

## **Spousal Emotional Nucleation and Fertility Limitation**

### **ABSTRACT**

This study investigates the consequences of spousal emotional nucleation for couples' fertility behavior. The article integrates existing theories relating the shift toward couple-centered marital relationships to fertility limitation. I expand on the fertility literature's common focus on spousal communication to include other dimensions of spousal emotional nucleation. This complex concept is often posited in the fertility literature but not often measured. Using unique nine year long monthly panel data from the Chitwan Valley Family Study, I test the effects of spouses' decreased attachment to parents and increased conjugal bond on fertility limitation. Empirical analyses demonstrate that these dimensions both directly increase contraceptive use. Spousal communication about family planning retains strong effects even when considered within the broader framework of emotional nucleation, demonstrating its important independent role in the transition to use of contraception. These results should motivate greater research attention to the influence of marital relationship dynamics on fertility behavior.

## **Spousal Emotional Nucleation and Fertility Limitation**

Theory suggests that change and variation in an extensive range of values and beliefs about family and family behaviors have been instrumental to worldwide fertility decline (Caldwell 1982; Caldwell, Reddy and Caldwell 1983; Chesnais 1992; Cleland and Wilson 1987; Freedman 1979; Lesthaeghe 1983; Lesthaeghe and Wilson 1986; Thornton 2001; Thornton 2005). Marital processes have been identified as an important factor in these changing beliefs about family formation which serve as a vehicle of worldwide fertility change. Key fertility theories have long argued that the emotional bond between husband and wife, or “emotional nucleation,” constitutes a central force shaping the transition from unlimited childbearing to fertility limitation (Caldwell 1982). Despite its importance, this hypothesis about emotional nucleation has proven difficult to test empirically because of both its complexity and the scarcity of measures of the emotional bond between husbands and wives, particularly in non-Western contexts. This paper achieves a first step toward filling this gap.

Although demographic research on fertility has historically focused exclusively on women, the literature on fertility behavior is increasingly recognizing that decisions regarding childbearing lie not only with women but with both spouses. Thus the integration of husband-wife relationship dynamics is becoming an important course of research on fertility. Social scientists have linked many dimensions of marital relationship dynamics to fertility behavior, including marriage timing (Bongaarts 1982; Bumpass 1969; Bumpass and Mburugu 1977; Marini 1981), marriage arrangement (Caldwell 1982; Goode 1964; MacFarlane 1986; Malhotra 1991; Rindfuss and Morgan 1983; Shorter 1975), and instability within marital relationships (Lillard and Waite 1993; Thornton 1978). This paper advances our knowledge about husband-wife relationship dynamics and fertility limitation in several fundamental ways. First, I construct

a theoretical framework which distinguishes two principal features of emotional nucleation: the separation from parents and the increasingly close conjugal bond. In this way I refine the concept of emotional nucleation into testable hypotheses.

Secondly, in the course of doing this I integrate a topic increasingly studied by demographers – spousal communication. Spousal communication about fertility and family planning is becoming a key aspect of the marital relationship dynamic because of its dramatic effects on contraceptive use. Studies of husband-wife communication demonstrate a strong positive association between spousal communication and contraceptive use (Bawah 2002; Feyisetan 2000; Lasee and Becker 1997; Laskar et al. 2006; Mukherjee 1975; Salway 1994). I expand the communication-centered focus to situate communication within the broader formation of an emotionally bonded nuclear family. I consider spousal communication about family planning and childbearing as an important dimension of the conjugal bond. Explicit consideration of potential effects of other dimensions of emotional nucleation is needed to determine the extent to which husband-wife communication per se exerts an independent influence on contraceptive use.

Finally, in addition to this substantive contribution, new longitudinal data from Nepal provide a fundamental methodological advance. This advance is possible because long-term (nine-year) longitudinal follow-up with detailed measures of contraceptive use (monthly) and low sample attrition (less than 5%) can be linked to rich baseline measures of emotional nucleation. Most research on spousal communication and contraceptive use is limited to cross-sectional data (Ezeh 1993; Feyisetan 2000; Lasee and Becker 1997; Mukherjee 1975; Salway 1994) and findings from the little research on spousal communication which does utilize panel data may be biased by high sample attrition between waves of data collection (Bawah 2002;

Sharan and Valente 2002). Comprehensive longitudinal data from the Chitwan Valley Family Study in rural Nepal provides a unique opportunity to employ state-of-the-art event-history methods to estimate the impact of husband-wife communication and more broadly emotional nucleation on the pace of subsequent transition into use of contraception.

Rural Nepal is an ideal setting to examine marital relationships and fertility because this population has only recently begun to experience the expansion of individual involvement in the choice of their spouse. Until recently, marriages in this setting were virtually all arranged by parents. Love, attraction, and an emotional bond between spouses were not important expectations of the marital relationship (Bennett 1983; Fricke 1986). Recently, however, dramatic social, economic and institutional changes have promoted steeply increasing participation of individuals in the selection of their own spouses (Ghimire et al. 2006). These dramatic changes in marital arrangement create substantial variation in husband-wife relationships. Rural Nepal is also an ideal setting because this population only recently began a transition to widespread use of contraception (Axinn and Yabiku 2001). This setting, then, provides an ideal opportunity to examine the relationship between emotional nucleation and the emergence of contraceptive use.

### **Conceptualizing Emotional Nucleation**

At the foundation of my theoretical framework is the emotional nucleation of the family, which is a fundamental aspect of Caldwell's theory of fertility decline (Caldwell 1982). This theory was constructed to apply to non-Western settings that historically were primarily agricultural, with low levels of education and wage labor participation, and had patriarchal family systems characterized by extended family households, extensive parental authority including over the arrangement of marriages, high fertility and low contraceptive use. Caldwell theorizes that in

such settings, net wealth transfers and authority relations between parents and children determine the motivation to have children. This theoretical work generates many hypotheses about how the direction of the intergenerational wealth flow is reversed and high fertility systems are destabilized. A comprehensive list of these hypotheses is beyond the scope of this paper, so I highlight some of the most prominent hypotheses which intertwine both emotional and economic relations within the family.

According to Caldwell, family-based economy reinforces high fertility, because wealth flows from children to parents. The central feature of a family-based economy is the familial mode of production, or production organized around kinship. In the familial mode of production, the extended family is the dominant economic unit and is focused on the control of production by family members. A continuous supply of children is important for providing labor and security. Furthermore, the familial mode of production is fundamental to intergenerational relations and has crucial implications for demographic decision-making. Intergenerational relations are characterized by an older generation enjoying advantages gained from the younger generations. Elders benefit materially from children's labor activity, and emotionally from children's veneration for the old, especially old males. This economic and emotional power provides elders with power over the young in reproductive decision-making as well. Because high fertility is needed to support the familial mode of production, fertility-related decisions in areas such as age at marriage, choice of spouse, and the practice of contraception during marriage are strongly influenced by the older generation rather than the newly married couple. Because they benefit from the upward wealth and emotional flow, older decision-makers value high fertility and thus have no incentive for their children and children-in-law to restrict childbearing. With this

structure of family-based economy and older reproductive decision-makers, fertility remains high.

Macro-level social and institutional changes can be mechanisms which reverse the wealth flow and bring about spousal emotional nucleation. Schooling and wage labor opportunities destabilize the familial mode of production and stimulate changing attitudes about family and marriage. By decreasing the labor productivity of children in the home and increasing the cost of children, these factors restructure intergenerational relations, transforming the relative status of family members. Children acquire new status within the family and general society, especially if their parents are uneducated. This feeling of success in the outside world grants children independence and less moral obligation to heed to family authority, prompting the emergence of nuclear families that operate beyond extended family control (Caldwell 1982).

