cross-level interaction was not significant and was thus not included in the final model.

[17] In a model that included only relationship characteristics, racial/ethnic difference between partners was negative and significant for the hormonal versus no method comparison.

condom relative to a hormonal or dual method and using a dual relative to a hormonal method. The intercept variance components represent residuals at the individual level for each dependent variable or individual effects that are left unexplained by the independent variables included in the model. All of the random variance components are significant, indicating that there is still significant variation across individuals in the type of contraceptive method used.

<div align="center">Discussion</div>

Not only are the characteristics of the individuals forming the relationship of importance in determining contraceptive practices, but so too are the unique features of the relationship itself. Like other studies, we find that the nature and characteristics of relationships influence contraceptive behavior (Ford & Norris, 2000; Ford et al., 2001; Howard et al., 1999; Katz et al., 2000; Ku et al., 1994; Manning et al., 2000; Manlove et al., 2003; Sheeran et al., 1999; Upchurch et al., 1991; Wingood & DiClemente, 1998). We have, however, gone beyond the scope of other studies by incorporating individual's multiple relationships from mid-adolescence to young adulthood and by utilizing multilevel techniques to examine these relationships. In other words, we acknowledge that relationships for the same individual are more similar than relationships for different individuals and at the same time that a given relationship may change across time and that a given individual may behave differently in different relationships. Our findings regarding the importance of relationship characteristics for both use and the type of method used provide further justification that contraceptive practices cannot be fully understood without studying the relationship in which the behavior occurs.

We find that individual-level factors are associated with the type of contraceptive method used at last sex and that the effects of these factors are similar to findings from other studies (Abma et al., 2004; Bankole, Darroch, & Singh, 1999; CDC, 2004; Mosher et al., 2004). Males are less likely to report using a hormonal or dual method relative to no method in their relationships. This may be due to underreporting of female-controlled methods by male respondents because they may not know that their partners are using hormonal methods. Males, however, are no more likely than females to report condom use relative to no method in their relationships. This finding is contrary to those from the Youth Risk Behavior Surveillance System (YRBS), which found that males were more likely than females to report condom use at last sex (CDC, 2004). The YRBS is a sample of adolescents and our results may suggest that differences between genders may decrease as adolescents age into young adulthood. Compared to whites, blacks are more likely to report condom use relative to no method but less likely to report hormonal use. Blacks are at particularly high risk of STDs, including HIV and thus may be aware of such differentials and are therefore protecting themselves against the risk of these outcomes through the use of barrier methods such as condoms. Compared to whites, Hispanics are less likely to use a hormonal or dual method compared to no method. This may be due to subgroup normative differences regarding birth control. Maternal education during adolescence is positively associated with contraceptive use. Mothers may communicate information regarding contraception as well as educational goals and aspirations, which have long term benefits for young adults' behaviors within both current and past relationships. This finding supports the importance of the family as a source of information, resources, and socialization. We also find that individuals with

older ages at first sex are more likely to use each method compared to no method. This indicates that the protective effect of later onset of sexual activity on contraceptive method use at first sex found by other studies (Abma et al., 1998; Abma et al., 2004; Manning et al., 2001) may also explain relationship-specific contraceptive use at last sexual intercourse.

We find that indicators of relationship commitment and couple homogamy are associated with contraceptive behavior in more or less the expected direction, except for relationship status. Our findings indicate that more serious relationships (e.g., married and cohabiting) are less likely to have used any method than exclusively dating relationships. This is surprising. According to the advanced data report based on the 2002 National Survey of Family Growth (Mosher et al., 2004), married and cohabiting women report higher percentages of current method use than never married, not cohabiting women. The Add Health sample is relatively young and therefore the marriages and cohabitations identified here may be representative of selective family formation behaviors, such as earlier ages at marriage and cohabitation. The desire and/or necessity to use any contraception in these relationships may be lower because the cost of becoming pregnant is lower for these select relationships. Individuals in these relationships may also have different union formation and lifestyle beliefs. Although we have controlled for whether a pregnancy had occurred, we do not know the couple's pregnancy intention at last sexual intercourse. Our finding for marriages may also be explained by differences in religious affiliation and religiosity. Being affiliated with the fundamentalist Protestant faith and stating that religion is very important are each associated with early marriage (Bramlett & Mosher, 2002). Religion and religiosity have

also been posited to reduce the likelihood of contraception (Rostosky, Wilcox, Wright, & Randall, 2004). It is unclear, however, whether religious differences would explain the finding for cohabiting relationships. We are going to examine the extent to which religion and other important factors may explain these findings in future analyses.

