J.biosoc.Sci, (2008) **40**, 413–429, © 2007 Cambridge University Press
doi:10.1017/S0021932007002507 First published online 8 Nov 2007

MEN'S SOCIAL NETWORKS AND CONTRACEPTION IN GHANA

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Summary. In this paper, longitudinal data from northern Ghana is used to assess the effects of encouragement to use family planning that men receive from their personal network partners on the adoption of modern contraception by their wives. The study tests a conceptual model that, in addition to the effect of men's network encouragement, incorporates the effect of encouragement to use family planning that women receive from their respective network partners and the effect of spousal communication on reproductive matters and approval of family planning. Results show that encouragement received by men from their social networks significantly increases the likelihood of subsequent contraceptive use by their wives but this effect operates primarily by galvanizing spousal communication on reproductive matters. The effect of encouragement received by women from their respective network partners is largely independent from the effect of male network encouragement but it influences contraceptive adoption both directly and through spousal communication.

Introduction

In this paper, longitudinal data from northern Ghana are used to assess the effects of encouragement to use family planning that men receive from their personal network partners on the adoption of family planning by their wives. The study tests a conceptual model that stems from two main bodies of literature – that on the role of social interactions in reproductive and contraceptive changes and that on the role of men in such changes – and that integrates the effects of encouragement that women receive from their respective networks and the effects of spousal interactions on fertility and contraceptive matters.

Demographic literature sustaining the current interests in the role of social interactions in fertility change spans back to historical research under the European Fertility Project (Knodel & van de Walle, 1979; Watkins, 1990) and research on family planning experiments in Taichung, Taiwan (Lu *et al.*, 1967; Palmore & Freedman, 1969). The findings from the European Fertility Project produced no direct evidence of diffusion effects but used social interaction processes and ideational change as a residual explanation to the pattern and pace of historical fertility decline

in Europe. The Taiwan study furnished evidence on how programme interventions can affect individuals not directly targeted by these interventions through the diffusion of novel preferences and technologies.

Within the last two decades, a number of studies following those pioneering efforts have addressed the effects of social interactions on reproductive changes in developing countries (Agyeman *et al*., 1996; Entwisle *et al*., 1996; Kohler, 1997; Watkins & Hodgson, 1998; Montgomery & Casterline, 1998; Montgomery & Chung, 1999; Boulay, 2000; Behrman *et al*., 2002; Kohler *et al*., 2000, 2001; Casterline, 2001; Palloni, 2001; Feyisetan *et al*., 2003; Madhavan *et al*., 2003; Musalia, 2005). Much of that literature has attempted to provide alternative explanations to mainstream demographic transition theories that have attributed fertility decline in developing countries to an adaptive response to changes in demographic, economic and social structures. These studies have promoted the idea that the diffusion of attitudes and behaviours is not tightly bound to societal structural changes but rather has an independent dynamic and to a large extent can account for the timing and pace of fertility change (Bongaarts & Watkins, 1996). It has been proposed that social interactions can influence reproductive and contraceptive behaviour through two main interrelated processes – social learning and social influence (Montgomery & Casterline, 1993, 1996; Bongaarts & Watkins, 1996; Kohler, 2001). Social learning refers to the acquisition of information from others, whereas social influence refers to the power that individuals exercise over each other through authority, deference and social conformity pressures (Montgomery & Casterline, 1996). Bongaarts & Watkins (1996) added a third dimension that is closely related to social learning – the joint evaluation of meaning and information exchanged in a particular context.

