

Title:

Kin influence on the decision to start using modern contraception:
a longitudinal study from rural Gambia.

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Short title:

Kin influence on contraceptive uptake

Abstract

In earlier work in rural Gambia, we found that kin influence reproductive success: matrilineal kin, especially mothers, maternal grandmothers and unmarried older sisters all helped to promote the survival and nutrition of young children; in contrast patrilineal kin, especially husband's mother, promoted fertility. These differing influences of maternal and paternal lineage are predicted on the basis of kin selection and sexual conflict theory, because the costs of reproduction fall more heavily on the mother than the father. These studies covered the period 1950-1975, when this population was essentially 'natural fertility, natural mortality'. It is not possible to tell whether these effects were due to kin influencing active reproductive decision-making, or due to indirect effects such as kin improving nutrition by helping. Since 1976 modern contraception has become available in this community. In an analysis of the behavioural ecology of the decision to start using modern contraception, we found that high parity for your age was a key determinant of the decision, as was village and calendar year. Here we examine whether the presence or absence of kin and also whether the contraceptive status of kin influenced the decision to start using contraception. We find little evidence that kin directly influence contraceptive uptake, either by their presence/absence or as models for social learning. However death of a first husband (i.e. widowhood) does accelerate contraceptive uptake. We discuss our results from an evolutionary demography perspective, in particular regarding theories of sexual conflict, biased cultural transmission and social learning.

Introduction.

Recent decades have seen a flourishing of research on cultural change from an evolutionary perspective. Boyd and Richerson (Richerson and Boyd 2005) and others have used cultural evolutionary models to argue that biased patterns of cultural transmission could underpin the evolution of a range of uniquely human traits, such as prosocial behaviour and the emergence of group norms that might favour the group rather than the individual, including reproductive levelling (Bowles 2006; Boyd and Richerson 1985; Gintis and others 2003; Guzman and others 2007; Kohler and others 2001; Richerson and Boyd 2005). One argument put forward from gene-culture co-evolutionary theory is that innate biases to copy those in prestigious positions may have led to the trend to reduce fertility: if children hamper our ability to achieve wealth and status in the modern world, then copying the wealthy could lead to the spread of notions of low fertility (Boyd & Richerson 1985). Another possibility, put forward by Newson and others, is that we are evolved to be influenced by those around us, who used to be kin who would encourage pronatalist norms so as to enhance their inclusive fitness; however modernising economies cause us to spend less time with kin and more time with unrelated individuals, so fertility declines as kin influence wanes and norms promoted by non-kin, probably emphasizing success outside the family, are likely to become the greater influence (Newson and others 2005; Newson and others 2007). These cultural evolutionary approaches are thus used to argue that an adaptive, evolved bias leads to a maladaptive outcome in a novel environment. Demographers have also stressed the importance of prestigious or influential members of the community to help promote the spread of ideas about contraception. However there is controversy as to the relative importance of group versus individual-level effects, in part due to lack of empirical evidence. In psychology, empirical work on precisely how social transmission might occur is being conducted in laboratory settings (Caldwell and Millen 2008; Efferson and others 2008). However the basic patterns of cultural transmission have not been widely studied in 'real world' settings.

Most studies of cultural transmission in the real world have been done in a parallel literature on the spread of innovations, which has been a key topic of interest to sociologists (Granovetter 1986; Rogers 1995), demographers (Behrman and others

2002; Kohler and others 2001; Montgomery and Casterline 1996; Valente and others 1997) and others (Munshi and Myaux 2006). After decades of research on the historic demographic transition to low fertility, favour was found with the hypothesis that cultural diffusion of an idea was a major determinant of the variation in the timing of the onset of fertility decline (Bongaarts and Watkins 1996). There is certainly evidence for social transmission in the uptake of modern contraception (Behrman and others 2002; Godley 2001; Kohler 1997; Madhavan and others 2003; Munshi and Myaux 2006; Musalia 2005; Valente and others 1997). Some of this evidence is based on similar contraceptive behaviour to those in your social network, although, as with all studies of social transmission, it has proved notoriously difficult to demonstrate social influence, separating it from simply social learning or other confounding effects (such as choosing friends with similar behaviours (Valente 2003)). Social influence usually refers to the external influences that set up decision-making contexts, including the social power that individuals wield through deference and authority (Montgomery et al, 1998). These kinds of influence often serve as social constraints on individual decision-making. Examples of social influence include copying prestigious individuals, being pressured into behaving a certain way, or doing something simply because most others in the neighbourhood start doing it, rather than evaluating the decision independently. It can also include social learning, usually understood in terms of an information gathering or a signal extraction process, which could simply be an efficient method of acquiring knowledge about a beneficial technology from others. Social influence can increase homogeneity of behaviour within groups and may not necessarily enhance individual fitness. Studies rarely have enough information to distinguish whether individual effects, or the influence of family, friends, neighbours or the wider group are the more important agents of cultural change. However evolutionary theory does generate clear predictions about the direction of kin influence on reproductive behaviour, as not all kin will have similar reproductive interests (see below), and non-kin do not share our reproductive interests at all and thus may help promote behavioural trends that result ultimately in lowering rather than enhancing our reproductive success (Newson and others 2005), such as starting to use contraception.

