WHERE DO SOCIAL STRUCTURES COME FROM?

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ABSTRACT

While structuralism and network theory have been enormously successful empirically, they have not been able to explain the origins of social structures and networks. I contend that the emerging field of evolutionary psychology can help us explain how some social structures and networks emerge. I illustrate my point with a persistent empirical puzzle in the social networks literature (why women have more kin in their personal networks than men do), and provide an evolutionary psychological explanation for this phenomenon. I test two implications of this explanation with the 1985 Social Networks module of the General Social Survey. The data provide support for the evolutionary psychological explanation of women's kincentric networks.

INTRODUCTION

Structuralism, and its most successful versions, social network analysis (Wasserman & Faust, 1994) and network exchange theory (Willer, 1999), are among the dominant theoretical perspectives in sociology. Structuralist theories explain individual behavior and interpersonal relations in terms of the actors' locations in the social structure, in particular, their ties (or lack thereof) to other actors and the latter's ties (or lack thereof) to still other actors. Network

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analysis explains individual behavior in terms of the properties and configurations of the networks (the presence or absence of ties between nodes), not in terms of the attributes of individual actors (Mayhew, 1980, 1981).

While network theories have been enormously successful in explaining individual behavior in terms of the properties of social structure, they leave social structures themselves exogenous. Just as the microfoundations of rational choice theory, which explain individual behavior partly in terms of individual values and preferences, leave these values and preferences exogenous (Stigler & Becker, 1977), network theories leave the networks exogenous. Structural theories cannot answer the question: Where do social structures come from? (just as rational choice theory cannot answer the question: Where do individual values and preferences come from?).

In this paper I will argue that the emerging field of evolutionary psychology can explain the origins of some (albeit not all) social structures, just as I have elsewhere (Kanazawa, 2001) argued that evolutionary psychology can explain the origins of some (albeit not all) values and preferences in the microfoundations of rational choice theory. I will first provide critiques of structuralism and network theory, especially their attempt to explain social networks in terms of homophily. I will then sketch out the foundational principles of evolutionary psychology and how it can potentially explain the origins of social structures. I will illustrate how evolutionary psychology can explain social networks by providing an evolutionary psychological explanation of a persistent puzzle in network theory: Why women have more kin in their personal networks than men do. I will present empirical evidence from the 1985 Social Networks module of the General Social Survey that supports my explanation for women's kincentric networks.

PROBLEMS WITH STRUCTURALISM

Apart from its inability to explain the origins of social structures, structuralism has a few theoretical problems, despite its tremendous empirical success. First, while structuralism and network theory purport to explain individual behavior purely in terms of properties and configurations of the social structure, all structural theories must nonetheless make some assumptions about the internal states of individual actors.[1] Take, for instance, Blau's (1977a) macrostructural theory, one of the most prolific and successful sociological theories from any perspective. While the theory aims to explain the patterns of intergroup relations from the properties of groups in society (mainly, the extent and patterns of heterogeneity and inequality among individuals within and between groups), the theory must nevertheless assume certain "sociopsychological

tendencies" (Blau, 1977b, p. 46) on the part of individual actors. For example, individuals in Blau's theory must *want to* marry and they must *want to* associate with others. In fact, Blau must assume a uniform level of *desire* to marry and associate with others across all individuals; otherwise, his theory does not work. If individuals do not have a constant level of desire to marry or associate with others, then heterogeneity, in the face of ingroup preferences, will not lead to greater levels of intermarriage and intergroup relations because individuals could simply choose not to marry or associate with anyone at all when there are no ingroup members to marry or associate with. Then his theorem (T-11: Increasing heterogeneity increases the probability of intergroup relations (Blau, 1977a, pp. 78–83)) will be *logically* false.

Some of Blau's assumptions explicitly refer to internal states of individual actors. For instance, the very first, and therefore the most fundamental, assumption of the theory assumes that individuals are homophilous (A-1: Social associations are more prevalent among persons in proximate than between those in distant social positions (Blau, 1977a, pp. 36–41)). Since no prior assumptions are made about the structural constraints on associations, this homophilous tendency must necessarily come from individual preferences and desires to associate with others in similar social positions.[2] In other words, A-1 posits choice homophily, not induced homophily (McPherson & Smith-Lovin, 1987, pp. 371–372). In fact, Blau (1977a, p. 36; emphases added) explicitly states: "People in similar social positions share social experiences and roles, and have similar *attributes* and *attitudes*, which promote social intercourse among them. This is the reasoning underlying the first axiom, on which numerous theorems rest."

While Blau's macrostructural theory, and other structural theories, must assume certain sociopsychological tendencies, they cannot explain why individuals have these tendencies. Why do individuals want to marry? Why do individuals want to associate with others? Why are individuals homophilous?

Another theoretical problem of structuralism is that it treats all actors as equivalent and interchangeable nodes in a social network (Blau, 1989, p. 53; Smith-Lovin & McPherson, 1993, p. 223). "Structuralists do not attribute social or psychological characteristics to individual humans. . . . Social phenomena are properties of social networks" (Mayhew, 1980, p. 346). In network theory, actors (egos) who have ties to identical or similar others (alters) are called "structurally equivalent" (Lorrain & White, 1971) or "regularly equivalent" (Sailer, 1978), and the theory predicts their behavior will be similar (since they share all structural characteristics). Alters in turn are defined by to which other actors they have ties. For instance, network theory does not posit that men and women are inherently different. It explains all sex

differences in behavior purely in terms of the differences in network ties (their strengths, numbers, and densities) between men and women (McPherson & Smith-Lovin, 1982; Smith-Lovin & McPherson, 1993).