Most diffusion studies on family planning have focused overwhelmingly on women and their social interactions leaving a dearth of information on men. Most studies on women's social interactions come to similar conclusions. Among other things, they emphasize the dependence of women on informal networks for information on fertility control, stress the importance of the behaviour and characteristics of women's personal network partners in contraceptive adoption, and demonstrate that social networks overall provide information mainly through social learning rather than by social influence (Rutenberg & Watkins, 1997; Valente *et al*., 1997; Behrman *et al*., 2002). The few recent studies that incorporate the role of men's social networks have largely yielded mixed evidence. While a few agree that men's interactions within their personal networks are important for contraceptive approval and subsequent use (Agadjanian, 2002; Behrman *et al*., 2002), a recent analysis using data from southern Ghana found no effect of men's interactions on their partner's contraceptive use (Casterline *et al*., 2002). However, these studies differ on the outcomes of interest considered; while some consider men's reported contraceptive use as the outcome of interest (Behrman *et al*., 2002) others used the women's contraceptive adoption as the dependent variable (Casterline *et al*., 2002).

Outside of diffusion studies on family planning, men's role in reproductive changes within marriage has received growing attention, especially in sub-Saharan Africa (Lesthaeghe, 1989; Caldwell *et al*., 1992; Ezeh, 1993; Bankole, 1995; Dodoo, 1995a, 1995b; Dodoo & Van Landewijk, 1996; Ngom, 1997; DeRose *et al*., 2004; DeRose & Ezeh, 2005). This focus stems from an increased recognition of the authority that men

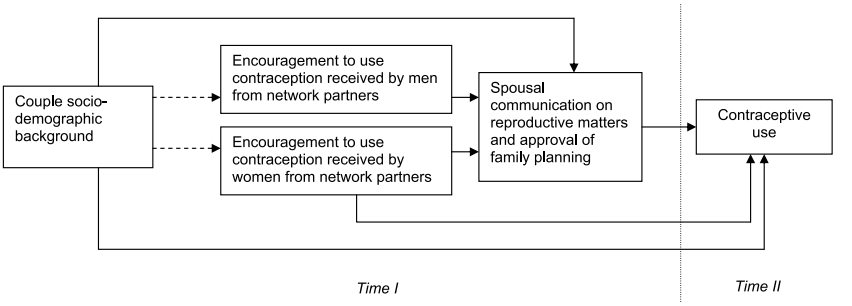

Fig. 1. Conceptual framework for the relationship between encouragement received from gendered social networks to use family planning and subsequent contraceptive adoption.

wield over reproductive decisions within marriage, especially in pronatalist societies (Ojeifo & Singh, 1984; Mona, 1988; Ezeh, 1993; Greene & Biddlecom, 2000). Expanding on this recognition, numerous studies have demonstrated a positive association between spousal communication on reproductive and family planning matters and contraceptive adoption (Nyblade & Menken, 1993; Agyeman *et al*., 1996; Lasee & Becker, 1997; Dodoo, 1998; Bawah, 2002). Similarly, studies have found positive and significant effects of approval of family planning by couples on contraceptive use (Mbizvo & Adamchak, 1992; Salway, 1994). Comparable studies have also demonstrated the importance of joint reproductive preferences for contraceptive use (Bankole & Singh, 1998; Takyi & Dodoo, 2005). However, none of these studies has looked into men's and women's social worlds outside the household boundaries. This study brings together these two bodies of literature – the literature on informal social interactions on reproductive matters and the literature on men's role in fertility changes – by examining the complementary effects of social influence exerted through gendered social networks on contraceptive adoption. In addition, unlike most studies on social interactions and men's role in fertility change, which are based on cross-sectional or retrospective data, this study uses prospective longitudinal data, allowing us to address more directly the issue of causality in the relationship between social interactions and contraceptive change.

Conceptual framework

Figure 1 summarizes the conceptual model of this study graphically. In this model, observed relationships between encouragement by social network partners, spousal interaction and women's contraceptive adoption are conceptualized.

