

THE FUNCTION OF MENSTRUAL TABOOS AMONG THE DOGON

Defense against Cuckoldry?

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Menstrual taboos are nearly ubiquitous and assume parallel forms in geographically distant populations, yet their function has baffled researchers for decades. This paper proposes that menstrual taboos are anticuckoldry tactics. By signaling menstruation, they may advertise female reproductive status to husbands, affines, and other observers. Females may therefore have difficulty in obfuscating the timing of the onset of pregnancy. This may have three consequences: (a) males are better able to assess their probabilities of paternity and to direct their parental investment toward genetic offspring; (b) adulterous pregnancies are more easily detected and penalized, enhancing sexual fidelity; and (c) males avoid marrying pregnant females by relying on menstruation as evidence of nonpregnancy. This hypothesis is tested with 29 months of field data on menstrual taboos among the Dogon of Mali. Key results include the following: (a) cuckoldry is a major Dogon concern, (b) menstrual huts advertise female reproductive status, (c) husbands impose the taboos upon their wives, (d) female defiance of the taboos is undetectable and probably rare, and (e) informants think that the taboos help husbands and patrilineages to avoid cuckoldry. Thus the anti-cuckoldry hypothesis provides helpful insight into the menstrual taboos of the Dogon and should be tested among other populations.

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Menstrual taboos are sufficiently widespread that they nearly qualify as a cultural universal. In the 186 societies that comprise the Standard Cross-Cultural Sample of Murdock and White (1969), the following menstrual taboos are among the most frequent: (a) the prohibition of sexual intercourse; (b) the requirement that husband and wife sleep apart; (c) the precept that a wife must not cook for her husband; (d) the exclusion of women from sacred places or activities; (e) the prohibition of particular labors in fields, gardens, or cattle corrals; (f) the prohibition of contact with male items, such as hunting gear and weaponry; (g) the segregation of women in a special hut; (h) restrictions on what a woman may eat or when she may wash; and (i) the requirement that a woman dress or adorn herself in a particular manner (Strassmann, unpublished data; see also Paige and Paige 1981:211; Stephens 1961; Young and Bacdayan 1965). These customs may be defined as rules, backed up by supernatural punishments, that govern a woman's behavior during her periodic menses. A girl may be subject to many taboos during her menarcheal ceremony, but I follow the precedent of previous investigators (e.g., Young and Bacdayan 1965) in restricting the definition of "menstrual taboo" to customs pertaining to the subsequent menses.

Although menstrual taboos are found in the vast majority of human societies, the function of these customs remains poorly understood. Cultural anthropologists have generated numerous hypotheses, but none has gained wide acceptance (e.g., Buckley and Gottlieb 1988; Douglas 1975:61–64; Ford 1945:12–13; Kitahara 1982; March 1980; Nunley 1981; Paige and Paige 1981:228–231; Sanday 1981:105–106; Schlegel 1972:93; Stephens 1961; Young 1965:155; Young and Bacdayan 1965). Perhaps one reason why the function of menstrual taboos has remained obscure is that anthropologists have paid scant attention to the fact that menstrual taboos publicize a reproductive phenomenon. Although menstrual taboos are concerned with a reproductive event, they have also eluded explication by biologists. For example, Alexander (1979:167) included menstrual taboos in a list of customs, discussed by Murdock (1949:266), which appear inconsistent with evolutionary theory.

In this paper I present a novel evolutionary hypothesis on the origin and persistence of menstrual taboos. I test this hypothesis with data obtained during a field study (February 1986 to August 1988) of menstrual taboos and menstrual cycling among the Dogon of Mali, West Africa. Previous hypotheses have been tested almost exclusively through cross-cultural research in the library rather than through direct observation in the field (see Buckley and Gottlieb 1988:12). The results reported here thus provide the first quantitative field data on menstrual taboos, including the segregation of women in menstrual huts. Before presenting my own study, I will first review previous hypotheses. These

hypotheses draw on a variety of anthropological traditions, none of which employs an evolutionary perspective. Because these hypotheses are too numerous to permit a comprehensive analysis, I will restrict this review to the most salient arguments.

PREVIOUS HYPOTHESES

Menotoxins

A hygienic explanation for menstrual taboos traces these customs to the possibility that intercourse with a menstruating woman exposes a man to urethritis-causing bacteria and the risk of infection to open wounds (Ford 1945:12–13). A related hypothesis is that the menstrual discharge contains bacterial “menotoxins” that are harmful to living tissues (Macht and Davis 1934; Montagu 1940; Schick 1920). The proposed “menotoxins,” however, have not been isolated. The evidence points to surprisingly little cyclical variation in the vaginal bacterial flora (Wilks and Tabaqchali 1987). Another problem with microbial arguments is that they do not explain the widespread belief that such items as fields, sacred areas, and weapons are vulnerable to menstrual pollution (Buckley and Gottlieb 1988:18–20).

Castration Anxiety

Stephens (1961) offers the Freudian view that menstrual taboos reflect male castration anxiety, which is provoked by “genital bleeding.” He concludes that the childrearing conditions that generate castration anxiety are a strong cross-cultural predictor of the extensiveness of menstrual taboos. Paige and Paige (1981:242–243), however, report that Stephens’s correlation all but disappears when they correct for methodological problems, such as sampling bias.

Hunting

Several investigators have suggested that menstrual taboos may have served the original purpose of preventing menstrual odor from interfering with human hunting activities (Kitahara 1982; March 1980; Nunley 1981). One problem with this hypothesis is that menstrual taboos are found in a majority of human societies in cross-cultural samples, whereas hunting is a major form of subsistence in a minority of societies (Buckley and Gottlieb 1988:22).

Dilemma of a Wife's Fertility

Paige and Paige (1981:209–254) interpret periodic menstrual bleeding as evidence that a woman remains fertile (i.e., has not yet reached menopause). A woman's continuing fertility, according to Paige and Paige (1981:214, 216), threatens both her own and her husband's kin, who fear that extra children may enhance the husband's political power at their expense. Paige and Paige (1981:229) suggest that a husband therefore sends his menstruating wife to the menstrual hut as a gesture of making her available to adulterers. This gesture, they argue, is a tactic of ritual disinterest in her capacity to procreate, which helps him to consolidate his political power. This hypothesis hinges on the doubtful assumption that people feel threatened by, rather than pleased with, the fertility of their daughters and daughters-in-law.

Male Dominance

Young and Bacdayan (1965) propose that menstrual taboos are a form of institutionalized discrimination against women. They predict that these customs should be found where males are dominant and tightly organized. This prediction suggests that menstrual taboos should be associated with patrilineal descent and patrilocal residence. I tested this prediction for the standard sample societies (Murdock and White 1969). The results provide no evidence for an association between the system of descent (patrilineal, matrilineal, or bilateral) and the conspicuousness of menstrual taboos ($\chi^2 = 2.23$, $df = 2$, $n = 164$, $p > 0.33$).¹ Indeed, two of the most conspicuous menstrual taboos (the segregation of women in menstrual huts and the adornment of a menstruating woman—e.g., painting her face red) are more common than expected in societies with matrilineal or bilateral descent ($\chi^2 = 7.03$, $df = 2$, $n = 164$, $p < 0.05$). The conspicuousness of menstrual taboos has a statistically nonsignificant association with matrilineal or uxori-local residence ($\chi^2 = 3.46$, $df = 1$, $n = 142$, $p > 0.06$). Moreover, societies with matrilineal or uxori-local residence are significantly more likely to have menstrual huts or menstrual adornment ($\chi^2 = 8.23$, $df = 1$, $n = 142$, $p < 0.01$). These results contradict the prediction that menstrual taboos are more prevalent in patrilineal, patrilocal societies.

Douglas (1975:62) and Young (1965:155) suggest that belief in menstrual pollution is a male tactic for dominating women. This hypothesis does not explain why menstrual taboos were particularly onerous in native North American populations in which women enjoyed comparatively high status (Spier 1930:315). Nor does it explain the results of cross-cultural studies which suggest that female status is unrelated to

the prevalence of menstrual taboos (Sanday 1981:105–106; Schlegel 1972:93). Perhaps the predictive power of the male dominance hypothesis can be extended, if the *purpose* of male dominance behavior is identified. Sexual selection theory (Darwin 1871) suggests that in humans as in other organisms, male dominance behavior (a) secures matings and (b) promotes confidence of paternity. The latter function is central to my own hypothesis.

Social Control

Douglas (1975:61–64) proposes that “menstruation rites” are a tool for coercing people to respect social distinctions and duties. She gives four examples of how this tool might be used: (a) to assert male superiority, (b) to assert separate male and female social spheres, (c) to attack a rival, and (d) to lay claim to a special relation. Although descriptive case studies reported by Douglas support her view that “danger beliefs” have a manipulative function, only the first of her four specific suggestions has been tested quantitatively (see above).

THE ANTICUCKOLDRY HYPOTHESIS

As an alternative to the above hypotheses, I propose that the function of menstrual taboos is to coerce women to signal their menstruations so husbands, affines, and other interested parties can monitor their reproductive status. This monitoring may help males to avoid cuckoldry by making it harder for females to deceive them about their probabilities of paternity.

Menstrual Taboos May Signal Menstruation

In setting forth this hypothesis, I begin with the proposition that menstrual taboos may signal menstruation. They may either require a woman to do something particular when she is menstruating that she would not ordinarily do at other times, or they may forbid her from pursuing customary activities so her absence from these activities is conspicuous. For example, among the Timbira of South America, a menstruating woman wore a red hip cord as a “badge” (Nimuendaju 1946:121). Thus, a Timbira woman wore a sign which meant “I am menstruating,” and this sign was probably obvious to anyone who could see her. The segregation of women in menstrual huts may also be

highly public (Paige and Paige 1981:213)—particularly if the hut is conspicuous in design and location.

