

Personal Influence IN THE Diffusion OF Fertility Control: THE Role Played BY Ideas VS. Behavior

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A woman faced with choices regarding contraception has several sources of information which may influence her decision. Among these are other women's ideas as well as their reported behavior. Applying a two-stage econometric model to data on married women taken from a study of Korean social networks, this paper assesses the relative impacts of the two information sources above. In addition, this paper (1) considers the role of social and opinion leadership in the impact of a family planning program by postulating two different social influence factors, (2) explores which types of social network contacts most significantly amplify the impact of the family planning program, and (3) discusses the effects of two types of family planning program efforts: the inputs of family planning field workers, and the use of indigenous women's groups.

Key Words: Fertility Control, Social Leadership, Family Planing Program

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I . INTRODUCTION

The role of diffusion has drawn considerable attention in recent theories of fertility transitions. Many studies on fertility transitions have suggested diffusion of fertility control in both contemporary and historical settings. Most empirical results see evidence of the existence of diffusion of fertility control in the following: (1) the trend in the proportion of those who use fertility control obeys an S-shaped curve analogous to the logistic curve observed in simple diffusion models; (2) fertility decline displays an apparent irreversibility; (3) fertility control is propagated in a spatial pattern; (4) fertility decline is associated with such attributes as language, ethnicity, and religion; and, (5) fertility decline may outpace the changes in conventional socioeconomic forces. It is unfortunate, however, that the empirical foundations supporting the diffusion concept and exploring its implications are not yet well established.

One reason for this is that much richer data are required for tests of diffusion hypotheses than for tests of conventional fertility models. In addition to the full set of conventional covariates, diffusion specifications may require detailed information on social networks, reference groups, and the behavior of individuals over time. Even if such data happen to be available, the researcher requires an appropriate statistical methodology to deal with the network data. As a companion to Chung (1994a), this paper tries to overcome these two obstacles in regard to data and statistical methodology, and present new findings in fertility transitions. The broad goal of the research is to investigate how informal interpersonal contacts make a contribution to facilitating the impact of a family planning program.

This study will concern the following four notions. The first notion is that other women's ideas regarding contraception, as well as their

contraception behavior, may exert influence on the woman's contraceptive use but presumably in different degrees. The second is that the role of social and opinion leadership should be taken into account in differences in diffusion effects across social networks. The third is that a new statistical methodology is applied to a set of social network data. Finally, the other is that diffusion effects exist in some social networks, but may have less significance in others. Then, I want to discuss about the effects of family planning program efforts to draw the policy implications of my results.

II. A REVIEW OF THE LITERATURE

There is considerable evidence that patterns of fertility decline are consistent with diffusion (e.g., Cleland and Wilson, 1987; Entwisle et al., 1992; Knodel and van de Walle, 1986; Leasure, 1962; Lesthaeghe, 1977; Livi-Bacci, 1971, 1977; Montgomery and Casterline, 1993; Retherford and Palmore, 1983; Watkins, 1986). Some recent studies have recognized the importance of "ideational" change in fertility transitions in Europe and in developing countries (Clerand, 1985; Cleland and Wilson, 1987; Coale and Watkins, 1986; Freedman, 1987; Knodel and van de Walle, 1986; Retherford and Palmore, 1983; Tsui, 1985). They emphasize that new ideas regarding family limitation and the social acceptability of contracepting appear to pass over a population, thereby causing rapid fertility decline. Freedman (1987) concludes that ignoring of ideas and mental frameworks in studies on fertility transitions in developing countries may happen to underestimate a potential change. Indeed, in the perspective of interpersonal diffusion, one's ideational change may occur either by others' behavior, or by their ideas, through interpersonal communication. However, none of the studies just mentioned has yet

distinguished the influence of others' ideas about contraception on one's contraception behavior from the influence of others' contraception behavior on one's behavior.

Some studies suggest that one's informal communication with others via social networks may, to some degree, affect one's ideas and then fertility behavior (Entwisle et al., 1992; Freedman, 1987; Knodel and van de Walle, 1986; Montgomery and Casterline, 1993; Watkins, 1986). Yet, there have been only a few applications of social network theory to fertility (e.g., Kincaid et al., 1993; Rogers and Kincaid, 1981; Rogers et al., 1975a, 1975b). Even these have tended to be local rather than national in scope. Moreover, these seem to have failed to examine closely what influences one's contraception behavior. For example, without exploring a possibility that interpersonal communication may result in ideational change, Kincaid et al. (1993) identify communication variables (e.g., communication with one's spouse, with other women, and with field workers) from ideational variables (e.g., awareness and knowledge of, or attitudes towards contraception) and conclude that all such variables play an important role in contraception. In studies of the diffusion of fertility control, therefore, it seems necessary to develop statistical models with appropriate specifications and apply them to social network data.

In addition, surprisingly, except for Chung (1994b), none of the studies above mentioned has focused attention on differences in diffusion effects across social networks (more roughly, across reference groups). Diffusion effects may not exist in some social networks but may operate powerfully in others. Such differences may be due to the following four factors. The first factor is related to a notion that perception can be viewed as an important intermediate process in the diffusion. In general, perception of others' behavior or ideas tends to result in behavioral change, through ideational change, in some span of

time.¹⁾ Therefore, the change in reproductive behavior of one woman may be caused by her ideational change, which may have been influenced either by her perception of others' contraception behavior in her social network or by her perception of the ideas regarding contraception of the woman in the social network (Palmore and Freedman, 1969; Chung 1994b). If the researcher is restricted only to information about some women's reported contraception behavior or ideas, rather than having information about others' perceptions of their behavior or ideas, diffusion effects may not be clearly evident in the results, nor may differences in such effects across social networks be correctly shown.

The second factor is that some types of social networks can be viewed as more open than others to the flow of information about new technologies or to ideational changes. Differences in degrees of "openness" across social networks may depend on the similarity (termed "homophily") or dissimilarity (termed "heterophily") in socioeconomic characteristics of the members of each social network. The first type of networks may be characterized as having "strong ties", the second as having "weak ties" (Granovetter, 1973, 1985). A number of sociologists have emphasized that "weak ties" connecting individuals, rather than "strong ties," enable new information to diffuse across groups. Therefore, it may be said that differences in socioeconomic characteristics of the members of each social network may cause diffusion effects to operate unevenly across different types of social networks.

As for the third factor, there may be opinion leaders within a social network whose ideas, advice or behavior influences the other members of the network. The diffusion of fertility control may speed up through

1) I don't want to say that ideational change must cause behavioral change, because in some cases the reverse may happen. This might provide a different dimension of approach for studies of the diffusion of fertility control.

such a leadership effect, because many women (or followers) who are uncertain about a new contraceptive method and are afraid of negative sanctions are likely to delay the adoption of the method until it has been adopted by the opinion leaders. Some studies show that contraception prevalence within a village increases with the contraceptive use of village opinion leaders (Rogers, 1975; Rogers and Kincaid, 1981; Rogers et al., 1975a, 1975b). This implies that if social (or opinion) leadership of women in a woman's social network is differently distributed from that in another social network, it may generate difference in diffusion effects.

The fourth factor is concerned with a possibility that individuals often have some scope for choice of their social networks, whether through selection of friends, schools, or neighborhoods. The formation of a woman's social network is, therefore, potentially endogenous in her decision on contraceptive use. For example, a woman who feels inclined to control her fertility is more likely than otherwise to contact those women who have ever used contraception methods and have some ideas about them. If this is the case, other women's contraception behavior or positive ideas toward contraception is likely to influence a woman's contraception decision more powerfully in the social networks which can provide information regarding modern contraceptive methods than in the social networks which operate as sources of information on consumer goods (Chung, 1994a, 1995; Montgomery and Chung, 1999).

III. DEFINITIONS AND MODELING

1. Definition of Terms

To test the presence and importance of diffusion concepts rigorously,

therefore, we first need to define "diffusion." My definition is a variant of that of Montgomery (1993) and Montgomery and Casterline (1993):

Diffusion exists when the reproductive behavior of one individual, or the information available to that individual has an influence on the reproductive behavior of another, by a private means.

In employing this definition, we may note the following four points. First, the definition focuses on the interpersonal aspects of diffusion, or more precisely on the linkage and nature of interpersonal relationships by which information is exchanged or behavior observed. Second, we adopt a concept of private means of gathering information, opposed to that of public means by which the government directly intervenes to influence the reproductive behavior of the target individuals. For example, one individual's perceiving behavior or ideas of another can be classified as a private means, whereas mass media campaigns or visits of family planning field workers as a public means directly controlled by the government. Third, the definition of diffusion does not strictly specify what diffuses. In my view, diffusion of fertility control may occur either through diffusion of new technology about fertility control, or through diffusion of new attitudes toward fertility control and family size. Finally, the definition is applicable in cases in which individuals have strong, prior intention to adopt the reproductive behavior.

Any individual typically participates in a social system involving many other individuals. The nature of the relationships which one individual has with others in the same social system may affect that individual's perceptions, actions, and beliefs.

To examine the effects of diffusion on fertility control, it is essential to consider such social systems properly. I view individuals' social networks as such social systems and define them following Knoke and Kuklinski (1982):

Social network is a specific type of social relation linking a defined

set of individuals.

Different types of social relations identify different social networks, even for a given set of individuals. A closer examination of women's social networks should provide information regarding the real interactions among women and explore the existence of diffusion effects in more rigorous way than before.