Encouragement to use family planning that marital partners who are not using contraception at time I might receive from their respective social networks affects women's contraceptive adoption at time II by stimulating spousal interaction on reproductive matters and fostering their agreement on benefits of family planning. The encouragements that men and women receive from their respective network partners are assumed to be largely independent from each other as men's and womens' social networks are highly gendered and rarely overlap (Agadjanian, 2002).

https://doi.org/10.1017/S0021932007002507 Published online by Cambridge University Press

However, while the encouragement received by men influences subsequent contraceptive adoption only through spousal interaction, the encouragement received by women affects contraception adoption both through spousal interaction and directly. As was shown in the review of the literature, spousal communication and approval of family planning are associated with contraceptive use and this is depicted in the conceptual framework. Lastly, spousal communication and contraceptive adoption are also affected by couples' socioeconomic, ethnocultural and demographic background. While encouragement received from social network partners cannot be influenced by couples' background characteristics, the selection of network partners can. A connection between background and encouragement is therefore shown with dotted lines.

Research hypotheses

Guided by the conceptual model, the following specific hypotheses are proposed and contextualized:

- Encouragement men receive from their social networks partners will have a significant positive effect on the likelihood of spousal communication regarding reproductive matters, net of the effects of encouragement received by their wives from their network partners and of other factors.
- Similarly, encouragement that men receive from their social networks partners will have a significant positive effect on the likelihood of spousal approval of family planning, net of the effects of encouragement received by their wives from their network partners and of other factors.
- Both encouragement received by men from their social network partners and encouragement received by their wives from their network partners will positively affect the likelihood of adoption of family planning, net of the spouses' economic, cultural and demographic characteristics.
- Once spousal interaction on reproduction and family planning at time I are controlled for, the effect of social network encouragement received by men on contraceptive adoption by time II will become trivial, whereas the effect of encouragement received by women will decrease but remain non-negligible.

Data

Data used in this study are from the 1998 and 1999 panel surveys conducted in the Kasena-Nankana district of Ghana. The Kassena-Nankana district is located in the north-eastern part of Ghana and shares borders with districts in the three northern regions of Ghana as well as Burkina Faso. The district is characterized by semi-arid climate, dispersed settlements and subsistence agriculture. The population of the district is estimated at 142,000 inhabitants, most of whom reside in rural areas (Debpuur *et al.*, 2002).

The panel survey system instituted in 1993 was a longitudinal follow-up of about 1900 randomly selected compounds in which all women of reproductive ages are interviewed (Binka *et al.*, 1995). In 1994, husbands or co-resident male partners were

also interviewed. The initial sample of women was drawn from the Navrongo Demographic Surveillance System (NDSS), a longitudinal register of the entire district's population and a record of all demographic events including births, deaths, in- and out-migration, marriages and pregnancies. The panel surveys are a major component of the data collection systems of the Navrongo Health Research Centre and were instituted to assess changes in reproductive behaviour and preferences and contraceptive use under the Community Health and Family Planning project (CHFP). The CHFP was a four-celled factorial experimental research, designed primarily to test the impact of convenient community health and family planning services on fertility and mortality rates in the district. The project was implemented by mobilizing two types of resources – the usual Ministry of Health resources, and community participation in service delivery and programme management. The four cells thus represented the different combinations of resources that were mobilized. Cell I had the community volunteers locally referred to as Yezura Zeena (YZ) only. Cell II had the Community Health Officers (CHO) only. Cell III, which was the most intensive project activity cell, combined Cell I (YZ) and Cell II (CHO). Cell IV maintained the standard Ministry of Health services only and served as the comparison area for the project (see Nazzar *et al.*, 1995, for a detailed description of the Navrongo Experiment).

The core instrument of the panel surveys was adopted from the core questionnaire of the 1993 Ghana Demographic and Health Survey. The instrument collected information on respondents' background, reproductive histories, contraception use, pregnancy and breast-feeding and fertility preferences. Women in the sample and their co-resident spouses were interviewed on these topics where applicable. In the 1998 and 1999 panel surveys, an expanded diffusion and social interaction module was added to the core instrument and administered to sampled women and their spouses in Cell III (most intensive) and IV (comparison)s. The module first inquired about outside-compound contacts, using responses to the question 'with whom do you talk most often?' to identify up to four network contacts. This was intended to emphasize interactions other than those with a spouse and kin who are likely to reside in the respondent's compound. The general demographic characteristics of each network member were solicited and the respondents' conversations with their social network partners regarding contraception were obtained. Among other questions, respondents were asked to indicate whether their network partners approve or disapprove of family planning, have ever used family planning and have ever encouraged the respondent to use family planning. In this paper, attention is given to the last indicator. The longitudinal nature of the data allows an assessment of the influence of such encouragement reported in 1998 on contraceptive use, as reported in 1999.