However, it is obvious that actors and their behavior are not entirely reducible to their network ties, and there can be vast individual differences even between actors who are structurally or regularly equivalent. And actors *do* possess inherent attributes and characteristics. Take Mark's (1998b) theory of musical taste acquisition, for example. He argues that individuals acquire their tastes in music (what types of music they like) from others with whom they associate. If one has many ties to others who listen to rock, one acquires a preference for rock; if one has many ties to others who listen to country, one acquires a preference for country.

A moment's reflection will reveal, however, that this is not entirely true. While we often acquire our musical tastes from our friends when we are young, we do not do so from our parents, even though we may have equally strong ties to both our friends and parents. In fact, we often develop a strong *distaste* for a certain type of music precisely because our parents like it, or develop a strong taste for it precisely because our parents *hate* it.[3] We developed a taste for Elvis and the Beatles *precisely* because our parents listened to Lawrence Welk and hated Elvis' gyrating hips and the Beatles' long hair. Of course, we liked Elvis and the Beatles because our friends liked them. If we acquire our musical tastes from those to whom we have close ties, why do we like the music our parents hate and our friends like?[4] Why do we rebel against our parents (and not our friends), but then only when we are young? Why are our parents different from our friends?

PROBLEMS WITH HOMOPHILY

Apart from the two theoretical problems identified above, the most significant problem with structuralism and network theory is its inability to account for the origins of social structures and networks. While all theories must leave some factors exogenous, and no theories can explain everything, I believe that social structures, which are the primary causal factors in structuralism, are too important for it to leave exogenous, just as values and preferences, which are among the primary causal factors in the microfoundations of rational choice theory, are too important for it to leave exogenous.

One of the very few factors that structuralists use to explain the origin of networks is *homophily* (McPherson & Smith-Lovin, 1987). The principle of homophily (Mark, 1998b, pp. 454–455) states that people who are similar in sociodemographic characteristics are more likely to interact with each other

than are people who are dissimilar. A large number of empirical studies conclusively demonstrate that personal networks are highly homophilous (Fischer, 1982, pp. 179–190; Marsden, 1987; McPherson & Smith-Lovin, 1987, footnote 1). Homophily in principle can explain the emergence of social networks from the state of nature. Given a collection of atomized individuals with no ties, a man is more likely to develop a tie with another man than with a woman. A white is more likely to develop a tie with another white than with a black. Eventually, a social network of a given type will emerge from the collection of individuals with homophilous tendencies.

However, homophily as an explanation of the origins of social structures and networks runs into at least four specific problems, all of which ultimately derive from the fact that *the concept of homophily is atheoretical.* First, this explanation of the emergence of social structures, in fact, the very concept of homophily itself, violates one of the fundamental assumptions of structuralism that actors do not have inherent attributes or characteristics (Mayhew, 1980; Smith-Lovin & McPherson, 1993). It is strictly with inherent individual characteristics such as sex, race, ethnicity, education, and income that actors can be more or less homophilous on these attributes (although Smith-Lovin & McPherson (1993, footnote 2) deny that any of these attributes is truly individual in nature).

Second, given that individuals have multiple sociodemographic characteristics, and given that the multiple correlation among these dimensions $R < 1.0$ (or, to use Blau's (1977a) language, given less than perfect consolidation of multiple parameters), when individuals are homophilous on one dimension, they are necessarily less homophilous on others. Individuals cannot be maximally or equally homophilous on two or more dimensions simultaneously. Conversely, once again, given $R < 1.0$, one can always identify one dimension on which individuals are necessarily more homophilous than other dimensions. Given $R < 1.0$, personal networks are by definition simultaneously homophilous on some dimensions and heterophilous on others (Blau, 1977b, pp. 44–46; Merton, 1972, pp. 21–29). Chance (random pairing) is the only criterion against which one can evaluate homophily.

Third, the very important distinction that McPherson and Smith-Lovin (1987, pp. 371–372) make between choice homophily and induced homophily turns out not to be a distinction. *Choice homophily* happens when individuals have the opportunity to associate with either similar or dissimilar others and they selectively choose to associate only or mostly with similar others to the exclusion of dissimilar others. *Induced homophily* happens when individuals have the opportunity to associate only or mostly with similar others because the groups to which they belong are already homogeneous. In homogeneous

groups, most or all of individuals' associates are already similar to them even when they choose their associates randomly from other group members and do not make any conscious effort to associate only with similar others. McPherson and Smith-Lovin's (1987) study of voluntary organizations in Nebraska shows that most personal networks are homophilous because of induced homophily, not choice homophily. Induced homophily, however, can take place only in the context of homogeneous groups. How do groups get to be homogeneous in the first place? Why do individuals join groups whose members are already similar to them? It is obvious that what produces group homogeneity (a necessary condition for induced homophily) is prior choice homophily (Feld 1982, p. 798). Induced homophily at time t is the result of choice homophily at time $t–i$ ($i = 1, 2, \ldots \infty$).