The diffusion of Western cultural ideas is another mechanism which can accelerate the emotional nucleation of the family. In many settings outside the West, the spread of formal education and exposure to media are primary factors promoting Western worldviews (Barber and Axinn 2004; Caldwell 1982; Caldwell, Reddy and Caldwell 1985; Hornik and McAnany 2001). Education based on Western teaching materials highlighting the nuclear family is likely to foster more positive attitudes in children toward love marriages and independence from extended family (Caldwell 1982; Thornton, Chang and Sun 1984; Thornton and Lin 1994). Mass media such as radio, television, and movies is also likely to encourage the spread of Western cultural ideas about marriage, by romanticizing the nuclear family with its strong conjugal bond (Axinn and Barber 2001).

Thus emotional nucleation essentially denotes the bringing together of husband and wife away from the older generation into a “nucleus” or central part of the family, and the emotional

bonding of spouses to each other. While discussed extensively in the literature on fertility decline, because of its multidimensional nature the concept of emotional nucleation is rarely explicitly measured in demographic surveys or tested empirically. I focus on two central dimensions of the emotional nucleation concept: the increasingly close emotional bond between spouses, and the physical and economic independence of married individuals from older generations. These two dimensions may be closely related and even occurring simultaneously.

### **Conjugal Bond**

The new model of the nuclear family favors an increasingly close conjugal bond. Goode (1964) contrasts the “intensity of emotionality” between the extended family system and the nuclear family system. According to Goode, the emotional ties among members of the large extended household are likely to be dispersed among more people and less intense. In a large extended household an individual cannot spend as much time with any one person as in a small conjugal family. This dispersion of interactions may lessen the intensity of emotional ties between any two individuals. This dispersion may also increase the likelihood that there is a clearer recognition of formal authority. Emphasis is placed on respect between generations, rather than full expressions of tenderness between parents and children or between husbands and wives.

In the nuclear family, the intensity of emotionality becomes more emphasized. The nuclear family unit is made up of a small number of people who have more close contact with one another (Goode 1964). Furthermore, the shift toward nuclear families is closely accompanied by the shift from arranged marriage toward greater participation in spouse selection, which may help to promote the conjugal bond. Theories about family and demographic change suggest that a shift from parent-controlled arranged marriage to individual-choice marriage can bring about other fundamental changes in family dynamics and fertility (Caldwell 1982; Goode 1964;

Malhotra 1991; Rindfuss and Morgan 1983; Thornton et al. 1984). The increasing importance of emotional and physical attachment of spouses as elements in the mate selection process may specifically change husband-wife dynamics. For example, individual-choice marriages, or arranged marriages that involve some participation in the choice of spouse by the individual, may be characterized by higher levels of husband-wife communication and cooperation than typical arranged marriages (Blood 1967; Xiaohe and Whyte 1990; Yelsma and Athappilly 1988). I focus on communication about family planning, expression of love, and domestic violence as key marital relationship dynamics that are likely to change the nature of childbearing. I hypothesize that increased communication and love and decreased domestic violence will lead to fertility limitation behavior.

***Communication.*** Communication is likely to be a key component of the bond between spouses that helps to increase contraceptive use. With the separation from the extended family and strengthening of the conjugal bond, decision-making power tips from the older generation to the couple themselves. Husbands and wives become partners in communicating about social and economic concerns related to the immediate family. There may be more communication between spouses about decisions in general, including those concerning family planning. I focus on frequency of communication specific to family planning, as opposed to communication in general, because I believe it is likely to have a more direct effect on contraceptive use. Furthermore, a stronger conjugal bond may engender more equality within the marriage, increasing the ability of wives to communicate about family planning with their husbands.

Communication may affect contraceptive use through several possible mechanisms. First, communication is helpful for transforming attitudes into the physical act of using a contraceptive. Although communication may enable a couple to reach agreement on a lower



desired family size, agreement alone will not lead to lower fertility (Beckman 1983). Agreement about fertility intentions must be translated into physical behavior in order to achieve these intentions. Communication may enable husbands and wives to exchange practical information about obtaining contraceptive methods. Once they are obtained, close communication between sexual partners is crucial if contraceptive methods are to be used effectively and consistently.

Second, spousal communication may lower the psychic costs of contraceptive use. Psychic costs are the social-psychological forces that imply negative judgment of contraceptives, causing emotional stress and thus discouraging contraceptive use. Individuals who are inclined to use contraception may not actually do so if they perceive disapproval from their spouses, their extended family, or the greater society. Spousal communication may reduce these psychic costs if one partner conveys a favorable attitude toward contraception to the other, thereby encouraging the partner that using contraception is a socially legitimate behavior. Furthermore, because effective and sustained use of contraception requires communication about sex, couples may incur psychic costs if discussing sex violates social norms of modesty and privacy in sexual matters (Beckman 1983). Overcoming shyness or cultural taboos against discussing sex or contraception with one's spouse could lower the psychic costs of contraceptive use.

Third, communication may lower the demand for children. The landmark study in Puerto Rico by Hill, Stycos and Back produced the following conceptual framework: The extent to which spouses have similar preferences regarding family size and family planning is called concurrence (Hill, Stycos and Back 1959). Concurrence can be attributed to either coincidentally similar preferences (concordance) or to mutually recognized agreement based on explicit discussion (consensus). In a setting where strong shared social norms support a certain level of fertility, concurrence between spouses is more likely to be attributed to coincidentally similar

views rather than explicit discussion (Coombs and Fernandez 1978; Hill et al. 1959; Yaukey, Griffiths and Roberts 1967). In such cases, individuals base behavior on these internalized norms or on assumptions about their partners' attitudes. This pattern of concurrence based on chance alone is more likely to occur in settings where high demand for children is a widely shared unspoken understanding (Beckman 1983). Because there is little variation of opinions on fertility in this type of setting, there is little need for explicit discussion or decision-making on the issue. Therefore concordance between partners is probably associated with high demand for children and low levels of contraceptive use.

Consensus, or mutually recognized agreement based on explicit discussion, may affect fertility differently, by helping to lower demand for children. As social norms of high fertility become less universal, more need for explicit decisions regarding childbearing may arise. In fact in a situation with little communication, spouses might be overestimating each other's demand for children. Communication is a process by which spouses reach agreement on each other's intentions for child spacing and family size. Communication may lead to greater empathy and cooperation of partners to arrive at consensus on a lower family size goal. Thus, I expect spousal communication about family planning to be an important determinant of contraceptive use.

*Love.* Spousal love is likely to be another intrinsic part of the conjugal bond that helps to increase contraceptive use. One way love may increase contraceptive use is by lowering the demand for children. Love marriages can be associated with weakening attachment to the spouses' families and new expectations of intimacy and happiness in the marital relationship (Goode 1964). The marriage may no longer be organized around familial goals, but rather personal goals of love and self-fulfillment. To the extent that spouses are fulfilling personal

interests with marriage, the extended family's interest and the bearing of many children may become of less concern.

A second possible mechanism through which love may increase contraceptive use is that love may cause the couple to attach a different meaning to sex. In a less intimate marriage, sexual relations may be restricted to the purpose of reproduction of the family. Spousal love may stimulate the desire for sexual contact on its own account. Contraceptives facilitate sex taking on the purpose of physical gratification or emotional fulfillment between partners without the intention to procreate. Therefore I expect love between spouses to increase contraceptive use.