2. Modeling Social Leadership

Fields as diverse as education, psychology, sociology, political science, and social choice have long investigated models of social (interpersonal) influence, either from a theoretical viewpoint²⁾, or with reference to empirical implications³⁾. Erbring and Young (1979) introduce a contiguity matrix which generates a contextual feedback effect, saying that in the case of communication or contagion processes, contiguity may be defined on the basis of exogenous information about amount of face-to-face interaction specific to each pair of individuals. French (1956) assumes that the degree of social influence is distributed evenly among those individuals with whom an individual is in direct communication. In his theoretical model, which slightly relaxes French's assumption, Harary (1959) allows an individual's own prior opinion to have a weight different from that of another's opinion. It is surprising that in studies of fertility transitions, social influence has often been ignored. In this paper, an empirical foundation for the social influence models found in other disciplines is considered.⁴⁾ I define two kinds of

2) For examples, see DeGroot (1974), French (1956), French and Raven (1959), Friedkin (1986), Friedkin and Cook (1990), Friedkin and Johnsen (1990), Harary (1959), and Sen (1986).

3) See Alexander et al. (1975), Doreian (1981), Erbring and Young (1979), and Haller and Woelfel (1972).

4) Previous studies on social influence in other fields provides some guidance as to the modelling of social leadership measures. In general, it would be expected that such measures depend on the characteristics of the network in which individuals i and j are found, and on their personal characteristics X_i and X_j as well.

social or interpersonal influence and explore methods to measure them in what follows:

(1) **Within-network leadership** is defined as the potential influence of one individual over another within a network, under the assumption that influence is uniformly distributed within the network, as suggested by French (1956). The measure of within-network leadership can be expressed as $1/d_{N_i}$, where d_{N_i} indicates the number of individuals who belongs to individual i 's social network N_i .⁵⁾ In the context of the leadership, every individual who belongs to individual i 's social network exerts the same influence over individual i 's behavior or opinion. For example, each of three individuals in an individual's network has a one-third unit of within-network leadership. The point is that the within-network leadership of an individual varies, depending on whose social networks she belongs to. We note that this concept does not take account of an individual's social status in terms of opinion leadership (the degree of importance in the group such as a village), which is sure to influence others' behaviors opinions.

(2) **Within-community leadership** is defined as the potential influence of one individual over another within an exogenously determined social group, which is very likely to be larger than the network. Suppose, for example, that such groups are determined by village boundaries. Then, the within-community (or within-village) leadership of individual j is measured by the number of references to him/her by the other villagers, in answer to a question such as: "From whom did you (or might you) receive information about [the specific topic] in your village?" The number of references to woman j might then be divided by the total number of references. This leads to a measure of the within-community leadership for individual j , expressed

5) Alternately, we could specify $1/(d_{N_i}-1)$ as a measure.

as $\frac{\sum_k I_k(j)}{\sum_k \sum_l I_k(l)}$ where $I_k(j)$ is an indicator variable taking the

value "1" if individual j belongs to the social network of person k , and the summations are taken over all village residents. Therefore, it is assumed that every individual has a degree of within-community leadership lying between zero and one within a village. Two points regarding this leadership measure should be noted: First, unlike the measurement approaches found in Laumann and Pappi (1973) and Rogers and Kincaid (1981), our within-community leadership measure is not absolute but relative, varying across social networks.⁶⁾ Second, an individual's within-community leadership obtained from our approaches does not depend on whose social network she belongs to, whereas the within-network leadership does.

The common point of two types of leadership measures is that each is not an absolute but rather a relative concept.

IV. THE STATISTICAL FRAMEWORK AND DATA

1. A Simple Probit Model: Influence of Contraception Behavior

In this section, I consider the assumption that contraception behavior

6) Rogers and Kincaid (1981) measure leadership by the number of direct choices received by an individual in a group in answer to a question like: "From whom in this group did you or will you receive information about this topic?" Laumann and Pappi (1973) use a two-step measure of leadership, adding the number of indirect choices in which one other individual links the leader to a follower to the number of direct choices. Thus, these two leadership measures have absolute concept, so that these cannot be applied to analyses of sample across different groups (or villages). To circumvent this difficulty, we normalize individual leadership measure by the summation over all individuals' leadership measures in the group (or village). As a result, this enables us to compare the degrees to which individuals have social leadership within a group (or village) where she lives by using the relative concept of leadership.

of other women in one's social network may affect one's behavior, through ideational change. I employ a single-equation probit model. My concern with interpersonal diffusion leads to the following specification:

$$C_i^* = X_i \beta_1 + Z_i \beta_2 + \gamma \sum_{j \in N_i} \omega_{i,j} Y_j + v_i \quad (1)$$

In this equation, C_i^* represents woman i 's unobservable propensity to use contraception currently. I assume that C_i^* is a function of observed variables such as individual and village characteristics X_i , indices of family planning program effort Z_i , a scalar measure of diffusion effects $\sum \omega_{ij} Y_j$, and a disturbance term v_i which embodies unmeasured influences on the behavior of woman i and follows a normal distribution $N(0, 1)$. The diffusion effect term first depends on a dummy Y_j , indicating that Y_j equals 1 if woman j , who belongs to woman i 's personal social network N_i , has used contraception, and 0 otherwise. The diffusion effect term also depends on an exogenously determined weight ω_{ij} that translates woman j 's behavior into a measure of influence on woman i . The variable ω_{ij} will be replaced by three different weights including the leadership measures discussed in the previous section: the unit, the within-network, and the within-community leadership measures. In particular, γ is an important parameter to be estimated because it represents an interpersonal diffusion effect coefficient; if it is significantly different from zero, a diffusion process is said to exist.

The equation implies that contraception behavior of woman j , in woman i 's social network, weighted by woman j 's influence measure on woman i , affects woman i 's unobservable propensity to use contraception. It is assumed that the propensity of woman i reflects her unobservable propensity about contraception and if it is equal to or greater than a threshold, she decides to use contraception. Let C_i equal

1 if woman i currently uses contraception, and 0 otherwise. Then, we define the model as

$$\begin{aligned} C_i &= 1 && \text{if } C_i^* \geq 0 \\ &= 0 && \text{if } C_i^* < 0 \end{aligned} \quad (2)$$

Therefore, the probability that woman i will currently use contraception is

$$\begin{aligned} \text{Prob}(C_i = 1) &= \text{prob}(v_i \geq -X_i \beta_1 - Z_i \beta_2 - \gamma \sum_{j \in N_i} \omega_{i,j} Y_j) \\ &= \Phi(X_i \beta_1 + Z_i \beta_2 + \gamma \sum_{j \in N_i} \omega_{i,j} Y_j) \end{aligned} \quad (3)$$

where $\Phi(\cdot)$ is the cumulative distribution function of the standard normal distribution. Similarly, the probability that woman i will not currently use contraception is

$$\begin{aligned} \text{Prob}(C_i = 0) &= \text{prob}(v_i < -X_i \beta_1 - Z_i \beta_2 - \gamma \sum_{j \in N_i} \omega_{i,j} Y_j) \\ &= 1 - \Phi(X_i \beta_1 + Z_i \beta_2 + \gamma \sum_{j \in N_i} \omega_{i,j} Y_j). \end{aligned} \quad (4)$$

2. A Two-Stage Model: Influence of Ideas

The probit model in the previous section assumes that contraception behavior of woman j , in woman i 's social network, influences the behavior of woman i , through change in woman i 's ideas. In addition, it assumes that woman j 's contraception behavior Y_j is expressed as a dichotomous variable. However, these assumptions can be viewed as problematic in the following two senses. The first sense concerns the case in which in some closed societies, contraception behavior is such a private matter subject to negative social norms that women can not perceive each other's use of contraceptives. If we just look at the influence of others' contraception behavior, the statistical framework may not explain the diffusion of fertility control fully, although there is evidence of the diffusion. In this case, it is likely that the diffusion of positive ideas about contraception operates more strongly than does that

of contraception behavior itself. The latter sense is related to an opinion that human interaction process may not be different from interaction between machines. The variable Y_j is too all-or-nothing and dichotomous for such a model to capture human interaction process properly. For example, the model forces contraception behavior of other women, who have not used contraception, to exert no influence on a woman's contraception behavior. In contrast, other women's ever-use of contraceptives is assumed to affect the woman's use of them perfectly. Consequently, the statistical framework based on the actual contraception behavior seems not to be enough to catch the significance of interpersonal diffusion in certain environments. As suggested by Freedman (1987), ignoring the relevance of ideas and mental frameworks in studies of human interactions may cause the underestimation of importance of diffusion effects, particularly in developing countries.

To explore the notion, I develop an econometric model. My first concern is to find a proxy of a woman's ideas regarding contraception. I introduce two assumptions:

- (1) woman j 's ideas about contraception are, although unobservable, represented by her own probability that she has used contraception, and
- (2) those ideas of woman j , which cannot be viewed simply as 0 or 1, have a continuous value between 0 and 1.

