The Contextual Effects of Gender Norms, Communication, and Social Capital on Family Planning Behaviors in Uganda: A Multilevel Approach

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This study hypothesized a multilevel model to examine the contextual effects of gender norms, exposure to health-related radio programs, interpersonal communication, and social capital on family planning behavior in Uganda. The results of hierarchical linear modeling showed that all of the four variables were significant predictors of family planning behavior. The authors found that gender norms as a contextual factor significantly interacted with the individual-level perceived benefit. The significant cross-level interaction effect was also observed between individuals' interpersonal communication and contextual variation in listening to a health-related radio program. Practical implications for family planning communication campaigns are discussed.

Keywords: *family planning; hierarchical linear modeling; social capital; gender norm*

Issues relating to human reproduction have steadily shaped an important public health agenda that includes national and international programs. In particular, the question of how effective family planning services are in reducing fertility in developing countries has received increasing academic attention in the past two decades. Family planning, by its working definition, is the ability of individuals and couples to anticipate and attain their desired number of children and the spacing and timing of their births (World Health Organization, 2006). It is achieved through the use of contraceptive methods, which is considered to represent (modern) family planning behaviors.

Studies that have examined the determinants of family planning behaviors or contraceptive use have mainly focused on micro-level (or individual-level) factors (e.g., Goodson, 2002; Gupta, Katende, & Bessinger, 2003). But because personal values,

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beliefs, and behaviors are always situated within and shaped by the social context of relationships among people who share the experience of belonging to a community (Smith, Littlejohns, & Thompson, 2001), researchers need to understand individuals' social surroundings and social/contextual factors. In addition to considering variables at the individual level, researchers would benefit from including these contextual factors in their efforts to predict health-related behavior. Indeed, many studies have already emphasized and demonstrated the importance of contextual effects in understanding health outcomes and health-related behavior (e.g., Cammack & Heaton, 2001; Frohlich, Potvin, Chabot, & Corin, 2002; Magadi & Curtis, 2003; Stephenson & Tsui, 2002).

The purpose of this study is to examine how shared values and norms, social networks, and social relations within a community influence individuals' decision and practice regarding a modern family planning behavior: contraceptive use. More specifically, this study investigates the contextual effects of gender norms, media use, interpersonal communication, and social capital on family planning behavior in Uganda. The documented failure of numerous information campaigns may be ascribed to a predominant focus on individual effects and a disregard for social influences. Accordingly, we expect that our findings of social/contextual influences on individual behavior will advance the body of information campaign literature and provide campaign practitioners with a much broader and richer understanding of how social surroundings matter to the promotion of media health campaigns.

Social Psychological Predictors of Family Planning Behavior

A substantial body of literature has examined the influences of demographic and socioeconomic factors on family planning behavior. For example, women with higher levels of education are significantly more likely to practice modern family planning methods (e.g., Gupta et al., 2003), and women with at least five living children are more likely than those with no living children to practice family planning (Gupta et al., 2003; Magadi & Curtis, 2003). In addition, women's age and marital status have also been found as significant predictors of family planning although their findings are not consistent. For example, findings showed that single (Magadi & Curtis, 2003) or formerly married women (Gupta et al., 2003), younger (Feyisetan, 2000) or middle aged women (Magadi & Curtis, 2003) are significantly more likely to practice family planning. A few studies also showed that religious affiliation is a strong predictor of family planning behavior. Catholics have lower use of modern family planning methods than do the Islamic (Feyisetan, 2000) and mainstream Protestants (Goodson, 1997).

Our study focuses on social-psychological variables instead of demographic and socioeconomic variables. Individuals' beliefs that they can motivate themselves and regulate their own behavior plays an important role in the process of behavior change in whether they will consider changing habits that are detrimental to their health (Bandura, 1994). The conceptualization of perceived self-efficacy in the social learning theory (Bandura, 1997) is an important construct predicting health behavior. In the context of health communication, perceived self-efficacy can be defined as "people's beliefs that they can exert control over their own motivation, thought processes, emotional states, and patterns of behavior" (Bandura, 1994, p. 26). Because behavior change depends on one's perceived capability to cope with stress and boredom and to mobilize one's resources and courses of action required to meet the situational demands, efficacy beliefs affect the intention to change risk behavior, the amount of effort expended to attain this goal, and the persistence to continue striving in spite of barriers and setbacks that may

undermine motivation (Schwarzer & Fuchs, 1995). Many studies have examined and supported the hypothesis that individuals' perceived self-efficacy is positively related to family planning behavior (e.g., Goodson, 2002; Kvalem & Traeen, 2000). The findings of these studies showed that perceived self-efficacy with contraceptive methods is positively associated with effective use of contraceptives.