***Physical Violence.*** I expect a transformation toward less physical violence between spouses to be another important component of the increasing conjugal bond. In a family structured by patriarchal control, males exercise authority over females. Violence toward a wife may be an act to reinforce her subordinate position (Hof and Richters 1999). A marriage based on an increasingly close conjugal bond may change intrafamilial power relations, balancing the relative power within the husband-wife dyad. Emotional nucleation between spouses may entail a more egalitarian marital relationship in all aspects. Growing equality between spouses may particularly be manifested in less physical abuse of the wife.

A reduction in domestic violence against women may have important implications for fertility behavior. Domestic violence has been linked to unplanned pregnancy (Campbell et al. 1995; Gazmararian et al. 1995; Gazmararian et al. 2000; Hof and Richters 1999; Kaye et al. 2006; Kishor and Johnson 2006). For example, using data on women in Cambodia, the Dominican Republic, and Haiti, Kishor and Johnson (2006) found that women who had ever experienced spousal violence were more likely to have adverse reproductive health outcomes including unwanted births. Domestic violence has also been linked to sexual coercion (Heise,

Moore and Toubia 1995; Hof and Richters 1999; Logan, Cole and Shannon 2007) and to sexual violence (Crowell and Burgess 1996; Dutton, Goodman and Bennett 1999). These experiences may involve non-use or inconsistent use of contraceptives. For example, women who report sexual coercion are less likely to use contraceptives (Koenig et al. 2004), and less use of contraceptives is likely to lead to unplanned pregnancy. I hypothesize that freedom from abuse may enable a wife to fulfill her reproductive health needs and avoid unplanned pregnancy by using contraceptives.

### **Separation from Parents**

The separation from parents is another important element of the emotional nucleation of the family. Separation from parents is a domain with hundreds of possible dimensions. As illustrations, I look at measures of residential and economic independence from the older generation.

*Residence.* Under the extended family system the household is ideally structured by three generations living with or in close proximity to each other, with newly married couples becoming absorbed into the existing household (Caldwell 1982; Goode 1964). The weakening of the family-based economy creates opportunity to establish family life based on an alternate premise, prompting a shift away from reliance on extended family toward a couple-centered relationship. As the relationship of spouses to their elders and extended families weakens, husbands and wives develop a closer emotional bond, and vice versa. Because co-residence with the extended family may be seen as restrictive to this intimate spousal bond, and because the financial ability to establish a new household may be facilitated by non-family labor force opportunities, the couple shifts toward neo-local residence.

The experience of living away from older relatives is likely to lead to fertility limitation by the couple. It is assumed that parents, on average, hold values characteristic of society in the past (Caldwell 1982; Waite, Goldscheider and Witsberger 1986). If true, then individuals who live with their parents are likely to be encouraged to hold those same historical values, such as preference for high fertility. Living away from parents may alter family formation attitudes and preferences (Axinn and Barber 1997), and may make the authority of the older generation more likely to be eroded (Caldwell 1982). Living away from parents may also make it more difficult to meet child care requirements, reducing the demand for children.

***Helping Parents.*** In addition to residential independence, this new model of the nuclear family also favors economic independence from the older generation. Under the extended family system household economic organization is focused on wealth flowing upward through generations. Beginning at early ages children contribute to household production through a variety of household activities, such as housework or farming (Cain 1977; Caldwell 1982). Parents retain control of children's economic output and therefore benefit from their productivity. Also, parents continue to receive returns as children grow into adulthood (Cain 1983). Adult children provide assistance to parents in the form of money or material items, regardless of the parents' health or employment status (Caldwell 1982). Various influences reduce children's economic contributions to parents. Opportunity for schooling and for individual advancement in the labor force reduces children's dependency on elders for employment, resulting in children no longer feeling obliged to help with family work. Also, the onset of children's schooling changes social attitudes about what childhood should be. In the nuclear family children become dependents who are not required to contribute to household

productivity. Instead, childhood becomes perceived as a period of investment, during which children are sent to school in order to secure their future (Caldwell et al. 1985).

The decline in children's obligation to help parents economically is likely to promote fertility reduction. If children cease to make productive economic contributions to their parents' household and spouses invest more heavily in the education and "quality" of their children, then household economic organization becomes focused on wealth flowing downward through generations. The direction of the wealth flow is reversed so young couples become more likely to spend on their children than on their parents, rendering high fertility no longer economically rational and thus causing fertility to decline.<sup>1</sup> Therefore, I expect the separation from parents to change the nature of childbearing. I hypothesize that both decreases in residence with parents and decreases in helping parents will be important determinants of fertility limitation.

### **Data and Methods**

I use data from the Chitwan Valley Family Study (CVFS) to test my empirical predictions. The Chitwan Valley is an ideal site for this research because both dramatic change in spousal relationships and a shift toward fertility limitation have occurred within the lifetimes of the valley's current residents. The CVFS consists of event-history data from a sample of 171 neighborhoods in the western part of the Chitwan Valley in south central Nepal. Neighborhoods are defined as clusters of approximately 5 to 15 households. In 1996 all individuals ages 15 to 59 living in the selected neighborhoods were interviewed. Furthermore, spouses living elsewhere were also interviewed. The overall response rate for this survey was approximately 97%, or

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<sup>1</sup> Of course some economists have argued that the direction of net wealth flows has always been downward (Willis 1982). Regardless, a shift in the relative balance of wealth (that is, less wealth flowing upward or more flowing downward) would be enough to increase the motivation to contracept.

5,271 completed interviews. These interviews collected a wide array of demographic, economic, social and attitudinal information, including indicators of marital relationship. Separate but identical interviews were conducted with husbands and wives. All interviews were conducted in the most common language in Nepal (Nepali); thus question wordings presented are translations of the original text. Since the 1996 baseline interviews, detailed contraceptive events have been recorded monthly for every individual interviewed in 1996 including those who moved out of the study area. I analyze these prospective measures of respondents' experiences with contraceptives for a total of 108 months, from February 1997 through January 2006.

For this analysis, the sample is restricted to 388 women who are married and between the ages of 15 and 34 at the 1996 baseline interview. Analyzing this age range is useful because in the Nepalese context the extremely young are unlikely to practice fertility limitation behavior (Axinn and Barber 2001). I restrict the sample to married women, first, because contraceptive use before marriage is extremely rare and, second, in order to study dynamics of the marital relationship as explanatory factors. Women who are sterilized, have sterilized husbands, or have ever used any contraceptive at baseline are also excluded. I focus on women who have never used contraceptives at the start of the study period for two reasons. First, to ascertain the effect of spousal dynamics on the *start* of contraceptive use; Second, to mitigate the potential selection bias that women who are current contraceptive users may purposely have more frequent discussion about family planning with their husbands.

Measures of independent variables are limited to 1996 because this is the last year that these data are available for use. Examining the effects of marital relationship dynamics measured at one point in time depicts them as unvarying, even though over time patterns of communication, love, or violence in a marital relationship could change. Updated measures of

these dynamics taken subsequent to the baseline would reduce the measurement error caused by recording this situation only once. However, I believe that reduced error in the measurement of characteristics of the marital relationship would yield even stronger effects; therefore these estimates of the effects of communication, love and violence can be considered conservative. I tested for interaction effects between time duration and each independent variable of interest in the model, hypothesizing that the effect of husband-wife dynamics may wane over time. No significant interaction effects were identified. Thus, the final models include main effects only.<sup>2</sup>

Of course a problem in social science is that reliance on observational study designs increases the possibility that unobserved variation produces observed associations, sometimes called endogeneity (Moffitt 2005). In this analysis here this is perhaps the greatest threat to my understanding of the relationship between communication and contraception. This is because theoretically it is possible that those with a high preceding propensity to use contraception are also most likely to discuss it with their spouses. As with all research based on observational study design, I am unable to randomly assign spousal communication and instead am forced to control for factors that influence both spousal communication and contraceptive use. Fortunately the CVFS includes uncommonly rich measures of prior conditions known to predict the propensity to contracept (Axinn and Barber 2001; Axinn and Yabiku 2001; Brauner-Otto, Axinn and Ghimire 2007). Furthermore, this problem of endogeneity is less likely to produce observed consequences of love and physical violence for contraceptive use, compared to communication. It is not immediately obvious that there are mechanisms linking the preceding propensity to contracept to these other dimensions of the husband-wife relationship. Finally, using measures of