In an earlier study (Mace and others 2006), we investigated the behavioural ecology of contraceptive uptake in four rural Gambian villages, using longitudinal data covering over 25 years. We found that high parity, relative to others of the same age, was a major factor correlated with hastening women's decisions to use modern contraceptives for the first time; so also was the village in which they lived, as was the calendar year. One village had virtually no contraceptive uptake due to being outside the development intervention that was providing the contraceptives locally. The other villages which had close kinship and marriage ties with that 'non-contracepting village' had lower rates of uptake than the village that did not have links of kinship with that village. One possible explanation we proposed was that the behaviour of kin may be directly influencing the decision to start using contraception, either due to simply being alive and thus able to persuade or coerce that person, or through close associates' contraceptive use serving as models for social learning about the new technology of contraception. Copying kin could potentially lead to the kind of between village differences that we observed.

In earlier work on this population we found that kin do influence reproductive success: patrilineal kin, especially husband's mothers, have an influence of increasing fertility (Allal and others 2004; Sear and others 2003); whereas matrilineal kin, especially the maternal grandmother and premarital older sisters, have an effect on keeping children alive (Sear and others 2000; Sear and others 2002). We have interpreted this in terms of the asymmetric costs reproduction, being higher for mothers than fathers, and of maternal mortality being more costly to matrilineal than patrilineal kin; this will cause patrilineal kin to be more pronatalist (Mace and Sear 2005; Sear and Mace 2008). Those studies focussed on data from the period 1950-1975, when this was more or less a 'natural fertility, natural mortality' population, so it is not possible to say whether these effects were due to kin influencing reproductive success indirectly, for example by enhancing nutrition through helping with workloads, or whether kin were directly influencing reproductive decision-making. Analysing kin effects on the decision to start using contraception offers the prospect of identifying direct kin influence on reproductive decision-making.

In this study, we again follow the adoption of contraception in this rural Gambian community over 25 years from 1975-2001, specifically testing whether kin directly

influence the decision to start using modern contraception. We do this first by seeking whether a certain relative being alive or dead influences time to first uptake, using time-to-event models, a similar method to that we used to seek kin effects on mortality and fertility when this was a natural fertility population. In particular, we test whether having living matrilineal or patrilineal grandparents and husband influence contraceptive uptake, as these were the kin found to influence fertility and child mortality rates in our earlier studies. We also test here the hypothesis that having a sister, a co-wife or any woman co-resident in the same compound who is already using modern contraception decreases the time taken to start using contraception, to see whether they are being copied.

Throughout the Gambia, fertility decline is only recently observed (Cohen 1998), and contraceptive use is relatively low: by the final year of data collection for this study (2001), only 8.9% of Gambian women are using modern methods of contraception at any time (UN 2003). The ideal of large family size persists, especially in rural areas, as it does in much of rural Africa; but modern contraception nonetheless provides a useful alternative to sexual abstinence for those wanting to space births, preserve maternal health and to prevent extremely large family sizes (Bledsoe and others 1994). One barrier to contraceptive uptake is fear of the new technology, often associated with the fear that fertility might not return after contraceptive use has stopped. Another is possible opposition from husbands; the women reported to us that their husbands were less concerned or aware of the high health costs to mothers and children of high fertility. However some men reported that problems with school and clothing costs resulted in large families being problematic. Some religious leaders also oppose birth control.