The first assumption says that a woman's probability of having used contraception will serve as a proxy of her ideas regarding contraception. The second may help the model to take into consideration influence of other women who have not used contraception, via their ideas, that is, their probability of having used contraception, although the previous probit model ignores the influence. Therefore, I consider the following specification: $Y_j^* = B_j \phi + \varepsilon_j$ (5)

where Y_j^* represents woman j 's unobservable propensity to have used contraception. Y_j^* is a function of observed variables such as individual and village characteristics B_j , and a disturbance term ε_j , which embodies unmeasured influences on the behavior of woman j and follows a normal distribution $N(0, 1)$. Let Y_j equal 1 if woman j has used contraception, and 0 otherwise. Then, the model is defined as

$$Y_j = \begin{cases} 1 & \text{if } Y_j^* \geq 0 \\ 0 & \text{if } Y_j^* < 0 \end{cases}$$

The probability that woman j has used contraception is

$$P_j = \text{prob}(Y_j = 1) = \begin{aligned} &\text{prob}(\varepsilon_j \geq -B_j \phi) \\ &= \Phi(B_j \phi) \end{aligned} \tag{7}$$

where $\Phi(\cdot)$ is the cumulative distribution function of the standard normal distribution.

My second concern is to set up a woman's decision problem on the current use of contraception. I employ a probit model, similar to equations (1) and (2). A difference is that contraception behavior of woman j in equation (1), who belongs to woman i 's social network, is replaced by her probability that she has used contraception, representing her ideas regarding contraception. The new specification is in what follows. Let C_i equal 1 if woman i currently uses a contraceptive, and 0 otherwise. Then, I define the model as

$$C_i = \begin{cases} 1 & \text{if } C_i^* \geq 0 \\ 0 & \text{if } C_i^* < 0 \end{cases} \tag{2}$$

where

$$C_i^* = X_i \beta_1 + Z_i \beta_2 + \gamma \sum_{j \in N_i} w_{i,j} P_j + v_i \tag{8}$$

and

$$P_j = \text{prob}(Y_j = 1) = \begin{aligned} &\text{prob}(\varepsilon_j \geq -B_j \phi) \\ &= \Phi(B_j \phi) \end{aligned} \tag{7}$$

In these equations, woman j indicates a woman who belongs to

woman i 's social network N_i , and B_j represents woman j 's socioeconomic characteristics. Substituting $\Phi(B_j, \Psi)$ in equation (7) for P_j in equation (8), we may note that the equation system is already in the reduced form, wherein the propensity of woman i to use contraception C_i^* in some way varies with exogenous characteristics B_j of woman j in woman i 's social network N_i .

The above econometric model seems inappropriate in the following two senses. First, suppose that we directly substitute $\Phi(B_j, \Psi)$ in equation (7) for P_j in equation (8). Then, we may obtain

$$C_i^* = X_i\beta_1 + Z_i\beta_2 + \gamma \sum_{j \in N_i} w_{i,j} \Phi(B_j, \Psi) + v_i \quad (9)$$

However, the model consisting of equations (2) and (9) may cause a computational difficulty, because as the number of women in woman i 's social network gets larger, it gets more problematic to obtain estimates of Ψ . Second, my major concern is not about Ψ but about γ , the diffusion effect coefficient. Therefore, it is not recommended to take much pains to estimate Ψ . The following explains a two-stage method to achieve my objectives in a more effective way.

At the first stage, I view a predicted probability of P_j as a substitute for the variable P_j . Therefore, I first regress Y_j , indicating contraception behavior of woman j in woman i 's personal social network N_i , on woman j 's socioeconomic characteristics B_j , by a simple probit model. After obtaining consistent estimates of parameter Ψ and then replacing Ψ by their estimates Ψ^e , I finally obtain the predicted probability that woman j has used contraception P_j^p :

$$P_j^p = \Phi(B_j, \psi^e) \quad (10)$$

If we substitute P_j^p for P_j in equation (9), the equation turns into

$$C_i^* = X_i \beta_1 + Z_i \beta_2 + \gamma \sum_{j \in N_i} w_{i,j} P_j^p + \gamma \sum_{j \in N_i} w_{i,j} (P_j - P_j^p) + v_i \quad (11)$$

or

$$C_i^* = X_i \beta_1 + Z_i \beta_2 + \gamma \sum_{j \in N_i} w_{i,j} P_j^p + v_i^0 \quad (12)$$

where $\gamma \sum_{j \in N_i} w_{i,j} (P_j - P_j^p) + v_i = v_i^0$.

After assuming that v_i^0 follows the normal distribution with zero mean and unit variance, at the second stage, I regress C on X , Z and $\gamma \sum_{j \in N_i} w_{i,j} P_j^p$ to estimate β_1 , β_2 and γ in equation (12) by using a usual probit estimation technique. If γ is significantly different from zero, an interpersonal diffusion process is said to exist.⁷⁾

3. Data

The data to be employed in this analysis were gathered in 1973, about 5 years after the formation of the Mothers' Clubs,⁸⁾ from an extensive national survey conducted for a research project on the clubs.⁹⁾ Data for 1037 married women, residing in 25 rural villages, are available for complete analysis.¹⁰⁾

7) It may be noted that to some degree, this technique has to suffer a loss of efficiency.

8) Concerning the Mothers' Clubs and their effects on the fertility change in Korean, please refer to Lee(1977). Westinghouse Health System and Korean Institute for Family Planning(1979) and Coale, Cho and Goldman(1980).

9) The sampling design was as follows. First, 450 Mothers' Clubs, located in 25 counties, were selected at random, at a sampling ratio of about 2 percent, from about 22,500 Mothers' Clubs which existed throughout the country in 1973. Second, one village was randomly chosen from each of the 25 counties in which the 450 Mothers' Clubs were located, so that the total number of villages is 25. Third, a total number of about 50 married women up to age 49 was randomly chosen from each of the chosen villages (see Lee [1977] and Park et al. [1974] for details on the sampling design). The sampling procedures, therefore, turn out to have been random, given the restriction that the surveyed villages must have a Mothers' Club. This might lead to a selectivity problem. However, when contraceptive prevalence in the surveyed villages, 35.6 percent is compared to that in rural Korea as a whole, 34 percent, we may conclude that selectivity is not a great problem.

The survey provides information regarding (1) conventional socioeconomic characteristics, (2) KAP (knowledge, attitudes, and practice) variables, (3) a retrospective fertility history, and (4) information regarding husband-wife communication, and other variables.

<Table 1> Descriptive Statistics for Socioeconomic Variables

Percentage currently using modern contraception	35.6 %
Percentage having ever used	59.1 %
Method distribution among current users *	
Loop	38.5 %
Pill	28.2
Vasectomy or tubal ligation	11.4
Condom	8.4
Rhythm, withdrawal and other	13.6
Percentage of women in Mother's Clubs	44.6 %
Percentage of women with any previous contact with family planning field worker	45.0 %
Woman's age	34.3 years
Woman's age at marriage	20.2 years
Marriage duration	14.1 years
Woman's education^a	
Illiterate	14.7 %
Literate but primary incomplete	13.5
Primary school	58.8
Middle school	9.0
High school or higher	4.0
Husband's education^a	
Illiterate	4.6 %
Literate but primary incomplete	9.7
Primary school	43.8
Middle school	19.8
High school or higher	22.1
Husband's occupation^a	
Agriculture	66.6 %
Professional or skilled worker	18.5
Others	14.9
Percentage of Protestants	9.7 %
Village Characteristics	
Percentage of persons aged over 50	9.3 %
Percentage of household daily news paper subscriptions	12.9
Percentage of household with TV sets	5.3

Note:^a Each group sums to 100 percent (Sample Size=1037 women)

- 10) Four different surveys were fielded, one about the Mothers' Club leaders, one to collect information about village women, one to survey village officials, and one from family planning field workers. Unfortunately, only the village women's survey is available for analysis.

<Table 2> Questions Used to Define Each Network^a

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- (1) Woman's friends: Who are the people that you meet and talk with most in this village outside of your family?
 - (2) Husband's closest friends: Of the people living in this village, who are your husband's closest friends?
 - (3) Hypothetical distributors of information on new family planning methods: If a new family planning method were available in this community and everyone except you knew about it, you would of course be concerned. In such a situation, if any of the village women were to tell you about such a thing, who in your opinion would she be?
 - (4) Family planning discussion group: Of the woman living in this village, who do you talk with most about family planning?
 - (5) Hypothetical sources of information on new family planning methods: If a new family planning method were available in this community and everyone except you knew about it, you would of course be concerned. Who would you talk to first to find out it under these circumstances?
 - (6) Those who are best informed about induced abortion: Who do you think is best informed about induced abortion in this village?
 - (7) Sources of information on health: Who do you usually talk to in this village about best thing to do when a member of your family is ill?
 - (8) Sources of information on consumer goods: When you are buying clothes for your children or important furniture for your household, do you listen to the advice or ask the opinion of anyone living in this village?
 - (9) Sources of information on children's education: Whether or not they have schoolaged children, adults often talk about problems of education for children. Who do you usually talk with or consult regarding problems of this sort?
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Note:^a For expository convenience, each network is named by its characteristics.

Table 1 provides descriptive statistics on the socioeconomic characteristics of all married women in the sample.

Most importantly, the survey provides valuable information in regard to the different social networks of each respondent, as well as leadership scores for the respondents. In my analysis, I will examine nine types of social networks. These are social networks concerned with a respondent's closest friends, the closest friends of her husband, family planning discussion groups, as well as social networks associated with new family planning methods, induced abortion, health, consumer goods, and children's education. Each respondent's social network regarding topic X was obtained by asking her a sociometric question such as: "From whom did you (or might you) receive information about

topic X?' Responses to each question were limited to the five most frequent links.¹¹⁾ Details about questions are presented in Table 2, where each social network is named by its characteristics for the purpose of exposition.

A respondent's social leadership score in the social network associated with topic X is measured by the number of direct responses given to her by the other respondents in answer to the question above.¹²⁾

V. RESULTS

1. The Baseline Model

Table 3 summarizes estimates of alternative versions of baseline probit models, in which the interpersonal diffusion effect is not considered for the time being.