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<sup>2</sup> To ensure that results are not particular to the 108-month time frame, I also re-estimated the models using only 72 months of data. Varying the time duration produces virtually identical results.



marital relationship dynamics taken before respondents' contraceptive use ensures that only contraceptive use occurring after the measurement of marital relationship is examined. This proper temporal ordering helps to establish a causal relationship between emotional nucleation and contraceptive use.<sup>3</sup>

### **Fertility Limitation**

As discussed in my opening remarks, the main objective of this analysis is to examine the impact of emotional nucleation on the transition from no use of birth control to the widespread use of birth control to limit family size. The key dependent variable of interest is beginning use of any method of contraception, measured monthly in the prospective data starting in February 1997. Measures of contraceptive use include using oral contraceptive pills, injectable contraceptives (e.g. Depo-Provera), condoms, foam/jelly/cream/spermicides, IUDs, Norplant, husband or wife sterilization, abstinence and indigenous contraceptive methods. This variable operationalizes the timing of the transition from never having used any contraceptive method to ever using any method, ignoring distinction among methods.<sup>4</sup> During each month the respondent did not use

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<sup>3</sup> Of course, women may anticipate future contraceptive use prior to the time they discuss it with their husbands, and thus be more inclined to start communicating about it. However, full ability to implement contraception may only be achieved when they have actually had the experience of discussing it with their husbands. Thus I believe this temporal ordering is appropriate for studying the relationship between spousal communication and contraceptive use.

<sup>4</sup> Of course I could disaggregate the dependent variable in a number of ways. I estimated models of alternative definitions of fertility limitation in order to test the sensitivity of my results. These models produce little change in the estimated effects of key measures of emotional nucleation. For example, when I use the five most common methods as the dependent variable, which are oral contraceptive pills, Depo-Provera, condoms, husband or wife sterilization, the coefficients for measures of separation from parents drop slightly, but all effects remain statistically significant. When I further disaggregate the dependent variable into individual methods, the coefficients for the measure of love have some interesting changes which I will discuss in the results section. For results presented in tables I use any contraceptive as the dependent variable because the theory is about fertility limitation in general rather than a specific method, and

any contraception the outcome variable is coded 0, and during the month when first contraception occurred it is coded 1. Person-months lived after the first use of contraception are excluded from the analysis, yielding a total of 22,990 person-months lived by the 388 women.

### **Conjugal Bond**

Conjugal bond may have independent effects from the separation from parents, or may be an endogenous intervening mechanism linking the separation from parents to spouses' rate of contraceptive use. I measure conjugal bond with three characteristics of the marital relationship which I believe represent different aspects of the changing marital bond: communication, love, and physical violence. Communication in the marital dyad is generally defined as the frequency of discussion between spouses, as reported by one or both partners (Beckman 1983). Even after narrowing the topic of communication to family planning, achieving valid measures of its frequency is difficult because of ambiguity in the definition of communication. The literature on couple communication reveals that spouses not only frequently disagree about substantive issues such as desired number of children or sex preferences (Coombs and Fernandez 1978) and factual history such as whether or not they have used contraception (Yaukey, Roberts and Griffiths 1965). They also frequently disagree on how often communication about such topics has even occurred between themselves (Beckman 1983; Hill et al. 1959). This may be due to varying interpretations by husbands and wives of what it means to have communicated. In other words, the communication might have been "of insufficient clarity, intensity, or duration to impress its participants in the same fashion" (Hill et al. 1959).

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because differences in the definition of fertility limitation do not alter my substantive conclusions.

Two questions allow me to construct multiple ordinal measures of communication about family planning: “How often do you and your (husband/wife) discuss how many children to have? Often (3), sometimes (2), or never (1)?” and “How often do you discuss contraceptive methods with your (husband/wife)? Often (3), sometimes (2), or never (1)?” These items are significantly correlated with each other ( $r = 0.47$ ,  $p < 0.0001$ ), and I create a discussion index averaging the two measures. Although I have measures of reported communication from separate interviews with husbands, interestingly those measures do not predict contraceptive use. I also created a measure of overall spousal communication by averaging the wives’ and husbands’ discussion indices, with the idea that a measure incorporating both spouses’ reports of discussion would more closely approximate the true amount of discussion than either individual’s report. However, this measure has the same effects as the discussion index created using only wives’ reports, showing that variations in wives’ reports predict contraceptive use, not variations in their husbands’ reports. Therefore, in spite of the fact that I conceptualize contraceptive use as a couple-level decision, my approach is to assume that the wife’s evaluation of the frequency of spousal communication is what is important in predicting contraceptive use.

As with the measure of communication, husbands’ reports of the amount of love they feel toward their wives does not predict contraceptive use. Thus in the final models I use the amount of love that the wife reports feeling toward her husband. Respondents were asked “How much do you love your (husband/wife)? Very much (3), some (2), a little or not at all (1)?”

I include physical violence as a means to measure a divergent aspect of the underlying construct of conjugal bond. I utilize a question asking the respondent if her husband has ever beaten her. Measuring whether the respondent has ever been beaten by her current husband essentially measures the opposite of bond between spouses, helping to attain better validity in the

measurement of conjugal bond. The item is reverse-coded with 1 indicating having never been beaten. None of the three measures of conjugal bond (discussion index, love, and violence) are significantly correlated with each other; thus I treat them as independent rather than constructing a scale.

### **Separation from Parents**

Measures of separation from parents fall into two categories: physical residence and help. For each measure of separation from parents, I investigated both the husbands' and wives' reports. Generally the wives' reports were more important in predicting contraceptive use. Thus for parsimony the final models include the wives' reports for each measure, and the husbands' reports only in the one case where they demonstrate an effect.

Within the concept of physical residence, I tap into both behavioral and attitudinal dimensions of living with parents. Because in this setting daughters often move into the homes of their in-laws, I hypothesized that measuring whether the husband lives away from his parents would be a valid indicator of the couple separating from parents; however, whether the wives live away from their own parents was what turned out to drive contraceptive use. A possible explanation for this is that in Nepal parental control may be greater over young women than young men. I construct a dummy variable of the wife living in a different village from her parents at baseline, coded 1 if the respondent does not live in the same village as her parents, and 0 if the respondent lives in the same village as her parents (including those living in the same house). I also assess attitude toward sons' residence with parents after marriage. Respondents were asked "Some people think that a married son should live with his parents in their old age. Do you strongly agree (1), agree (2), disagree or strongly disagree (3) with this statement?" In

this case the husbands' report demonstrated an effect on contraceptive use; thus the final models include both wives' and husbands' reports for this measure.

Likewise, I gauge helping parents with both behavioral and attitudinal measures. I assess the behavioral aspect of helping parents with a question "Have you ever helped your parents by giving them grain, clothes, money, or something else while you were living away from them?" I reverse-code a dummy variable 1 if the respondent answered no and 0 if she answered yes. This question was not asked to respondents who had never lived away from their parents; I assume that the respondents who had always lived with their parents were helping them in a similar way and thus include them in the group coded 0. To assess attitude toward helping parents, I utilize a question "Some people think that having many children would help parents do their work. Do you strongly agree (1), somewhat agree (2), or don't agree at all (3)?" As with the measures of conjugal bond, I treat measures of separation from parents as independent rather than constructing a scale. The highest correlation among measures of separation from parents is between the wife's two attitudinal measures: The wife disagreeing that a married son should live with his parents is significantly correlated with her disagreeing that having many children would help parents with work ( $r = 0.17, p < 0.001$ ).