The sample for this analysis is drawn from marital couples interviewed in 1999 who completed the social interaction module in 1998, were not using modern contraception in 1998, and had not used it before. Also, female spouses must not have been pregnant at the time of the interviews in 1998 and 1999. Only valid values on all variables of interest are included in the sample. These restrictions reduce the sample to 1353 married women and 1156 married men (about 32·2% of the men were in polygynous unions with more than one of the interviewed women). The sample selection criteria resulted in a total sample loss of about 28·1%. However, no significant differences can be observed between respondents who were interviewed in

1998 and those who either could not be traced in 1999 or were excluded due to the above restrictions, on the main indicators used in this study. It is therefore assumed that the sample selection is random and does not bias the estimates.

Methods

To test the hypotheses of the study, logistic regression models predicting two outcomes are estimated. The first two models correspond to the first two hypotheses. The first outcome is whether or not both spouses reported in 1998 having talked with each other about the desired number of children they would like to have. This variable is constructed by linking responses of husbands with those of their wives. This variable is operationalized as a dichotomy, assuming the value of 1 if both marital partners report discussions and 0 if otherwise. The second outcome is whether or not both spouses approve of family planning. This is also constructed as a dichotomy and combines responses from both spouses. A value of 1 is assigned if both marital partners report approval of family planning and 0 if only one or none of the marital partners approve of family planning. Even though approval of family planning by both spouses may not always result from a direct discussion between them, it is assumed that in most cases such spousal discussions, short or long, frequent or infrequent, do take place. Although the tests for these outcomes use cross-sectional data, the nature of the relationship between network encouragement, on the one hand, and spousal communication regarding fertility or approval of family planning, on the other, makes the causality argument plausible (encouragement by social network partners is more likely to cause spousal communication on reproductive matters and approval of family planning than vice versa). The last outcome is a dichotomous indicator of whether or not a wife reported using modern contraception in 1999. The corresponding models test the third and fourth hypotheses. Because the predictors are drawn from the 1998 panel, the causality argument is enhanced by the temporal order.

Because the sample for this study is based on marital partners and a number of the surveyed men and women were in polygynous unions, a husband–wife dyad rather than an individual as a unit of analysis is used. This approach allows the analysis to account for the fact that some of the female respondents were married to the same male respondents.

Random effect models are fitted to analyse the data. This approach allows the analyses to account for multilevel data structures (e.g. Barber *et al.*, 2000). Specifically, women in polygynous unions, constituting a non-negligible minority of the sample (15%), typically live in the same compounds. Choices and behaviours of women co-residing in a compound may be affected by some unobserved characteristics of the compound that these women share and that set them apart from other women in the sample. Thus, allowing the intercept to vary randomly by compound not only protects against deflated standard errors and potentially biased hypotheses tests but also adjusts for duplicated observations of polygamous men.

The primary explanatory variable used in both tests is encouragement received by men from their social network partners to use contraception. This variable is constructed based on respondents' answers to the question 'Has [Name] ever

encouraged you to use a modern contraceptive method to avoid or delay pregnancy?' ('Name' refers to social network partners named by the respondent; a maximum of four could be named.) The variable is operationalized as a dichotomy, taking the value of 1 if the respondent was encouraged to use family planning by at least one network partner in 1998 and 0 if otherwise. The secondary explanatory variable is encouragement received by women from their network partners. It is operationalized in exactly the same way as the previous variable.