This study also expects beliefs regarding family planning practices to be an important predictor of contraceptive use, including perceived barriers to and expected benefits (or response efficacy in other literature) of adopting family planning methods. According to the health belief model (HBM), a social-psychological model based on value-expectancy theory, perceived barriers refer to the potential negative aspects of a particular health action and act as impediments to undertaking the recommended behavior (Rosenstock, 1974), whereas perceived benefits refer to the perceptions that the perceived risk would be substantially reduced by taking a specific action (Rosenstock, Strecher, & Becker, 1988). Perceived benefits are the result of beliefs about the benefits gained by a particular action weighed against the costs of or barriers to action (Rutter & Quine, 2002). Although there have been inconsistent findings on the relationship between perceived benefits and condom use (e.g., Allard, 1989; Volk & Koopman, 2001), perceived barriers have received relatively consistent support as a significant negative predictor of safer sex behaviors (e.g., Volk & Koopman, 2001; Winfield & Whaley, 2002).

The Effects of Contextual Factors on Family Planning Behavior

Most behaviors that impact public health are interwoven with social values and norms that determine healthy or unhealthy practices. Blau (1960) has viewed social values and norms as "common orientations toward social conduct that prevail in a society or group" (p. 179). He argued that the common values and norms in a group have influences on the conduct of its members through two kinds of fear that an individual feels: fear of his or her conscience and fear of social sanctions. In other words, individuals conform to prevailing social values and norms to avoid feeling guilty but also to gain social approval, and thereby to avoid social disapproval (Blau, 1960). The psychological mechanism concerning individuals' conformity to group and authority has been well evidenced in two classic experiments (Asch, 1956; Milgram, 1974). Authoritarian social values and norms prevailing in a community can function as external factors that constrain individuals' own attitudes and behaviors. An individual's perception about how the community views their actions affects their health-related behaviors (Stephenson & Tsui, 2002). As such, community beliefs and norms relating to health-related behaviors affect individuals' health-related attitudes and behaviors.

Gender Norms. Social norms related to gender roles strongly affect sexual and reproductive health (see Malhotra, Schuler, & Boender, 2002). Gender roles that are socially constructed and socialized determine differences between women and men in access to economic resources and decision making. Traditional gender norms in African countries, especially southern African countries, support male authority and allow men, rather than women, to access economic resources. Despite some progress in gender equity and/or equality, most African countries still represent patriarchal, patrilineal, and male-dominant societies. In many patriarchal and male-dominant societies, culture dictates that "good" women are ignorant about sex and passive in sexual interactions (United Nations Population Fund [UNFPA], 2002). An organization of the United Nations, UNFPA indicates that this makes it difficult for women to inform themselves

about risk reduction and more difficult, even if they are informed, for them to negotiate safer sex or the use of condoms (UNFPA, 2002). Varga (2003) argued that the relationship between gender norms and sexual risk taking was reflected in adolescents' sexual negotiation dynamics. Varga (2003) explained, "A girl's respectability is gained by her being sexually available to her partner, allowing him sexual decision-making authority, exhibiting coyness and resistance to his sexual advances, being sexually faithful, and avoiding pregnancy" (p. 163).

Many studies have evidenced a positive relationship between women's egalitarian beliefs and ability to practice fertility or contraceptive uses (see Malhotra et al., 2002). Reciprocally, the use of family planning methods can also promote a woman's perception of herself as empowered, resulting in more egalitarian beliefs in general (Waszak, Severy, Kafafi, & Badawi, 2003). Studies have suggested that a community's gender norms are a contextual factor that affects individuals' reproductive as well as sexual behaviors (e.g., Greenwell, 1996; Varga, 2003; Waszak et al., 2003). For instance, Greenwell (1996) found that community beliefs concerning childbearing preferences and reproductive health behaviors have a strong influence on individual attitudes toward family planning and fertility preferences. Waszak et al. (2003) argued that traditional gender norms "limit a woman's ability to use family planning if she perceives herself as being bound to cultural expectations or the will of her husband" (p. 197). As such, it is expected that the individuals' psychological benefits of practicing family planning might be mitigated by patriarchal and masculine gender norms shared in a community.

Communication. Communication at all levels—personal, family, community, and mass media—plays a major role in individual decision-making in the field of reproductive health (Piotrow, Kincaid, Rimon, & Rinehart, 1997). Piotrow et al. (1997) have viewed the role of communication as

> the key process underlying changes in knowledge of the means of contraception, in attitudes toward fertility control and use of contraceptives, in norms regarding ideal family size, and in the openness of local cultures to new ideas and aspirations and new health behavior. (p. 2)

Exploring the influence of communication on reproductive health has been considered one of the important perspectives to encourage people to practice family planning. Valante and Saba (1998) argued that communication campaigns that disseminate information about family planning methods and services will increase the demand for family planning services and eventually lead to reduced fertility.