### **Controls**

In order to properly specify the models, I control for various respondent characteristics that may be confounders between the independent variables of interest and the likelihood of contraceptive initiation. I control for the respondent's birth cohort because contraceptive use has increased dramatically over time, as indicated by large differences in the rate of contraceptive use across older cohorts (Axinn and Barber 2001). I use two dichotomous indicators of birth cohort: 1972-1981 (age 15 to 24 at the baseline survey) and 1962-1971 (age 25 to 34 at the baseline survey).

The older birth cohort is the omitted category; effects of being in the younger cohort are relative to the older cohort.

I control for ethnic group, which in Nepal is related to religion. I use five dichotomous indicators of ethnicity (Upper Caste Hindu, Lower Caste Hindu, Newar, Hill Tibeto-Burmese, and Terai Tibeto-Burmese) because of these groups' diverse propensities to use contraceptives (Axinn and Barber 2001). Upper Caste Hindu status is the omitted category; effects of belonging to the other ethnic groups are relative to this group.

I control for participation in spouse selection because a shift from arranged marriages to choice marriages has been theorized to engender fertility change (Caldwell 1982; Goode 1964; Rindfuss and Morgan 1983). I conceptualize differences in the way marriages are contracted as a continuum rather than as a stark dichotomy between "arranged" or "choice" because variability exists between these two extremes (Rindfuss and Morgan 1983). I construct an ordinal scale coded from 1 to 5 to measure the extent to which the respondent had choice in selecting her spouse, using responses to the question "People marry in different ways. Sometimes our parents or relatives decide whom we should marry, and sometimes we decide ourselves. In your case, who selected your (first) spouse? Your parents or relatives, yourself, or both?" Respondents who answered "both" were asked a follow-up question: "Although both of you may have decided, one of you may have had a little more influence than the other. Who had more influence in choosing your spouse? You or your parents and relatives?" From these responses I construct an ordinal scale with 1 indicating that parents/relatives completely arranged the marriage, 2 indicating that both decided but parents had more influence, 3 indicating that the parents/relatives and

respondent equally influenced the decision, 4 indicating that both decided but the respondent had more influence, and 5 indicating that the respondent chose her spouse completely by herself.<sup>5</sup>

I expect experiences with previous childbearing and attitudes toward future childbearing to have consequences for contraceptive use. To capture these possible consequences, I control for previous childbearing with a measure of number of children ever born, with the expectation that the presence of children will increase discussion of family planning and contraceptive use by creating greater need.<sup>6</sup> Similarly, I control for child mortality with a measure of number of children that ever died, with the expectation that parents will respond to the loss of children by “replacing” them, which would decrease contraceptive use (Wolpin 1998). I also control for preference to stop childbearing, with the expectation that respondents expressing this attitude will be more inclined to use contraceptives. I utilize a question “Would you like to have more children?” and code a dummy variable 1 if the respondent answers no and 0 if the respondent answers yes. This question was not asked to respondents who had never had any children at the baseline interview; it is assumed that in this setting anybody who has not yet had a child will want to do so. Thus I include all respondents in the sample who had never had any children at baseline in the group coded 0.

I control for educational attainment with a measure of years of education because among socioeconomic variables, education has consistently been shown to strongly affect reproductive

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<sup>5</sup> I also tried classifying participation in choice of spouse as a dichotomous measure. I tried one measure coded 1 if the respondent had any say in the choice of spouse and 0 if the respondent had no say. I also tried a measure coded 1 if the respondent had complete say in the choice of spouse and 0 otherwise. I tried this with both wives’ reports and husbands’ reports. This did not change the results.

<sup>6</sup> I also examined the impact of number of sons ever born. This effect was not statistically significant, and I do not include it in the models.

behavior (Axinn 1993; Axinn and Barber 2001; Caldwell 1982).<sup>7</sup> I control for two parental characteristics that are likely to increase the respondent's contraceptive use: parents' education, with a measure of whether either the respondent's father or mother ever went to school, and parents' contraceptive experience, with a measure of whether either the respondent's father or mother ever used a contraceptive. I also control for accessibility of contraceptives by including a continuous variable measuring the number of minutes it takes to walk to the nearest healthpost.

Finally, I control for duration since the baseline interview with a counter variable, measuring years precise to the month, and the counter variable squared.<sup>8</sup> These measures parameterize the baseline hazard of contraceptive use, which conforms to a quadratic curve where the hazard rises during the early years and declines in later years. The means and standard deviations of these variables are presented in Table 1.

*(Table 1, about here)*

### **Estimation Technique**

I use event-history methods to model the risk of adopting any contraceptive method. Because this event is measured once a month, I conceptualize the transition to using contraception in

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<sup>7</sup> I also examined the impact of the respondent's husband's educational attainment. This effect was not statistically significant, and I do not include it in the models.

<sup>8</sup> I also re-estimated my models controlling for marital duration at the baseline interview. I tested two different ways to measure marital duration: a continuous measure of years since marriage and a dummy variable indicating whether the couple had been married for more than five years. Neither of these measures substantially changed the results. Furthermore, because marital duration is negatively correlated with being in the younger birth cohort, including this control deflates my estimates of the effects of younger birth cohort on contraceptive use. Similarly, because marital duration is positively correlated with number of children ever born, including it inflates my estimates of the effects of number of children ever born on contraceptive use. Nonetheless, estimates of the effects of emotional nucleation remain virtually the same whether or not the control for marital duration is included in the models.



discrete time rather than in continuous time. To estimate the discrete-time hazard models, I use logistic regression in the form

$$\ln[p/(1-p)] = \alpha + \Sigma(\beta_k)(X_k),$$

where  $p$  is the monthly probability of beginning contraceptive use,  $p/(1-p)$  is the monthly odds of first contraceptive use occurring,  $\alpha$  is a constant term,  $\beta_k$  represents the effects parameters of the explanatory variables, and  $X_k$  represents the explanatory variables in the model. This approach to discrete time estimation of the hazard model is described in detail elsewhere (Allison 1982, 1984). Coefficients in a logit model give the change in the log-odds of first contraceptive use for a unit change in the explanatory variables. To facilitate interpretation of the coefficients, I report the exponentiated log-odds coefficients, or the odds ratios, which are interpreted as the amount by which the monthly odds of first contraceptive use are multiplied for a unit change in the explanatory variable. Thus odds ratios equal to 1 represent no effect, odds ratios greater than 1 represent positive effects, and odds ratios less than 1 represent negative effects.

Finally, because the CVFS employed a clustered sampling strategy, with several individuals living in the same neighborhood, I use a multilevel discrete-time hazard model. Recent research demonstrates that this modeling strategy is suitable to these data because it accounts for their hierarchical structure (Barber et al. 2000). Estimates are calculated using the GLIMMIX macro for SAS according to the approach described by Barber et al. 2000. Thus the results are properly specified for the multilevel nature of these data.