Among users, however, the results are in the expected direction, with more committed relationships being more likely to have used a hormonal method relative to a condom or a dual method. Among relationships in which contraception is used, the risk of pregnancy may be greater than the risk of sexually transmitted diseases for relationships that are married and cohabiting compared to other types of relationships. This is evidenced by a greater likelihood of using a hormonal method relative to a condom and a dual method among these relationships as compared to exclusively dating relationships. Committed relationships may also experience greater emotional closeness, which has been shown to be associated with a reduced likelihood of developing intentions to use condoms (Santelli et al., 1996). Also, methods such as condoms may not be adequately integrated into relational scripts in serious relationships. In intimate relationships, individuals may not consider using condoms because of normative beliefs about what should occur in intimate relationships or because either partner may be hesitant to introduce the use of condoms as it may imply infidelity, signify distrust, or symbolize casual sex (Cooper et al., 1998; Hynie, Lydon, Cote, & Weiner, 1998; Gilmore, DeLamater, & Wagstaff, 1996; Wingood & DiClemente, 1998).

Conversely, in less committed relationships, such as those described as being only sexual, the use of condoms or dual methods may occur with greater likelihood because the risk of sexually transmitted diseases may be of primary concern (Ku et al., 1994;

Sheeran et al., 1999). However, we find that these more casual types of relationships are actually less likely to be using any method of protection than are exclusively dating relationships. From a public health perspective, this is concerning as these relationships are much higher-risk and warrant the use of protection. Individual's perception of the partner's attitude regarding contraception and the content of communication are significant determinants of use (Manlove et al., 2003; Sheeran et al., 1999; Wingood & DiClemente, 1998). Because individuals in these types of relationships may not know enough about each other, they may be unable to accurately assess the partner's perceptions and/or perceive greater negative consequences of using contraception. In these casual types of relationships, communication about contraception may also be particularly difficult. When comparing method users, however, relationships described as only sexual are more likely to have used a condom or a dual method relative to a hormonal method than relationships that are dating exclusively. This is encouraging because if individuals in these types of relationships do use a method, they are more likely to use methods that provide greater protection against sexually transmitted diseases (e.g., condoms and dual methods). Relationships that are identified as frequently but not exclusively dating or as dating once in a while do not differ in their use of condoms relative to no method. These relationships are less likely to use a hormonal or dual method relative to no method than are exclusive dating relationships and are also more likely to use a condom or a dual method relative to a hormonal method.

The findings for the condom versus hormonal comparisons are consistent with other research that finds that more casual relationships are more likely to use condoms and more committed relationships are more likely to use hormonal methods (Catania et

al., 1989; Cooper et al., 1998; Fortenberry et al., 2002; Katz et al., 2000; Ku et al., 1994; Macaluso et al., 2000; Seidman et al., 1992; Wingood & DiClemente, 1998). In this study, we are able to examine a more detailed description of the committed versus casual dichotomy and in fact, find that there are differences that may not have been depicted by previous distinctions. In other words, there appear to be gradations of relationship status; more committed relationships can be broken down into additional categories of married, cohabiting, or dating exclusively and we find that the effects of each of these types on contraceptive behavior differ. Similarly, casual can be further broken down into categories of frequently but not exclusively dating, dating once in a while and sex only relationships, and again there is variation in contraceptive use across these categories.

Other indicators of relationship commitment are associated with contraceptive behavior in the expected ways. As the amount of time that the couple knew one another before having sex increases, the likelihood of contraceptive use increases. While this is similar to other studies (Manlove et al., 2003; Sheeran et al., 1999), we find that it is not associated with the type of method used among users. In other words, among users, the amount of time that the couple knew each other does not affect which type of method is used, just that it is used. As the duration of the relationship increases, the likelihood that the couple will use a hormonal method or a dual method relative to no method increases. Beyond five months, however, relationships that are longer are no less likely to use a condom relative to no method. On the other hand, duration has the expected effects among users: as the length of the relationship increases, the likelihood of using a condom or a dual method relative to a hormonal method decreases. These findings support the results of other researchers that indicate that condom use decreases across time within a

given relationship and that other non-barrier methods such as the pill may be used instead (Fortenberry et al., 2002; Howard et al., Katz et al., 2000; Ku et al., 1994; Macaluso et al., 2000). Frequency of sex is associated with use and type of method used. Similar to other studies (Katz et al., 2000; Sheeran et al., 1999), we find that use of barrier methods such as condoms decreases and use of non-barrier methods such as the pill increases with increasing frequency. This may occur because of greater stability or intimacy in such relationships (Cooper et al., 1998; DeLamater, 1981) or because condoms may be viewed as inconvenient or as a hindrance to sexual pleasure (Katz et al., 2000).