The regression models include the following control variables drawn from the 1998 survey: education (none, primary and secondary education or higher); type of marital union – monogamous vs polygynous; the couple's number of living children (measured as a continuous variable); area of residence – rural areas vs the town of Navrongo; couple's ethnicity (practically all couples were monoethnic) – Nankam vs Kasem or other; religion (again, in almost all couples spouses shared the same religion) – Christians vs traditionalists or Muslims. The type of family planning intervention cell is also controlled for by contrasting Cell III (the most intensive intervention cell) and the comparison cell (an investigation of the effects of the type of cell and the overall implications of the factorial experimental research design lie beyond the goals of this study). Finally, the models predicting contraceptive use control for spousal communication regarding childbearing and approval of family planning in 1998 (i.e. the same variable that is used as the outcome in the test of the first hypothesis).

Results of the study are presented starting with descriptive comparisons of men and women who were not contracepting in 1998 and who reported in that year having received encouragement to use family planning from their respective network partners and those who did not report having received such encouragement. Results of the model predicting spousal communication and approval of family planning from network encouragement is then presented. Finally, a series of models predicting contraceptive use from network encouragement are presented. The multivariate models of contraceptive use start with a baseline model that includes only men's network encouragement as a predictor. Then women's network encouragement is added. In the following step, spouses' background characteristics are added. Finally, spousal communication and approval of family planning are included in the model. Because the data were collected as part of the CHFP, in all regression models the type of cell – intensive programme cell vs comparison cell – is controlled for.

Results

Bivariate associations

Table 1 displays descriptive characteristics of men and women who received encouragement to use family planning from their network partners and of those who did not. In general, reporting encouragement for family planning from network partners was somewhat higher among women than men – 21% vs 18% – but contrary to a possible expectation that such encouragement would be much more common among women, the gender differences were modest and not statistically significant.

Table 1. Characterisitcs of men and women who received and who did not receive encouragement to use family planning from their social network partners, Navrongo Project, Kassena-Nankana district, 1998 (percentages unless otherwise indicated)

	Men			Women		
	All men	Encouraged to use FP	Not encouraged to use FP	All women	Encouraged to use FP	Not encouraged to use FP
Mean age (standard deviation)	45·0(12·4)	41·4(10·7)	45·8(12·6)	34·6(8·0)	33·1(7·4)	35·0(8·2)
Mean number of children (standard deviation)	3·3(1·6)	3·3(1·6)	3·3(1·6)	2·7(1·4)	2·7(1·4)	2·7(1·3)
Type of union						
Polygynous	32·2	31·6	32·3	40·4	39·1	40·8
Monogamous	67·8	68·4	67·7	59·6	60·9	59·2
Education						
None	69·8	45·6	75·0	77·5	66·2	80·5
Primary	12·7	18·9	11·4	14·9	19·4	13·7
Secondary/higher	17·5	35·5	13·6	7·7	14·4	5·9
Ethnicity						
Nankam	62·3	53·4	64·2	58·2	56·7	58·6
Kasem/Other	37·7	46·6	35·8	41·8	43·3	41·4
Religion						
Christianity	23·7	43·7	19·4	33·6	46·5	30·2
Traditional/Muslim/Other	76·3	56·3	80·6	66·4	53·5	69·8
Spousal communication on reproductive intentions						
Yes	26·1	57·3	19·4	15·7	31·7	11·5
No	73·9	42·7	80·6	84·3	68·3	88·5
Approval of family planning						
Yes	83·9	97·1	81·1	90·0	97·5	87·9
No	16·1	2·9	19·0	10·0	2·5	12·1
Type of family planning intervention cell						
Intensive programme cell	52·2	56·8	51·2	50·8	44·7	52·4
Comparison cell	47·8	43·2	48·8	49·2	55·3	47·6
Percentage	100	82·2	17·8	100	79·0	21·0
Total	1156	950	206	1353	1069	284

On the whole, respondents who reported encouragement were younger than those who did not report it, but the age differences between the two groups were not large. Within each group, men were considerably older than women on average (as they were in the sample as a whole). Despite the age differences between those encouraged and not encouraged, both subgroups within each gender had the same number of children. There were almost no differences in the level of encouragement between respondents in monogamous and polygynous unions. Not surprisingly, schooling was positively associated with receiving encouragement to use family planning, pointing to the educational selectivity of social network partners. The trend was very similar for women and men, with the percentage distribution across educational categories reflecting gender differences in educational attainment. Christian men and women reported higher levels of encouragement than those who adhered to a traditional or another religion. Interestingly, the gender differences in the religious distribution were more pronounced among those who did not report having been encouraged to use family planning by a network partner. Encouragement to use family planning also showed variation by ethnicity.