Studies of individuals' exposure to mass media and family planning have found that exposure to contraceptive-use messages increases the likelihood of practicing contraception (e.g., Cammack & Heaton, 2001; Gupta et al., 2003; Stephenson & Tsui, 2002). It should be noted, however, that the effect of mass media on behavioral outcomes might be mediated by interpersonal communication among individuals. According to a traditional hypothesis of media effects (e.g., Chaffee, 1982), the mass media are effective at changing awareness, knowledge, and attitude, but interpersonal communication is often necessary for behavioral change. Several studies have shown that mass media campaigns have an indirect effect on health behavior through their effects on interpersonal communication, attitudes, or social norms regarding health-related outcomes (e.g., Rimal, Flora, & Schooler, 1999; Storey, Boulay, Karki, Heckert, & Karmacharya, 1999; Valante & Saba, 1998). For example, examining the relative influence of mass

media and interpersonal communication on a reproductive health behavior in Bolivia, the findings of Valante and Saba (1998) indicate that the mass media do influence information-related steps to behavior change, such as family-planning-method awareness and knowledge, whereas the personal network exposure is more strongly associated with all behavior change steps. Rimal et al. (1999) showed that exposure to media campaign messages not only has a direct effect on overall health behaviors regarding cardiovascular disease, but it also affects health information seeking and interpersonal communication, which in turn affect the health behaviors. Storey et al. (1999) also found that the Radio Communication Project (RCP) in Nepal had a significant indirect effect on modern family planning through interpersonal communication about family planning. Although communication has been described as a "cross-level" discipline, research too often has focused on individual use of communications, neglecting the more dynamic, multilevel nature of communications (Price, Ritchie, & Eulau, 1991). Indeed, several scholars cautioned against using such individual-focused research and encouraged more multilevel analysis in this discipline (e.g., Paisley, 1984; Pan & McLeod, 1991). Paisley (1984), for instance, suggested that communication scholarship should pay attention to processes operating at cultural, social, and psychological levels. Pan and McLeod (1991) discussed several cross-level communication theories by nature, and Mutz (1998) coined the term *impersonal influence* to emphasize the power of normative social influence that media can bring to people's everyday lives. Thus, we argue that mass communication, along with interpersonal communication, would play a role as contextual factors that disseminate and intensify shared information at different degrees across communities.

Social Capital. Social capital, which refers to resources gained through social relations (Serageldin & Grootaert, 1999), is a popular but elusive concept that has been applied to different research arenas, including health behavior. Coleman (1990, p. 305) considered the concept to be community-based resources that assist to produce different positive outcomes at the individual level by instigating micro-to-macro transition between such individual behaviors and communities. In a similar but extended line of argument, Putnam (2000) has defined *social capital* as "connections among individuals—social networks and the norms of reciprocity and trustworthiness that arises from them" (p. 19). Thus, he includes not only networks themselves but also shared norms and mutual trust, which facilitate coordination and cooperation for mutual benefit.

In the domain of health behavior research, our study is not the first to consider social capital as a contextual variable. Kawachi, Kennedy, Lochner, and Prothrow-Stith (1997) conceptualized social capital as "a community-level variable whose counterpart at the individual level is measured by a person's social networks" (pp. 1491-1492). When we consider social capital as community cohesion that results from positive aspects of community life, which are associated with the positive community norms of trust and reciprocity between community members and with a positive local identity (Campbell, Williams, & Gilgen, 2002), social capital can be defined as positive community networks and relationships between community members. These positive community networks and relationships enable a community to produce and maintain positive health outcomes, as these "serve as a buffer to health-damaging stress" (Campbell et al., 2002, p. 42).

Indeed, many studies have examined and supported a hypothesis that high levels of social capital are associated with positive health outcomes (e.g., Campbell et al., 2002; Kawachi et al., 1997). For example, Kawachi et al. (1997) identified four social capital indicators (social trust, perceived lack of fairness, perceived helpfulness of others, and

membership in groups) and found that each of these four measures was significantly associated with income inequality and mortality. Examining the links between HIV-related sexual health and social capital in a South African mining community, Campbell et al. (2002) found significant associations between nine organizational memberships operationalized as social capital and HIV infection, as well as three risk factors for HIV infection—casual partners, condom use with casual partners, and alcohol consumption.

It is expected that differences in social capital between communities affect individuals' family planning behavior and moderate the effects of social psychological variables at the individual level on family planning behavior. Social capital, as discussed earlier, might play a role in mitigating and preventing various risk behaviors caused by unwanted pregnancy in communities where positive community networks and relationships between community members are active.

Hypothesized Multilevel Model

Based on the above discussion, we suggest a hypothesized multilevel model to investigate the contextual effects of gender norms, communication variables, and social capital on family planning behavior. First, at the individual level, we predict that perceived benefits, self-efficacy, and social capital would be positively related to family planning behavior and that perceived barrier and gender norms (i.e., male dominance) will be negatively related to family planning behavior. Although our main purpose is to examine contextual effects of gender norm and social capital on family planning behavior, the two variables should also be included at the individual level for at least two reasons: (a) the two variables were originally measured at the individual level (see Method); and (b) if they are not controlled for at the individual level, it becomes unclear whether significant effects found at the aggregate level are indeed contextual effects or effects carried over from individual-level effects (Hox, 1995; Snijders & Bosker, 1999; also see Paek, Yoon, & Shah, 2005, for application).