Numerous other taboos are more subtle but might still signal menstruation to a target individual, such as a husband. Among the Fon of West Africa, a particular room in the family compound was reserved for the menstruating women of the household. During menstruation, a Fon woman was forbidden from cooking for her husband (Herskovits 1938:287–288)—a change in the daily routine that he was sure to notice. Even the ban on intercourse, which is one of the most private of menstrual taboos, may have a signaling function. Among the Micmac of North America, it was believed that a man who had sexual contact with a menstruating woman would be unable to walk. This belief may have been the pretext for a rule that forced married women to inform their husbands of the onset of menstruation (Wallis and Wallis 1955:244–245).

In Murdock and White's (1969) standard sample, I found that 71% of societies ($n = 132$) had taboos that may have advertised menstruation only to the husband and immediate family or, in a few cases, lacked menstrual taboos altogether.² Twenty-nine percent of societies ($n = 54$) had conspicuous taboos, of which 57% ($n = 31$) had menstrual huts or menstrual adornment.

Menstruation May Reveal Female Reproductive Status

To understand why it might be important to know when a woman is menstruating, it is helpful to recognize that menstrual taboos arose in natural fertility populations. This term refers to noncontracepting populations in which women do not attempt to cease child-bearing when they have reached a target family size (Henry 1961; Leridon 1977:17, 120). In these populations, women spend most of their reproductive years pregnant or in postpartum amenorrhea (Short 1976). For example, Dogon women aged 20 through 34 years spent an average of only 15% of the time in menstrual cycling over a 2-year period. They spent 29% of the time pregnant and 56% in postpartum amenorrhea (Figure 1).

I propose that, in a natural fertility population, menstrual taboos advertise female reproductive status to any individuals who witness a woman's menstrual observances. To these onlookers, the timing of the resumption of menses after postpartum amenorrhea, and the approximate onset of pregnancy—as indicated by the cessation of menses, should become evident. The brief windows when a woman is cycling also should become conspicuous. The advertisement of female reproductive status may have three important consequences.

First, it may advertise a woman's entry into the most fecundable stage

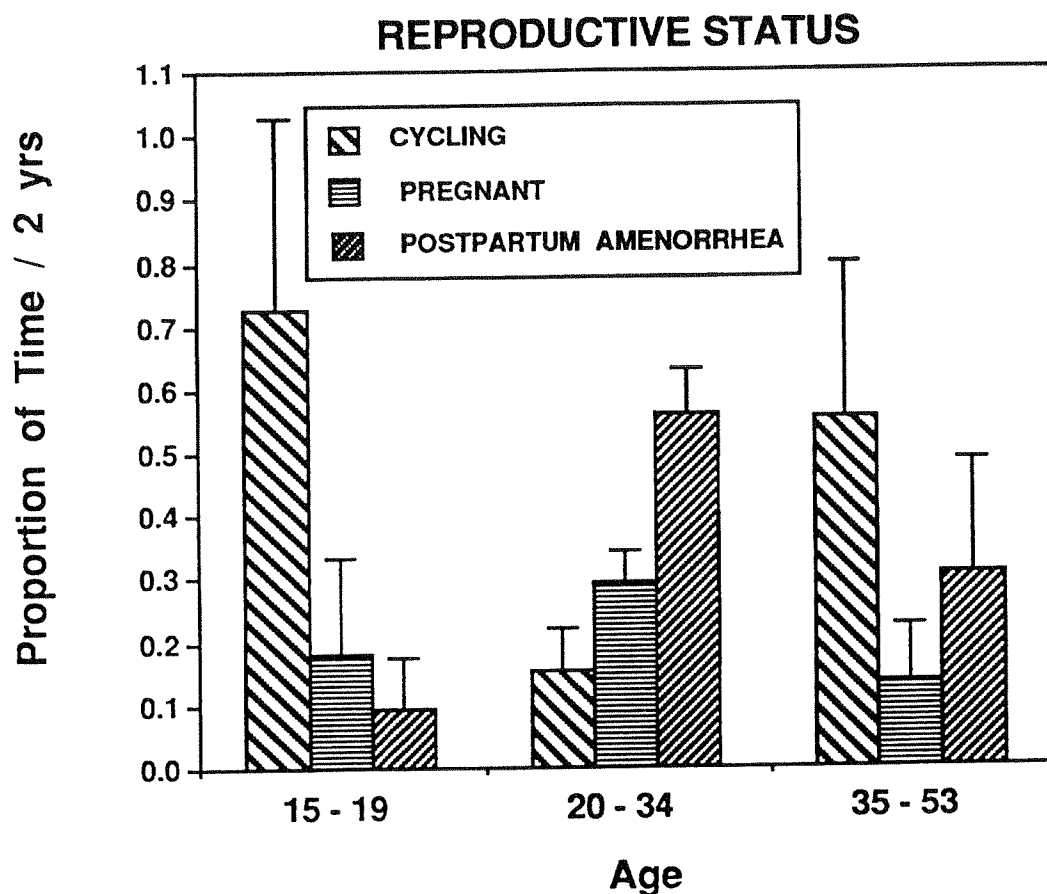


Figure 1. Variation in reproductive status with age between menarche and menopause, $n = 66$ (women not resident throughout the study or not exposed to the risk of conception because of infertility, spousal separation, or divorce are excluded). Women aged 20 through 34 had 80% of all recognized pregnancies. Bars are means; extensions show 95% confidence limits.

of the interbirth interval. This argument assumes that, although people probably do not know the correct timing of ovulation within the menstrual cycle, they do know that conception is more likely to occur during cycling than during postpartum amenorrhea or pregnancy. I base this assumption on ethnographic reports suggesting that people correctly interpret both prolonged cycling that does not result in pregnancy and prolonged amenorrhea as symptoms of infertility (e.g., Calame-Griaule 1965:163, 234; Dole 1974:13; Leakey 1977:512, 1162; Pilsudski 1910:772).

Second, by flagging menstruation, menstrual taboos may advertise nonpregnancy. Alexander (1979:167) has suggested that signaling nonpregnancy may be the function of the unusually copious menstrual flow of human females. Regardless of whether advertisement of nonpregnancy is an evolved function of menstruation, it is clear that menstruation is sound evidence of nonpregnancy (see Johnson and Everitt

1988:252–253). Thus, taboos that call attention to a woman's menstruation identify her as nonpregnant.

Third, because a pregnant woman stops observing menstrual taboos, the conspicuous cessation of these observances may advertise pregnancy. This consequence should be especially important early in gestation before other signs of pregnancy are available. Thus menstrual taboos may make it possible to detect the possibility of pregnancy as soon as one or two menstrual periods have been missed. In the absence of menstrual taboos, it could be difficult to determine whether a woman is pregnant, cycling, or amenorrheic. This argument assumes that people connect the cessation of menses with the onset of pregnancy. This connection requires observation of the natural order of events in the human reproductive cycle that begins and culminates with a birth. The intermediate stages of postpartum amenorrhea, menstrual cycling, and pregnancy occur in a regular order that does not appear to escape notice (e.g., Calame-Griaule 1965:234; Dorsey 1884:263; Leakey 1977:512; Seligman and Seligman 1911:101).

Monitoring Female Reproductive Status May Help Males to Avoid Cuckoldry

Starting from the hypothesis that menstrual taboos reveal female reproductive status (especially the fecund waiting time to conception, nonpregnancy, and the onset of pregnancy), one could generate multiple evolutionary hypotheses regarding how this information is used. I propose the specific hypothesis that knowledge of female reproductive status helps males to avoid cuckoldry. I define cuckoldry as the fitness cost of *investing* in a genetically unrelated offspring. If a woman's adultery does not lead to pregnancy, or if her husband does not invest in the offspring of her lover, then cuckoldry does not result. In species with paternal care, natural selection is expected to have favored male tactics for resisting cuckoldry (Trivers 1972). In humans, these tactics should be particularly well developed because paternal care is extensive.

Using genetic markers, Sing et al. (1971) have shown that it is possible to estimate the incidence of discrepancies between stated and genetic paternity in human populations. These discrepancies provide a rough estimate of the incidence of cuckoldry; however, too few studies have been published to permit any generalizations for the human species as a whole. Nonetheless, fear of cuckoldry is an age-long theme (e.g., Hiatt 1989; Molière 1971) that recurs throughout the ethnographic record (for reviews, see Daly and Wilson 1983:290–291; Dickemann 1981).

To develop the hypothesis that knowledge of female reproductive status helps males to avoid cuckoldry, I will consider the significance of

menstrual taboos for the husband, the patrilineage, the matrilineage, and the woman herself. These four perspectives are not mutually exclusive—each provides a component of the hypothesis.

The Husband

Assessing Paternity? In humans, confidence of paternity is at the heart of a major conflict of interest between the sexes. Females may often benefit from deceiving males about their probabilities of paternity, whereas males may benefit from discovering such deception. In this conflict, no physiological event may have greater significance than menstruation. Menstruation is the best indicator of the timing of the onset of pregnancy. When females control this knowledge, they retain an important advantage.

By subjecting females to menstrual taboos, males may force them to relinquish this advantage. Wives who obey menstrual taboos may be less able to deceive their husbands about the timing of menstruation. Of course, knowledge of menstruation does not guarantee an accurate assessment of paternity. Since paternity assessments are always based on circumstantial evidence, however, husbands may have no better alternative than to seize the information that is available.