Methods

This study takes place in four, neighbouring villages in rural Gambia, three of which had unusually good access to health care due to the presence of a medical centre. This was set up by the UK MRC (Medical Research Council) as part of a long-term medical research project. The majority of villagers are Mandinka farmers, living and working in an environment characterised by strong seasonality and high disease burdens; and are Muslim. Medical research started at the site in 1949, which

included the recording of dates of all births and deaths in the four villages, but did not involve the year-round presence of medical staff in the villages until 1974. Prior to 1974, the villages experienced high fertility and high mortality, due to high levels of general parasitism and specifically malaria (Billewicz and McGregor 1981). In 1975 the medical centre was opened in one of the villages, providing free medical care, which was available throughout the year; mortality rates began to decline immediately (Lamb and others 1984; Rayco-Solon and others 2004), although fertility remained high. It was at that time that contraceptive services first became available. Before 1975, one village (D) had withdrawn from the research project, so only 3 villages had access to the contraceptive and other services provided by the medical centre. Much of the research being conducted in villages A, B, and C was on mothers and babies, so mothers had frequent contact with midwives, from whom contraceptive advice and the contraceptives themselves could be obtained.

760 married women between the ages of 15 and 92, currently living in the four villages, were interviewed in a single-round survey in the year 2001. The dates of birth, the dates of children's births and the parents of most of these women and their husbands, and the dates of death of these parents, could be ascertained from the existing MRC database. The sample included all women living in villages A-D who were present at the time of the survey (excluding women who moved to the villages solely to work at the health clinic and research station). The characteristics of the villages are given in Table 1. The survey included questions on whether they were currently using modern contraceptives and when, if ever, they had first used modern contraceptives. For the latter question, they could answer: before their first birth, or after which birth they had first used contraception, if ever. Only those women whose year of birth was on record and whose children's years of birth were known were included in our analysis, but due to long term nature of data collection at the site this group of women was very few. Further, women who were 50 or over in 1975 were excluded as they would not have had need of contraception by the time the medical centre was opened. This reduced the sample size to 707. Women living in village D were excluded from the analysis, as almost no-one in that village used contraception as they did not have access to the local medical centre. This further reduced the sample size to 517 (further reduced to 463 in model 1 only as we excluded those women for whom we did not know husband's age).

It is assumed that women started using contraception in the year of the opening of the birth interval in which they stated they first used contraception. Event history analysis (a logistic regression of yearly probability of first use) was used to investigate which covariates influenced age at first use (using the proc logistic procedure on year-based data in SAS). Methods of modern contraceptive use were either injectables and/or pills. Our response variable was a simple dichotomy of use/non-use of modern contraception, with no distinction between contraceptive methods in the analysis. Records were right censored in 2001 or when the woman reached age 50; and records were left censored in 1975 or at age 15. Sample sizes of those included, by village, are shown in Table 1.

The data were expanded into person years. We conduct two different event history analyses of time to first use of modern contraceptives (table 2). In model 1, it is recorded yearly whether or not each woman had a living mother, father, husband's mother, husband's father or whether her first husband was still alive. In model 2, for each person year it was calculated whether or not any sister or co-wife had started using contraception, or whether any woman living in the same compound (referred to here as neighbours) who was neither a sister nor a co-wife had ever used contraception, and in which year they started. If co-wives' time to first use of contraception are correlated, that might suggest that husbands are a key influence on the decision. If neighbours who are not co-wives or sisters are an influence then this just suggests a general influence of people with whom one might be expected to have frequent conversations even if they are not kin, suggestive of more generalised social learning. Because we have data on virtually the complete village, our measures do not suffer from the biases inherent in the commonly used method of asking informants either about those in their social network, or asking informants to report the contraceptive behaviour or attitudes of others. It should be noted however that we do not know about the contraceptive status of sisters or co-wives or former neighbours who had died or moved away out of the study area, so the data is not comprehensive in that respect; having a sister living in one of the villages now, using contraception, versus all other conditions is the comparison made. Thus having a sister, co-wife or neighbour that had ever used contraception were entered as time-varying covariates; these variables were entered with all the other time-

varying and fixed effects, to determine to what extent there is any evidence that these particular kin and/or neighbours' contraceptive behaviour had a direct influence on her decision to start using contraception herself.

Other time-varying covariates included were woman's age, age squared, husband's age, parity, and date.