There was a strong association between encouragement received from network partners and reporting spousal communication on reproductive matters, with such communication being considerably more likely among those who received encouragement. Interestingly, the positive association between network encouragement and spousal communication seems to be especially high for men. Similarly, encouragement is associated with a high level of approval of family planning, and again this association appears stronger for men than for women. Notably, however, even among those men and especially women who did not report any network encouragement to use family planning, the approval of family planning was quite high. Finally, there were also differences between the experimental and control cells. The pattern of these differences is noteworthy. While among encouraged men the percentage of those living in the experimental cell was somewhat higher than among non-encouraged men, the pattern was the opposite for women. These differences suggest that family planning programme interventions are likely to galvanize informal network exchanges and encouragements regarding contraception among men, while among women the interventions, on the contrary, may make such exchanges and encouragements less necessary, arguably because the *formal* information and encouragement that they provide may be sufficient for at least some women to make up their minds.

Receiving encouragement for family planning and spousal interaction

The results of the cross-sectional random effects logistic regression model predicting the effect of encouragement received by men from their social networks on spousal communication regarding reproductive matters are presented in the first column of Table 2. In all, the effect is strong and statistically significant: receiving encouragement from a social network partner leads to a more than three-fold increase in the odds of spousal discussion of childbearing matters, relative to not receiving such encouragement. The effect of male network encouragement is not only highly significant (odds ratios of 3·2) but it is also somewhat stronger than that of female network encouragement (odds ratios of 2·9). The effects of other predictors are also

Table 2. Random effects logistic regression models predicting spousal communication on reproductive intentions and approval of family planning from encouragement to use family planning, 1998, Navrongo Project, Kassena-Nankana district, Ghana (odds ratios)

Predictors	Spousal communication on fertility intentions	Spousal approval of family planning
Encouragement of men by their social network partners		
Encouraged	3·22**	4·75**
Not encouraged (Ref.)	1	1
Encouragement of women by their social network partners		
Encouraged	2·91**	2·37**
Not encouraged (Ref.)	1	1
Men's control variables		
Age	0·77	0·86
Education		
None (Ref.)	1	1
Primary	0·79	1·03
Secondary/higher	2·04*	0·76
Women's control variables		
Age	1·18	0·82*
Education		
None (Ref.)	1	1
Primary	1·6	1·10
Middle/higher	2·98*	1·53
Couples' control variables		
Type of marriage		
Polygamous	0·45*	0·83
Monogamous (Ref.)	1	1
Number of living children	0·89	1·21*
Ethnicity		
Nankam	1·39	1·60†
Kasem/Other (Ref.)	1	1
Religion		
Christianity	1·75†	1·05
Traditional/Muslim (Ref.)	1	1
Place of residence		
Urban	1·91	3·48*
Rural (Ref.)	1	1
Family planning intervention cell		
Intensive programme cell	0·89	2·31**
Comparison cell (Ref.)	1	1
Variance (ρ)	0·07	0·484**
Log-likelihood	− 251·21	− 643·04
N	1353	1353

Ref., reference category.
†$p<0·10$; *$p<0·05$; **$p<0·01$.

https://doi.org/10.1017/S0021932007002507 Published online by Cambridge University Press

noteworthy but because they lie beyond the focus of this study, they are not discussed here but only note that no significant differences between the intervention intensive and comparison cells can be seen.