11) In respect to the network variables, two points may be noted. First, in a handful of cases respondents gave their own ids in a list of social network contacts. These may be due to miscoding. However, it is possible that the respondent indicated another woman within her household. Unfortunately, the Korean data did not allow for multiple surveys per household. Second, cases of duplicate ids cited within a given social network were found, which again seem likely to be miscodes. For my analysis, the same id in the list of social network contacts as that of the respondent is erased and one of the duplicate ids within her social network is removed.

12) As noted, information about social networks in the Korean data is exceedingly rich. Yet, unfortunately, the data have the following limitations. First, they are cross-sectional. Therefore, we must regard the analysis as a snapshot, rather than a full, dynamic study of diffusion, and of creation and disappearance of social networks. Second, social networks are restricted to within-village networks, so that we cannot trace interpersonal information flow into and out of the village, except in the case of the family planning field workers. Third, only married women of reproductive age were interviewed. This may disregard the influence of older and younger generations on reproductive decision. Fourth, the data fall short of information regarding economic characteristics such as household income. Finally, location of each surveyed village is missing, so that other sources of data cannot be implemented.

<Table 3> Current Use of Modern Methods: Baseline Probit Estimates
(T-Statistics in Parentheses)

	Model 1	Model 2	Model 3	Model 4 [with village dummies]
Constant	-2.146 (3.24)	-2.112 (3.12)	-2.025 (2.98)	-1.549 (2.03)
Woman's age	-.004 (0.15)	-.006 (0.22)	-.009 (0.32)	-.011 (0.38)
Marriage Duration	.213 (6.13)	.194 (5.47)	.189 (5.29)	.199 (5.40)
Marriage Duration, Squared	-.006 (8.62)	-.005 (7.71)	-.005 (7.42)	-.005 (7.46)
Woman's Education				
Primary school	.055 (0.48)	-.025 (0.21)	-.044 (0.37)	-.108 (0.88)
Middle school	.509 (2.68)	.392 (2.02)	.373 (1.92)	.176 (0.86)
High school or higher	.633 (2.53)	.578 (2.28)	.545 (2.14)	.441 (1.65)
Husband's Education				
Primary school	.356 (2.44)	.377 (2.55)	.371 (2.50)	.342 (2.24)
Middle school	.393 (2.31)	.407 (2.35)	.390 (2.25)	.311 (1.74)
High school or higher	.325 (1.85)	.343 (1.93)	.317 (1.77)	.316 (1.71)
Husband's Occupation				
Agriculture	.112 (0.92)	.094 (0.76)	.075 (0.60)	.095 (0.64)
Professional or skilled labor	.254 (1.67)	.220 (1.43)	.242 (1.56)	.220 (1.27)
Protestant	-.201 (1.37)	-.222 (1.49)	-.219 (1.46)	-.303 (1.81)
Field Worker Constant		.490 (5.66)	.445 (5.02)	.516 (5.46)
Mothers' Club Membership			.208 (2.29)	.252 (2.56)
Log-Likelihood	-610.0	-593.8	-591.2	-563.9
Chi-Square	130.0	162.4	167.2	222.2
(d. f.)	(12)	(13)	(14)	(38)

Note : Sample Size=1037

Model 1 in column 1 is our basic model which includes exogenous individuals' socioeconomic characteristics as regressors. Models 2 and 3 consider the field worker contact and the Mothers' Club membership variables, respectively. Finally, village fixed-effects are taken into account in Model 4 by inclusion of the village dummies.

The probability that a woman will currently use modern contraceptive methods increases with her marriage duration up to about 18 years and then decreases with it (Model 1). In Models 1 to 3, with the exception

of the primary school, a woman who has a higher education level is more likely to use contraception, other things being equal. In particular, husband's education has a positive effect on contraceptive use, except for high school or higher education. Models 3 and 4 show that the field worker contact (T-value is 5.46, in Model 4) has more significant impact on the probability of use than does Mothers' Club membership (2.56 in Model 4). Concerning village fixed-effects, I test, using the likelihood ratio test, whether all the village dummy variables are different from zero. The test rejects, at the 1 percent significance level, the null hypothesis that there is no village-fixed effect on the probability that a woman will currently use contraception.¹³⁾

2. The Simple Probit Model: Influence of Contraception Behavior

1) Inclusion of Diffusion Effect Terms: Actual Ever-Use

We may ask ourselves whether the actual ever-use of contraceptives of a woman's friends influence her own use of contraceptives. Table 4 summarizes a case in which each diffusion effect term is derived calculated from information regarding actual ever-use of contraception of friends.¹⁴⁾ For the "Woman's friends" network, ¹⁵⁾ we have included different interpersonal diffusion effect terms with different social leadership measures i, j : the unit leadership, the within-network leadership, and the within-community leadership measures.

Model 1 is the basic model, and Models 2, 3 and 4 include,

13) Twice the difference of the estimated likelihood with and without restrictions is 52.6, and the critical value of chi-square statistics is 42.9 at 24 degrees of freedom for the 1 percent significance level.

14) Whenever the diffusion effect term of interest consists of the actual ever-use of contraception of women who belong to a respondent's social network, we must remove women who (a) belong to a women's social network, but (b) are not interviewed, as discussed above.

15) For details about each social network, see Table 2.

respectively, the field worker contact variable, the Mothers' Club membership variable, and village dummies.

<Table 4> Single-Equation Model in The "Woman's Friends" Network
(Actual Ever-Use of Friend)
(T-statistics and elasticities are, respectively, in parentheses and in brackets)

Weight	Model 1	Model 2	Model 3	Model 4
				[With Village Dummies]
Unit Leadership				
Actual Ever-Use	.108 {.216} (3. 46)	.087 {.174} (2. 71)	.073 {.148} (2. 24)	.053 {.108} (1. 50)
Field Worker Contact		.459 (5. 24)	.430 (4. 82)	.508 (5. 36)
Mothers' Club Membership			.157 (1. 68)	.220 (2. 18)
Log-Likelihood	-604. 0	590. 1	-588. 7	-562. 8
R ²	.1287	.1501	.1529	.2040
Within-Network Leadership				
Actual Ever-Use	.295 {.191} (2. 37)	.230 {.150} (1. 82)	.198 {.130} (1. 55)	-.014 {.009} (0. 10)
Field Worker Contact		.475 (5. 45)	.436 (4. 90)	.517 (5. 46)
Mothers' Club Membership			.191 (2. 09)	.253 (2. 56)
Log-Likelihood	-607. 2	-592. 2	-590. 0	-564. 0
R ²	.1246	.1470	.1510	.2022
Within-Community Leadership				
Actual Ever-Use	.890 {.165} (3. 62)	.830 {.155} (3. 35)	.734 {.137} (2. 87)	.545 {.103} (1. 90)
Field Worker Contact		.477 (5. 49)	.449 (5. 04)	.514 (5. 43)
Mothers' Club Membership			.139 (1. 49)	.206 (2. 02)
Log-Likelihood	-603. 4	-588. 2	-578. 1	-562. 1
R ²	.1304	.1540	.1562	.2046

The key variable in these models is "Actual Ever-Use, " my measure of interpersonal diffusion effect. Note that different point estimates of the diffusion effects vary across different weight specifications. To

compare the changes in probability of current use across specifications, I will employ a concept of average elasticity. From now on, the average elasticity of each diffusion effect term is shown in brackets in each table. In Model 1, the average elasticity of the actual ever-use variable in the case of the unit leadership measure is 0.216. This implies that with other things equal, a 1.000 percent increase in the diffusion effect term would cause the probability that a woman will currently use contraceptives to rise by 0.216 percent.

I will raise two questions and then draw possible answers from these empirical results. The first question is whether or not the diffusion effects exists significantly in each specification. The possible answers are given in what follows.

(1) In the cases (Model 1) without family planning program efforts variables, all specifications employing social leadership measures show an evidence of presence of diffusion effects; the effect is shown to be the most in the within-community leadership case and the least in the within-network leadership case.

(2) In the case of the unit leadership measure, Models 1, 2, and 3 support the existence of diffusion effect at the 5 percent significance level, with T-values of 3.46, 2.71, and 2.24, respectively. However, Model 4, which includes village fixed-effects, fails to reject the null hypothesis that there is no diffusion effect.

(3) For the within-network leadership measure, Models 3 and 4 fail to reject the null hypothesis.

(4) Throughout all models and all specifications of social leadership, the inclusion of the field worker contact variable and the Mothers' Club membership variable tends to decrease the magnitude and significance of the diffusion effects, suggesting that there may be a correlation between the diffusion effect terms and either of the family planning program efforts variables.

It is interesting that all models using the within-community leadership measure show more clear evidence of the existence of diffusion effects than those using any other social leadership measures; for example, the within-community leadership measure supports interpersonal diffusion in Models 1 to 3 at the 5 percent level and in Model 4 at the 10 percent level. Thus, it is likely that as a higher proportion of other women in a woman's social network (particularly those who have greater within-community leadership) use contraception, the woman herself is more likely to use contraception.