Village of residence, wealth rank of head of household in 2001 were entered as fixed variables. The households in which women lived were wealth ranked into three categories, according the judgement of three independent villagers, with rank1 meaning the wealthiest.

Clearly the nature of the kin influence being examined is therefore different in models 1 and 2, with model 1 looking at kin influence simply through being alive, whereas model 2 is examining opportunities for social learning from observing the contraceptive behaviour of close kin or co-resident females. Different kin are examined in the two models partly because our previous work showed that grandparents can influence reproductive success whereas married sisters do not. But also the nature of the data varies across the generations; it would not be possible to examine the role of grandparents as models for copying contraceptive behaviour as hardly any of them had access to modern contraception in their younger years, contraception only becoming available after 1975.

Results.

There were 148 events of contraceptive uptake among the 517 women in villages A-C, representing a minority of the women interviewed (29.1%). Current use of contraception in 2001 in villages A-C is 16.9% (see Table 1). However these figures mask a great deal of variation over space and time. Mean level of current contraceptive use is only marginally lower than that observed amongst married women in the Gambia as a whole, but it varied from 0.5% in village D to 18.3% in village C. All women stated they had not used contraception prior to their first birth. Furthermore, the first use of contraception was only rarely associated with an end to reproduction. Most women went on to have further births after they had

become contraceptive users, consistent with the notion that women were mostly using contraception to space births or avoid post-partum sexual abstinence.

The event history analysis on time to first use is shown in Table 2. Most results were similar to those found in Mace et al (2006) in which no kin influence terms were included in the model, suggesting these effects are robust to the addition of kin influence effects. In all models the effect of age is broadly negative (whilst the age term is positive, the larger age-squared term is negative causing a decline over most of the relevant age range); but this is combined with a strongly positive effect of women's parity. Because parity increases with age then actually older women are more likely to be users within cohorts. This result is strongly suggestive of strategic use of contraception by women to space births among those who have a large number of children relative to others of their age.

In all models, the effect of household wealth was significant, although not in the direction predicted by the notion that wealthy (thus high status) individuals are generally the innovators with respect to contraceptive uptake (a process evolutionary anthropologists refer to as prestige bias). The wealthiest families were significantly slower than medium or poor families to first use contraception. This is, however, consistent with the evolutionary ecological perspective, which predicts that wealthy families will have more children because they have more resources with which to successfully raise children.

The effect of village is also very significant in all models even when kin influence parameters are included in the model: Village A and the smaller Village B follow roughly the same trajectory and time to first use of contraception is not significantly different in these two villages. However village C is following a much faster trajectory; non-users have almost three times the annual probability of first using contraception than in villages A and B. This is not related to geographic distance from the medical centre, which is in fact located in village A, with villages B, C and D roughly equidistant (and nearby).

Model 1 examines not whether kin are using contraception but whether kin are alive or dead, and therefore capable of exerting influence on the decision to start using

contraception. Cohort and year effects are controlled for independently. Age of both the woman herself and her husband's age are controlled for, although only the woman's age is significant. We find no evidence that having a living mother (ie maternal grandmother to offspring), father, mother-in-law (ie husband's mother and paternal grandmother to offspring) or father-in-law was associated with time to uptake of contraception. It should be perhaps noted that parameter estimates were in the direction predicted, with paternal grandmothers on average having a delaying effect, whereas maternal grandmothers on average having a speeding up effect on time to first use, but these effects were not significant. However, having first husband alive (i.e. never being widowed) delays time to first use of contraception.

Model 2 shows that if calendar year (in three year bands in this case) is included, there is no significant association between her own and her sister or co-wife's contraceptive use, suggesting that copying kin or co-wife behaviour cannot be statistically distinguished from simply a general increase in acceptance of or use of contraception over time. Another woman resident in her compound starting to use contraception also appears to have no detectable effect on her time to first use.

Discussion.