Finally, the most significant problem with the concept of homophily and its atheoretical nature is that nobody knows where homophily comes from. Why are individuals homophilous? Why are they more homophilous on some dimensions than others? For instance, why are they more homophilous on age, sex and race than on education and occupation (Lazarsfeld & Merton, 1954; McPherson & Smith-Lovin, 1987, Table 1; Verbrugge, 1977)? If homophily is so important and pervasive, then *why isn't everybody gay?* Marriage is one of the most important social relations in anyone's life, and sex is one of the most salient sociodemographic dimensions. Why then are most people decidedly *not* homophilous in this very important social relation on this very salient dimension? Obviously, the answer is that most people are *biologically* heterosexual and therefore heterophilous on sex in marriage (just like a few are homosexual and homophilous for the same reason).[5] If biological and evolutionary predispositions underlie whether or not one is homophilous in this particular social relation on this particular dimension, is it unlikely that similar predispositions also underlie other choices individuals make in their networks?

EVOLUTIONARY PSYCHOLOGICAL ORIGINS OF SOCIAL STRUCTURES

I contend that one can solve these and other theoretical problems with structuralism and network theory by introducing two assumptions. First, actors are *inherently* different in ways other than their structural positions and their network ties to others. The primary ways that actors can be different are in their preferences and values, in what they *want* to do (regardless of what they are structurally constrained to do). Actors are therefore *not* interchangeable nodes. Second, these inherent differences between actors influence their behavior, in

addition to the structural effects of their network positions on it.[6] These two assumptions combined lead us to predict that different actors (such as men and women) would behave differently even if they are structurally or regularly equivalent.[7] Of course, since the actors' current network positions are largely the result of their past choices to associate with some and not others, these assumptions also lead us to predict that different actors (such as men and women) will occupy different structural locations. In other words, these two assumptions help us figure out where social structures come from.

I believe that the emerging field of evolutionary psychology (Barkow, Cosmides & Tooby, 1992; Buss, 1999) helps us understand how different actors may hold different values and preferences, and how these individual differences between actors produce different social structures and networks through their choice of affiliative ties. Evolutionary psychology seeks to discover universal *human nature*, which is a collection of domain-specific psychological mechanisms. A *psychological mechanism* is an information-processing procedure or decision rule that natural and sexual selections have equipped humans to possess in order to solve a particular adaptive problem (a problem of survival or reproduction). Unlike decision rules in microeconomic subjective expected utility maximization theory or game theory, however, evolved psychological mechanisms mostly operate *behind our conscious thinking*.

Evolutionary psychology is premised on two broad generalizations. The first generalization, to put it bluntly, is that there is nothing special about humans. To put it more precisely, "certainly we are unique, but we are not unique in being unique. Every species is unique and *evolved* its uniqueness in adaptation to its environment. Culture is the uniquely human way of adapting, but culture, too, evolved biologically" (van den Berghe, 1990, p. 428). Human beings are just like other animal species, and all the laws of nature, in particular, the laws of evolution by natural and sexual selection, apply equally to humans as they do to other species. The second broad generalization is that there is nothing special about the brain as a human body part; it is just like the hand or the pancreas or any other body part. Just as a long history of human evolution has shaped the hand or the pancreas to perform a specific function, so has the evolution shaped the human brain to perform certain tasks (solving adaptive problems).

The second generalization leads to a very important implication of evolutionary psychology. Just as the basic shape and functions of the hand and the pancreas have not changed since the end of the Pleistocene epoch about 10,000 years ago, the basic functioning of the brain has not changed very much in the last 10,000 years. The human body (including the brain) evolved over

millions of years during the Pleistocene epoch in the African savanna where humans lived during most of this time (Maryanski & Turner, 1992, pp. 69–90). This environment – African savanna where humans lived in small bands of fifty or so related individuals as hunter-gatherers – is called the environment of evolutionary adaptedness (EEA) (Bowlby, 1969) or ancestral environment, and it is to the EEA or the ancestral environment that our body (including the brain) is adapted.

Figure 1 presents the basic theoretical structure of evolutionary psychology. It argues that an adaptive problem leads to an evolved psychological mechanism, which then usually leads to adaptive (fitness-maximizing) behavior *in the EEA*. Evolutionary psychology assumes that most behavior *in the EEA* maximizes inclusive fitness of the actor. However, it recognizes that our current environment may be radically different from the EEA, yet our psychological mechanisms (just like our hands and our pancreas) are still the same as they were in the EEA and produce the same behavior as they did in the EEA. This leads to the distinct possibility that our behavior in our current environment might be completely maladaptive. To the extent that our current environment is different from the EEA (to which all psychological mechanisms are adapted), evolutionary psychology would predict that our current behavior is maladaptive.