## **Results**

In Table 2 I present the effects of multiple measures of spousal communication on the odds of contraceptive use. Model 1 shows that the frequency of discussing how many children to have significantly raises the odds of contraceptive use: variation from never to sometimes (or from

sometimes to often) increases the monthly odds of adopting contraception for those who have not already done so by 42%. Model 2 shows that discussing contraceptive methods has even larger influence on the odds of contraceptive use: as the frequency of discussion of contraceptive methods increases, the monthly odds of adopting contraception are enlarged by 45%. Model 3 shows that frequency of discussion of these two topics is, not surprisingly, related. Including the two measures in the same model reduces both their significance and magnitude, but does not eliminate their positive independent effects. Model 4 shows that a discussion index, which averages the two measures, has a larger influence on contraceptive use than either of its individual components: for each additional unit increase in the discussion index, the monthly odds of adopting contraception increases by 64%. These results are consistent with my belief that both discussion measurements relate to the general practice of family planning communication, and that using two measurements provides a better estimate of communication behavior. Furthermore, these findings show strong support for the hypothesis that husband-wife communication increases the pace of subsequent transition into use of contraception. These effects may result from the couples' ability to transform attitudes into actual contraceptive use, or they may result from lowered psychic costs of contraceptive use. These effects may also be the product of communication actually lowering the couples' demand for children, or they may result from other intervening mechanisms. Whatever the cause, these results are consistent with the conclusion that more spousal communication about family planning has a significant impact on subsequent fertility limitation behavior.

*(Table 2, about here)*

Note also that several of the control variables in these models have large and significant effects on the hazard of contraceptive use. For example, women in the younger cohort are much

more likely to adopt contraception than women in the cohort just slightly older. In addition, the numbers of children that were ever born and that ever died have opposite effects on the hazard of contraceptive use, as is consistent with my hypotheses and with previous literature. Lastly, note that participation in spouse selection has no effect on contraceptive use, suggesting that contraceptive use is explained entirely by other factors. The effects of these control variables remain stable in subsequent tables; thus from now on I do not present coefficients for control variables in tables.

In Table 3 I estimate the effects of different components of the conjugal bond on the odds of contraceptive use. Model 1 shows that the discussion index has the largest influence of the measurements of conjugal bond (this model is identical to Model 4 in Table 2; I present it again here for ease of comparison with the next models). Model 2 shows that spousal love significantly raises the odds of subsequently adopting contraception: for each increasing amount of love that the respondent reports feeling toward her husband, the monthly odds of adopting contraception is increased by 39%.<sup>9</sup> Model 3 shows that the absence of physical abuse also raises the monthly odds of adopting contraception; having never been beaten by a husband increases the odds by 53%, although the influence of this factor is notably less significant than the influences of communication and love. Overall, the estimates in Table 3 consistently show that an increasingly close conjugal bond increases the odds of using contraception. This finding supports the notion

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<sup>9</sup> As I mentioned, I disaggregated the dependent variable in various ways to test the sensitivity of my results to changes in the definition of fertility limitation. Interestingly, the effect of spousal love is reduced when the dependent variable is contraceptives which in this setting have been used in the past to stop childbearing, which are IUDs, Depo-Provera, Norplant, husband or wife sterilization (Axinn 1992). However, the effect of spousal love on condom use is four times larger than the effect on any contraceptive, and the effect of spousal love on oral contraceptive pill use is virtually the same as the effect on any contraceptive, while the effect of the discussion index is reduced when I use pills or condoms as the dependent variable. Thus spousal love may have different implications for use of temporary methods.

that as the changing nature of husband-wife dynamics encourages stronger emotional ties the demand for children is lowered, thus promoting couples to use contraception.

*(Table 3, about here)*

In Table 4 I estimate the effects of various components of separation from parents on the odds of contraceptive use. First, I examine dimensions of physical residence. Models 1, 2 and 3 show that both behavioral and attitudinal dynamics concerning non-residence with parents significantly increase the odds of adopting contraception. For the wife, living in a different village from her parents has large effects, raising the monthly odds of contracepting by 103%. Also, each of the separate reports by wives and husbands of the attitude that a married son is not obligated to live with his parents has significant effects (the wives' reports demonstrate an effect of raising the monthly odds of contracepting by 38%, and the husbands' 34%). This finding is consistent with the idea that when spouses form a bond outside of the control of older generations, or even feel positively toward this idea, they will be more likely to limit their fertility. Next, I examine the concept of helping parents. In contrast to physical residence, resistance to helping parents does not strongly increase contraceptive use. Models 3 and 4 show that neither the wives' lack of experience helping parents nor the attitude opposing that many children help parents with work have strong effects, although their effects are in the hypothesized direction and the latter attains minor statistical significance.<sup>10</sup> Thus the estimates in Table 4 show that residential independence from parents increases the odds of using contraception, and is more important in predicting contraceptive use than a declining obligation to help parents economically. We might understand this result more fully if we knew more about

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<sup>10</sup> Of course, error in my measurement of declining obligation to financially help parents may also play a role in preventing these variables from being able to predict contraceptive use.

the wives' relationships to their parents, and how these relationships change when the wives marry and move away. Possibly living away from parents is crucial to diminishing parental authority, enabling a wife to implement preferences that differ from those of her parents.

*(Table 4, about here)*

I present Table 5 to illustrate the independent effects of these various measures of emotional nucleation, by adding the measures with strong effects into the same models. Model 1 shows the independent influences of the discussion index, spousal love, and absence of physical violence. When these three measures are included in the same model their effects remain almost as large as when they were modeled separately (see Table 3 for comparison). Similarly, Model 2 includes the measures of residential independence from parents. This model shows that the influences of wives' actual residence away from parents and both spouses' positive attitudes toward residence away from parents are independent. They too remain nearly as large as when they were modeled separately (see Table 4 for comparison).

*(Table 5, about here)*

The final model, Model 3, shows that the conjugal bond has a strong positive influence on contraceptive use even when controlling for separation from parents, and vice versa. In fact the magnitudes of the effects of each factor are only minutely smaller than when the other factors were not included (for example, the effect of communication is a 54% increase in the hazard of contraceptive use, compared to the 64% increase previously in Table 3). In view of these substantial independent relationships with the rate of contraceptive use, conjugal bond does not seem to play a role in transmitting the effects of separation from parents. I hypothesized that conjugal bond could serve as an intervening mechanism, explaining the influence of separation from parents on contraceptive use. However, the remaining significant effects of both conjugal

bond and separation from parents are direct effects, which cannot explain each other's influence on contraceptive use.

Given the theoretical reasons for expecting emotional nucleation to be a multidimensional concept, these results are fitting. Each variable captures a different dimension of emotional nucleation, meriting inclusion in measurement of the overall concept. However, because conjugal bond and separation from parents are measured at the same time, their relationship remains unresolved. The question of intervening mechanisms requires measures over time to fully tease out effects of various dimensions of emotional nucleation. Furthermore, there are likely to be other components of this concept unmeasured in these analyses, which may impact contraceptive use. These results acknowledge the need for demographic surveys to include more measures of separate specific dimensions of emotional nucleation.

These findings show strong support for my hypothesis that increased conjugal bond and decreased attachment to parents both foster the adoption of contraception. These findings are also consistent with my general emotional nucleation framework. The nuclear family emphasizes both the bond between husband and wife and their separation from the older generation. This family model changes the nature of childbearing such that fertility limitation behavior is encouraged. The result is increased use of contraception. As social change creates opportunities for more spouses to shift toward couple-centered marital relationships, perhaps these experiences will encourage even more fertility decline in a setting in which, until the recent past, fertility limitation has been virtually nonexistent.

### **Discussion**

Overall these results indicate that the emotional nucleation of the family tremendously increases fertility limitation behavior. Both processes of spouses distancing from parents and developing a

stronger conjugal bond have substantial effects on the propensity to initiate contraceptive use. These results clearly point to the shift toward couple-centered marital relationships as an important factor in spouses' increasing use of contraceptives. The strong empirical evidence I present is consistent with theoretical predictions based on a framework which distinguishes between important dimensions of the complex concept of emotional nucleation. I find that the influences of various dimensions of emotional nucleation examined here are essentially independent of each other.