The second question concerns goodness-of-fit.¹⁶⁾ To investigate which social leadership measure of the four best approximates the Korean data, I employ the direct R^2 method.¹⁷⁾ As shown in Table 4, in Models 1 to 4, specifications using the within-community leadership measure and the unit leadership measure report, respectively, the highest and the second highest R^2 value. The within-network leadership measure show the third highest. Therefore, the results imply (1) that an appropriate choice on the social leadership measure helps to improve the goodness-of-fit of the model, and (2) that the assumption that women's social influence (or leadership) is evenly distributed across women cannot capture correctly the delicacy of social interactions between women. Ignoring this may depreciate the significance of interpersonal diffusion effects in studies on fertility control.

16) In the case of qualitative dependent variables, the accuracy with which a model approximates the observed data can be judged by using the fit between the predicted probabilities and observed response frequencies (Maddala, 1983). For discussions about measures of goodness-of-fit for the qualitative response models, see Amemiya (1981), Maddala (1983), McFadden (1974), and Zavoina and McElvey (1975).

17) Note that the actual value of the dependent value is either 0 or 1, whereas the predicted value is a probability. Goldberger (1973) and Morrison (1972) studied the correlation between a binary dependent variable and a predicted probability, arguing that the R^2 is a measure of the proportion of variance explained in the binary model.

2) Differences in Diffusion Effects across Different Social Networks and across Different Social Leadership Measures

<Table 5> Single-Equation Model with Village Dummies: "Actual Ever-Use"
(T-statistics and elasticities are, respectively, in parentheses and in brackets)

Weight	Network ^a								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Unit Leadership									
Actual Ever-Use	.053 {.108} (1.50)	.082 {.138} (2.40)	.075 {.104} (2.12)	.121 {.201} (3.63)	.082 {.129} (0.97)	.045 {.024} (1.78)	.065 {.079} (1.78)	.007 {.009} (0.22)	.085 {.100} (2.45)
Field Worker Contact	.508 (5.36)	.508 (5.35)	.489 (5.11)	.473 (4.94)	.489 (5.12)	.503 (5.27)	.506 (5.34)	.514 (5.41)	.483 (5.04)
Mothers' Club Membership	.220 (2.18)	.223 (2.24)	.212 (2.11)	.167 (1.64)	.199 (1.97)	.237 (2.37)	.219 (2.19)	.248 (2.47)	.212 (2.12)
Log-Likelihood	-562.8	-561.0	-561.7	-557.3	-561.0	-563.5	-562.4	-563.9	-560.9
Within-Network Leadership									
Actual Ever-Use	-.014 {.009} (0.10)	-.021 {.012} (0.17)	.197 {.116} (1.75)	.321 {.182} (2.58)	.214 {.130} (1.74)	-.0002 {.000} (0.00)	.092 {.051} (0.87)	-.015 {.007} (0.14)	.171 {.079} (1.59)
Field Worker Contact	.517 (5.46)	.517 (5.46)	.504 (5.30)	.497 (5.23)	.498 (5.23)	.516 (5.42)	.517 (5.46)	.517 (5.46)	.505 (5.32)
Mothers' Club Membership	.253 (2.56)	.254 (2.56)	.228 (2.29)	.216 (2.17)	.220 (2.20)	.252 (2.53)	.241 (2.42)	.254 (2.56)	.230 (2.30)
Log-Likelihood	-564.0	-563.9	-562.4	-560.7	-562.5	-564.0	-563.6	-563.9	-562.7
Within-Community Leadership									
Actual Ever-Use	.545 {.103} (1.90)	.825 {.116} (2.56)	1.224 {.149} (3.66)	.994 {.156} (3.45)	.832 {.142} (3.09)	.375 {.142} (3.09)	.809 {.070} (1.91)	.097 {.007} (0.21)	1.002 {.078} (2.24)
Field Worker Contact	.514 (5.43)	.509 (5.37)	.474 (4.95)	.493 (5.17)	.485 (5.08)	.510 (5.37)	.508 (5.35)	.514 (5.41)	.486 (5.09)
Mothers' Club Membership	.206 (2.02)	.222 (2.23)	.168 (1.66)	.160 (1.56)	.159 (1.54)	.243 (2.43)	.219 (2.19)	.248 (2.48)	.213 (2.13)
Log-Likelihood	-562.1	-560.6	-557.1	-557.9	-559.1	-563.7	-562.1	-563.9	-561.4

Note :^a Each number indicates each social network described in Table 2:

- (1) Woman's friends
- (2) Husband's closest friends
- (3) Hypothetical distributors of information on new family planning methods
- (4) Family planning discussion group
- (5) Hypothetical sources of information on new family planning methods
- (6) Those who are best informed about induced abortion
- (7) Sources of information on health
- (8) Sources of information on consumer goods
- (9) Sources of information on children's education

Table 5 shows estimates of the single-equation model across different social networks, in which diffusion effects are shown to depend largely on types of social networks and social leadership measures.

Empirical findings may be summarized in the following. First, when the unit leadership measure, $\omega_{ij}=1$, is employed, diffusion seems to operate most in the family planning discussion group social network. An increase of 1.000 percent in the diffusion effect term in this social network would cause the probability of contraceptive use to rise by 0.201 percent. This impact is over twice that of the sources of information on children's education network, 0.108 percent. This stresses the importance of the family planning discussion group social network in diffusion, as compared to that of any other social network. The husband's closest friends, the hypothetical sources of information on new family planning methods, and the hypothetical distributors of information on new family planning methods social networks also show significant influence on the probability of contraceptive use; the average elasticities of diffusion effects in these social networks are, respectively, 0.138, 0.129, and 0.104. Surprisingly, while the diffusion effect is statistically insignificant in the woman's friends network, it is shown to be significant in the husband's closest friends network, having the second highest elasticity. This could imply (1) the importance of weak ties, on the basis of a finding that wives of husband's closest friends of a woman are not likely to belong to the woman's friends social network,¹⁸⁾ and (2) a possibility that the communication among husbands may play an important role in contraceptive use in rural areas in 1973 Korea.

Considering the within-community leadership specification, second, diffusion seems the most important in the family planning discussion group social network, as found in the unit leadership specification. The

18) Refer to Table 5.6 (Overlaps in Network Membership by Type of Network) in Chung (1994a).

diffusion effects are still significant in some social networks such as the hypothetical distributors of information on new family planning methods, the hypothetical sources of information on new family planning methods, the husband's closest friends, and the sources of information on children's education networks.

Third, the specification employing within-network leadership measure do not support the existence of diffusion effects in most social networks. In case of within-network leadership do the effects exist only in the family planning discussion group social network.

Fourth, no matter which social leadership measure is concerned, diffusion effects on contraceptive use do not exist in the those who are best informed about induced abortion network, nor in the source of information on consumer goods social network.

As a result, it is clearly shown that whether or not the diffusion effect exists depends on (1) which social network is considered and (2) through which attributes women interact with each other in the social network, with the latter concerned with social influence factors.¹⁹⁾

3. The Two-Stage Model: Influence of Ideas

Table 6 shows selected probit results for the "Wife's friends" social network, In which the instrument P_j^P the predicted probability that

19) The single-equation models assume that each social network is exogenously given. Yet, to some extent, the formation of a social group is under a woman's or a family's control. For example, although a diffusion effect was shown to exist in the family planning discussion group social network, it is possible that a woman who intended to use contraceptives was more likely than others to organize her own family planning discussion group social network and to seek information on contraception from it. Ignoring this might have caused estimates of coefficients obtained from the model to be inconsistent. Worse than that, it might have caused the diffusion effects to be overestimated, particularly in social networks concerned with contraception. Unfortunately, it seems impossible) to avoid the endogeneity associated with the formation of a social network in a single-equation framework.

woman j , in woman i 's social network, has ever used contraception was employed as a proxy of the dummy variable Y_j .

The left side of the table concerns the case in which field worker contact and Mothers' Club membership variables are dummy variables, as will be called Model I. Models 1-4 represent the same as in Table 4. It is very interesting to compare the results in Table 4 with those in Model I of Table 6.

First, quite differently from the results in Table 4, those in Model I indicate at the 5 or 10 percent significance level that there exists a diffusion effect, no matter which either weight term or any model specification is concerned. Recalling that the results based on the simple probit model specification with village dummies Model 4 reject the presence of diffusion effect, this finding provides us with a very important implication that other women's ideas about contraception, rather than their contraception behavior, are likely to influence a woman's contraception behavior.

Second, another difference between results of the simple probit and the two-stage models arises from the significance of the Mothers' Club membership variable. Specifications with the unit and the within-community leadership measures, showing relatively superior goodness-of-fit to the other leadership measures, report that the Mothers' Club membership has no impact on the probability of a woman's current use of contraceptives at the 5 percent significance level, particularly in Model 4. This is an interesting result, because the simple probit model supports evidently the significance of the Mothers' Club membership. Nevertheless, the field worker contact variable is still shown to be very significant, even in the two-stage model.