Relying as it does on universal human nature and its sex differences (distinct male and female human natures) for its explanations of human behavior, evolutionary psychology is particularly suited for explaining social phenomena that are culturally universal, such as why it is that young men commit an overwhelming majority of violent and property crimes in every human society (Kanazawa & Still, 2000). However, it can also explain culturally variable phenomena. By specifying how universal human nature interacts with varied local environments, evolutionary psychology can also explain, for instance, why women in some societies choose to marry polygynously while those in others choose to marry monogamously in the absence of the institution of marriage (Kanazawa & Still, 1999). However, due to its reliance on universal human nature, evolutionary psychology cannot explain idiosyncratic differences in individual behavior. Behavior genetic and developmental psychological theories can better explain such unique individual behavior. Evolutionary psychology tends to explain the behavior of individuals in rough categories, such as men and women (sex differences), rich and poor (class differences), or young and old (age differences).

While evolutionary psychology proper is a microlevel theory of individual behavior, it can also explain some emergent phenomena. A key assumption in the macrolevel application of evolutionary psychology is the methodologically

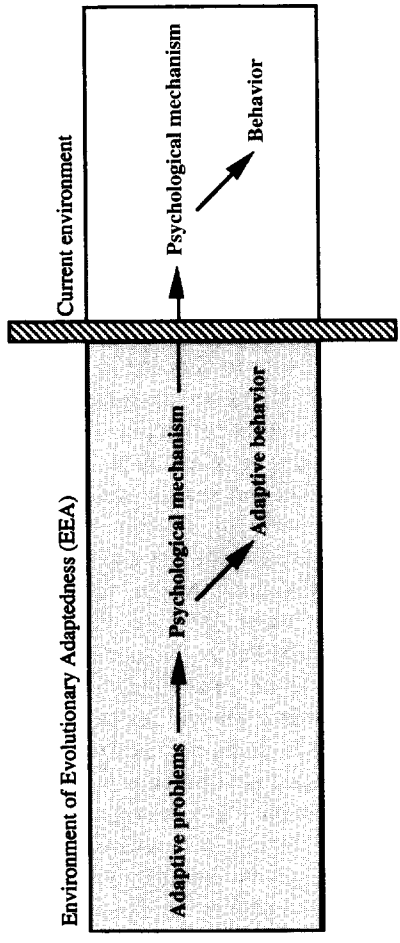

Fig. 1. The Basic Theoretical Structure of Evolutionary Psychology.

individualist one that the emergent properties at the macro level reflect the aggregation of individual behavior at the micro level. Evolutionary psychology can thus explain the emergence of some norms (Kanazawa & Still, 2001). It is my contention here that evolutionary psychology can also explain the emergence of another aggregate phenomenon: Social structures and networks. I believe that it can address and begin to solve some of the problems of structuralism and network theory discussed above.

How can evolutionary psychology solve some of the theoretical problems of structuralism and network theory? First, it can explain why most personal networks are homophilous on such dimensions as sex, age, and race. One very important implication of evolutionary psychology is that *the human brain is biased to perceive the environment as if it were still the EEA.* Since the basic architecture of the human brain has not changed since the end of the Pleistocene epoch about 10,000 years ago, it has difficulty comprehending elements that emerged in the meantime. This is why most people have innate phobias of spiders and snakes, many species of which are poisonous and therefore represented genuine threats to survival in the EEA, but they do not have phobias of such evolutionarily novel dangers like cars and guns, even though far more people in contemporary societies die of automobile accidents and gunshot wounds than of spider or snake bites. The human brain, adapted to the EEA, functions as if spiders and snakes represent some of the greatest threats to human survival (Buss, 1999, pp. 62–63).

Human society in the EEA was more or less egalitarian and there were few clear differentiations among individuals. Major exceptions to this, however, were sex and age (Maryanski & Turner, 1992, pp. 78–89). Human society, just like primate societies, has always had clear divisions of labor based on age and sex, and has always been gerontocratic. These features of human society in the ancestral environment put people into age and sex categories, and our ancestors mostly associated with others of the same sex and similar ages. And, of course, all human societies in the ancestral environment were racially and ethnically homogeneous. Humans also possess a psychological mechanism that makes them ethnocentric and preferentially associate with others in their deme (a local population within which people marry endogamously) (Whitmeyer, 1997). I contend that individuals have homophilous tendencies today because we have evolved psychological mechanisms that compel us to associate with others of the same sex and race and similar age, and these evolved psychological mechanisms reflect the social organization of human society in the EEA.

Evolutionary psychology, and its assumption of the human brain being biased to perceive the environment as if it were the EEA, can also explain why individuals are more homophilous on sex, age, and race than on education and

occupation (Lazarsfeld & Merton, 1954; McPherson & Smith-Lovin, 1987, Table 1; Verbrugge, 1977). This is because differentiations among humans based on the former set of dimensions were meaningful in the EEA, while similar differentiations based on the latter set were not. The human brain has more difficulty differentiating others on the basis of their occupation or educational attainment than on sex, age and race, just like the human brain has more difficulty comprehending cars and guns as dangers to survival than comprehending spiders and snakes as such. Thus individuals are *unconsciously* more homophilous on primordial dimensions of sex, age and race than on evolutionarily novel dimensions of occupation and education.