There is no evidence here that the presence or absence of mothers (who were in general too old to have had the opportunity to use modern contraception themselves but we know are helpful to mothers in raising children), fathers, husband's mother or husband's father directly influence the decision to start using contraception for the first time. There is no evidence that women are copying either sisters, co-wives or neighbours residing in the same compound in the decision to start using modern contraception. If social learning is happening, it might explain village level effects, but there is no evidence of any particular relative or neighbour being of special importance in this process. That there was no evidence of a co-wife using contraception hastening uptake, suggests that the husband was not necessarily the major determinant of whether or not the innovation was used. However a living first husband does have a significant deterrent effect on contraceptive uptake. This suggests either that the wife's fertility preference was always for a reduced birth rate and, freed from her first husband's influence, it is easier to achieve that aim; or it

may simply be that second husbands may also be less preferred husbands and/or that socioeconomic status and general security may have been harmed by widowhood, leading women not to favour further reproduction. Women of reproductive age quickly remarry after widowhood in this population, either through the levirate system (marrying a brother of the dead husband), or into another family. But women's roles as levirate or second wives may be more detached from husband's influence than first wives.

Contraceptive decisions appear to be more directly associated with socio-demographic variables indicating the individual circumstances of the woman, such as her age-specific parity and her wealth and marital status, rather than being directly influenced by either the presence or the contraceptive behaviour of members of the extended family. Strong year and cohort effects suggest that cross-sectional analyses that do not usually control adequately for fixed or time-varying co-variables, especially time, may return unreliable results in answering questions about social influence and social learning. There are so many potential confounds when examining the adoption of innovations over time that event history analysis is likely to be much more reliable (Singer and Willett 1993). Some economists have gone so far as to argue that existing studies showing peer influence on decision-making are in fact artefacts of an inability to control adequately for exogenous factors (Manski 1993). Whilst it is very difficult to rule out the possibility of uncontrolled hidden effects here, given that the peers are defined on the basis of kinship and marriage rather than self-chosen social networks, and the saturated nature of the sample, and it is unlikely that any such factors would alter our conclusion that no peer effects are evident in this population.

However the fact that the village she is in, and the calendar year, remain very significant correlates of first contraceptive uptake, does suggest that some form of cultural change in time and space is important in enabling a woman to make the decision to adopt this innovation. Listening to midwives, or to the radio, may be more important than the behaviour of friends and relatives. Or, even if social contact is related in some way to the rate of contraceptive uptake, perhaps through social learning, it may be that talking to anyone about contraceptives is just as influential as talking to kin or co-wives; women may simply need information or evidence of

successful use, rather than necessarily being influenced in the underlying fertility preferences of others. Furthermore, contraceptive use was still reasonably rare, and once it becomes more common, some kind of tipping point may be reached in which a wish to conform suddenly increases use, and a study conducted even a few years later could return a different result.

Social learning is clearly not the only explanation for the rate of spread of this new technology. Twenty-five years is a very long period of exposure to an innovation; so long that it becomes implausible to argue that ideas about contraception had not diffused into all those villages with access to the clinic long before many individuals started to use the technology. It is therefore necessary to ask why it took so long for contraceptive use to become more common. Whilst it has been conventional to evoke social and cultural barriers in this context, both have proved rapidly surmountable obstacles when women find themselves living in conditions favouring low fertility. To take an extreme example, rural Ethiopia has one of the highest birth rates in Africa. Yet in the Ethiopian capital city, Addis Ababa, where a large proportion of the population are actually recent migrants from rural areas, birth rates are below replacement (Gurmu and Mace 2008; Sibanda and others 2003). Furthermore it is the wealthier individuals that have the highest birth rates, despite the fact that they are likely to have better access to both news media and medical services than the poor (Gurmu and Mace 2008). One plausible explanation is that competition for resources (such as housing and jobs), and thus a society that now favours high levels of investment per child, are important determinants of receptivity to ideas about limiting family size (Mace 2008). In the Gambia, the rural, agrarian economy in these villages did not necessarily provide these ultimate reasons for higher parental investment in fewer children, until recently. Since 1975, as infant mortality has declined, the village populations are thought to have nearly doubled, without commensurate increase in farmland (indeed opportunities for rice cultivation have actually been reduced since the Sahel droughts of the 1970s). Education in the villages is not readily available beyond the basic level, and out-migration for women to look for work or education was not a common strategy. However, since the population density in the villages has increased, the reliance on out-migration and off-farm employment as a strategy has also increased. Job opportunities outside farming usually require education and/or out-migration.