An example may help to illustrate this argument. Imagine that a woman who has recently been unfaithful to her husband has become pregnant. Clearly, her husband is at risk for cuckoldry. He may or may not be responsible for the pregnancy, and the opinion of his wife cannot be trusted. If, however, the adultery was separated from the pregnancy by at least one menstrual period, then the husband can dismiss his fear of cuckoldry. Because menstrual taboos help to define the timing of the onset of pregnancy, they may assist the husband in evaluating his likelihood of paternity. Although he can never establish his paternity with certainty, by monitoring his wife's reproductive status he may at least reduce his uncertainty.

To assess his likelihood of paternity, a husband may couple whatever knowledge he has of his wife's romances with information about the timing of menstruation—as revealed by menstrual taboos. If he deduces that he is at risk for cuckoldry, he may take preventive action. For example, he may divorce his pregnant wife or refuse to invest in the child unless it bears a resemblance to himself. Among the Mende of Sierra Leone, the child may be vulnerable to a still worse fate. According to Harris and Sawyerr (1968:143), "In olden times, a child born as a result of an adulterous union, was promptly destroyed, usually on the evidence of his features."

It might be assumed that, despite female deception, husbands can

reliably detect menstruation without the help of taboos. In a natural fertility population, however, consistent detection of menstruation may be difficult. One reason is that menstruation is a rare event. For example, Dogon women ($n = 39$) aged 20 through 34 years had a median of only two menses each during my 2-year study (Figure 2).

Monitoring a wife's menses is made more difficult by the unpredictability of menstruation. Variation in cycle length both within and between women is the rule rather than the exception—even in women of good health (Treloar et al. 1967; Vollman 1977:15–72). This normal variation in cycle length is augmented by pregnancy and early fetal loss. In a hormonal study of noncontracepting women in the United States, 31% of all pregnancies ended in fetal loss, and 69% of these losses occurred before the pregnancy had been clinically detected (Wilcox et al. 1988).

In many societies, husbands and wives tend to work, eat, and socialize in same-sex groups. Hence opportunities to detect menstruation may be limited by the segregation of the sexes. A husband could potentially discover his wife's menses through sexual intercourse. The likelihood of such discoveries would depend, in part, on coital frequencies. In polygynous families a husband rotates between multiple wives (Calame-Griaule 1965:331), so coital frequencies with each woman might not be adequate to reveal menstruation. A menstrual flow of short duration, such as the 3-day flow reported for the Lese of Zaire (Bentley et al. 1990), might also make detection difficult. If these obstacles are combined with clothing and hygienic practices that further conceal menstruation, husbands may be unable to monitor the menstruations of their wives.

If, however, a woman respects a taboo that signals her menstruations to her husband, then consistent detection may become less difficult. Thus menstrual taboos may institutionalize the requirement that wives notify their husbands of menstruation. Husbands may gain automatic knowledge of the timing of menstruation, and access to this crucial information is no longer left to happenstance.

Detering Adultery? If menstrual taboos help husbands to assess paternity, they may increase the potential cost of adultery for cycling women and their lovers. If caught, a woman might face loss of a mate, if her husband rejects her; loss of paternal investment; wasted maternal investment, if a child is killed or suffers the stigma of illegitimacy; elevated adultery penalties; and so forth. Her lover might also risk paying steep adultery damages and other penalties. These costs may help to deter adultery under some circumstances.

In testing this possibility, it is important to control for other factors that also determine the incidence of adultery. One of these factors is the system of descent. In matrilineal societies, adultery may be common because divorce is not a major threat to a woman's social and economic

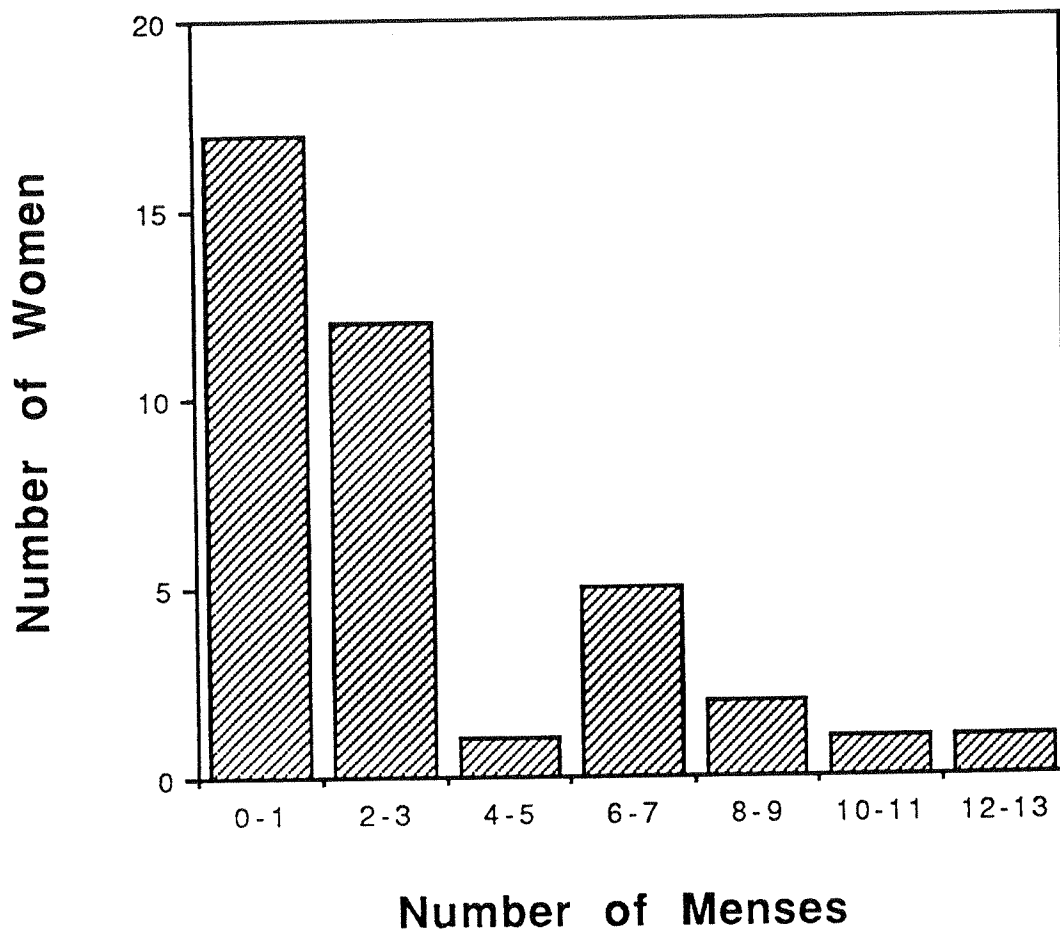


Figure 2. The number of menses for women aged 20–34 years over a 2-year interval, $n = 39$ (women not resident throughout the study or not exposed to the risk of conception because of infertility, spousal separation, or divorce are excluded).

standing (see Flinn 1981; Fortes 1950:283; Gaulin and Schlegel 1980; Hartung 1985; Kurland 1979:159–161).

Moreover, if menstrual taboos help to prevent cuckoldry, they may be less important when the risk of cuckoldry is contained through other means. They may be *more* important when the risk of cuckoldry is *not* contained through other means. Thus, positive feedback may occur in two directions between the prevalence of adultery and the prevalence of menstrual taboos. Whether the forward or the backward arrow is stronger is hard to predict. If the taboos are minimally effective, then adultery may remain common despite the taboos; however, it might be less common than it would have been in their absence.

Avoiding Marriage to a Pregnant Woman? Thus far I have discussed cuckoldry that results from adultery, but cuckoldry could also result

from marrying a pregnant bride. When remarriage follows quickly upon divorce, or is preceded by a period of sexual freedom, a woman may bring into her next marriage a fetus from a previous husband or lover. This fetus might not be welcomed. For example, among the Tikopia of the South Pacific, when a man married a pregnant woman the baby was usually killed (Firth 1936:528). The advertisement of menstruation could overcome this problem by enabling men to marry women immediately after menstruation. When few available women are virgins, proof of menstruation as a condition for marriage could become more important than proof of chastity.

When a man marries a woman who has recently menstruated, he not only reduces his risk of cuckoldry, he also may increase his chances of marrying a readily fecundable woman. Because avoiding cuckoldry and marrying a readily fecundable woman may be simultaneous advantages of marrying a cycling woman, it is difficult to determine which benefit is more important. Nonetheless, the cost of cuckoldry may be greater than the cost of having to wait a few months before one's wife can conceive. The wait might well be worthwhile since it would gain for the husband the assistance of a productive laborer—while it reduced the likelihood that the woman might marry someone else instead.

The Patrilineage

Cuckoldry is not necessarily something to which only a husband is vulnerable. An entire patrilineage is cuckolded if the descendants of an unrelated male, who has cuckolded a patrilineage member, gain access to the resources shared by the entire patrilineage. The cost of this type of cuckoldry is particularly great when an important heritable resource (e.g., land) is owned jointly. Then the cost is not only borne by the entire patrilineage, it is perpetuated over many generations. Consequently, patrilineage members are expected to have an interest in safeguarding each other from cuckoldry.