While sex, age, and race are more visible characteristics of individuals than education or occupation, this is *not* why we are more homophilous on the former than on the latter. Many markers of ethnic membership are not visible. (The interminable civil wars in Somalia during 1990s were fought between subclans within the same clan within the same tribe within the same race (Geekie, 1993, p. 11; Gregory, 1992, p. 34; Sheehan, 1993, p. 41).) Yet we are always homophilous on ethnicity. In contrast, many other highly visible characteristics (such as height or weight) do not as readily form the basis of homophily. This is because ethnicity (no matter how visible or invisible the markers) was always an important basis for defining group membership and a deme in the EEA, while height and weight were not (although the latter characteristics were important for mate selection and the human brain does respond to them when selecting a mate).

AN ILLUSTRATION: WOMEN'S KINCENTRIC NETWORKS

As a concrete illustration of how evolutionary psychology can explain the origins of social structures, I will turn to one persistent empirical puzzle in network theory: Women's kincentric networks. Empirical studies on personal networks repeatedly demonstrate that otherwise comparable men and women have similar personal networks. The only exception to this rule is that women have more kin and fewer coworkers in their personal networks than men do (Campbell, 1988; Fischer & Oliker, 1983; Marsden, 1987). While there appears little doubt that this sex difference in personal networks exists, few in network theory seem to know why. Why do women have more kin in their personal networks than men do?

To my knowledge, Smith-Lovin and McPherson (1993, pp. 233–237; Munch, McPherson & Smith-Lovin, 1997) are the only ones to offer an explanation of this phenomenon. Using fictitious characters named Jim and

Jane, they explain how the compositions of their personal networks remain more or less the same through adult years because "Jim is serious about his career as an engineer [and] Jane is equally serious about her nursing". However, the change begins when they become parents. "When their first child is born, however, Jane's mother comes to visit for two weeks; Jane begins to use her sister as a babysitter for daytime care while she is working. . . . Because more of her time is taken up with the baby, Jane's networks become more centered on neighborhood and kin, to some extent at the expense of her work and voluntary association friends. Jim's work and group ties are less altered" (pp. 234–235).

Their explanation, however, simply begs the questions: Why is it Jane's mother who comes to visit after the baby is born, not Jim's (when Jim's mother is presumably equally related to the baby as Jane's mother)? *Or is she?* Why is it Jane's sister who becomes their babysitter, not Jim's sister (when both sisters are presumably equally related to the baby)? *Or are they?* Smith-Lovin and McPherson assume that it is Jane, not Jim, who is the primary caretaker of the baby. Why is this so?

Evolutionary psychology can answer all of these questions. The fact that the female gamete (egg) is greater in size and fewer in number than the male gamete (sperm) (which is the biological definition of male and female), and the fact that gestation takes place within the female body, together lead, directly or indirectly, to almost all of the sex differences in preferences and behavior. One of these differences is parental investment. Across all species for which these two conditions hold, the female makes greater parental investment than the male. In fact, for most species, the male parental investment is limited to the sperm. The sex differences in parental investment occurs because males under these conditions have far greater *fitness ceiling* than the females do; males can produce a far larger number of offspring in their lifetime than females can.

This is true of humans as well. Thus, while *successful reproduction* is equally important to men and women, *each child* is far more valuable to a woman than to a man because it represents a greater share of a woman's lifetime reproductive potential than a man's. Men are exceptional in nature in that they make a large amount of parental investment into their offspring (compared to males of other species). Nonetheless, women (just like females of most other species) still make far greater parental investment into their children than men do, because women's evolved psychological mechanisms compel them to do so.

For these evolutionary reasons, women are more motivated to make parental investment than men are. However, women cannot always do it alone; sometimes, they need help from others, especially in the EEA where resources

were scarce and life was precarious. When mothers need help in their effort to raise their children, nobody is more likely or willing to deliver it than their kin. Women's kin are sometimes even more motivated to invest in the children than the putative fathers are, because, due to paternity uncertainty (created by the possibility of cuckoldry), the fathers may or may not be genetically related to the children, whereas the maternal kin are always genetically related to the children. For the same reason, paternal kin are not as motivated to invest in the children as maternal kin are. I contend that this is why women, even today, have a larger number of kin in their personal networks than men do. Women's evolved psychological mechanism compels them to make greater parental investment into the children, and women need to rely on their kin in case they need help, materially or otherwise.

EMPIRICAL TESTS

I derive two specific empirical hypotheses from this evolutionary psychological explanation of women's kincentric networks. First, if women maintain their ties to their kin in case they need help with their parental investment, then women who are materially better off should need less help from their kin, and therefore less need to maintain their ties with them. Second, women who are currently married should need less help from their kin than women without husbands, because, even with residual paternity uncertainty, the fathers should be motivated to make some parental investment into the offspring and thereby lessen the mothers' burden. Women can make less parental investment into their children if they have their mates present than if they didn't. I emphasize that women need not make the decisions to have more or less kin in their networks consciously. When they have more resources or are married, women may just *feel like* not keeping in touch with their relatives, without really knowing why. Women's evolved psychological mechanisms may respond to external conditions beneath their conscious thinking.

At any rate, if my explanation is correct, then both family income and being currently married should decrease the extent to which women have kin in their personal networks. Further, these two variables should not have any effect on the extent to which men have kin in their personal networks. It seems to me that there are no other plausible explanations for the negative effects of resources and marriage on kin network only among women but not among men. I therefore test these two hypotheses with the 1985 Social Networks module of the General Social Survey. Note that my precise prediction is that the independent variables have significant negative effects on the dependent variable among women, but not among men. My prediction is *not* the more

common one of an interaction effect between sex and the independent variables of interest. A significant sex interaction effect would only demonstrate that the coefficients for men and women are significantly different *from each other.* It does not tell us if the coefficient is significant for women and not significant for men, as I predict. (The sex interaction effect could be significant, and the coefficients for men and women could both be significant or both be non-significant.) I therefore estimate the equations separately for men and women, rather than include sex interaction terms.