Similarly, encouragement received by men from network partners had a strong positive impact on the odds of both spouses approving of family planning (in all about a quarter of husband–wife dyads reported mutual approval). In fact, the effect of encouragement was much stronger than in the spousal communication model (odds ratio of 4·8 vs 3·2). Encouragement received by women also had a statistically significant positive effect on spousal approval of family planning, but this effect, even though strong in magnitude, was less pronounced than in the spousal communication model (odds ratio of 2·4). While not commenting on the other variables, note is made that in this model, unlike the previous model, the effect of family planning intervention is strong and statistically significant. The specification of the random effect for compound contributed to the total proportion of variance explained by the models, even though this is more evident in the model on spousal approval of family planning (ρ=0·48), than in the spousal communication model (ρ=0·07).

Receiving encouragement for family planning and subsequent contraceptive use

Table 3 displays the results of a series of random effects logistic regression models predicting contraceptive use in 1999 from network encouragement and other characteristics reported in 1999. To highlight the effect of the main predictor – encouragement received by men from their network partners – four models are presented, as was described in the Methods section. Model 1 (baseline) shows a clear statistical difference between having received and having not received encouragement from men's network partners. Encouragement to use family planning received by husband leads to a 2·3 times rise in the odds of using contraception by wife a year later, controlling for the effect of the family planning programme intervention.

Model 2, which adds encouragement received by women from their social networks, demonstrates that the effects of both types of encouragement – through men's networks and women's networks – are largely independent. The effect of encouragement received from men's networks declines in magnitude but remains highly significant. The effect of encouragement received from women's networks is also statistically significant and is somewhat larger in magnitude than the effect of male network encouragement.

Model 3 adds spouses' individual and shared background characteristics. As a result, the strength of the effect of male network encouragement drops even further. However, the 1·7 odds ratio is still statistically significant, indicating that the non-trivial impact of encouragement to use family planning received by men is largely independent of demographic, economic and cultural background. The effect of female network encouragement also weakens, but like the effect of men's network encouragement remains statistically significant. While it is not the intention of this study to discuss the effects of control variables, note is made that neither husband's nor wife's educational levels exert any influence on contraceptive use.

The final model, Model 4, adds spousal communication and spouses' joint approval of family planning to the model. While the effect of encouragement received

Table 3. Random effects logistic regression models predicting contraceptive use in 1999 from encouragement to use family planning received through social networks in 1998, Navrongo Project, Kassena-Nankana district, Ghana (odds ratios)

Predictors	Model I	Model II	Model III	Model IV
Encouragement of men by their social network partners				
Encouraged	2·29**	2·03**	1·66*	1·43
Not encouraged (Ref.)	1	1	1	1
Men's control variables				
Age			0·81	0·82
Education				
No education (Ref.)			1	1
Primary			0·80	0·82
Middle/higher			1·35	1·28
Encouragement of women by their social network partners				
Encouraged		2·35**	2·17**	1·99**
Not encouraged (Ref.)		1	1	1
Women's control variables				
Age			0·93	0·93
Education				
No education (Ref.)			1	1
Primary			1·10	1·07
Secondary/higher			0·70	0·61
Couples' control variables				
Type of marriage				
Polygamous			1·09	1·17
Monogamous (Ref.)			1	1
Number of living children			1·29*	1·29**
Ethnicity				
Nankam			1·38	1·35
Kasem/Other (Ref.)			1	1
Religion				
Christianity			1·58†	1·57†
Traditional/Muslim (Ref.)			1	1
Place of residence				
Urban			10·51**	9·95**
Rural (Ref.)			1	1
Spousal communication on reproductive intentions				
Yes				1·96*
No (Ref.)				1
Spousal approval of family planning				
Yes				1·62
No (Ref.)				1
Family planing intervention cell				
Intensive programme cell	2·40**	2·58**	4·96**	4·90**
Comparison cell (Ref.)	1	1	1	1
Variance (ρ)	$9{\cdot}3\times10^{-8}$	$9{\cdot}3\times10^{-8}$	$9{\cdot}3\times10^{-8}$	$9{\cdot}3\times10^{-8}$
Log-likelihood	− 337·43	− 330·88	− 306·26	− 303·35
N	1353	1353	1353	1353