Menstrual taboos that signal menstruation to an entire patrilineage, rather than to the husband alone, may enable patrilineages to help their members to avoid cuckoldry. As long as members of the same patrilineage do not cuckold each other, there should be no conflict between the interests of the patrilineage as a whole and those of the individual members who comprise it. Under these circumstances, a menstrual taboo that reduces the risk of cuckoldry for a patrilineage should also reduce a husband's cuckoldry risk (and vice versa). The defenses that might help a patrilineage to avoid cuckoldry are the same as those discussed above for husbands: assessing paternity, deterring adultery, and requiring prospective wives of lineage members to be demonstrably

cycling. When an entire patrilineage is able to marshal one or more of these defenses, greater success might be achieved than when the full burden of defense rests on the husband.

The Matrilineage

The anticuckoldry hypothesis does not require patrilineal descent or patrilocal residence. Matrilineal, matrilineal societies are predisposed to a high frequency of divorce and adultery (see Flinn 1981; Gaulin and Schlegel 1980; Hartung 1985; Kurland 1979:159–161), which might make menstrual taboos particularly useful. Nonetheless, patterns of parental investment are different in matrilineal as opposed to patrilineal societies, so some differences in the functioning of menstrual taboos are expected.

In a matrilineal society, individuals belong to the lineage of their mothers, not their fathers. Since adultery does not bring unrelated individuals into the lineage, the man who mistakes his paternity may bear the full cost of cuckoldry. Other members of his matrilineage may be unaffected. This argument suggests that a matrilineage should be less concerned with the paternal certainty of its members than a patrilineage. Hence a matrilineage may be less interested in imposing menstrual taboos on the wives of its members than a patrilineage.

In a matrilineal society, however, men may be more interested in imposing menstrual taboos on their sisters. If a woman's husband is unconvinced of his paternity, her brother may be forced to become the provider for her child. Depending on her brother's circumstances, including his own confidence of paternity, investment in his wife's child might be more advantageous than investment in his sister's child (Gaulin and Schegel 1980; Hartung 1985; Kurland 1979:163–167). Thus, in a matrilineal society, a woman's brother may want to promote the paternal certainty of his sister's husband. By imposing menstrual taboos on his sister, he may sometimes shift part of the burden of economic investment onto her husband. Her husband may be willing and able to invest, but only if he is convinced of his paternity. This argument suggests that in regard to his sister's sexual fidelity, a brother may have a confluence of interest with his sister's husband.

The Female Perspective

To evaluate the significance of menstrual taboos for females, it is helpful to begin with the phenomenon of menstruation itself. If menstruation is functional, then it must serve female interests. If it hindered

female interests, then it could not have evolved by natural selection. Similarly, any signal that evolved by *natural selection* must have evolved because of its benefits for the signaler (see Krebs and Dawkins 1984). Signals that evolved by *cultural selection*, however, may have been perpetuated because of benefits for the recipient.

Culturally evolved signals, such as menstrual taboos, may take the form of rules of conduct. These rules of conduct may be subject to the following generalizations: those in positions of power should have greater leverage for promoting rules that serve their own interests, and those who are disadvantaged by the rules are expected to resist them when the cost of resistance is low. This resistance may involve counter-manipulation and subterfuge. Thus, menstrual observances may be signals, but they do not necessarily serve the interests of the females who do the signaling. I propose that the primary benefits of menstrual taboos go to males (a woman's husband, his patrilineage, or her brothers). According to this argument, males impose the taboos on females, and females do not embrace the taboos voluntarily; however, females may help males to impose menstrual taboos on *other* females. Female enforcers are expected to target their social competitors and the wives of their male kin. If the taboos do not serve the interests of the females who obey them, then why are females willing to respect these customs?

Social Reprisals? One possibility is that females are forced to respect the taboos by a broad variety of punishments—beatings, accusations, social humiliation—that follow disobedience. Loss of paternal care could be one of these reprisals. According to this argument, women do *not* find it inherently advantageous to respect the taboos, but they find it costly to disobey them except when the risk of detection is low.

Supernatural Sanctions? Because menstrual taboos are rules of conduct during menstruation that are coupled with *supernatural punishment* for noncompliance, these sanctions may help to impose the taboos. Menstrual rules requiring women to signal their menstruations, but enforced only by social reprisals, may be less effective and, therefore, not widely imitated or perpetuated. Thus, supernatural sanctions may be important both for the enforcement as well as for the cultural transmission of menstrual taboos. Supernatural penalties are especially powerful because any woman who believes in these penalties is bereft of the possibility that her infractions might escape detection. Any time she violates a taboo, her punishment will follow automatically.

Not all westerners are familiar with the power of supernatural threats as tools for manipulating behavior; however, belief in the power of a taboo is little different from belief in divine punishment for a violation of the Ten Commandments. It is also analogous to the belief that violating

these commandments is *inherently* immoral because this belief makes a violator automatically culpable. Detection is unnecessary. The seventh commandment, which forbids adultery (Deuteronomy 5:18), may help to protect confidence of paternity and thus may be functionally similar to menstrual taboos. This commandment, or the Judeo-Christian ideology of which it is a part, may have been a significant curb on sexual infidelity in some societies (see MacDonald 1989).

Paternal Care? Alternatively, it could be argued that respect for menstrual taboos is a female strategy for securing paternal care. Unlike the previous suggestions, this argument proposes that females have an incentive for promoting the taboos. This argument is incompatible with the expectation that the taboos make it harder for a woman to deceive her husband about his probability of paternity. He has the same information that she has about the timing of menstruation. Whenever cuckoldry is a risk, he should *withhold*, not enhance, paternal investment.

To prevent loss of investment, women might have to forego adultery. This abstention seems more likely to accommodate their husbands' interests than their own. Otherwise women would not be expected to be adulterous in the first place, and menstrual taboos would be unnecessary.

Similarly, if the taboos make it harder to conceal a pregnancy from a previous marriage, they may force women to remarry when cycling. This constraint might accommodate men by helping them to avoid the risk of marrying pregnant women. If it were never in women's interests to remarry when pregnant, then future husbands would have no need for proof of nonpregnancy.

These arguments suggest that the greater the disparity between male and female interests in regard to female sexual fidelity, the greater the potential advantages of menstrual taboos for males, and the greater the potential disadvantages for females. The interests of females, on average, might be better served by the concealment of menstruation, whereas those of males, on average, might be better served by the advertisement of menstruation. If this conclusion is correct, then it is unlikely that copious menstruation evolved for showiness.

Now imagine that women respect menstrual taboos faithfully when they have nothing to hide, and then fake menstruation (e.g., by going to the menstrual hut) when they are pregnant from adultery. If they follow the faked menstruation with an extended interlude of fidelity, then they might be able to fool their husbands into unawareness of the cuckoldry risk. If this tactic is successful, then it might enable women who respect the taboos to gain more paternal care despite adultery. These ploys might be successful on occasion; however, if they become widespread, they are likely to be discovered. Then husbands are expected to seek

better means of ensuring that menstrual taboos will be honest signals—or to cease relying on them altogether. Thus, although women may sometimes manipulate menstrual taboos to their own advantage, if this deception becomes prevalent, then husbands should no longer use menstrual taboos to assess paternity. Under these circumstances, if husbands were previously enforcing the taboos, then their incentive for further enforcement should disappear. Wherever women enforce menstrual taboos on their own behalf, husbands could hardly find them more credible than wives' verbal reports about the timing of menstruation. Therefore, any society in which menstrual taboos are commonly violated should be one in which menstrual taboos are losing their hypothesized function as anticuckoldry tactics—or vanishing altogether.

In summary, the anticuckoldry hypothesis suggests that menstrual taboos coerce women to reveal their menstruations, which helps husbands and patrilineages to avoid cuckoldry. The taboos may be enforced primarily by a woman's husband and her affines. If descent is matrilineal, however, her own brothers may participate in enforcement. Women are not expected to embrace the taboos voluntarily, but they may help males to impose the taboos on *other* women who are social competitors or wives of male kin. Fear of social reprisals and supernatural sanctions may be the primary reasons why women obey the taboos.

To test the anticuckoldry hypothesis, I turn to my field study of menstrual taboos and menstrual cycling among the Dogon of Mali, West Africa. This study is part of a broader investigation of human evolutionary ecology among the Dogon.

A TEST OF THE ANTICUCKOLDRY HYPOTHESIS

Ethnographic Background

The Dogon live in the Sahel in a region dominated by the Bandiagara Escarpment—a 260 km sandstone cliff (Desplagnes 1907:73–85; Huizinga et al. 1979). Their villages are permanent, nucleated settlements structured by agnatic kinship (Pern 1982:48–50). Residence is patrilocal (Paulme 1940:64, 263) and the marriage system is polygynous with no more than three cowives allowed simultaneously (Calame-Griaule 1965:325, 331; Cazes and Jacquard 1981; Paulme 1940:352–353). Contraception is absent, and in a sample of postreproductive women ($n = 45$), the total fertility rate was 8.6 ± 0.3 live births per woman. By age 12 months, 20% of all babies born alive ($N = 388$) had died and, by age 5

years, the mortality rate was 46% (Strassmann, unpublished data). The primary subsistence crop is millet, but onions may be grown for the cash needed to purchase millet when rains are poor (Bouju 1984:127, 161–173; Paulme 1940:134). The Dogon are among the African populations least influenced by Near Eastern or European culture. Many villages maintain animist traditions, such as masked dancing and ancestor worship, whereas neighboring peoples converted centuries ago to Islam (Paulme 1940:567–568; Pern 1982:28–29, 46).