Consistent with other studies (Abma et al., 1998; Darroch et al., 1999; Ford et al., 2001; Ford et al., 2002; Glei, 1999; Manlove et al., 2003; Manning et al., 2000; Miller et al., 1997), we find that age difference between partners is negatively associated with using contraception. Our results, however, indicate that there are differences by the type of method used and that it matters whether the partner is older or younger. For instance, the likelihood of using a condom relative to no method is only significant for relationships in which the partner is older whereas having an older or a younger partner is associated with a lower likelihood of using a hormonal or a dual method compared to no method. It is not clear why there are differential effects for age difference depending on the type of method used. This needs to be investigated further. Contrary to our hypothesis, racial/ethnic differences were not associated with contraceptive use or type of method used. This may reflect changes in patterns and the meanings of homogamy in terms of race/ethnicity among young adults. This type of difference may not matter any more, at least not for contraceptive practices.

Age of the respondent at the beginning of the relationship is associated with method used such that as the respondent aged, they were less likely to have used a condom and more likely to have used a hormonal or dual method relative to no method. This is similar to other studies that find that contraceptive use and the type of method used varies by age (CDC, 2004; Kahn et al., 1990; Mosher et al., 2004; Santelli et al., 1997). When comparing method types among users, age was negatively associated with using a condom or a dual method relative to a hormonal method and using a condom relative to a dual method. Other studies have shown that condom use and dual method use are more likely among younger individuals (Bankole et al., 1999; Harvey, Henderson, & Branch, 2004; Riehman et al., 1998; Sheeran et al., 1999). Even when controlling for other individual and relationship characteristics, age remains important, indicating that contraceptive behaviors change as youth age, independent of individual and relationship characteristics.

Although this study provides new information regarding the association between relationship characteristics and contraceptive behavior among youth, there are limitations. The patterns of associations between individual-level and relationship-level characteristics and contraceptive use are generally consistent with the available literature. However, the mechanisms underlying these associations are still not well defined. There is still variation in the average contraceptive use for a given individual that is not captured by the individual or relationship characteristics included in our models. Associations between individual and relationship characteristics and contraceptive behavior might be accounted for by other factors that are not available for this sample of relationships, such as emotional closeness, gender equity, violence, and whether the

couple has discussed contraception (Manlove et al., 2003; Sheeran et al., 1999; Soler et al., 2000; Wingood & DiClemente, 1997, 1998). In addition, we have not yet included psychosocial measures at the individual-level that have been shown to be important (Sheeran et al., 1999). Because these types of measures vary considerably across time within individuals as well as within relationships, we would need to collect such information at the time that the individual is in each relationship. A better understanding of how these types of factors may influence contraceptive behavior is warranted. There may also be potential errors in the reporting of relationship information due to recall bias, misunderstood questions, and/or reluctance to report sensitive information. However, the Add Health study does use audio-CASI techniques, which have been shown to improve the reporting of sensitive behaviors (Turner et al., 1998). Additionally, there may be selection into certain types of relationships that could bias our results. Individuals who are motivated by intimacy needs form different relationships than do individuals who are motivated by pleasure-seeking goals (Cooper et al., 1998; DeLamater, 1987). For instance, individuals who are driven by intimacy needs may have fewer partners, have partners who are more familiar, and have closer relationships (Cooper et al., 1998). When partners are better known, communication concerning and use of contraception may be easier, thereby potentially affecting both use and type of method used in these types of relationships.

Still, the findings regarding the importance of the relational context for contraceptive use are important because they emphasize that contraceptive behavior varies across relationships for a given individual as a function of the features of the relationship, and that use and the type of method used also varies by the age of the

respondent. This study extends previous research by examining a relationship- and act-specific measure of contraceptive behavior and by investigating different types of contraceptive methods. In addition, we employ multilevel techniques which allow for the inclusion of multiple relationships per individual thereby facilitating both between and within individual analyses. As always, there is more work to be done. Due to the complexity of nonlinear multilevel models and the small number of relationships per individuals for a majority of individuals, it is not possible to conduct random coefficient models. We have, however, allowed some of the level-1 coefficients to vary nonrandomly as a function of individual-level characteristics. Preliminary findings indicate that there are some interesting cross-level interactions, and we will explore these further. We will also investigate the ordering of relationships within individuals and the extent to which these relationships are serially monogamous or concurrent. Future analyses will incorporate relationships identified at Waves I and II thereby allowing for longitudinal analyses. This will enable us to test, for instance, whether the effects of relationship characteristics vary across substantively important age categories and investigate whether the characteristics of and behaviors within adolescent relationships influence young adult relationships.