Second, we examine the effects of four contextual variables (gender norms, media use, interpersonal communication, and social capital) on individuals' family planning behavior. In other words, we examine whether the four contextual variables measured at the aggregate level affect the levels of family planning behavior across communities. Finally, we explore the possibility of cross-level interaction, by examining whether the four contextual variables measured at the aggregate-level moderate the effects of individual-level variables on family planning behavior. Figure 1 illustrates the hypothesized model.

METHOD

The present study is based on a secondary analysis of the community survey data that was collected in Uganda as part of the Delivery of Improved Services for Health (DISH) project. The project was facilitated through a bilateral agreement between the Government of Uganda (GOU) and United States Agency for International Development (USAID) to make high-quality reproductive, maternal, and child health services more widely available and accepted in Uganda, a country that has one of the highest total fertility and mortality rates in Africa (see Nabukera et al., 2002, for more detailed information).

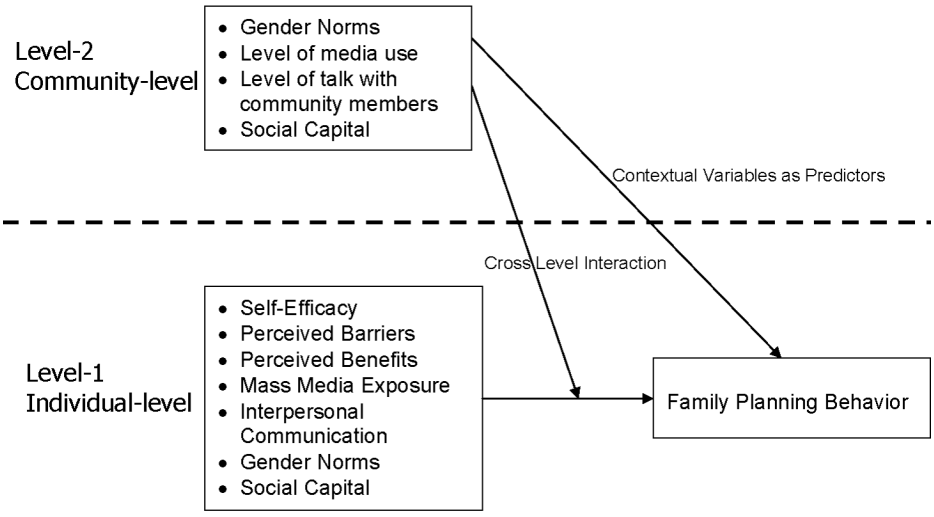

Figure 1. A hypothesized model of multilevel approach to family planning behavior.

A random household sample was drawn from all parishes and villages within a 5-km radius of any health center in the year 2001. Within each village, systematic random sampling techniques were used to select households where appropriate adults older than 18 years old were interviewed face-to-face.

The hierarchically nested data involving individual respondents nested within villages are suitable for our study that explores relationships between individual-level and contextual-level factors for family planning behavior. Thus, the villages become our aggregate-level unit of analysis, whereas individuals within each village are the individual-level unit of analysis.

Out of the total number of 415 valid respondents within 39 villages, villages with fewer than 10 respondents were excluded, leading to a total sample size of 350 individual respondents within 30 villages. Although our sample size at the individual level is rather small, aggregate-level sample size is sufficient enough to achieve our goal of examining contextual effects (see Kreft & de Leeuw, 1998; Paterson & Goldstein, 1992).

Measurement

Five demographic variables serve as control variables: age, gender, education level, religion, and number of living children. Respondents have a mean age of 31.65 (*SD* = 10.27), with a slightly higher proportion of females (57.4%) to males (42.0%). Surveyed on a 7-point ordinal scale ranging from 1 (*illiterate*) to 7 (*tertiary*), the sample showed a mean education level of 3.92 that falls between *below primary* and *primary* (*SD* = 1.14). For the seven religious categories, Catholics (40.3%) and Protestants (43.4%) were dominant; thus, each was created as a dummy variable (Catholic = 1, other = 0; Protestant = 1, other = 0). Finally, 59% of respondents were married (*SD* = .49) with an average number of living children of 3.78 (*SD* = 2.61). The six demographic variables including the two dummy variables of religion were residualized in our model to achieve both control and model parsimony simultaneously.

Independent Variables. We include social-psychological and communication variables as independent variables. Except for exposure to health-related radio program, all of the variables were measured with multiple items using a 5-point, Likert-type scale (range: 1 = *strongly disagree* to 5 = *strongly agree*); thus, the multiple items for each variable were averaged to create each index. Factor analysis with principal component analysis (PCA) estimation method was performed to examine the factor structure (with eigenvalue criteria of 1), and Cronbach's alpha reliability coefficients were computed to assess internal consistency.

For the psychological variables, perceived barrier was measured by averaging four items, such as "I am worried about side effects from family planning methods," "Family planning methods are inconvenient," "Family planning services are hard to get," and "It is embarrassing to get family planning service." These items were measured with a 5-point, Likert-type scale (range: 1 = *strongly disagree* to 5 = *strongly agree*; Cronbach's alpha = .63).