In this analysis I consider spousal communication as an important dimension of emotional nucleation. In many previous studies, the effects of communication on contraceptive use were measured at the same time or shortly thereafter (Feyisetan 2000; Lasee and Becker 1997; Mukherjee 1975; Salway 1994). The measures of emotional nucleation used in this analysis come before the women have ever used any contraceptives, and yet exert significant influence on contraceptive use. Furthermore, communication about family planning retains a strong positive effect even when other dimensions of emotional nucleation are considered. This highlights the important independent role played by spousal communication in the transition to use of contraception.

In addition to theoretical insights, the strong independent influence of communication demonstrated here has important policy implications. A great deal of previous research focusing on husband-wife communication and contraceptive use examines African settings (Bawah 2002; Feyisetan 2000; Lasee and Becker 1997; Salway 1994). Researchers in sub-Saharan Africa have often suggested that administrators of family planning programs have taken it for granted that women play the primary role in making contraceptive decisions, and that this neglect of men and marital interactions has hampered the programs' abilities to increase contraceptive prevalence

and reduce fertility levels (Ezeh 1993; Mbizvo and Adamchak 1991; Salway 1994). In the South Asian region, high fertility persists despite longstanding goals of postponing childbearing and reducing total fertility in order to ease overpopulation and poverty. A growing literature suggests that the neglect of men's roles in contraceptive behavior could perhaps be limiting the success of family planning programs in South Asia as well, and advocates facilitating spousal communication about family planning as a policy tool (Mahmood and Ringheim 1997; Sharan and Valente 2002). Although husbands' reports of frequency of communication did not contribute to the explanation of contraceptive use, the finding that wives' perceptions of the conjugal bond are important explanatory factors in contraceptive use reveals that husbands do play an important role in the adoption of contraception. In this setting then, it appears that policies aimed at reducing fertility should integrate men into family planning programs. These findings suggest that activities aimed at providing individuals with information to transmit to their partners and enhancing couple communication skills could potentially increase the use of contraceptive methods. Information promoting family planning should also directly target men, who can then participate in discussion supporting their wives' use or their own use of contraception.

Although understanding factors that reduce fertility in poor nations has been a high priority for decades, questions about the factors that speed transitions to lower fertility remain unresolved thus far. Because spousal communication is emerging in the fertility and family planning literature as an important factor leading to contraceptive use, future research should strive for a greater understanding of the depth of spousal communication about family planning beyond its frequency. This could include elements of the communication such as who started the conversation, what was its intention, what was the specific content, the quality, and the duration



of the conversation, and whether it resulted in agreement or disagreement. Moreover, the study of fertility behavior is generally moving toward a focus on couples rather than women. This calls for further understanding of the inner workings of marital relationship dynamics and the mechanisms producing their effects on contraceptive use.

This study takes a first step in measuring emotional nucleation and documenting its effects on contraceptive use. Explorations of other substantial dimensions of this concept and investment in direct measures of these dimensions will be necessary to fully understand the influence of emotional nucleation on fertility limitation behavior. For example, social psychologists have attempted to measure the construct of romantic love by creating scales to combine dimensions of love, and using these scales to differentiate between the degree of “loving” a romantic partner and “liking” a platonic friend (Rubin 1970). And in the family studies literature, research on adolescent independence from parents makes conceptual distinctions among different forms of parental authority, and finds that shifts in parental authority occur in some domains and not others (Smetana 1988, 1995; Smetana and Asquith 1994; Smetana and Daddis 2002).

Finally, this study demonstrates the capacity of the emotional nucleation framework and suggests that exploration of other consequences of spousal emotional nucleation and communication will be fruitful avenues for future research. First, the strong impact observed on contraceptive use suggests that changing marital relationships may affect other aspects of fertility behavior, such as time until first birth or completed fertility. Second, changing marital relationships may affect subjective aspects of fertility, such as ideal family size or gender preference, in addition to objective behavior. Third, these results indicate that researchers should consider the long-term outcomes of marital dynamics. I demonstrate consequences measured

after the measures of marital dynamics were taken. Consequences of husband-wife relationship dynamics lasting even longer may exist, for the married couple and potentially for their children as well.

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Table 1. Means and Standard Deviations of Variables Used in the Analyses (N=388)

| <i>Independent Variables</i>                                | Mean             | Standard<br>Deviation | Minimum | Maximum |
|---|------------------|-----------------------|---------|---------|
| <i>Conjugal Bond:</i>                                       |                  |                       |         |         |
| Discuss Number of Children                                  | 1.64             | 0.58                  | 1       | 3       |
| Discuss Contraceptive Methods                               | 1.43             | 0.57                  | 1       | 3       |
| Discussion Index  | 1.54             | 0.49                  | 1       | 3       |
| Loves Husband   | 2.04             | 0.69                  | 1       | 3       |
| Never Been Beaten by Husband                                | 0.89             | 0.32                  | 0       | 1       |
| <i>Separation from Parents:</i>                             |                  |                       |         |         |
| Wife Lives in Different Village from Her Parents            | 0.81             | 0.40                  | 0       | 1       |
| Wife Disagrees that Married Son Should Live with Parents    | 1.59             | 0.67                  | 1       | 3       |
| Husband Disagrees that Married Son Should Live with Parents | 1.52             | 0.73                  | 1       | 3       |
| Wife Never Helped Parents                                   | 0.65             | 0.48                  | 0       | 1       |
| Wife Disagrees that Many Children Help Parents with Work    | 1.96             | 0.76                  | 1       | 3       |
| <i>Control Variables</i>                                    |                  |                       |         |         |
| <i>Couple's Experience:</i>                                 |                  |                       |         |         |
| Participation in Spouse Selection                           | 2.11             | 1.69                  | 1       | 5       |
| Number of Children Ever Born                                | 1.72             | 1.58                  | 0       | 7       |
| Number of Children Ever Died                                | 0.19             | 0.52                  | 0       | 3       |
| Preference for No More Children                             | 0.42             | 0.49                  | 0       | 1       |
| Min. Walk to Nearest Healthpost<br>(median)                 | 20.85<br>(15.00) | 18.22                 | 0       | 90      |
| <i>Wife's Background:</i>                                   |                  |                       |         |         |
| <i>Birth Cohort:</i>  |                  |                       |         |         |
| 1972-1981   | 0.61             | 0.49                  | 0       | 1       |
| 1962-1971   | 0.39             | 0.49                  | 0       | 1       |
| <i>Ethnic Group:</i>  |                  |                       |         |         |
| Upper Caste Hindu   | 0.39             | 0.49                  | 0       | 1       |
| Lower Caste Hindu   | 0.11             | 0.31                  | 0       | 1       |
| Newar   | 0.05             | 0.23                  | 0       | 1       |
| Hill Tibeto-Burmese   | 0.16             | 0.36                  | 0       | 1       |
| Terai Tibeto-Burmese  | 0.29             | 0.45                  | 0       | 1       |
| Years of Education<br>(median)                              | 3.69<br>(3.00)   | 4.07                  | 0       | 14      |
| Parent Ever Went to School                                  | 0.36             | 0.48                  | 0       | 1       |
| Parent Ever Used Contraceptive                              | 0.36             | 0.48                  | 0       | 1       |

*Note:* Measures are from the start of the study period, when first contraceptive use equals 0 for all respondents.