Dogon Menstrual Taboos

The menstrual taboos of the Dogon have been extensively described (see especially Calame-Griaule 1965; Dieterlen 1941, 1947; Dieterlen and Calame-Griaule 1960; Griaule 1966; Paulme 1940). Unless otherwise indicated, the following account derives from my own field work and reports those customs still ongoing in the village of Sangui between 1986 and 1988. Sangui is one of the ten villages of Sanga. It is located on the plateau of the Bandiagara Escarpment at 14° 29' north latitude and 3° 19' west longitude.

When a Dogon woman menstruates, she is polluting or *puru*. She must sleep at a special hut called the *yapunune ginu* or *yapunduru*, which means "house of menstruating women." Her visit to this hut lasts a minimum of five nights, or even longer if her flow continues. If a man has sexual intercourse with a menstruating woman, the potency of his ancestral altars will be destroyed. These altars protect against such disasters as famine and illness. It is *dama* or taboo for menstruating women to walk the village streets or enter family compounds. Violations of this taboo also desecrate the altars. Men must not enter the menstrual hut and do not approach closer than 2 or 3 m to it.

The cooking vessels of menstruating women are contaminating, so between menses they are stored outside the village among rocks. A menstruating woman also uses special places for washing and elimination. At the end of her stay in the hut, she anoints her body with oil from the fruit of the *sa* tree (*Lannea acida*). She is thereby rid of menstrual impurity and ready for her next conception. The Dogon believe that a woman is most likely to conceive during her first act of intercourse after menstruation. They say that it is therefore especially important that her first sexual relations be with her husband.

Close to dawn each morning, menstruating women leave the hut to carry out their habitual work (except cooking or drawing water for their families). They continue whatever field work is in season, including collecting firewood, harvesting millet, or watering the onion gardens. They are exempt only from the minor seasonal task of pounding fresh

onions and rolling the wet mash. Menstruating women are supposed to extinguish their evening cooking fires by the appearance of the first star, known in Sangui as *yapunduru dja kaya guai*, or "menstruating women it's time to eat." This custom is not rigorously followed, and people are unsure of its origin. Perhaps it served to hide the village, or the menstruating women, since only the fires at the two menstrual huts can be seen from the surrounding bush.

The annual plastering of Dogon dwellings with wattle and daub, which seals them against the rain, is a male task. Because the menstrual huts are forbidden to men, the women of Sangui plaster the huts themselves. In other villages they are sometimes left unplastered. Traditionally, the menstrual huts were repaired by the *ine puru*, "impure men," who handled corpses and performed other polluting tasks (Calame-Griaule 1965:31, Dieterlen 1941:137; Paulme 1940:55, 268). Most sources agree that the *ine puru* built the menstrual huts (Calame-Griaule 1965:31, 241, 243; Dieterlen 1941:137; Palau-Marti 1957:32; cf. Paulme 1940:267). My informants, however, said that they did not know who built the huts because the construction occurred long before they were born.

When a new village is founded, writes Paulme (1940:267), the men's shade shelter is built first, then the menstrual hut, followed by the family house. Before work on the menstrual hut begins, the senior man of the assembly pours a little millet porridge on the site and says to the *Yeban* spirits: "We are going to build the menstrual hut. *Yeban*, protect this village, give us children, make this village important."

Infertile women who hope to have a child may place hooked sticks, called *domolo*, above the door of the hut. Moreover, according to Calame-Griaule (1965:241) and Paulme (1940:266–267), nude figures of men and women, with prominent sexual organs, are sometimes modeled in the clay of the external walls. These designs are intended to promote fertility (Paulme 1940:267).

Previous Interpretations

Although ethnographers describe the menstrual taboos of the Dogon in detail, they devote only a few words to the function of these customs. Paulme (1940:263) states that the fear inspired by menstruation is, by itself, adequate cause for the taboos. According to Dieterlen (1947), the Dogon believe that menstrual blood is impure because it failed to form a fetus, and therefore lacks *nyama* or vital force. Without further elaboration, she concludes: "These facts justify by themselves all the interdictions for menstruating women." In a psychoanalytic work, Parin et al. (1966) mention that the Dogon regard menstruation as the "direct intro-

duction to pregnancy," but they conclude that the function of the taboos is to protect men from castration fear. Griaule (1966:19–20, 137–138) reports the words of a blind elder, Ogotemmêli, who said that menstruation is a flow of bad blood caused by the primordial incest between the jackal and his mother, the Earth. This incestuous act defiled the Earth and incurred for women a monthly debt from which the only reprieve is pregnancy and lactation. The separation of menstruating women from the community, said Ogotemmêli, prevents contamination of the men and the altars.

Calame-Griaule (1965:234–235) does not propose a function for menstrual taboos, but her work suggests that the Dogon recognize the reproductive significance of menstruation:

The menstrual hut may be viewed as the refuge of wives who are afflicted and ashamed by their momentary infecundity, but it also shelters their great hopes of not returning the following month on account of pregnancy. The menstrual hut has multiple symbols of fertility. In addition to the image of a pregnant woman, one sees little *domolo* hung all around the roof by the men who built the house. These represent the birth of boys. Women set out round pots in hope of daughters. In effect, people always wish that menstruation, by ridding a woman of her bad speech, will permit her to conceive upon returning home.

In summary, ethnographers offer several interpretations of Dogon menstrual taboos, but they do not pursue these interpretations in detail. In the following sections, I will test my own interpretation: the anti-cuckoldry hypothesis.

Methods

The Sample. The sample is the total population of the village of Sangui between February 1986 and August 1988. In January of 1988, this village had 460 inhabitants who were members of 59 "work-eat groups," economic units in which the members cultivate the same millet fields and eat together from the harvests. These work-eat groups comprise four patrilineages.

Data Collection. On 736 consecutive nights, my research assistants and I censused the women at the two menstrual huts in Sangui. The census data include the date, the time, and the women's identification numbers. We also recorded births and known fetal losses over the course of the study. Using these data, I determined whether a woman was cycling, pregnant, or in postpartum amenorrhea on each of the 736 days of the study. Cycling was defined as the interval including the first day of the first postpartum menstruation through the first day of the last

menstruation before a recognized pregnancy. Pregnancy was defined as beginning on the second day of the last menstruation and including the day of birth or known fetal loss. Postpartum amenorrhea was defined as the interval from the day after birth or miscarriage through the day before the first postpartum menstruation. These definitions provide an objective means of delineating reproductive status based on observable events. Using the menstrual hut census, I also calculated the length of all menstrual cycles. A menstrual cycle was defined as beginning on the first day a woman went to the menstrual hut and ending the day before she next returned to the hut, provided a recognized pregnancy did not intervene.

I estimated the ages of all individuals from the Dogon system of age-classes. These age-classes are segregated by sex and encompass about two and a half years each. People keep track of birth order within age-classes, so it was possible to achieve excellent discrimination of relative age. To attach birthdates to my listing of people by relative age, I relied primarily on datable events.

Genealogical data for Sangui residents include information on parents, grandparents, and great-grandparents and were obtained from interviews of nearly all the adults of Sangui. Data on residence were also obtained from interviews and confirmed by observation.

I recorded marriages and divorces both prospectively over the two and a half years of the study and retrospectively using a questionnaire on marital and reproductive histories. I administered this questionnaire in Dogon to all adults after I had lived for more than 2 years in Sangui. This questionnaire also asked respondents to state their religious affiliation, if any. Although most of the data reported here are from the village of Sangui, I also present data on religious affiliation in the nearby village of Dini (population 505).

Results and Discussion

Paternal and Lineage Investment. The anticuckoldry hypothesis predicts that genetic paternity is an important requirement for paternal investment. I therefore ask: How often did men regularly invest in offspring whom they knew to be unrelated? In Sangui ($N = 460$ inhabitants), no child who had been fully weaned belonged to the work-eat group of a stepfather (i.e., mother's husband). After divorce ($N = 108$ divorces), children were raised by their putative genetic fathers and stepmothers or by other relatives, such as grandparents. The genealogical data uncovered no instance of a child having been adopted by an unrelated man. Thus significant investment by Dogon males is directed exclusively toward those offspring who are believed to be genetic relatives.

This result is consistent with previous ethnographic reports emphasizing the importance of genetic descent through the male line. For example, Paulme (1940:432–433) concludes,

Dogon society rests on the principle of agnatic descent and does not allow for bastards. While an illegitimate girl could still find a home through marriage, a boy would be condemned to the worst possible fate. Without a father, without paternal relatives, a bastard would not find a field to cultivate, a house to shelter in, nor any kin to protect him. In earlier times, the problem was resolved by selling the child as a slave to Fulani pastoralists of the plains, but today slavery is forbidden. Nowadays, a woman who became pregnant under these conditions will attempt to abort herself. If she fails, the mid-wives who attend to her delivery will immediately suffocate the new-born.

My own informants confirmed that, when a woman becomes pregnant outside of marriage, she may use roots and herbs to abort herself, but they said these pregnancies are rare. They also agreed that, because a daughter does not inherit millet fields, it is less crucial that her father be known. They said that an illegitimate daughter would be able to marry, whereas a son of uncertain paternity would be an outcast and probably leave the area. The greater importance of genetic paternity for Dogon sons is predicted by the evolutionary expectation that the cost of cuckoldry is primarily the cost of *investing* in a genetically unrelated offspring.