An index of perceived benefit was constructed by averaging four items using the same Likert-type scale as above: "The pill is effective in preventing pregnancy," "IUDs are effective in preventing pregnancy," "Condoms are effective in preventing pregnancy," and "Implant/injections are effective in preventing pregnancy" (alpha = .80). Likewise, self-efficacy was an average index of four items with regards to perceived capability or easiness to use different family planning methods, using the same scale above (alpha = .68).

Social capital and gender norms variables were created by averaging multiple items using a 5-point, Likert-type scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Six items of social capital were posed with the following statements: "This is a close-knit community"; "People in this community can be trusted"; "People in this community will intervene if someone's children were engaging in delinquent behavior"; "In this community, if you perform a favor for one of your neighbors, they will likely return the favor at some future date"; "One of the norms in this community is that people help one another"; and "In this community, it is common for ordinary people to participate in one or more social, business, or community organizations" (alpha = .76). Participants were also asked to respond the following five questions regarding traditional sex roles and male preference: "Boys should help with housework the way girls do," "The family line continues only through male children," "Having a son is essential for performing the last rites of parents," "Sons can provide economic security in the parent's old age but not daughters," and "Having male children increases a family's prestige" (alpha = .80). It should be noted that these two variables also served as contextual variables, which were measured as an aggregation of their individual-level measures across villages.

For the communication variables, exposure to health-related radio programs and interpersonal communication regarding family planning behavior served as both individual-level and contextual-level factors. Exposure to a health-related radio program was measured with multiplication of the two measures: "Do you have the habit of listening to radio?" (5-point ordinal scale ranging from 1 = *don't listen to radio* to 5 = *listen daily*) and a question about whether one listened to health programs (1 = no, 2 = yes). Interpersonal communication was an additive index of three binary items (1 = no, 2 = yes): I have talked about family planning with (a) spouse, (b) friends, and (c) siblings (KR-20 = .71).

Family planning behavior served as our dependent variable, using a 5-point scale single item with the wording "I currently use a family planning method (such as pills,

Table 1. Descriptive Statistics of the Variables

	Individual Level (n = 350)[b]		Aggregate Level (n = 30)	
Variables[a]	*M*	*SD*	*M*	*SD*
Age	31.65	10.27	—	—
Gender (2 = female)	1.58	0.49	—	—
Married	0.59	0.49	—	—
Education level	3.92	1.14	—	—
Number of living child	3.78	2.61	—	—
Protestant (dummy)	0.44	0.50	—	—
Catholic (dummy)	0.41	0.49	—	—
Perceived barrier	2.47	0.84	—	—
Response efficacy	3.63	1.01	—	—
Self-efficacy	3.13	1.08	—	—
Family planning behavior	2.33	1.60	—	—
Social capital[c]	3.57	0.82	3.57	0.31
Gender norm[c]	3.58	0.86	3.57	0.32
Listen to health-related radio[c]	6.22	2.89	6.25	1.04
Talk about family planning behavior[c]	4.72	1.28	4.74	0.47

a. The dependent variable is family planning behavior at the individual level. Demographic variables were residualized onto independent variables and thus were not included in our final model.

b. There were a number of missing variables across the variables, which were listwise deleted in the analysis.

c. The four variables were aggregated and served as contextual variables in our analysis.

intrauterine device (IUD), condoms, implant/injections)" (range: 1 = *never* to 5 = *every time*). Missing values contained in all the variables used here were listwise deleted. Table 1 reports descriptive statistics for all the variables used in this study.

Analysis

Hierarchical linear modeling (HLM) was performed with an estimation of restricted maximum likelihood across the two levels (individuals nested in villages). The HLM is often more appropriate than ordinary least squares (OLS) regression methods because the former captures contextual variation across groups (villages in this study) by examining variances at the aggregate-level, which the OLS procedure cannot perform automatically (Raudenbush & Bryk, 2002; Snijders & Bosker, 1999). The multilevel model contains two components where "i" indicates number of indicators at individual-level and "j" at aggregate-level, (1) a fixed effects component—gamma (γ) coefficients denoted as G_{ij} or γ_{ij}, which consists of level-1 slope coefficients and cross-level interaction coefficients, and (2) a random effects component—tau (τ) coefficients denoted as U_{ij}—that indicates variability across metropolitan contexts.

Table 2 shows fixed effects coefficients at both levels and random components at the aggregate level. Although effects and variability at aggregate-level are present, individual-level predictors can still be interpreted in the same way as in OLS regression (Hox, 1995; Kreft & de Leeuw, 1998; Snijder & Bosker, 1999).