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Acknowledgments

Table 1. Selected characteristics of respondents and relationships, National Longitudinal Study of Adolescent Health, Wave III (2001-2002)

	Percentage or Mean
Individual characteristics	
Age at Wave III (years)	22.00
Gender	
Male	43.5
Female	56.5
Race/ethnicity	
Non-Hispanic White	60.3
Non-Hispanic Black	19.6
Hispanic	13.9
Non-Hispanic Other	6.2
Nativity status	
US born	95.1
Foreign born	4.9
Age at first intercourse (years)	16.10
Family structure at WI	
Two biological parents	53.9
Biological mother/stepfather	9.0
Biological father/stepmother	2.4
Biological mother only	25.5
Biological father only	3.7
Other situations	5.5
Parental education at WI	
Maternal education	13.36
Paternal education	13.60
Household income (1994)	$45,949
Number of individuals	6,197

Table 1. Selected characteristics of respondents and relationships, National Longitudinal Study of Adolescent Health, Wave III (2001-2002) (continued)

	Percentage or Mean
Relationship characteristics	
Relationship status	
Married	4.6
Cohabiting	15.1
Exclusively dating	35.3
Frequently dating	12.6
Dating once in a while	8.4
Only having sex	24.0
Current status	
Past	79.6
Current	20.4
Pregnancy occurred in relationship	
No	87.1
Yes	12.9
Time knew each other before first sex	
≤ 1 day	9.7
2-7 days	9.8
1-2 weeks	10.2
2-4 weeks	12.6
1-5 months	25.5
6 months-1 year	11.1
≥ 1 year	21.1
Duration of sexual relationship	
≤ 1 month	24.3
2-4 months	22.4
5-12 months	24.8
13-27 months	12.8
≥ 28 months	15.6
Frequency of sex	
Had sex on one occasion only	20.7
≤ 1 time per week	24.7
2 times per week	11.9
3 times per week	11.7
4-7 times per week	20.7
≥ 8 times per week	10.3

Table 1. Selected characteristics of respondents and relationships, National Longitudinal Study of Adolescent Health, Wave III (2001-2002) (continued)

	Percentage or Mean
Relationship characteristics	
Age difference	
Partner ≥ 3 years older	25.8
Partner 2 years older	11.6
Partner 1 year older	13.2
Partner same age	21.3
Partner 1 year younger	13.1
Partner 2 years younger	8.6
Partner ≥ 3 years older	6.5
Race/ethnic difference	
Partner same race/ethnicity	77.8
Partner different race/ethnicity	22.2
Respondent's age at the beginning of the relationship (years)	18.75
Type of contraceptive method used	
Condom	40.6
Hormonal method	13.9
Dual method	15.7
No method	29.7
Number of relationships	23,413

Note: Unweighted percentages and means. *N*=6,197 individuals and *N*=23,413 relationships, except for maternal and paternal education for which individual *N*s are appropriately reduced for girls living in families lacking a mother or father.

Table 2. Multilevel multinomial logistic regression results of type of contraceptive method used, National Longitudinal Study of Adolescent Health, Wave III (2001-2002)

Individual characteristics	Condom vs. None	Hormonal vs. None	Dual vs. None	Condom vs. Hormonal	Dual vs. Hormonal	Condom vs. Dual
Intercept	-0.5101	-6.4190***	-3.5957***	5.9089***	2.8233***	3.0856***
Male (ref: female)	0.0099	-0.4167***	-0.4025***	0.4267***	0.0143	0.4124***
Race/ethnicity (ref: White)						
Black	0.6484***	-0.9676***	0.1523+	1.6159***	1.1199***	0.4961***
Hispanic	0.1528+	-0.6869***	-0.5827***	0.8397***	0.1041	0.7356***
Other	-0.1359	-0.7239***	-0.8141***	0.5881***	-0.0901	0.6782***
Foreign born (ref: US born)	-0.0260	-0.3648*	-0.5150**	0.3388*	-0.1502	0.4890**
Age at first sex (years)	0.0933***	0.0628***	0.1170***	0.0305+	0.0542**	-0.0237
Family structure at WI (ref: two biological parents)						
Biological mother/stepfather	-0.0702	0.0139	-0.0683	-0.0841	-0.0822	-0.0019
Biological father/stepmother	-0.0608	-0.2970	-0.0564	0.2362	0.2406	-0.0044
Biological mother only	0.0714	0.3245	-0.0548	-0.2531	-0.3793	0.1262
Biological father only	0.2739	0.5608*	0.6535*	-0.2869	0.0927	-0.3796
Other situations	0.2695	1.0039**	0.5946*	-0.7344*	-0.4093	-0.3251
Parental education at WI						
Maternal education	0.0251*	0.0706***	0.0574**	-0.0455**	-0.0132	-0.3223*
Paternal education	0.0172	0.0334*	0.0005	-0.0163	-0.0330+	0.0167
(ln) Household income at WI	-0.0079	0.1223*	-0.0140	-0.1302*	-0.1363*	0.0061