<Table 6> Two-Stage Model with Village Dummies:

Actual Ever-Use in the "Wife's Friends" Social Network

Model I : Field Worker Contact and Mothers' Club Membership are Dummy Variables

Model II: Even Field Worker Contact and Mothers' Club Membership are Instrumental Variables

(T-statistics and elasticities are, respectively, in parentheses and in brackets)

Weight	Model I				Model II		
	Model 1	Model 2	Model 3	Model 4	Model 2	Model 3	Model 4
	[With Village Dummies]				[With Village Dummies]		
Unit Leadership							
Acture Ever-Use	.405 {.434} (6.68)	.380 {.411} (6.18)	.367 {.397} (5.85)	.262 {.287} (3.61)	.405 {.434} (6.68)	.404 {.433} (6.61)	.324 {.352} (4.64)
Field Worker Contact		.449 (5.05)	.425 (4.74)	.496 (5.21)	-.013 (0.04)	-.028 (0.08)	2.974 (1.21)
Mothers' Club Membership			.091 (0.97)	.176 (1.73)		.031 (0.11)	2.047 (1.80)
Log-Likelihood	-587.2	-574.3	-573.9	-557.4	-587.2	-587.2	-572.1
Within-Network Leadership							
Acture Ever-Use	1.547 {.545} (6.00)	1.510 {.538} (5.75)	1.468 {.523} (5.55)	.587 {.213} (1.75)	1.549 {.546} (6.00)	1.540 {.543} (5.96)	.850 {.303} (2.60)
Field Worker Contact		.472 (5.38)	.439 (4.89)	.507 (5.35)	.078 (0.25)	-.001 (0.003)	2.666 (1.08)
Mothers' Club Membership			.157 (1.71)	.231 (2.33)		.160 (0.59)	2.328 (2.06)
Log-Likelihood	-591.5	-576.9	-575.4	-562.4	-591.4	-591.3	-579.5
Within-Community Leadership							
Acture Ever-Use	2.713 {.265} (5.95)	2.700 {.266} (5.86)	2.598 {.256} (5.52)	1.867 {.186} (3.40)	2.779 {.271} (6.03)	2.770 {.270} (5.96)	2.255 {.223} (4.26)
Field Worker Contact		.486 (5.55)	.466 (5.18)	.508 (5.35)	.305 (0.99)	.284 (0.84)	2.928 (1.20)
Mothers' Club Membership			.096 (1.03)	.174 (1.71)		.039 (0.14)	2.055 (1.81)
Log-Likelihood	-591.7	-576.2	-575.7	-558.1	-591.2	-591.2	-573.6

Three models Models 2 to 4 in Model II in Table 6 take it into consideration that the family planning effort variables might be

correlated with unobserved disturbance terms, thereby causing an issue of likely endogeneity. In Model II, therefore, even the field worker contact and the Mothers' Club membership variables are substituted by instrument variables, that is, predicted probabilities regressed on women's socioeconomic characteristics. Main findings may be summarized:

(1) The actual ever-use variable, the diffusion effect term, is shown to be more important in Model II than in Model I. In any model in Model II, the diffusion is operating at the 5 percent significance level.

(2) Comparing results of Models 2 and 3 in Model I with those in Model II, we notice the big loss of significance of the family planning effort variables. In other words, the field worker contact and the Mothers' Club membership variables become insignificant in Model II. The finding that the role of the field worker contact disappears in a surprising degree implies that the variable is likely than the Mothers' Club membership variable to be endogenous.

(3) The Mothers' Club membership variable is shown to be significant in Model 4 in Model II, rather than Model 3. The membership variable shows significant influence in case of the within-network leadership measure at the 5 percent level, while it is significant in cases of the unit and the within-community leadership measures at the 10 percent level.

(4) In contrast to Model 4 in Model I, Model 4 in Model II explores no significance of the field worker contact variable for any leadership specification. The difference of T-values of the field worker contact variable between two models is much larger than that of the Mothers' Club membership variable.

Results obtained from the two-stage model with village dummies across all of the nine different social networks are displayed in Table 7, in which the field worker contact variable and the Mothers' Club

membership variables are dummy variables as in three models in Model I in Table 6.

<Table 7> Two-Stage Model with Village Dummies: "Actual Ever-Use"

Model I : Field Worker Contact and Mothers' Club Membership are Dummy Variables
(T-statistics and elasticities are, respectively, in parentheses and in brackets)

Weight	Network ^a								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Unit Leadership									
Actual Ever-Use	.262 {.287} (3.61)	.241 {.219} (3.55)	.228 {.161} (3.35)	3.6 {.262} (4.61)	.262 {.215} (3.93)	.128 {.032} (1.38)	.204 {.127} (2.84)	.061 {.040} (0.93)	.221 {.136} (3.39)
Field Worker Contact	.496 (5.21)	.497 (5.22)	.476 (4.97)	.473 (4.91)	.476 (4.98)	.499 (5.23)	.499 (5.25)	.508 (5.35)	.480 (5.03)
Mothers' Club Membership	.176 (1.73)	.204 (2.04)	.190 (1.89)	.138 (1.34)	.163 (1.60)	.231 (2.10)	.208 (2.08)	.235 (2.35)	.208 (2.08)
Log-Likelihood	-557.4	-557.5	-558.3	-553.1	-561.1	-562.9	-559.9	-563.5	-558.1
Within-Network Leadership									
Actual Ever-Use	.589 {.213} (1.75)	.415 {.129} (1.50)	.664 {.202} (2.90)	1.017 {.298} (3.76)	.864 {.279} (3.37)	.115 {.016} (0.58)	.561 {.160} (2.47)	.139 {.037} (0.64)	.644 {.157} (2.99)
Field Worker Contact	.507 (5.35)	.502 (5.27)	.494 (5.19)	.490 (5.13)	.492 (5.17)	.511 (5.38)	.515 (5.43)	.513 (5.42)	.502 (5.28)
Mothers' Club Membership	.231 (2.33)	.236 (2.38)	.218 (2.19)	.189 (1.89)	.192 (1.91)	.245 (2.46)	.225 (2.26)	.246 (2.48)	.219 (2.20)
Log-Likelihood	-562.4	-562.8	-559.7	-556.9	-558.2	-563.7	-560.9	-563.7	-559.4
Within-Community Leadership									
Actual Ever-Use	1.867 {.186} (3.40)	1.854 {.142} (3.14)	2.738 {.158} (4.24)	2.627 {.198} (4.57)	1.885 {.155} (3.70)	1.315 {.025} (1.19)	2.767 {.108} (2.96)	.994 {.040} (1.15)	2.162 {.107} (3.23)
Field Worker Contact	.508 (5.35)	.502 (5.18)	.473 (4.94)	.490 (5.12)	.485 (5.09)	.507 (5.34)	.498 (5.24)	.506 (5.33)	.484 (5.07)
Mothers' Club Membership	.174 (1.71)	.215 (2.15)	.159 (1.56)	.130 (1.26)	.142 (1.37)	.235 (2.35)	.202 (2.01)	.232 (2.32)	.200 (2.00)
Log-Likelihood	-558.1	-558.9	-554.6	-553.1	-556.8	-563.2	-559.4	-563.2	-558.6

Note:^a Each number indicates each social network described in Table 2:

- (1) Woman's friends
- (2) Husband's closest friends
- (3) Hypothetical distributors of information on new family planning methods
- (4) Family planning discussion group
- (5) Hypothetical sources of information on new family planning methods
- (6) Those who are best informed about induced abortion
- (7) Sources of information on health
- (8) Sources of information on consumer goods
- (9) Sources of information on children's education

We may summarize the results:

(1) Throughout all social networks, both the unit and the within-community leadership measures specifications tend to support the existence of diffusion effect at the 5 percent significance level.

(2) Whichever leadership specification is concerned, the diffusion effect is shown to operate in such social networks as the hypothetical distributors of information on new family planning method, the family planning discussion group, and the sources of information on children's education networks. On the contrary, any leadership specification doesn't support the diffusion effect in such social networks as the those who are best informed about induced abortion, and the sources of information on consumer goods networks.

(3) The diffusion effects in terms of the average elasticity being compared the effect is operating most strongly in the family planning discussion group social network in case of the within-community leadership measure, showing the elasticity of 0.198.

(4) The Mothers' Club membership becomes less important in Table 7 than in Table 5.

Table 8 shows the results of cases in which even the field worker contact and the Mothers' Club membership variable are instrumental variables across all the social networks, as in three models in Model II in Table 6.

Considering either the unit or the within-community leadership measure, we may notice that there is a diffusion effect in all of the nine social networks. In terms of the average elasticity, the wife's friends social network and the family planning discussion group social network show the strongest diffusion effects, 0.352 in case of the unit leadership measure and 0.234 in case of the within-community leadership measure, respectively. The case of the within-network leadership does not support the existence of diffusion effect at the 5

percent significance level in the those who are best informed about induced abortion social network and in the source of information on consumer goods social network.