Table 2. Estimates of Fixed Effects and Cross-Level Interaction on Family Planning Behavior

	Empty Model (Full Unconditional)		Random Intercept Model (Conditional)		Final Model (Full Conditional)	
	Coefficient	*SE*	Coefficient	*SE*	Coefficient	*SE*
Mean as outcome						
Intercept (γ_{00})	2.38†	.14	2.36†	.10	2.33†	.10
Social capital[a] (γ_{01})			–0.63*	.37	–0.42	.32
Gender norm[a] (γ_{02})			–0.89*	.47	–0.71	.44
Talk about FP[a] (γ_{03})			0.37*	.21	0.35*	.20
Listen to health-related radio[a] (γ_{04})			0.17*	.10	0.21*	.10
Slope coefficient (individual-level predictors)						
Perceived barrier (γ_{10})			–0.22*	.11	–0.28*	.11
Perceived benefit (γ_{20})			0.31***	.08	0.30†	.07
Self-efficacy (γ_{30})			–0.05	.08	–0.06	.08
Social capital (γ_{40})			0.06	.12	0.05	.11
Gender norm (γ_{50})			–0.14	.12	–0.14	.11
Talk about FP (γ_{60})			0.28†	.07	0.32†	.07
Listen to radio (γ_{70})			–0.00	.03	–0.01	.03
Cross-level interaction (slope-as-outcome)						
Perceived Barrier × Gender Norm[a] (γ_{11})					0.13	.72
Perceived Benefit × Gender Norm[a] (γ_{21})					–0.96***	.34
Talk About FP × Listen to Radio[a] (γ_{61})					0.16**	.07

NOTE: Significant test for fixed effects follows *t* ratio distribution. FP = family planning.
a. Variables with capital letters indicate aggregate-level predictors (aggregated score of individual-level variables).
*$p < .10$. **$p < .05$. ***$p < .01$. $^{\dagger}p < .001$.

To examine whether a multilevel model is appropriate (i.e., whether any variance is detected at the multilevel structure), intraclass correlation was computed from the empty model, which has no variable introduced with only random error allowed to be free. The intraclass correlation captures the proportion of variance that lies between level-2 units, which is .15 in this study. This finding indicates that about 15% of the variation is accounted for at group level. This amount of variation explained at group level is moderate, as Snijders and Bosker (1999) noted that intraclass correlations in previous educational research with values between .05 and .20 are common. Furthermore, the finding indicates that the variance component of intercept (U0) was about .38 with statistical significance (χ^2 [29] = 82.97, $p < .001$), implying that there is a significant variability in the mean score of family planning behavior across the 30 villages. HLM results are reported in Table 2.

RESULTS

Individual-Level Effects

As predicted, perceived barrier was a significantly negative predictor of the dependent variable ($\gamma_{10} = -.28$, $p < .05$) and perceived benefit was positively related to family planning behavior ($\gamma_{20} = .30$, $p < .001$). The more people think that family planning behavior is difficult or inconvenient to adopt, the less likely they are to use a family planning method. In contrast, people's perceptions about positive consequences and benefits of using various kinds of family planning methods led them to use such methods. However, self-efficacy did not significantly predict the dependent variable. This suggests that people's beliefs of whether they or their partners were easily able to use family planning methods did not affect their actual family planning behavior.

Our results also show that interpersonal communication was positively (and strongly) related to the family planning behavior ($\gamma_{60} = .32$, $p < .001$), whereas exposure to a health-related radio program was not a significant predictor of the dependent variable ($\gamma_{70} = -.01$, $p = ns$). Thus, the more that people discuss family planning methods with their siblings, friends, and partners, the more likely it is that they adopted any of the family planning methods; however, the extent to which they listen to a health-related radio program did not affect their family planning behavior. But no significant effects of gender norms and social capital, which were measured at the individual level, on family planning behavior were found.

Aggregate-Level (Contextual) Effects

First of all, we hypothesized that our four contextual variables—gender norms, media use (listening to health-related radio program), interpersonal communication about family planning, and social capital—influence the mean level of the family planning behavior. For the contextual effects, we adopted a statistical significance level of .10 (see the second column in Table 2) for aggregate-level predictors, because the sample size at aggregate level is only 30.

In our random-intercept model that only allows the intercept to be random across communities, all of the four variables were significant predictors of the individual-level dependent variable at the significance level of .10. In other words, the overall mean of family planning behavior was lower in communities that are tightly knit, and people trust and help each other more ($\gamma_{01} = -.63$), and where there were less male preference or traditional sex roles ($\gamma_{02} = -.89$). In communities where more community members talk about family planning methods ($\gamma_{03} = .37$) and where more members listen to health-related radio programs than any other community ($\gamma_{04} = .17$), on the other hand, the mean level of family planning behavior was higher.

Although all of the four contextual variables were significant in the random-intercept model, our final model shows that the effects of social capital and gender norms became nonsignificant after entering cross-level interactions (see the third column of Table 2). Accordingly, the effects of the two communication variables only remained significant in our final model ($\gamma_{03} = .35$, for interpersonal communication; $\gamma_{04} = .21$, for level of listening to health-related radio program at community-level).

Cross-Level Interactions

Given the fact that levels of family planning behavior differ across communities, influenced by the contextual factors, we are compelled to question whether any contextual-level

variable influences the strength of the effects of individual-level predictors on the dependent variable. Because there is little multilevel research devoted to exploration of cross-level interaction and little theoretical background to identify the relationship between specific level-1 and level-2 variables, we relied on our theoretical rationale and exploratory analysis to finalize our model. In so doing, first, four individual-level variables—self-efficacy, social capital, gender norms, and listening to the health-related radio program—were excluded (or fixed at level 1), because they were not significant predictors of the dependent variable.