If paternal investment is extensive, then the fitness cost of cuckoldry is potentially greater. It is therefore important to consider the extent of paternal care among the Dogon. I sometimes observed Dogon fathers baby-sitting and occasionally attending to the hygiene of small children. In Sangui, males own 100% of the land (131 hectares) from which the children are fed (Strassmann, unpublished data). Mothers do not own land and therefore lack sufficient resources to raise children independently. Fathers also pass on membership in their patrilineages, which gives their sons the right to inherit use of millet fields. This inheritance is crucial because millet is the subsistence crop and good land is scarce (Bouju 1984:105–122; Paulme 1940:100–101, 134). Thus the parental investment provided by both fathers and patrilineages is considerable.

The women of Sangui have undergone a procedure called clitoridectomy in which the clitoris is partially excised (see Paulme 1940:486–487). Clitoridectomy may be an anticuckoldry tactic because it reduces female libido (Dickemann 1979; Hartung 1976). Hence it is consistent with the evidence that Dogon males attempt to direct their parental investment toward genetic offspring.

Hut Visitation as a Signal of Menstruation. The anticuckoldry hypothesis proposes that menstrual taboos signal menstruation. If they fail to signal

menstruation—at least to the husband—then the anticuckoldry hypothesis is falsified. Several lines of evidence suggest that hut visitation may be a reliable indicator of menstruation.

First, when hut visitation alone is used to calculate menstrual cycle length, the median of the women's median cycle lengths was 30 days (lower and upper 95% confidence limits were 29.0 and 32.0 days, respectively; $n = 58$ women, 477 cycles). When cycles longer than 46 days ($n = 73$) or shorter than 17 days ($n = 4$) are excluded, the median of the women's median cycle lengths was 28.5 days (lower and upper 95% confidence limits were 27.5 and 29.0 days, respectively; $n = 54$ women, 400 cycles). I excluded the long and short cycles because, when the cycles for all women are aggregated, they are outside values. They fall above or below the "inner fences" defined as follows (Wilkinson 1988:431): lower fence = twenty-fifth percentile - 1.5(interquartile range), upper fence = seventy-fifth percentile + 1.5(interquartile range). All women in this study were noncontracepting, so these outside values may reflect pregnancy ending in early fetal loss.

These results suggest that menstrual hut visitation has a periodicity that is characteristic of menstrual cycles that have been reported for women in other populations (Vollman 1977:15–72). If hut visitation were not a reasonable indication of menstruation, this periodicity would not be expected. These results cannot exclude the possibility, however, that women occasionally fake menstruation.

Second, to test for faked menstruations, I examined women's gestational intervals. Out of 25 births for which the gestational interval was fully included in the study, all occurred approximately 9 months after the first day of the mother's last visit to the hut. In no case did a woman give birth as much as one month early or late. If any of the 25 mothers had faked a menstruation, I would have expected at least one birth to be suspiciously early.

Third, the menstrual span (age of oldest minus youngest menstruant) was 38 years, which matches the menstrual span for women in the United States (Treloar et al. 1967).

Fourth, women who became recognizably pregnant ($n = 31$) stopped going to the huts. An equal number who did not become pregnant ($n = 33$) continued to go to the huts for the remainder of the 736-day study or until their departure from the village—with two exceptions. The exceptions were a 52-year-old woman whose last visit ended on day 231 and a 50-year-old woman whose last visit ended on day 372 of the study. These two women appear to have reached menopause.

Fifth, it was possible to use the data on hut visitation, known fetal losses, and births to calculate what appears to be a highly accurate profile of the reproductive status of the women of Sangui over a 2-year

interval (Figure 1). This profile is plausible because it shows a pattern of age-specific variation in female reproductive status that is consistent with reports that fecundity has an inverse U-shaped relationship with age (e.g. Doring 1969; Wood and Weinstein 1988). If menstrual hut visitation did not reflect menstruation, then this outcome would not have been expected.

Use of Menstrual Huts for Monitoring Female Reproductive Status. Because I was able to use the menstrual taboos of the Dogon to monitor female reproductive status, it is evident that the Dogon could do so as well. Anyone interested in the status of a particular woman could simply take note when she went to the menstrual hut and conclude that she was cycling. If her return to the menstrual hut was delayed, it would be evident that she might be pregnant.

The Dogon clearly understand that the cessation of menses is a sign of pregnancy (Calame-Griaule 1965:234). They also recognize that it is unusual for a woman to skip directly from lactational amenorrhea to pregnancy without a prior menstruation. These rare occurrences are happy events, and the child will be named *Yakunyo* if it is a girl and *Akunyo* if it is a boy (Dieterlen 1941:159–162; Dieterlen and Calame-Griaule 1960:81).

When menstrual huts are communal, as is the case for the Dogon, the onset of pregnancy becomes more obvious. The women whose visits to the hut overlap in a particular month form a highly visible cohort. In subsequent months, it is easy to see if one of the women fails to return to the hut—long after the others have made their rounds. Of course, variation in cycle length exists within and between women, but in spite of this variation, it is helpful to use the menses of other women as a frame of reference to detect pregnancy in a particular woman. In my study, an average of 3.8 women were at the menstrual huts on a given night, and this figure ranged from 0 to 9.

Although menstrual hut visitation appears to give the Dogon the *opportunity* to monitor menstruation, it remains to be established whether they actually do so. It might be assumed that Dogon men do not bother to notice who is at the menstrual hut; however, when people saw me walking somewhere, they often asked me where I was headed. If I said I was going to the menstrual hut, both sexes were able to correctly forecast who I would find. Indeed, it is hard to live in Sangui and *not* notice who is at the menstrual huts.

Sangui is a village 440 m long by 150 m wide with two menstrual huts for the women and three shade shelters (*toguna*) for the men. The huts are within 23 and 25 m of the nearest shade shelters and are in full view of them. Both huts are located along major paths that connect different

sections of the village. Principal paths to the fields also pass by the menstrual huts, as do those to the main water source. The menstrual huts stand out from all other houses of the village because they are round rather than rectangular. They are also striking because they are not enclosed in compounds, whereas other dwellings are usually surrounded by walls that protect privacy. Conspicuousness is not an attribute unique to the menstrual huts of Sangui. In all of the Dogon villages I have visited (approximately 30), these structures are distinctly round, prominently located, and unobscured by walls. The conspicuousness of Dogon menstrual huts may therefore be an intentional feature of their design.

The women at the huts tend to be fully visible as they sit talking, cooking, or lie sleeping on the rocks. The roofs are too low to provide standing room, and the huts measure only 2.5 m in diameter. These dimensions often make the huts so cramped that not all of the menstruating women can fit. The huts are also hot and windowless, so the women usually prefer to remain outside. Thus, when a Dogon woman goes to the menstrual hut, her menses are advertised to the entire village.

To what extent could menstruation be detected in the absence of menstrual taboos? Dogon habits of clothing and hygiene suggest that detection might be difficult. Women wear heavy skirts of locally spun cotton that wrap around the waist and extend below mid-calf. They absorb the menstrual discharge with rags and wash three times a day. Moreover, as shown above (Figure 2), menstruation is a rare event. Thus, without the help of taboos, it is unlikely that patrilineages could monitor menstruation. Reliable monitoring might be difficult even for husbands.

Informants' Statements. To pursue the possibility that menstrual taboos help men to avoid cuckoldry, I interviewed informants. During the interviews, I asked the following specific questions: *Why do menstruating women go to the menstrual hut? Is that the only reason, or is there a more profound reason?* In posing these questions, I was careful not to present leading arguments or to disclose my own opinions. The responses nonetheless reflect the beliefs and experiences of my particular informants and are not intended as a survey of Dogon opinion in general. Answers to the first question emphasized the calamities that would result from the desecration of altars. It was clear that people of both sexes firmly believed that menstruating women could disempower these altars and provoke major disasters. In response to the second question, three male informants volunteered that menstrual huts help a man to assess his likelihood of paternity and to avoid marrying a pregnant woman.

One of these informants told me about a paternity dispute that affected him personally. This man said that, when he returned from working in the Ivory Coast, he found his wife living with a man from the next village. A month later he reclaimed her and she began to live with him. But then a rumor spread that the woman had been made pregnant by the temporary husband. The situation could not be resolved because both men had abandoned animism and converted to Islam. They were not maintaining the ancestral shrines that are vulnerable to menstrual pollution, so women in their families did not go to the menstrual hut. My informant claimed responsibility for the pregnancy, however, because he had noticed his wife's menstrual rags when rummaging in her room for a towel. Nonetheless, the insult of the rumors made him angry, so he grabbed his rifle and began to wait for his rival behind a baobab tree. Eventually a relative arrived and calmed him down. This informant also told me that men carefully note the menstruations of their wives to assess the possibility of cuckoldry.

A second Moslem informant told me that he himself had married a pregnant woman. After the wedding he was tipped off about her condition so he took the precaution of not consummating the marriage. He demanded that she procure an abortion, but the woman denied she was pregnant. Then he sent her to live with his relatives in the city. They eventually took her to a physician who reported that by then she was 5 months pregnant. He divorced her and shaved his head as a means of purification.

Another story concerns a young man who was unsuccessful at finding a wife. He eventually was able to attract a woman and acknowledged himself as the father of her baby. His lineage rejected his paternity claim, however, and refused to allow him to bring the woman home. This story suggests that Dogon patrilineages exclude genetically unrelated individuals from becoming inheriting members.

People believe that if genetically unrelated males gain entry into a lineage, the original lineage will die out. An informant recounted an anecdote that illustrates this point. A Dogon man was conscripted by the French and sent to fight in the First World War. On his return he found his wife pregnant and determined to divorce her, but the colonials forced him to keep her. He adopted the baby, which was a son, but gave it a secret name that meant it was not his own. As time went on, he had grandsons by both this adopted son and his genetic sons. After his death, the grandsons by the former all survived, whereas those by the latter all died. His genetic sons became angry, so they revealed the secret about their adopted brother. When the adopted brother and his sons heard the news, they left the area permanently.