Table 2. Multilevel multinomial logistic regression results of type of contraceptive method, National Longitudinal Study of Adolescent Health, Wave III (2001-2002) (continued)

Relationship characteristics	Condom vs. None	Hormonal vs. None	Dual vs. None	Condom vs. Hormonal	Dual vs. Hormonal	Condom vs. Dual
Relationship status						
(ref: dating exclusively)						
Married	-0.8300***	-0.5296***	-0.9437***	-0.3005*	-0.4142**	0.1137
Cohabiting	-0.4707***	-0.1936**	-0.4062***	-0.2772***	-0.2127**	-0.0645
Frequently dating	-0.1074+	-0.5283***	-0.2630**	0.4209***	0.2653**	0.1555*
Dating once in a while	-0.1121	-0.5656***	0.2236*	0.4535***	0.3420**	0.1115
Only having sex	-0.2764***	-0.7374***	-0.5581***	0.4612***	0.1794+	0.2817***
Current (ref: past)	-0.3742***	0.7311***	-0.1804*	-1.1052***	-0.9114***	-0.1938**
Pregnancy ever occurred (ref: no)	-0.9298***	-0.9647***	-1.0473***	0.0350	-0.0826	0.1176
Time knew each other before						
first sex (ref: ≤ 2 weeks)						
2-4 weeks	0.1193*	0.1158	0.2141**	0.0035	0.0983	-0.0948
1-5 months	0.1488**	0.0983	0.1815**	0.0505	0.0831	-0.0326
6 months-1 year	0.2185**	0.2021*	0.4132***	0.0164	0.2111*	-0.1947*
≥ 1 year	0.0890	0.1807*	0.1874*	-0.0917	0.0068	-0.0984
Duration (ref: ≤ 1 month)						
2-4 months	0.1191*	0.0863	0.2648**	0.0328	0.1785+	-0.1457*
5-12 months	0.0310	0.3547***	0.2703**	-0.3237**	-0.0844	-0.2393**
13-27 months	0.0068	0.9154***	0.4510***	-0.9086***	-0.4644***	-0.4442***
≥ 28 months	0.0180	1.1184***	0.6345***	-1.1004***	-0.4839***	-0.6165***

Table 2. Multilevel multinomial logistic regression results of type of contraceptive method used, National Longitudinal Study of Adolescent Health, Wave III (2001-2002) (continued)

Relationship characteristics	Condom vs. None	Hormonal vs. None	Dual vs. None	Condom vs. Hormonal	Dual vs. Hormonal	Condom vs. Dual
Frequency of sexual activity (ref: ≤ 1 time per week)						
Had sex once	0.2222**	-0.2409*	-0.0036	0.4630***	0.2373*	0.2257**
2 times per week	-0.2834***	0.2805**	0.0213	-0.5639***	-0.2592**	-0.3047***
3 times per week	-0.4340***	0.3303***	-0.2667**	-0.7643***	-0.5970***	-0.1673*
4-7 times per week	-0.5454***	0.3868***	-0.3205***	-0.9322***	-0.7074***	-0.2250**
≥ 8 times per week	-0.7797***	0.0199	-0.4521***	-0.7995***	-0.4720***	-0.3275***
Age difference (ref: partner within 2 years of age)						
Partner 3+ years older	-0.1907***	-0.2097**	-0.2457***	0.0191	-0.0360	0.0551
Partner 3+ years younger	-0.0904	-0.2704*	-0.3514**	0.1800+	-0.0810	0.2610*
Partner different race/ethnicity (ref: partner same race/ethnicity)	0.0691	-0.0518	0.1195+	0.1208+	0.1713*	-0.0505
Respondent's age at beginning of the relationship (years)	-0.0373***	0.1508***	0.0438**	-0.1881***	-0.1070***	-0.0812***
Random variance component						
$\hat{\tau}_{00(m)00(m)}$	1.4177***	1.8965***	2.9372***	2.4165***	1.5121***	2.1844***

Note: Unweighted results. N=6,197 individuals and 23,413 relationships. $+ p \leq 0.10$; $* p \leq 0.05$; $** p \leq 0.01$; $*** p \leq 0.001$.