Ref., reference category.
†$p<0{\cdot}10$; *$p<0{\cdot}05$; **$p<0{\cdot}01$.

https://doi.org/10.1017/S0021932007002507 Published online by Cambridge University Press

through men's networks on subsequent contraceptive use does not disappear completely, it is no longer statistically significant. The effect of wife's network encouragement also decreases, but it remained statistically significant, suggesting that this effect is independent from that of spousal communication. The latter shows statistically significant effects: the odds of contraceptive use are about twice as high among spousal units who reported discussing reproductive matters as among those who did not report it. This result is consistent with previous findings on the significant positive relationship between spousal communication and contraceptive use (Bankole, 1995; Bawah, 2002). At the same time, the spousal dyad's shared approval of family planning is not statistically significant. In this test, the specification of the random effect for compound explains little of the variance (ρ is nearly 0). Other attempts to specify the random effect by men (within-man variability) or analyse the results without the random effect specification did nothing to change the results presented on Table 3.

Conclusion

This article undertook to ascertain the possible relationship between encouragement by social network partners to use contraception and women's contraceptive adoption. The conceptual model proposed fused evidence generated by the literature on social interactions and fertility processes with that produced by studies of the role of men in reproductive changes. The first hypothesis was based on the assumption that encouragement to use family planning received from partners of husbands' and wives' social networks will affect spousal communication on reproductive matters independently of each other and of the background characteristics of partners. The second and third hypotheses rested on the assumptions that encouragement received from men's network influences contraceptive adoption through spousal communication, whereas encouragement received from women's networks affects contraceptive use directly as well as through spousal communication regarding reproductive goals. All four hypotheses were confirmed lending support to the overall conceptual model. The only important qualification that the analysis produced is that spouses' joint approval of family planning does not in itself increase the likelihood of contraceptive adoption in the way that spousal discussion of reproductive preferences does.

The results are not meant as an exhaustive proof of the connection between informal social interactions and contraceptive adoption. In fact, explicit focus was only given to one dimension of this complex relationship – that of social influence. Yet, because most studies of social interactions and fertility changes focus on the social learning aspect of this relationship (Montgomery & Casterline, 1996; Bongaarts & Watkins, 1996; Kohler *et al.*, 2001; Behrman *et al.*, 2002), the emphasis of the study on social influence seems particularly valuable. It should also be stressed, however, that this emphasis does not mean that conversations encouraging someone to use a contraceptive method cannot contain some factual information contributing to learning about contraception. Another important contribution of the findings is to the ongoing debate about the place and role of men in reproductive and contraceptive changes in sub-Saharan Africa. The evidence of the influence that men receive from their social network partners reinforces earlier research highlighting the role of this

phenomenon alongside the more widely acknowledged role of women's social networks. Yet, notably, the study results also reaffirm and reconsider the role of spousal communication for contraceptive adoption. As these results show, the input on reproductive and family planning matters that men get from their social networks is translated into a higher likelihood of contraceptive adoption, mainly by stimulating communication among spouses on childbearing matters.

The findings of this study present compelling policy implications. Not only family planning, and more broadly, reproductive heath interventions should heed the importance of informal social interactions but they also should distinguish between gendered networks of women and men. Whatever specific forms and mechanisms are chosen for the promotion of informal social interaction and peer education among men, this promotion should be aimed at galvanizing communication among marital partners on reproductive matters. Notably, as the results presented in Table 2 suggest, spousal communication on reproductive matters may be impervious to direct influence of family planning intervention programmes, while being strongly affected by informal peer influences exerted through men's and women's social networks.

Acknowledgments

The authors are grateful to the people of Navrongo and the Navrongo Health Research Centre for supplying the data. Thanks are also due to Cornelius Debpuur, James F. Phillips and Ayaga Bawah for useful comments on earlier drafts.

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