Better nutrition may have been reducing birth intervals if contraception is not used. All these factors have been slowly moving in the direction of providing incentives to limit family size through contraception over the last 25 years. Ideas may be diffusing through networks in villages, but only when conditions ultimately favour higher parental investment in each child are ideas about lower fertility and contraception converted into actual uptake. Husbands are the only specific category of kin that appear to have a direct influence on contraceptive decisions, in that their death is associated with a higher risk of starting to use contraceptives.

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Table 1. Characteristics of study villages

Village	Population in 2001*	No. of households in 2001	No of women included in sample	Contraceptive prevalence in under 50s in sample in 2001 (%)
A	1676	174	288	10.4
B	425	53	87	15.3
C	550	80	142	29.6
D	1044	117	-	0.5
Totals or Mean	3695	424	517	7.9 (A-D) 16.5 (A-C)

*Population sizes are estimated to have increased by between 50-90% since 1975

Table 2. Event history analysis of time to first use of modern contraceptives (2 models). Age, age squared, husband's age, parity (relative to parity 3-5), sister uses, co-wife uses, neighbour uses, date (relative to 87-89) and whether mother, father, mother-in-law, father-in-law is dead are time-varying. Village of residence (relative to village B), and wealth rank (relative to wealth rank 2) are fixed. Significant effects are shown in bold.

Predictor	Presence/absence of kin				Contraceptive status of kin			
	Model 1 (N = 463)				Model 2 (N = 517)			
	B	S.E.	Exp(B)	P	B	S.E.	Exp(B)	P
<i>Individual effects</i>								
Age	0.20	0.10	1.22	0.06	0.22	0.09	1.24	0.02
Age²	-0.06	0.02	0.99	0.00	-0.04	0.02	0.99	0.00
Village C	1.24	0.30	3.47	0.00	1.38	0.28	3.98	0.00
Village B (Ref)	-	-	-	-	-	-	-	-
Village A	-0.09	0.28	1.09	0.74	0.26	0.26	1.30	0.32
Parity 0 to 2	-0.77	0.31	0.45	0.01	-0.88	0.27	0.41	0.00
Parity 3 to 5 (Ref)	-	-	-	-	-	-	-	-
Parity 6+	0.84	0.29	2.33	0.00	0.98	0.28	2.66	0.00
Wealth Rank 1	-0.77	0.25	0.46	0.00	-0.48	0.20	0.61	0.03
Wealth Rank 2 (Ref)	-	-	-	-	-	-	-	-
Wealth Rank 3	-0.27	0.20	0.62	0.19	-0.20	0.19	0.81	0.29
<i>Marriage effects</i>								
First Husband died (ref: No)	0.96	0.43	2.61	0.02				
Husband Age	-0.01	0.01	0.98	0.28				
<i>Kin effects</i>								
Mother living (ref: No)	0.16	0.26	1.17	0.53				
Father living (ref: No)	-0.01	0.21	0.98	0.95				
Husbands Mother alive (ref: No)	-0.25	0.25	0.77	0.32				
Husbands Father alive (ref: No)	-0.06	0.23	0.94	0.79				
<i>Peer effects</i>								
*Sister used (ref: No)					0.01	0.26	1.01	0.95
Co-wife used (ref: No)					-0.04	0.26	0.95	0.86
Neighbour used (ref:No)					-0.28	0.31	0.75	0.36
<i>Year</i>								
1975-1977	-2.10	0.63	0.12	0.00	-2.18	0.62	0.11	0.00
1978-1980	-1.15	0.43	0.31	0.00	-1.24	0.42	0.28	0.00
1981-1983	-0.90	0.41	0.40	0.02	-1.01	0.40	0.36	0.01
1984-1986	-1.27	0.47	0.28	0.00	-1.24	0.44	0.28	0.00
1987-1989 (Ref)	-	-	-	-	-	-	-	-
1990-1992	-0.26	0.36	0.47	0.77	-0.28	0.34	0.69	0.40
1993-1995	0.79	0.31	2.21	0.01	0.49	0.29	1.63	0.09
1996-1998	1.63	0.49	5.13	0.00	0.93	0.29	2.54	0.00
1999-2001	1.51	0.52	4.55	0.00	0.88	0.32	2.42	0.00
Constant	-5.17	1.72	0.00	0.00	-4.93	1.45	0.00	0.00

* For all peer effects, the category of no kin in that group using contraception was further divided into no kin in that category in the study site, and kin in that category but that have not used contraception, but no significant effects were found (results not shown).