<Table 8> Two-Stage Model with Village Dummies: "Actual Ever-Use"

Model II: Even Field Worker Contact and Mothers' Club Membership are Instrumental Variables

(T-statistics and elasticities are, respectively, in parentheses and in brackets)

Weight	Network ^a								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Unit Leadership									
Actual Ever-Use	.324	.258	3.7	.377	.335	.244	.269	.135	.288
	{.352}	{.287}	{.216}	{.322}	{.272}	{.062}	{.166}	{.088}	{.176}
	(4.64)	(4.31)	(4.68)	(5.93)	(5.25)	(2.67)	(3.83)	(2.14)	(4.49)
Field Worker	2.974	2.847	2.765	3.162	2.751	2.572	2.837	2.778	3.341
Contact	(1.21)	(1.15)	(1.11)	(1.27)	(1.10)	(1.04)	(1.14)	(1.13)	(1.36)
Mothers' Club	2.047	2.056	2.184	2.180	2.164	2.261	2.287	2.203	2.055
Membership	(1.80)	(1.82)	(1.93)	(1.92)	(1.91)	(2.00)	(2.03)	(1.96)	(1.81)
Log-Likelihood	-572.1	-573.3	-571.7	-564.7	-568.8	-579.1	-575.4	-580.5	-572.5
Within-Network Leadership									
Actual Ever-Use	.850	.678	.853	1.240	1.127	.326	.664	.298	.780
	{.303}	{.209}	{.256}	{.361}	{.360}	{.046}	{.187}	{.078}	{.188}
	(2.60)	(2.51)	(3.82)	(4.73)	(4.53)	(1.70)	(2.97)	(1.41)	(3.69)
Field Worker	2.666	2.834	2.817	2.613	2.820	2.736	2.440	2.725	3.054
Contact	(1.08)	(1.15)	(1.14)	(1.04)	(1.15)	(1.11)	(0.98)	(1.11)	(1.24)
Mothers' Club	2.328	2.194	2.173	2.234	2.437	2.308	2.344	2.257	2.126
Membership	(2.06)	(1.94)	(1.92)	(1.97)	(2.15)	(2.05)	(2.08)	(2.01)	(1.88)
Log-Likelihood	-579.5	-579.7	-575.5	-571.5	-572.4	-581.4	-578.4	-581.8	-575.9
Within-Community Leadership									
Actual Ever-Use	2.255	2.193	3.438	3.117	2.462	2.415	3.580	1.914	3.592
	{.223}	{.167}	{.198}	{.234}	{.202}	{.046}	{.139}	{.076}	{.141}
	(4.26)	(3.79)	(5.52)	(5.65)	(5.12)	(2.24)	(3.93)	(2.29)	(4.37)
Field Worker	2.928	3.013	3.433	3.095	3.712	2.879	2.921	2.828	3.222
Contact	(1.20)	(1.22)	(1.39)	(1.25)	(1.50)	(1.17)	(1.18)	(1.15)	(1.31)
Mothers' Club	2.055	2.000	2.077	2.033	2.072	2.238	2.217	2.179	2.060
Membership	(1.81)	(1.78)	(1.83)	(1.78)	(1.82)	(1.98)	(1.97)	(1.93)	(1.81)
Log-Likelihood	-573.6	-575.4	-566.8	-566.1	-569.1	-580.3	-574.6	-580.1	-573.0

Note :^a Each number indicates each social network described in Table 2:

- (1) Woman's friends
- (2) Husband's closest friends
- (3) Hypothetical distributors of information on new family planning methods
- (4) Family planning discussion group
- (5) Hypothetical sources of information on new family planning methods
- (6) Those who are best informed about induced abortion
- (7) Sources of information on health
- (8) Sources of information on consumer goods
- (9) Sources of information on children's education

It is of interest to compare the findings shown in Tables 7 and 8. While the diffusion effects turn out to be more significant in Table 8, the field worker contact variable and the Mothers' Club membership variables seem to be less important in that table. In particular, for any specification, the field worker contact turns out to be trivial at the 5 percent significance level. This implies that the field worker contact is very likely to depend on the respondent's observed or unobserved socioeconomic characteristics and to deflate the significance and the point-estimate of the diffusion effect term across all the social networks. It may be noted, therefore, that to identify and measure the diffusion effect correctly, we need to control the field worker contact variable, irrespective of which social network or social influence factor is employed.

VI. CONCLUSION AND DISCUSSIONS

The central discussions from my analyses are focused on the comparison between the results from the simple probit models based on contraception behavior (the "behavior" models) and those from the two-stage models based on ideas toward contraception (the "ideas" models). First, the "ideas" models provide much stronger evidence of diffusion effects than the "behavior" models. While the "behavior" models support diffusion effects in five out of nine types of social networks for the unit or within-community leadership measures, the "ideas" models support it in seven types of social networks at the 5 percent significance level. Furthermore, when we consider cases in which family planning efforts variables are replaced by instruments, the diffusion effects is shown to be operating in all social networks in the cases of both leadership measures.

Second, it is shown that there exists a large difference in magnitude of the diffusion effect between the two types of models. The "ideas" models tend to increase the magnitude of the effect in terms of average elasticity, compared to the "behavior" models. Examining the husband's closest friends social network with the unit leadership measure, we find that the average elasticity is 0.138 in the "behavior" model, 0.219 in the "ideas" model with the efforts dummies, and 0.287 in the "ideas" model with the instrumental efforts variables. It is similar in cases of the family planning discussion group social network under the within-community leadership measure; 0.156 in the "behavior" model, 0.198 in the "ideas" model with the dummy efforts variables, and 0.234 in the "ideas" model with the instrumental efforts variables.

The third concern is related to which kinds of models can detect the diffusion effect more fully. In the "behavior" models, diffusion effects are shown to exist in some types of social networks, but they are not significant in others. In other words, the presence of a diffusion effect is unevenly distributed across different social networks. However, in the "ideas" models, diffusion effects turn out to be present relatively evenly across various types of social networks, particularly in cases of instrumental efforts variables. One reason for this is that others' ideas about contraception might be perceived more easily than their contraception behavior might be, irrespective of types of social networks. If we ignore this, it is unlikely to accept the presence of diffusion of fertility control in some social networks correctly and to capture the diffusion effect fully.

Fourth, we may ask ourselves, "Which types of social network contacts most significantly amplify the impact of the family planning program in terms of the average elasticity?" In the "behavior" models, the family planning discussion group social network shows the most significant diffusion effect in the unit and within-community social

leadership measures. The husband's closest friends and the hypothetical distributors of information on new family planning methods social networks are ranked as those which show the second most significance in cases of the unit and within-community leadership measures, respectively. However, the case is not the same in the "ideas" models. Whether the family planning efforts variables are assumed either as dummies or as instruments in the "ideas" models, the unit leadership measure specifications rank the woman's friends as the social network which provides the most significant diffusion effect and the family planning discussion group as that which shows the second most significant effect. On the contrary, in cases of the within-community leadership measures, the diffusion effect operates most significantly in the family planning discussion group and second most significantly in the woman's friends social network. Roughly, we may conjecture that the influence of "behavior" is very strong in the family planning discussion group social network and "ideas" are very effective in the woman's friends as well as the discussion group social networks.

Fifth, a difference between results of the "behavior" and "ideas" models arises from a finding regarding the significance of the family planning efforts variables: the field worker contact, and the Mothers' Club membership. While the "behavior" models support the effect of both efforts variables on the contraception decision, Mothers' Club membership tends to show no impact on the decision in the "ideas" models in cases where the efforts variables are expressed as dummies. Meanwhile, one group of the "ideas" models concerns the issue of the likely endogeneity of the family planning effort variables, considering a possibility that either field workers' contact with a woman or her being a member of the Mothers' Club may be conditioned on her intention to use contraception. The empirical results obtained from the group of the models provide two interesting findings. One is that the diffusion effect

becomes more significant, while the effort variables show insignificant effects. The other is that the field worker contact, rather than the Mothers' Club, may be viewed as endogenous. When the effects of interpersonal diffusion and family planning effort are analyzed, therefore, it is not recommended to assume simply that some family planning effort variables are exogenously given.

Finally, whether the diffusion effect exists and how much we can improve the goodness-of-fit of the model depends in part on which kind of social leadership measure is employed. For example, specifications using the within-community leadership measure provide more clear evidence of the existence of diffusion effects in fertility control and better fit to the data than those using any other social leadership measures. If we don't take into consideration a possibility that women have different degrees of social leadership, it is unlikely to capture fully the significance of diffusion effects.

My results above are still subject to several limitations. First, the Korean data are not longitudinal but cross-sectional. If there is a time-dependent element in those decisions, the analysis may yield biased parameter estimates of the diffusion effect terms. Therefore, it should be noted that cross-sectional studies such as this one are somewhat limited in exploring the diffusion process per se. Second, it is likely that individuals often have some scope for choice of members of their social networks, whether through selection of friends, schools, or neighborhoods. In a sense, therefore, a woman's social networks may be viewed as reflections of her efforts to seek information regarding different issues. This surely generates one fundamental statistical issue to be taken into consideration in studies on diffusion of fertility control. Third, the hypothetical tests employed in the "ideas" models are based on uncorrected standard errors, which come from a loss of efficiency due to the two-stage models. Therefore, it is difficult to examine

closely the differences in the results of the "behavior" and "ideas" models, even though we may figure out differences in general characteristics.

Finally, a woman's perception of others' contraceptive use has a strong positive impact on her propensity to use contraception(Chung, 1994b). Therefore, studies on the diffusion effect of fertility control need detailed information about perception processes of others' contraception behavior and ideas toward contraception. Unfortunately, the Korean data don't provide such information for all types of social networks. Likewise, employing full information about motivations of family planning efforts may provide a clue to avoid the likely endogeneity concerning the efforts.

REFERENCES

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- Alexander, K. L., Bruce K. Eckland, and L. J. Griffin(1975), "The Wisconsin model of socioeconomic achievement: A replication." *American Journal of Sociology* 81 324-342.
- Amemiya, T.(1981), "Qualitative response models: A survey." *Journal of Economic Literature* 19 1483-1536.
- Chung, Woojin(1994a), *The Diffusion of Fertility Control in Korea: Multilevel Models for Social Network Data*. Ph.D. thesis, State University of New York at Stony Brook.
- _____ (1994b), *Effects of Social Leadership on the Diffusion of Fertility Control: An Analysis of Social Network Data*. Working Paper, CarolinaPopulation Center, University of North Carolina at Chapel Hill.
- Cleland, J.(1985), "Marital fertility decline in developing countries." In J. Cleland and J. Hobcraft (ed.), *Reproductive Change in Developing Countries*. Oxford: Oxford University Press.
- Cleland, J. and C. Wilson(1987), "Demand theories of the fertility transition: An iconoclastic view." *Population Studies* 41(1) 5-30.
- Coale, Ansley J, Lee-Jay Cho and Noreen Goldman(1980), *Estimation of Recent Trends in Fertility and Mortality in the Republic of Korea*. Report-Committee on Population and Demography, no.1.Washington, DC: National Academy of Sciences.
- Coale, Ansley J. and Susan Cotts Watkins (ed.)(1986), *The Decline of Fertility in Europe: The Revised Proceedings of a Conference on the Princeton European Fertility Project*. Princeton, NJ: Princeton University Press.
- DeGoot, M. H.(1974), "Reaching a consensus." *Journal of the American Statistical Association* 69 118-121.
- Doreian, Patrick(1981), "Estimating linear models with spatially distributed data." In Samuel Leinhardt (ed.), *Sociological Methodology*. San Francisco: Jossey-Bass.