Next I asked the questions, *How reliable is menstrual hut visitation as an indication of menstruation?* and *Do women ever fake menstruation?* Infor-

mants of both sexes replied that, if suspicions arise that a woman is faking menstruation to cover up a pregnancy, a man could send his sister to the menstrual hut to verify the flow of blood. Alternatively, the verification could be performed by the other women at the menstrual hut. The informants said that women who faked menstruation would be caught. They stressed that these women would be very bad and would be severely punished. But they had never heard of a woman faking menstruation in their village, so they could not tell me the specifics of any punishments actually used. A female informant said she knew of only one case of a woman attempting to fake menstruation. She said that this woman was found out and that, in her opinion, faking was rare. A male informant was less certain. He said that cuckoldry is a topic that brings the men a great deal of malaise.

In summary, my Dogon informants expressed the following: (a) concern that disrespect for menstrual taboos would provoke disasters, (b) problems of uncertain paternity arising when women in Moslem families remarry without going to the menstrual hut, (c) the attentiveness of men to the menstruations of their wives owing to fear of cuckoldry, (d) the eagerness of men to divorce women who turn out to have been pregnant before the marriage, (e) the unwillingness of patrilineages to share the cost of cuckoldry, (f) the belief that faked menstruations are probably rare, and (g) the conviction that faked menstruations are detected and penalized. Thus Dogon culture as interpreted by my informants is consistent with the anticuckoldry hypothesis.

Enforcement of Menstrual Taboos. The anticuckoldry hypothesis predicts that in a patrilineal society, such as the Dogon, husbands and patrilineages play the major role in enforcing menstrual taboos. Religious acculturation provides a natural experiment with which to test this prediction.

In the village of Sangui, religious acculturation is superficial and therefore does not shed much light on enforcement. In fact, I chose Sangui as a study site partly because, on my initial visit, several men told me that Sangui women always respected the menstrual taboos. However, five out of 122 women (4.1%) who had reached menarche told me that they had recently stopped visiting the huts. One of these women was Catholic, two were Protestant, and two were Moslem. Their husbands were of the same religions except one of the Protestant women was married to a Catholic. It is unlikely that other women had stopped respecting the taboos but not told me so, because their absence from the huts was consistent with other data. For example, some went regularly to the menstrual hut until they became pregnant. Other women never went to the hut, but were clearly old and postmenopausal. Still others had given birth at the start of the study and were in postpartum amenorrhea while demonstrably nursing an infant.

Because going to the menstrual hut in Sangui is too widely respected to test my prediction regarding enforcement, I examined the nearby village of Dini. In Dini, animism is less prevalent than in Sangui, but it still remains strong in some families. Whether a woman goes to the menstrual hut in Dini depends on her husband's religion. If her husband is animist, she *always* goes to the hut, but if he is nonanimist she stays home. Her own religion is irrelevant. The only exception to this rule is that a woman will go to the menstrual hut if her husband's father is animist and not deceased—even if her husband is nonanimist. The correlation between husband's religion and whether or not a woman goes to a menstrual hut is highly significant ($\chi^2 = 101.26$, $df = 1$, $n = 133$, $p < 0.001$).

This result reflects the animist belief that menstrual pollution will damage the altars that protect against famine and illness. These altars are maintained only by animists—through periodic libations of millet porridge and animal sacrifices. Because nonanimist men no longer maintain their altars, no supernatural consequences will follow if their wives lapse out of the hut custom. Two conclusions emerge from the foregoing analysis: first, continued belief in the supernatural penalties for noncompliance is an important enforcement mechanism for the maintenance of Dogon menstrual taboos, and second, husbands are behind this enforcement mechanism more so than wives because it is a husband's (or his father's) religion that matters; the wife's religion is inconsequential. Moreover, both male and female informants in Dini said that among potential husbands of equal wealth, women prefer nonanimists because they do not like going to the menstrual hut. These results are incompatible with any hypothesis that attributes the taboos to strategies that primarily serve the interests of females. Three further lines of evidence also suggest that males impose the taboos:

First, the altars that are vulnerable to menstrual pollution belong to men—either individually or collectively as patrilineages and clans. The women marry in from other lineages, often even other villages, and have little to do with animist shrines. Furthermore, animism is much more attractive to males than to females. In a sample of 71 men and 113 women from Sangui, men were significantly more likely to identify with animism ($\chi^2 = 10.11$, $df = 1$, $p < 0.01$) and women were more likely to reject all religions ($\chi^2 = 20.61$, $df = 1$, $p < 0.001$). A common statement from the women was: "What does it matter? Won't my work be the same?" Because animism is more popular among males, this religion appears to serve male interests better than female interests.

Second, male enforcement is also suggested by the fact that women who are married to the men of a particular patrilineage go to the menstrual hut for that patrilineage. In some villages (e.g., Tiogou), a one-on-one correspondence is apparent between the number of groups of related males and the number of menstrual huts. There is no corre-

spondence between groups of related females and menstrual huts. Marital residence is patrilocal (Paulme 1940:64, 263), which means that related females are dispersed. Therefore, if women were the motivators of menstrual taboos, each woman might individually signal her menstrual status through adornment rather than menstrual hut attendance. The association of menstrual huts with particular patrilineages implies enforcement by patrilineages.

Third, although Dogon males have effectively imposed numerous taboos on females, I am unaware of any taboos that Dogon females have imposed on males. A possible reason for this inequality is that Dogon males, but not females, have the power to back up threats of supernatural sanctions with social reprisals. During my stay in Sangui, no woman was ever caught and punished for breaking a menstrual taboo; therefore, I do not know what social reprisals, if any, help to maintain these customs. I did, however, observe women being punished for breaking other taboos. For instance, a woman who broke the taboo against insulting the vulva of her husband's mother had to pay a steep fine. The male elders of the village used the money to pay the Malian government for breaking a law regarding woodcutting. As a warning to other women to respect their husbands, every female had to remain shut up indoors on a subsequent morning until about 7:00 A.M. During the women's confinement, young boys marched through the village striking ominous drum-beats. I asked a woman which age categories of males were behind this punishment. She said the punishment was not by age, it was by sex, and then she pointed to her baby grandson and said he too was behind it.

I also observed women paying penalties for breaking a taboo against touching the animist shrine called *Yomor*. Only men are allowed to touch this structure. A woman who touches it willfully, or brushes past it accidentally, will be struck by thunder. To prevent death, women volunteer their guilt by bringing offerings of millet or chickens to the *Yomor* at the annual *buro* or rain festival. The men who maintain the *Yomor* then feast on this food. The *Yomor* is also useful to the men in other ways. On its roof are several of the hooked sticks called *domolo*. Any time a man wants to warn women against picking his mangoes, he grabs one of these sticks and hangs it in a tree. If a woman picks the fruit she risks death or deformed children. Thus Dogon men impose taboos as a means of enforcing rules that serve their own interests.

In summary, the evidence that Dogon menstrual taboos are enforced by males, not females, is fourfold: (a) the religion of a woman's husband (or his father) determines whether she goes to the menstrual hut—she does not have the discretion to choose; (b) menstrual pollution endangers animist altars, and animism appears to promote male interests

more than female interests; (c) menstrual huts are associated with patrilineages; and (d) in Dogon society the imposition of taboos appears to be a male prerogative.

Abandonment of Menstrual Taboos. Although males enforce Dogon menstrual taboos, animism is an important vehicle of enforcement. In villages like Dini, men who convert to Islam and Christianity no longer require their wives to use the menstrual huts. This observation raises the questions: Why do men adopt these outside religions? Does the abandonment of animism increase their risk of cuckoldry?

The data suggest that men who worked longer in the city are more likely to be Moslem. Animist men ($n = 44$) from Sangui were away for a mean of 17.1 months (standard error 4.0 months), whereas Moslems ($n = 10$) were away for 82.2 ± 31.8 months. Thus, on average, Moslems had spent five and a half more years in the city than animists. The difference between animists and Moslems was statistically significant (Mann-Whitney $U = 62.5$, $p < 0.01$).

Choice of religion may involve numerous issues, but one reason why men may adopt Islam is geographic separation from the permanent altars that are a nonportable part of animism. Another possible reason is that in Malian cities animism is viewed by some as "backward." The government officials and successful businessmen are usually Moslem, as is most of the urban population overall (see Imperato 1977:29, 55–56, 85, 203–204). In the city, Islam might therefore facilitate social connections. An administrative chief alluded to this possibility when he said, "As a planter, for the millet, the women and the children, one remains animist; For commerce and politics, one follows Islam" (Parin et al. 1966:386–387).

Unlike the adoption of Islam, the adoption of Christianity is not associated with time spent working in the city. Christians ($n = 14$) were away for a mean of 26.5 ± 8.9 months, and the urban experiences of Christians and animists were not significantly different in length (Mann-Whitney $U = 224.0$, $p > 0.12$). A possible reason for this result is that both Catholic and Protestant missionaries operate locally, and Christians are a minority in the cities in which the Dogon work (see Imperato 1977:29, 85). Why do Dogon men adopt Christianity? Several told me they were persuaded by economic incentives, including aluminum watering cans. These cans are highly prized because they have the potential to enhance the revenues from onion production.