Dependent variable. I use the measure of kin density as the dependent variable. This is the proportion of kin among their (up to) five closest associates, and thus varies from 0 to 1.0. Unlike a similar measure used by Marsden (1987) and others, however, I exclude the spouse from the category of kin, for two reasons. First, the respondent's current marital status is one of the predictors in the following tests, so I need a measure of kin density that is independent of whether or not they have a spouse. Second, and more importantly, from the evolutionary psychological perspective, and particularly for my explanation, the spouses do not count as kin because they are not genetically related to the respondents.

Marsden (1987, p. 129) reports, that, when spouses are included among kin, women's kin density is 0.066 higher than men's (0.580 vs. 514, $p < 0.01$). When I exclude spouses from kin, the difference increases to 0.1064 (0.3881 vs. 0.2817, $p < 0.0001$). Thus the sex differences in kin density of personal networks is even greater than previously thought.

Independent variables. I use the measures of total family income and current marital status (1 if currently married) as main predictors of kin density. I predict significant negative effects of both variables on women's kin density, but not men's.

Control variables. Since the number of kin that the GSS respondents can have in their personal networks is in reverse proportion to the number of coworkers (given that the GSS limited the total number of associates to five), I need to control for the respondent's work status. I include variables that measure respondent's status which make it more likely that they have coworkers in their personal networks: Full-time employment (1 if the respondent has a full-time job), and occupational prestige (the Hodge-Siegel-Rossi Prestige Scores). Since blacks, especially black males, have fewer ties to their families than others (Marsden, 1987, Table 3), I also control for race (1 if black). Finally, in order specifically to test the explanation offered by Smith-Lovin and McPherson (1993; Munch et al., 1997), I include a measure of parenthood in the equations (1 if the respondent has had one or more children, 0 if the respondent is childless). If Smith-Lovin and McPherson are correct,

then parenthood measured by this variable should have a significant positive effect on the kin density of women's personal networks.

Results. Table 1, Columns (1) and (3), indicate that total family income has a significantly negative zero-order correlation with kin density *for both men and women* ($p < 0.001$ for men, $p < 0.0001$ for women). Once I control for other variables, however, family income no longer has a significant effect on men's kin density. For women, family income continues to have a significantly ($p < 0.01$) negative effect on kin density, even after I control for their relevant occupational status and race. Most importantly, a measure of parenthood does not have a significant effect on kin density of women's personal network (even though it has a significantly negative effect on *men's* kin density). The results in Table 1 therefore confirm my evolutionary psychological explanation of

Table 1. The Effect of Family Income on Kin Density.

	Women		Men	
Predictor:	(1)	(2)	(3)	(4)
Family income	-0.0199****	-0.0130**	-0.0178***	-0.0080
	(0.0041)	(0.0048)	(0.0050)	(0.0058)
Controls:				
Full-time job		-0.0701**		-0.0674*
		(0.0270)		(0.0301)
Occupational prestige		-0.0013		-0.0024
		(0.0010)		(8.7194^{-4})
Race		0.0155		-0.1776***
		(0.0451)		(0.0461)
Parenthood		0.0330		-0.1069***
		(0.0306)		(0.0276)
Constant	0.5760	0.5612	0.4653	0.5995
	(0.0396)	(0.0586)	(0.0522)	(0.0599)
Number of cases	770	706	648	634
R^2	0.0304	0.0411	0.0195	0.0771

Note: Standard errors are in parentheses.
*$p < 0.05$
**$p < 0.01$
***$p < 0.001$
****$p < 0.0001$

women's kincentric networks and disconfirms Smith-Lovin and McPherson's (1993).

The pattern is virtually identical in Table 2. Once again, being currently married has a significantly negative zero-order correlation with kin density for both men and women ($p < 0.01$ for women, $p < 0.001$ for men). Once again, however, being currently married has no significant effect on men's kin density once I include other variables in the equation. For women, being currently married continues to have a significantly ($p < 0.01$) negative effect on kin density of personal networks even after I include all the control variables. Parenthood once again has no significant effect on women's kin density (and a significantly negative effect on men's). The results in Tables 1 and 2 taken together seem to suggest that women have more kin in their personal networks

Table 2. The Effect of Being Currently Married on Kin Density.

	Women		Men	
Predictor:	(1)	(2)	(3)	(4)
Currently married	-0.0758**	-0.0784**	-0.1026***	-0.0495
	(0.0242)	(0.0258)	(0.0262)	(0.0300)
Controls:				
Full-time job		-0.0789**		-0.0810**
		(0.0259)		(0.0269)
Occupational prestige		-0.0016		-0.0027**
		(9.2555^{-4})		(8.3522^{-4})
Race		-0.0352		-0.1649***
		(0.0421)		(0.0439)
Parenthood		0.0538		-0.0864**
		(0.0299)		(0.0304)
Constant	0.4273	0.4806	0.3464	0.5512
	(0.0174)	(0.0474)	(0.0208)	(0.0427)
Number of cases	844	774	687	672
R^2	0.0115	0.0361	0.0220	0.0761

Note: Standard errors are in parentheses.
*$p < 0.05$
**$p < 0.01$
***$p < 0.001$
****$p < 0.0001$

because they need their kin's help in their effort to make parental investment into their children.