Second, HLM exploratory analysis was performed to see which contextual variable was a potential candidate as a moderator of the relationship between individual-level variables and the dependent variable. When there are no strong theories concerning which variables play significant roles as aggregate-level predictors, Hox (1995) has recommended performing the procedure by starting with the simplest possible model and including the various types of parameters step by step. In addition, we had theoretical reasons that gender norms would be an aggregate-level moderator of social-psychological variables, such as perceived barrier and perceived benefit, and the contextual variable of exposure to health-related radio program would interact with the interpersonal communication variable. The third block in Table 1 shows our final model that contains the cross-level interaction.

The model shows that, indeed, gender norms as a contextual factor significantly interacted with the individual-level perceived benefit variable ($\gamma_{21} = -96$, $p < .01$). It implies that perceived benefit is a positive and strong predictor of family planning behavior, but its effect became weaker in communities where strong male-centered norms are prevalent. However, the cross-level interaction between gender norms and perceived barrier was not statistically significant.

The most interesting finding lies in the significant cross-level interaction between the contextual variable of listening to a health-related radio program and the individual-level variable of interpersonal communication ($\gamma_{61} = .16$, $p < .05$). Talking about family planning methods with people whom you can easily approach was a strong predictor of adopting a family planning method at the individual level; then, such effects of the variable became even stronger in communities where people listen to health-related radio programs more in general.

Random Effects: Still Variance Unexplained?

After entering all the hypothesized individual-level and contextual variables, some variance still remained across communities, as shown in Table 3. It implies that there are still contextual variables that are unknown and unexplained in our model that causes variability of mean level of family planning behavior (U0 = .17, $p < .01$) and that explains variability of the effects of perceived barrier across communities (U1 = .40, $p < .05$).

DISCUSSION

The purpose of this study was to examine the contextual effects of gender norms, media use, interpersonal communication, and social capital on family planning behavior in Uganda. For this purpose, we tested three hypotheses: (a) the effects of several social-psychological variables as well as gender norms, mass and interpersonal communication, and social capital, which were measured at the individual level; (b) the

Table 3. Random Effects Across Communities

	Empty Model		Random Intercept Model		Random Intercept-Random Slope Model	
	Variance Component	*SD*	Variance Component	*SD*	Variance Component	*SD*
Intercept (U0)	.38†	.62	.44†	.20	.17***	.17
Perceived barrier (U1)					.40**	.16
Level-1 effect (R)	2.22	1.49	1.98	1.41	1.36	1.84
Intraclass correlation	.15					
Deviance	1238.31	1206.51	1191.86			
No. of parameter	2	2	4			
χ^2D test (*df*D)[a]			14.65 (2)†			

NOTE: Chi-square distribution. Restricted maximum likelihood estimation.

a. A χ^2D test is performed for comparison between random intercept model and random slope model (including all the explanatory variables at two levels). This chi-square difference test (also called deviance or likelihood-ratio test) was performed to determine that our final model is not overfitted but optimally fitted (and parsimonious) among available models. When compared to the random intercept model that allows only the intercept coefficient to be random, our model shows a significant fit improvement (χ^2 difference test; χ^2D [2] = 16.65, $p < .001$). In addition, the more complex model, which allows other variance components to be random across communities, fails to show a significant fit improvement in comparison to ours (χ^2D [7] = 0.97, $p = ns$). The analysis indicates that our final model appears to be optimal.

**$p < .05$. ***$p < .01$. †$p < .001$.

effects of the four contextual variables measured at the aggregate level; and (c) cross-level interactions between the individual level and contextual variables.

As hypothesized, we found two social psychological variables, such as perceived benefit and perceived barrier, as significant predictors of family planning behavior, which is consistent with previous findings in the HBM literature (e.g., Volk & Koopman, 2001; Winfield & Whaley, 2002), although we could not identify self-efficacy as a significant predictor.

As was expected, social capital and gender norms measured at the individual level were not significant predictors of family planning behavior. As we argued earlier, these two variables have an inherently more collective and aggregate nature; therefore, it is appropriate for them to be treated as contextual variables. As such, it appears that these findings might provide partial evidence of our argument. According to the results, gender norms as a contextual variable affect the levels of family planning behavior across communities, even after controlling for individual-level variables. In other words, the more that norms in a village emphasize traditional gender roles (i.e., male dominance in decision making and boy preferences), the less likely village members are to adopt a family planning method. These findings suggest that traditional gender norms as a contextual factor function as a social mechanism to limit individuals' ability to use family planning. This reasoning might be supported by the findings on cross-level interaction between the

contextual variable of gender norms and perceived benefit. The effect of perceived benefit on family planning behavior was significantly moderated by gender norms at the aggregate level. Thus, as male-centered norms in a village weaken individuals' expectation of benefits gained from using a family planning method, individuals' intention and ability to adopt a family planning method might be diminished. These findings can be explained by Zaltman and Duncan's (1977) argument regarding resistance to change. They argued that conformity to social norms is one of the strong forces for resistance to changes or adopting innovations. They noted, "Norms provide stability and behavioral guidelines that define what individuals can expect from one another…any change that is incompatible with existing norms will tend to be resisted by most members of the social system" (Zaltman & Duncan, 1977, p. 74).