- Entwisle, Barbara, Ronald R. Rindfuss, David K. Guilkey, Aphichat Chamrathirong, Sara Curran, and Yothin Sawangdee(1992), "Community and contraceptive choice in rural Thailand: A case study of Nang Rong district." *Paper presented at the Annual Meetings of the Population Association of America*, Denver, CO, Apr. 30-May 2.
- Erbring, L. and A. Young(1979), "Individuals and social structure: Contextual effects as endogenous feedback." *Sociological Methods and Research* 7(4) 396-430.
- Freedman, R.(1987), "The contribution of social science research to population policy and family planning program effectiveness." *Studies in Family Planning* 18(2) 57-82.
- French, John R. P.(1956), "A formal theory of social power." *Psychological Review* 63 181-194.
- French, John R. P. and Bertran H. Raven(1959), "The bases of social power," in Dorwin Cartwright (ed.) *Studies in Social Power. Research Center for Group Dynamics Series, no. 6. Ann Arbor: Research Center for Group Dynamics, Institute of Social Research, University of Michigan.*
- Friedkin, Noah E.(1986), "A formal theory of social power." *Journal of Mathematical Sociology* 12 103-126.
- Friedkin, Noah E. and Karen S. Cook(1990), "Peer group influence." *Sociological Methods and Research* 11(1) 122-143.
- Friedkin, Noah E. and Eugene C. Johnsen(1990), "Social influence and opinions." *Journal of Mathematical Sociology* 15 193-205.
- Goldberger, Arthur Stanley(1973), "Correlations between binary choices and probabilistic predictions." *Journal of the American Statistical Association* 68-84.
- Granovetter, Mark S.(1973), "The strength of weak ties." *American Journal of Sociology* 78 1360-1380.
- _____ (1985). "Economic action and social structure: The problem of embeddedness." *American Journal of Sociology* 91(3) 481-510.

- Haller, Archibald O. and J. Woelfel(1972), "Significant others and their expectations: Concepts and instruments to measure interpersonal influence on status aspiration." *Rural Sociology* 37 591-622.
- Harary, D.(1959), "A criterion for unanimity in French's theory of social power," in Dorwin Cartwright (ed.) *Studies in Social Power. Research Center for Group Dynamics Series, no. 6.* Ann Arbor: Research Center for Group Dynamics, Institute of Social Research, University of Michigan.
- Kincaid, D. Lawrence, Ernest Massiah, Achiatya Das Gupta, and S. N. Mitra(1993), "Ideational aspects of fertility change in Bangladesh." *Paper presented at the Annual Meeting of the Population Association of America*, Cincinnati, OH, Apr. 1-3.
- Knodel, John E. and Etienne van de Walle(1986), "Lessons from the past: Policy implications of historical fertility studies." In Ansley J. Coale and Susan Cotts Watkins (ed.), *The Decline of Fertility in Europe: The Revised Proceedings of a Conference on the Princeton European Fertility Project.* Princeton, NJ: Princeton University Press.
- Knoke, David and James H. Kuklinski(1982), *Network Analysis.* Beverly Hills, CA: Sage.
- Laumann, Edward O. and F. U. Pappi(1973), "New directions in the study of community elites." *American Sociological Review* 38 212-230.
- Leasure, J. William(1962), *Factors Involved in the Decline of Fertility in Spain, 1900-1950.* Ph.D. thesis, Princeton University.
- Lee, Sea-Baick(1977), *System Effects on Family Planning Innovativeness in Korean Villages.* Ph.D. thesis, University of Michigan.
- Lesthaeghe, Ronald J.(1977). *The Decline of Belgian Fertility, 1800-1970.* Princeton, NJ: Princeton University Press.
- Livi-Bacci, Massimo(1971), *A Century of Portugese Fertility.* Princeton, NJ: Princeton University Press.
- _____ (1977), *A History of Italian Fertility during the Last Two Centuries.* Princeton, NJ: Princeton University Press.

- Maddala, G. S.(1983), "Limited-dependent and Qualitative Variables in Econometrics." *Econometric Society monographs in Quantitative Economics*, no.3. Cambridge, England: Cambridge University Press.
- McFadden, D.(1974), "The measurement of urban travel demand." *Journal of Public Economics* 3 303-328.
- Montgomery, Mark R.(1993), "The diffusion of fertility control in Taiwan: A multi-level analysis." *Paper presented at the Annual Meeting of the Population Association of America*, Cincinnati, OH, Apr. 1-3.
- _____ and John B. Casterline(1993), "The diffusion of fertility control in Taiwan: Evidence from pooled cross-section time-series models." *Population Studies* 47(3) 457-479.
- _____ and Woojin Chung(1999), "Social Networks and the Diffusion of Fertility Control in The Republic of Korea." In (ed) Richard Leete. *Dynamics of Values in Fertility Change*. Oxford: Oxford University Press.
- Morrison, D. G.(1972), "Upper bounds for correlations between binary outcomes and probabilistic predictions." *Journal of the American Statistical Association* 7 68-70.
- Palmore, James A. and Ronald Freedman(1969), "Perception of contraceptive practice by others: Effects on acceptance." In Ronald Freedman and John Y. Takeshita (ed.), *Family Planning in Taiwan: An Experiment in Social Change*. Princeton, NJ: Princeton University Press.
- Park, Hyung Jong, Kyung-Kyoon Chung, Dal Sun Han, and Sea Baick Lee(1974), *Mothers' Clubs and Family Planning in Korea*. Seoul, Korea: School of Public Health, Seoul National University.
- Retherford, Robert D. and James A. Palmore(1983), "Diffusion processes affecting fertility regulation, " in Rudolfo A. Bulatao and Ronald D. Lee with Paula E. Hollerbach and John Bongaarts (ed.), *Determinants of Fertility in Developing Countries*. Studies in Population, vol.2, New York: Academic Press.
- Rogers, Everett M.(1975), "Network analysis of the diffusion of innovations." *Paper presented at the Mathematical Social Science Board's Research Symposium on Social Networks*, Hanover, New Hampshire.

- Rogers, Everett M. and D. Lawrence Kincaid(1981), *Communication Networks: Toward a New Paradigm for Research*. New York: The Free Press; London: Collier Macmillan.
- Rogers, Everett M., Hyung Jong Park, Kyung-Kyoon Chung, and Sea Baick Lee(1975a), "Mothers' Clubs in the diffusion of family planning ideas in Korean villages: An illustration of network analysis." *Paper presented to the American Association for the Advancement of Science*, New York, Jan. 26-31.
- Rogers, Everett M., Hyung Jong Park, Kyung-Kyoon Chung, Sea Baick Lee, W. S. Puppa, and Brenda A. Doe(1975b). "Network analysis of the diffusion of family planning innovations over time in Korean villages: The role of Mothers' Clubs." *Paper presented at the Population Association of America annual meeting*, Seattle, Apr.
- Sen, A.(1986). "Social choice theory." In Kenneth Joseph Arrow and Michael D. Intriligator (ed.), *Handbook of Mathematical Economics*, Vol. 3. Handbooks in Economics. Amsterdam: North-Holland.
- Tsui, A. O.(1985). "Community effects on contraceptive use." In John B. Casterline (ed.), *The Collection and Analysis of Community Data*. Voorburg: International Statistical Institute.
- Watkins, Susan Cotts(1986). "Conclusions." In Ansley J. Coale and Susan Cotts Watkins (ed.), *The Decline of Fertility in Europe: The Revised Proceedings of a Conference on the Princeton European Fertility Project*. Princeton, NJ: Princeton University Press.
- Westinghouse Health Systems and Korean Institute for Family Planning(1979). *Republic of Korea Contraceptive Prevalence Survey Summary Report*. Seoul.Korea.
- Zavoina, R. and W. McElvey(1975). "A statistical model for the analysis of ordinal level dependent variables." *Journal of Mathematical Sociology* 4 103-120.

출산조절결정 확산에 미치는 타인의 견해와 행동의 영향도 비교 연구

정우진

여성은 여러 원천에서 제공되는 다양한 정보를 참고하여 출산조절결정을 한다. 본 연구는 사회조직(social network) 자료를 2단계 계량경제모형에 적용함으로써 여성의 출산조절에 미치는 다른 여성들의 견해와 행동의 효과를 분석한다. 동시에 (1) 출산조절결정에 미치는 사회적 지도력의 영향, (2) 여러 종류의 사회조직간 영향도 비교, (3) 출산조절 현장요원 및 여성사회조직의 역할 등을 고려함으로써 저개발국의 출산조절정책수립을 위한 정책적 시사점을 제공한다.

핵심단어: 출산조절결정, 사회적 지도력, 출산조절정책