Table 2. Logistic Regression Estimates of the Effects of Spousal Communication on the Odds of Using Any Contraceptive

| <i>Independent Variables</i>      | Model 1           | Model 2           | Model 3           | Model 4           |
|-----------------------------------|-------------------|-------------------|-------------------|-------------------|
| Discuss Number of Children        | 1.42***<br>(3.26) |                   | 1.28*<br>(2.06)   |                   |
| Discuss Contraceptive Methods     |                   | 1.45***<br>(3.28) | 1.29*<br>(2.04)   |                   |
| Discussion Index                  |                   |                   |                   | 1.64***<br>(3.86) |
| <i>Control Variables</i>          |                   |                   |                   |                   |
| Couple's Experience:              |                   |                   |                   |                   |
| Participation in Spouse Selection | 1.00<br>(0.02)    | 1.01<br>(0.19)    | 1.01<br>(0.18)    | 1.01<br>(0.17)    |
| Number of Children Ever Born      | 1.27**<br>(3.02)  | 1.23**<br>(2.64)  | 1.24**<br>(2.66)  | 1.24**<br>(2.67)  |
| Number of Children Ever Died      | 0.67*<br>(-2.30)  | 0.72*<br>(-1.90)  | 0.71*<br>(-1.99)  | 0.71*<br>(-2.00)  |
| Preference for No More Children   | 1.18<br>(0.89)    | 1.19<br>(0.92)    | 1.19<br>(0.93)    | 1.19<br>(0.93)    |
| Min. Walk to Nearest Healthpost   | 0.99<br>(-1.03)   | 0.99<br>(-1.19)   | 0.99<br>(-1.12)   | 0.99<br>(-1.12)   |
| Wife's Background:                |                   |                   |                   |                   |
| Birth Cohort: <sup>a</sup>        |                   |                   |                   |                   |
| Age 15-24 in 1996                 | 1.98***<br>(3.94) | 2.11***<br>(4.33) | 2.02***<br>(4.05) | 2.02***<br>(4.07) |
| Ethnic Group: <sup>b</sup>        |                   |                   |                   |                   |
| Lower Caste Hindu                 | 1.34<br>(1.05)    | 1.29<br>(0.93)    | 1.32<br>(1.02)    | 1.32<br>(1.02)    |
| Newar                             | 1.02<br>(0.05)    | 1.05<br>(0.15)    | 1.01<br>(0.04)    | 1.01<br>(0.04)    |
| Hill Tibeto-Burmese               | 2.22***<br>(3.17) | 2.07**<br>(3.00)  | 2.11**<br>(3.02)  | 2.11**<br>(3.02)  |
| Terai Tibeto-Burmese              | 0.98<br>(-0.10)   | 1.01<br>(0.04)    | 0.96<br>(-0.17)   | 0.96<br>(-0.17)   |
| Years of Education                | 1.05*<br>(1.97)   | 1.05*<br>(2.06)   | 1.05*<br>(1.94)   | 1.05*<br>(1.94)   |
| Parent Ever Went to School        | 1.04<br>(0.23)    | 0.98<br>(-0.15)   | 0.99<br>(-0.09)   | 0.99<br>(-0.09)   |
| Parent Ever Used Contraception    | 1.05<br>(0.29)    | 1.00<br>(0.03)    | 1.03<br>(0.18)    | 1.03<br>(0.18)    |

|                         |                    |                    |                    |                    |
|-------------------------|--------------------|--------------------|--------------------|--------------------|
| Duration <sup>c</sup>   | 1.39***<br>(3.83)  | 1.37***<br>(3.58)  | 1.39***<br>(3.76)  | 1.39***<br>(3.76)  |
| (Duration) <sup>2</sup> | 0.96***<br>(-3.79) | 0.96***<br>(-3.64) | 0.96***<br>(-3.74) | 0.96***<br>(-3.74) |
| Person-months           | 22,990             | 22,990             | 22,990             | 22,990             |
| Deviance                | 2691.57            | 2708.60            | 2696.00            | 2696.30            |

Note: Numbers in parentheses are t-ratios

† p<.10; \*p<.05; \*\*p<.01; \*\*\*p<.001 (one-tailed tests)

<sup>a</sup> Reference Group is age 25-34 in 1996

<sup>b</sup> Reference Group is Upper Caste Hindu

<sup>c</sup> Duration is measured in years since baseline interview precise to the month

Table 3. Logistic Regression Estimates of the Effects of Conjugal Bond on the Odds of Using Any Contraceptive

| <i>Independent Variables</i> | Model 1           | Model 2           | Model 3         |
|------------------------------|-------------------|-------------------|-----------------|
| Discussion Index             | 1.64***<br>(3.86) |                   |                 |
| Loves Husband                |                   | 1.39***<br>(3.30) |                 |
| Never Been Beaten by Husband |                   |                   | 1.53*<br>(1.93) |
| Person-months                | 22,990            | 22,990            | 22,990          |
| Deviance                     | 2696.30           | 2683.45           | 2699.55         |

Note: Numbers in parentheses are t-ratios

†p<.10; \*p<.05; \*\*p<.01; \*\*\*p<.001 (one-tailed tests)

Table 4. Logistic Regression Estimates of the Effects of Separation from Parents on the Odds of Using Any Contraceptive

| <i>Independent Variables</i>                                | Model 1           | Model 2           | Model 3           | Model 4        | Model 5         |
|---|-------------------|-------------------|-------------------|----------------|-----------------|
| Residence with Parents:                                     |                   |                   |                   |                |                 |
| Wife Lives in Different Village from Her Parents            | 2.03***<br>(3.89) |                   |                   |                |                 |
| Wife Disagrees that Married Son Should Live with Parents    |                   | 1.38***<br>(3.13) |                   |                |                 |
| Husband Disagrees that Married Son Should Live with Parents |                   |                   | 1.34***<br>(3.18) |                |                 |
| Helping Parents:  |                   |                   |                   |                |                 |
| Wife Never Helped Parents                                   |                   |                   |                   | 1.02<br>(0.15) |                 |
| Wife Disagrees that Many Children Help Parents with Work    |                   |                   |                   |                | 1.15†<br>(1.59) |
| Person-months   | 22,990            | 22,990            | 22,990            | 22,990         | 22,990          |
| Deviance  | 2681.75           | 2688.17           | 2708.50           | 2707.32        | 2705.77         |

Note: Numbers in parentheses are t-ratios

†p<.10; \*p<.05; \*\*p<.01; \*\*\*p<.001 (one-tailed tests)

Table 5. Logistic Regression Estimates of the Effects of Conjugal Bond and Separation from Parents on the Odds of Using Any Contraceptive

| <i>Independent Variables</i>                                | Model 1           | Model 2           | Model 3           |
|---|-------------------|-------------------|-------------------|
| <i>Measures of Conjugal Bond</i>                            |                   |                   |                   |
| Discussion Index  | 1.60***<br>(3.60) |                   | 1.54***<br>(3.26) |
| Loves Husband   | 1.35**<br>(2.98)  |                   | 1.34**<br>(2.87)  |
| Never Been Beaten by Husband                                | 1.50*<br>(1.87)   |                   | 1.38†<br>(1.44)   |
| <i>Measures of Separation from Parents</i>                  |                   |                   |                   |
| Wife Lives in Different Village from Her Parents            |                   | 1.94***<br>(3.63) | 2.00***<br>(3.74) |
| Wife Disagrees that Married Son Should Live with Parents    |                   | 1.33**<br>(2.75)  | 1.30**<br>(2.56)  |
| Husband Disagrees that Married Son Should Live with Parents |                   | 1.28**<br>(2.61)  | 1.24*<br>(2.26)   |
| Person-months   | 22,990            | 22,990            | 22,990            |
| Deviance  | 2669.44           | 2665.26           | 2635.87           |

Note: Numbers in parentheses are t-ratios

†p<.10; \*p<.05; \*\*p<.01; \*\*\*p<.001 (one-tailed tests)