At the individual level, although the effect of exposure to a health-related media program on family planning behavior was not found, interpersonal communication significantly affected family planning behavior. As discussed earlier, these findings seem to support a notion that interpersonal communication is a direct predictor of behavioral change, whereas the mass media channel is more effective at changing awareness, knowledge, or attitude. In other words, the findings on the cross-level interaction between the contextual variable of exposure to a health-related radio program and the individual-level variable of interpersonal communication seem to support this argument. The effects of interpersonal communication became even stronger in communities where people listened to health-related radio programs more in general. The amount of mass media use at the aggregate-level reflects the amount of information exchanged and consumed by members. If this is the case, exposure to a health-related media program at the aggregate level might determine the degree of interpersonal communication regarding family planning behavior. In these regards, we need to recall the findings of Cammack and Heaton (2001), which indicated that higher exposure to mass media at the regional level is associated with greater family-planning-program success beyond exposure to the mass media at the individual level.

Notably, although the effects of the other three contextual variables were in the expected directions, the contextual effect of social capital on the mean level was in a negative direction. This result can be explained in line with the role of gender norms in family planning behavior. When we view social capital as obligations and expectations, information, and norms existing between and among social relations (Coleman, 1990), we cannot completely rule out the possibility that social capital can negatively function depending on the dominant values within a society. For example, in a traditional society like Uganda, patriarchal and male-dominant values are regarded as an important value to be maintained and conformed to by the members. In fact, Zaltman and Duncan (1977) indicated that group solidarity might be a strong force for resistance "if the subsystem that is the object of change satisfies important needs of functions in many other parts of the social system" (p. 72). As such, social capital in Uganda might result in reinforcing the existing values or norms regarding biased gender roles. Campbell et al. (2002) argued that even though social capital might be associated with beneficial outcomes in some contexts, this might not always be the case. Their findings provided empirical evidence on the concept of "negative social capital" in that *stokvel* (voluntary savings clubs accompanied by social festivities) membership was associated with increased sexual health risks.

Several limitations of this study should be noted. Because of the complex nature of multilevel analysis, inclusion of one additional variable often makes the entire model much more complicated and harder to interpret. For this reason, all demographic variables

in this study were residualized for the purpose of achieving model parsimony and control simultaneously. Psychological variables based on the HBM may also be limited in that items that construct each variable might not capture a full array of issues, situations, and experiences. For example, self-efficacy, a well-known predictor of health behavior, did not significantly predict the family planning behavior. The null finding may be because of the fact that survey questions are not adequately situation specific. This speculation goes beyond the scope of our research, but it should be further examined in future studies.

Another limitation related to the measurement issue concerns our dependent variable of family planning behavior with a single item. Because few sophisticated scales of family planning behavior are available, the single-item measure in family planning behavior (which is studied particularly in developing countries) is not uncommon and the question wording is fairly standard in family planning research (e.g., Gupta et al., 2003). Nevertheless, development and use of a scale with multiple items should more accurately capture the complex nature of family planning behaviors.

Multilevel analysis is a valuable approach for capturing contextual effects on individuals' health-related actions in Uganda (a country where a primary society, or *gemeinschaft*, still exists). But when we apply our findings to a more urbanized and developed society like the United States, a fundamental question can be raised concerning the actual boundary of contextual effects or the conceptualization of community. Future replication using data collected from an urbanized and developed country is therefore suggested.

Implications for Practice

Despite several limitations, this study has several significant practical implications in the context of family-planning communication campaigns. First, the findings of this study suggest that communication campaigns for family planning should be designed to change community norms that prevent individuals' unhealthy behaviors. Scholars and practitioners should also pay attention to negative effects of social capital on family planning and other health behavior. They should understand that social trust and social network, as critical elements of social capital, could not only promote but also prohibit social changes. Researchers should try to identify factors that are associated with the roles of social capital in either direction.

Second, campaign designers need to be concerned about the different roles of mass and interpersonal communication. Although a mass media campaign might play an important role at the early stages of behavior change (i.e., awareness, knowledge, or persuasion), the interpersonal network may be effective at the later stages (i.e., decision, action, or maintenance). For example, through interpersonal networks, women might decide whether to continue using the contraceptive method that they adopted.

Third, the findings in this study imply that family planning practices should not simply be considered as individual reactions or mere reactions to the social structure. Instead, they should be understood as an interaction of people's everyday activities with their surroundings and resources (Frohlich et al., 2002). As such, for an efficient and successful campaign, planning and implementation need to be connected with various social organizations, such as medical or political organizations. Practitioners should understand that many health practices other than family planning behavior (e.g., AIDS, alcohol use) might operate in the multilevel interactions between individuals and social contexts.

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