

Influences on communication about reproduction: the cultural evolution of low fertility[☆]

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Abstract

The cultural norms of traditional societies encourage behavior that is consistent with maximizing reproductive success but those of modern post-demographic transition societies do not. Newson et al (2005) proposed that this might be because interaction between kin is relatively less frequent in modern social networks. Assuming that people's evaluations of reproductive decisions are influenced by a desire to increase their inclusive fitness, they will be inclined to prefer their kin to make fitness-enhancing choices. Such a preference will encourage the emergence of pronatal cultural norms if social networks are dense with kin. Less pronatal norms will emerge if contact between kin makes up a small proportion of social interactions. This article reports evidence based on role-play studies that supports the assumption of the kin influence hypothesis that evaluations of reproductive decisions are influenced by a desire to increase inclusive fitness. It also presents a cultural evolutionary model demonstrating the long-term effect of declining kin interaction if people are more likely to encourage fitness-enhancing choices when interacting with their kin than with nonrelatives.

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1. Introduction

This article reports the results of a test of a key assumption of the “kin influence hypothesis” (Newson et al., 2005) that communications between kin are more likely than communications between non-kin to encourage behavior consistent with achieving reproductive success. Communication biased in this way would provide a means by which individuals can promote their inclusive fitness (Hamilton, 1964).

The kin influence hypothesis suggests that, for any single interaction between close kin, there is a probability that this promotion will cause an attitude or behavioral change in the participants and that this change will tend in the direction of

a more effective pursuit of reproductive success. Over many social interactions occurring over time in kinship-based networks, this mechanism can maintain pronatal cultural norms (i.e., norms that prescribe behavior consistent with maximizing reproductive success). But when interaction between kin is only a small proportion of social interaction, as in modern societies, cultural norms can evolve that allow behavior to become increasingly less consistent with the efficient conversion of resources to offspring. This mechanism could largely account for the demographic transition, the collapse in fertility that occurs as societies modernize (Borgerhoff Mulder, 1998).

We present a cultural evolutionary model demonstrating how a reduction in contact between kin could result in the erosion of pronatal cultural norms if the content of communication is biased in the way suggested by the kin influence hypothesis. Cultural evolutionary models have shown that even very weak innate biases influencing the transmission of information within a population will cause

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the cultural norms of that population to change. Over time and many social interactions, culture evolves in a way that can be predicted by the direction of the bias (Boyd & Richerson, 1985; Durham, 1991; Richerson & Boyd, 2005). Theoretical investigations of biased transmission have previously concentrated on “learning” biases of potential recipients of cultural information, which influence what learners adopt. The kin influence hypothesis assumes a “teaching” bias in the sources of cultural information. These influence the information available to learners.

2. Modernization, reproduction, and culture

2.1. Modern social networks and fertility

The pattern of social interactions that occurs in modern social networks is an evolutionary novelty. Living in kin-based social groups is a human characteristic with evolutionary roots that probably extend back to the Miocene (Foley, 1996). Compared to other ape societies, all human societies are remarkable in the extent to which cooperation occurs between nonrelatives (Richerson & Boyd, 2005). Nevertheless, traditional societies are highly kin-oriented, compared to modern societies. Industrialization introduces cheap mechanized transport and allows family members to pursue economic opportunities far from their place of birth. As a result, the vast majority of interactions occurring in postindustrial societies are between individuals who are not genetically related, and interactions that take place via contemporary telecommunication media are often between people who have not even met. That modernization is the trigger for a dramatic change in social networks has been well documented (e.g., Notestein, 1945; Ogburn & Nimkoff, 1955; Thornton & Frick, 1987; Zelinsky, 1971).

Links between a widening of social networks and the adoption of reproductive behavior that is inconsistent with maximizing reproductive success are also well documented. Individuals with wider social networks are the first in a population to adopt family limitation (e.g., Axinn & Barber, 2001; Axinn & Yabiku, 2001; Barber, Pearce, Chaudhury, Gurung, 2002; Behrman, Kohler, Watkins, 2002; Bongaarts & Watkins, 1996; Boulay & Valente, 1999; Kohler, 2001; Valente, Watkins, Jato, van de Straten, Tsitsol, 1997; Watkins, 1990; Watkins & Danzi, 1995; Weinstein, Sun, Chang, Freedman, 1990, Godley, 2001). Reproductive decisions that limit family size might be adaptive in environments in which resources are restricted (e.g., Mace, 1998), but the family limitation that accompanies modernization occurs at a time of rapid increase in the availability of resources. The norms of modern societies encourage parents to believe that they must invest large amounts of time and resources in their children if they are to be successful, but there is no evidence that this investment pays off in terms of reproductive success. Kaplan, Lancaster, Johnson, and Bock (1995) found that men raised in small

families did not achieve greater fitness than those raised in large families.

Turke (1989) has also suggested that the modern fertility decline may be the result of a reduction in contact between kin, suggesting that psychological mechanisms, which evolved to solve the problem of allocating life effort in a manner that maximizes reproductive success, monitor the availability of committed caregivers to provide help with raising children. When kin cease to be available, these mechanisms determine reproductive resources to be low, even if the couple is well supplied with physical resources. Therefore, instead of investing in a large number of offspring, couples concentrate their reproductive investment on producing small number of socially competitive children.

2.2. Culture and reproductive decisions

Newson et al. (2005) argue that, although the amount of practical support available from a kinship network may be one of the factors that influence reproductive decisions at the individual level, if viewed at the population level, kin altruism may have a more important effect.

Individuals operating in a social network provide each other with a vast amount of social information. A long tradition of research in social psychology has shown that the exchange of social information that occurs within a group creates and maintains the social norms or culture of the group (e.g., Turner, 1991; Postmes, Haslam & Swaab, 2005). Day-to-day discussions between group members develop and continually revise the canon of values and beliefs that provide the proximate explanations for many of the decisions, including reproductive decisions, that are made by group members. For example, the belief that each child needs his own bedroom will motivate a couple who can only afford a three-bedroom home to avoid having a third child. Reproductive decisions are influenced by many such cultural elements, and modern societies have developed a large number of elements that combine to make even very prosperous people believe they cannot or should not raise a large family.

The kin influence hypothesis does not suggest that kin obsessively encourage wise reproductive decisions or that people who are not related spitefully encourage behavior that reduces reproductive success. The bias is weak, so the content of conversations between both friends and relatives will largely reflect prevailing cultural norms. However, it has been seen that when social networks are dense with kin, cultural institutions encourage couples to produce as many children as they can successfully raise (Lorimer, 1954). For example, an explanation of why African societies may “offer greater resistance to fertility decline” (Caldwell & Caldwell, 1987, p. 409) summarizes cultural characteristics that acted (and, to some extent, still do act) to maintain high fertility. In interviews about childbearing conducted in Africa, a majority responded that it is “fearful” to die without children. Limiting of family size was considered extremely risky because of a keen awareness of the

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