Critics might argue, however, that the non-significant effect of parenthood on women's kin density disconfirms my evolutionary psychological explanation (as well as Smith-Lovin and McPherson's). If, as I argue, women need their kin to help raise their children, why doesn't being a parent have an effect on their kin density?

This is because the human brain has difficulty making facultative choices in response to situations that did not exist in the EEA. Take the example of our preference for sweets and fats (Barash, 1982, pp. 144–147). We have an evolved psychological mechanism that compels us to consume sweet and fatty foods because, in the nutritionally deficient EEA, those who had a taste for and consumed more such foods (which contain higher calories) survived better and had greater reproductive success than those who didn't have such a taste. This psychological mechanism, however, does not respond facultatively to different nutritional conditions. It does not say "*If* you are malnourished and can use extra calories, *then* consume as many sweet and fatty foods as you can get your hands on. *If*, however, you are not malnourished, *then* do not consume such foods". It does not say so because the second contingency ("if you are not malnourished") never existed in the EEA; our ancestors were always on the verge of malnutrition. This psychological mechanism does not allow us to make facultative choices in response to different conditions, and that is why we have a *constant* craving for sweet and fatty foods regardless of our current nutritional condition. We have a taste for such foods even though few of us are malnourished today, and we get obese as a result.

Similarly, parenthood was a constant in the EEA. Given that humans in the EEA were mildly polygynous (Alexander et al., 1979; Leutenegger & Kelly, 1977), there were many men who did not have any mates and therefore did not reproduce at all, but we are not descended from these men. And almost all women had mates and reproduced in the EEA. Given the absence of reliable means of birth control, parenthood was inevitable for anyone with mates (which included most adult women). Thus our evolved psychological mechanisms do not allow us to make facultative choices on the basis of our parental status ("If you have children, do X; if you don't have children, do Y"), because, once again, the second contingency ("if you don't have children") never held true for our ancestors from whom we are descended and inherited our psychological mechanisms. This is why all women, regardless of their current parental status, are compelled to maintain ties with their kin in preparation for making parental investment into their offspring. In contrast, even in the EEA, some women and families were materially better off than

others, and some women were "married" while the husbands of others have either died or left them. Thus the human brain, adapted to the EEA, can make the facultative decisions such as "if you're poor, rely on your kin; if you are rich, do not rely on your kin" or "if you do not have a mate present, rely on your kin; if you have a mate present, do not rely on your kin."

DISCUSSION

In this paper I have argued that evolutionary psychology can provide an explanation for the origins of social structures and networks. I have constructed one evolutionary psychological explanation for why women have more kin in their personal networks than men, and have tested two hypotheses drawn from the explanation with the 1985 Social Networks module of the General Social Survey. The data provide support for the view that women maintain strong ties to their kin because they may need help in their parental investment into the offspring. Both total family income and being currently married have significantly negative effects on kin density of women's personal networks, while they have no significant effects in men's personal networks.

The case for evolutionary psychology's utility for structuralism and network theory is far from solid, however, and I will need to subject more evolutionary psychological theories of the origins of social structures to rigorous empirical tests. Unfortunately, it is impossible to demonstrate the empirical validity of such theories with the current networks data. They simply do not make fine enough distinctions among kin to test further evolutionary psychological hypotheses. All existing networks data recognize very rough categories of kin. For instance, the 1985 Social Networks module of the General Social Survey, which I use in this paper, only recognizes parents, siblings, children, and other family members as categories of kin. The 1986 ISSP module on Social Support and Networks does slightly better and recognizes mothers, fathers, sisters, brothers, daughters, sons, grandparents, grandchildren, aunts and uncles (one category), and other relatives. This is understandable since, without being informed by modern evolutionary psychology, it is natural for social scientists to assume that all grandparents are the same and aunts and uncles are the same.

From the perspective of evolutionary psychology, however, even the fine distinctions among kin that the 1986 ISSP module on Social Support and Networks makes are not sufficient to test its hypotheses. For instance, one would need to know whether the grandparents are maternal grandmother,

maternal grandfather, paternal grandmother, or paternal grandfather. We would also need to know whether the aunts and uncles are maternal or paternal. These minute distinctions make a difference for an evolutionary psychological theory of kin networks.

For example, the four grandparents are very different from the evolutionary psychological perspective. Maternal grandmothers, being the mother of the mother of the grandchildren, are certain to be genetically related to them, because there are no men (and thus paternity uncertainty) involved in that branch of the family tree. Both maternal grandfathers and paternal grandmothers have one male link, and therefore one possibility of cuckoldry and of not being related to the grandchildren. Paternal grandfathers, on the other hand, have two male links and therefore two possibilities of cuckoldry and of not being related to the grandchildren. Therefore, in terms of the possibility of being related to the grandchildren, the following relationship holds: maternal grandmother > maternal grandfather = paternal grandmother > paternal grandfather. There is evidence that the amount of grief that grandparents experience after the death of a child follows this precise pattern: Maternal grandmothers mourn more than either maternal grandfathers or paternal grandmothers, who in turn mourn more than paternal grandfathers (Littlefield & Rushton, 1986). I would therefore predict that, of the four grandparents, women are most likely to have maternal grandmothers in their personal networks, followed by maternal grandfather and paternal grandmother, and women are least likely to have paternal grandfather in their personal networks. What is significant about this prediction is that one would be able to adjudicate between evolutionary psychological explanation of women's kincentric networks and that based on pure homophily, because the latter would predict that women are more likely to have either maternal or paternal grandmothers in their personal networks than either maternal or paternal grandfathers.

A similar empirical test is possible with respect to aunts and uncles, or nieces and nephews. An evolutionary psychological explanation would predict that women are more likely to have maternal aunts and uncles, and maternal nieces and nephews, in their personal networks than their paternal counterparts. An explanation based on homophily would predict that women are more likely to have aunts and nieces on either side in their personal networks than uncles and nephews on either side. Of course, these empirical tests are currently impossible to conduct because there exist no networks data that make such fine distinctions among kin. I call for network theorists and researchers to take evolutionary psychology seriously, and collect personal network data that make finer distinctions among kin.

NOTES

1. I owe this insight to Heather A. Haveman.

2. Carley (1991) argues that individuals who share the same information are more likely to interact with each other than people who do not share the same information. "Individuals may be more "comfortable" interacting with someone with whom they have much in common, individuals may avoid "costs" because information exchanges may be more efficient between similar individuals, or individuals may acquire "rewards" because common knowledge may produce more opportunities for interaction" (p. 334). Given the empirical fact of strong homophily on sex and ethnicity, however, Carley must explain how and why individuals of the same sex or ethnicity come to possess the same information in the first place, *prior to* and *in the absence of* homophilous interaction.

3. I owe this insight to Eliana Friedman Hechter.

4. Of course, a more damning criticism of Mark's (1998b) study is that it really does not test a structural theory of musical taste acquisition. All he demonstrates is that different types of music have different niches, defined by the modal characteristics of their fans, and those who are in the niche are more likely to develop a taste for the music than those who are outside it (the niche hypothesis), and those who are inside the niche, even when they are not fans, are more likely to know about the music than those who are outside the niche (the familiarity hypothesis). (Mark does derive and test other hypotheses from his theory, however.) From these empirical patterns, Mark concludes that individuals acquire their musical tastes from others through homophilous network ties. However, this conclusion is not at all necessary. Perhaps a deliberately absurd example will help make my point.

If I plot the age distribution of women who are diagnosed with breast cancer, I will probably get a unimodal distribution, with the modal age around 50. I will thus define "the niche" for breast cancer as women between the ages of 45 and 55. I will then demonstrate that actors who are in the niche (for instance, a 47-year-old woman) are statistically more likely to have breast cancer than those who are outside the niche (a 21-year-old woman), supporting the niche hypothesis of breast cancer acquisition. Because personal networks are homophilous, middle-aged women are likely to have other middle-aged women as friends, and young women are likely to have other young women as friends. Then those who are in the niche, even when they don't have breast cancer themselves, are more likely to know someone who does than those who are outside the niche, supporting the familiarity hypothesis of breast cancer acquisition. I have therefore demonstrated that women acquire breast cancer through their homophilous ties to others in their networks.

I concur with Hofstadter (Forthcoming), Orians and Heerwagen (1992), Thornhill (1998), and Wilson (1998, Chapter 10) that what we find esthetically pleasing in art, literature, and music has evolutionary psychological origins and can be explained by neuroscience. It would therefore be not at all be surprising if our tastes in music, and how they change over time, have an evolutionary psychological basis. If most of us become politically less liberal and more conservative as we age, and if this lifecourse pattern has evolutionary causes (Kanazawa, 2001), it would be equally plausible that we like loud music (or music that our parents hate) when we are young and quiet music (or music that our parents like) when we are old for the same reasons.

5. A gene that predisposes men toward homosexuality has been located at Xq28 (X chromosome, arm q, location 28), even though the gene itself has not been identified (Hamer et al., 1993). The same location, however, does not seem to influence women's sexual orientation (Hu et al., 1995). Given that women's sexual orientation tends to be more flexible than men's, it is entirely possible that no such genes exist for women (Blum, 1997, pp. 127–157).

6. I agree with Blau (1977b, p. 28, emphases added) wholeheartedly: "Of course, there can be no doubt that technological and economic conditions, *cultural values*, and *psychological motives* influence human behavior and hence social relations. This is not at issue. Granted the existence of these influences, the question raised is what independent influences the structure of social positions in a society or community exerts on social relations".

7. For instance, Mark's (1998a) theory of information and social structure can explain the emergence of social structures from undifferentiated systems. One of the integral assumptions of his model, however, is the similarity assumption: "Individuals with similar information are more likely to interact than are individuals with dissimilar information" (Mark, 1998a, p. 312). In other words, individuals in his model must: a) be different in the information they possess; b) be able to differentiate others on the basis of the information they possess; and c) act on this differentiation.

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