Outside religions may be politically or economically attractive, but do they help to mitigate cuckoldry? The formal doctrines of both Islam and Christianity address this problem. If implemented, these doctrines may reduce the importance of menstrual huts and other indigenous menstru-

al taboos. Specifically, the Koran attempts to prevent cuckoldry by requiring a divorced woman to wait for three menstrual periods before remarrying: "And the divorced women must wait for three courses; And it is not lawful for them to conceal what God has formed in their wombs" (Koran 2:28:228). If the marriage was unconsummated, however, a woman may remarry immediately (Koran 33:6:49). Although the Koran specifies that a woman count three menses before remarrying, in most Islamic societies she actually waits about three months. This waiting period is known as the *iddah* (Hart 1976:144; Lewis 1962:31, l'Hote 1944:295). After the *iddah*, a woman could not conceal a fetus fathered by her former husband because she would deliver conspicuously early. Thus the Koran provides men with a means of avoiding marriage to pregnant women.

Islam also prescribes the claustration of women through purdah and veiling, which Dickemann (1981) interprets as mate-guarding tactics. Hence Islam addresses both the risk of cuckoldry resulting from the remarriage of women and the risk of cuckoldry resulting from adultery. Christianity also addresses both of these risks by attempting to discourage divorce and adultery (1 Corinthians 6:9 and 7:10; Deuteronomy 5:18; Matthew 19:3-9).

The *iddah*, purdah, and veiling were not practiced by any of the 53 women of Sangui and Dini who were married to Moslems. I am also unaware of any evidence that Christianity has influenced the Dogon incidence of adultery and divorce. Thus, when Dogon men adopt Islam or Christianity, they may gain political, economic, or other advantages, but they do not necessarily gain alternative defenses against cuckoldry. Choice of religion seems to involve trade-offs. To reduce these trade-offs, the Dogon often practice animism at home and Islam in the city, or follow two religions simultaneously (Parin et al. 1966:386-387). For example, in Sangui 79% of the nonanimist men (19 of 24) sent their wives to the menstrual hut.

If the outside religions adopted by the Dogon do not equip them with new defenses against cuckoldry, then the anticuckoldry hypothesis makes a clear-cut prediction: among husbands whose wives do not go to the menstrual hut, there are more cuckolds.

Potential Costs of Menstrual Advertisement. The anticuckoldry hypothesis proposes that menstrual taboos reduce the cuckoldry risk; however, they could also aggravate the cuckoldry risk by making it possible for adulterers to identify cycling women. To distinguish between these two alternatives, it would be helpful to know to what extent males focus their sexual attention on women who have recently been to the menstrual hut. To the extent that they also pursue women who have *not* recently been to the hut, menstrual advertisement becomes less risky for hus-

bands. Possible reasons why men might seek matings with these females are twofold: first, forming a sexual relationship with a woman when she is *not* fecundable may lead to the opportunity to impregnate her when she is fecundable, and second, anticipation of sexual pleasure, rather than opportunities to impregnate, may be the more important *proximate* motivation for adultery in humans.

To the extent that males actively seek out cycling women, however, menstrual advertisement becomes risky for husbands—how risky would depend on the receptivity of females. My observations, and those of Paulme (1940:408, 432), suggest that Dogon women are cautious about becoming pregnant from adultery. Rather than having a clandestine lover, they sometimes prefer to divorce and live with a man openly as an official wife—even if they return to their former husband in a matter of weeks. Thus 15% of all remarriages in Sangui were to a former husband. If cycling women are nonetheless susceptible to seduction and rape, husbands should attempt to keep information about menstruation to themselves and other trusted individuals. I therefore ask, does group structure among the Dogon, and among other societies with conspicuous menstrual taboos (29% of the standard sample societies), keep the taboos conspicuous only within a safe sphere?

Historically, the risk that a Dogon woman's menstruations could be detected by men from other villages was probably low. Travel between villages was infrequent and dangerous on account of slave-raiding by the Fulani and Mossi tribes (see Beaudoin 1984:39; Paulme 1940:271; Pern 1982:27–29). Villages were therefore located on protected sites on the plateau top or the scree slopes of the Bandiagara Escarpment (Paulme 1940:26; Pern 1982:27). Movement onto the plains, and greater exchange between villages, came only in the 1920s with the imposition of colonial rule (Beaudoin 1984:39; Paulme 1940:27; Pern 1982:27–28). The isolation of villages is evidenced by the evolution of 14 different Dogon "dialects"—several of which are mutually incomprehensible (Calame-Griaule 1968:62–72). Thus frequent exchange between villages is a novel condition. Under historical circumstances, it probably would have been difficult for men to monitor the reproductive status of women in other villages.

Do men exploit their knowledge of the reproductive status of the women living in their own village? During the two and a half years that I lived in Sangui, I learned of only one affair between a man and the cycling wife of another man from the same village. This affair took place when the woman's husband was working in the city. It was notorious because the two men belonged to the same patrilineage and the woman became pregnant. The penalty imposed on the adulterous man was steep. He lost a millet field that had an area of 11,260 m², which was 85% of his total hectareage. He borrowed new land from his wife's relatives,

but his hectareage under cultivation was still 41% smaller than before (Strassmann, unpublished data). The adulterous man's brother returned from his home in Abidjan, the capital of the Ivory Coast, to argue for a smaller penalty, but his efforts were unsuccessful. This example suggests that impregnating the cycling wives of other men in the same village is at best a highly risky strategy. The steep penalties may easily account for the apparent rarity of adultery among fellow villagers.

Furthermore, men in the same village do not steal each other's wives (Bouju 1984:54; Calame-Griaule 1965:325). This point is supported by data from the 114 women of Sangui who were at least 20 years of age in 1988. These women reported that they had remarried a total of 108 times to men from more than 30 different villages. In only 22 of these remarriages did a woman marry a man from the same village as one of her former husbands. In 16 of these 22 cases, the woman remarried the former husband himself. In five cases she married her deceased husband's brother, leaving only one case in which a woman married two potential rivals from the same village. In this instance the woman was already postmenopausal. Thus, when a man steals another man's wife of reproductive age, he takes her from another village—not his own. Men from the same village will have repeated interactions, and are subject to the authority of the same elders, so their behavior may be tempered by the greater risk of retaliation and punishment.

The foregoing data suggest that the men, other than a woman's husband, who are best able to monitor a woman's reproductive status are also those who are least likely to exploit this information. Adulterers may take women opportunistically whenever they can, but because they tend to come from other villages, they may not know which women are cycling. Thus the possible costs of menstrual advertisement for husbands may be outweighed by the benefits.

Mechanisms of Cuckoldry Avoidance. Although menstrual taboos might help males to avoid cuckoldry, quantitative data are needed on the relative importance of specific mechanisms of cuckoldry avoidance. As discussed previously, these mechanisms include assessing paternity, deterring adultery, and avoiding marriage to a pregnant bride. Because these mechanisms are not mutually exclusive, they will be difficult to tease apart. Dogon informants emphasized the importance of menstrual taboos for avoiding marriage to pregnant women. This possibility predicts that men should selectively marry cycling women—as evidenced by menstrual hut attendance. More specifically, marriage should take place immediately after a woman leaves the menstrual hut when menstruation has signaled nonpregnancy. To test this prediction, I used the data on female reproductive status as well as data on divorce and remarriage.

During the 2 years of the study, 10 divorced women married men of Sangui. Seven of these women came from other villages, and all seven menstruated about a month after their arrival. I do not have data on their menstruations in their previous villages, but all appear to have been cycling rather than pregnant or amenorrheic. This conclusion would be false only if (a) the arrival of these women happened by coincidence just to precede the resumption of menses after postpartum amenorrhea, (b) they were pregnant upon arrival and miscarried shortly thereafter, or (c) they faked their menstruations.

Two of the three women of Sangui who divorced and remarried within the village went to the menstrual hut three times between the resumption of menses and marriage. The third woman went four times. When a woman remarries, she simply moves in with her new husband without ceremony (Paulme 1940:352, 387–388). I therefore know the actual day of marriage for only one woman. She went to her new husband the precise day she left the menstrual hut.

Because 10 is a small sample size, one might argue that all of the women could have been cycling upon marriage by chance alone. Given that women aged 20–34 spent an average of only 15% of the time cycling, the probability of such an event is remote: $(.15)^{10} = 6 \times 10^{-9}$. This result supports the prediction that Dogon women usually marry when cycling. In this respect the behavior of human females resembles that of chimpanzees (*Pan troglodytes*). Adult female chimpanzees almost always transfer between troops when they are sexually cycling (Pusey and Packer 1986).

A general tendency to marry when cycling might be advantageous for females as well as for males. In the absence of menstrual advertisement, however, marriage might not be so fine-tuned to female reproductive status. When menstruation is concealed, it should be much easier for a pregnant woman to pass herself off as nonpregnant. The information is anecdotal, but both of my Dogon informants who personally had faced the suspicion of having married pregnant women were Moslem and married women from Moslem families. These women neither went to the menstrual hut nor respected the iddah, so the timing of the onset of their pregnancies could be less easily ascertained.

The more women a man marries in his lifetime, the greater is his risk of marrying a pregnant woman. I therefore calculated the cumulative number of spouses for all men ($n = 87$) and women ($n = 114$) in Sangui aged 20 years or older in 1988 (Figure 3). Among the men, the median number of wives was three. Among the women, the median number of husbands was two. Thus the median number of times a man risked marrying a pregnant woman was three. (This value would have been higher if multiple marriages to the same woman had been included.)

It would be helpful to know whether a Dogon man is at greater risk for

POLYGyny

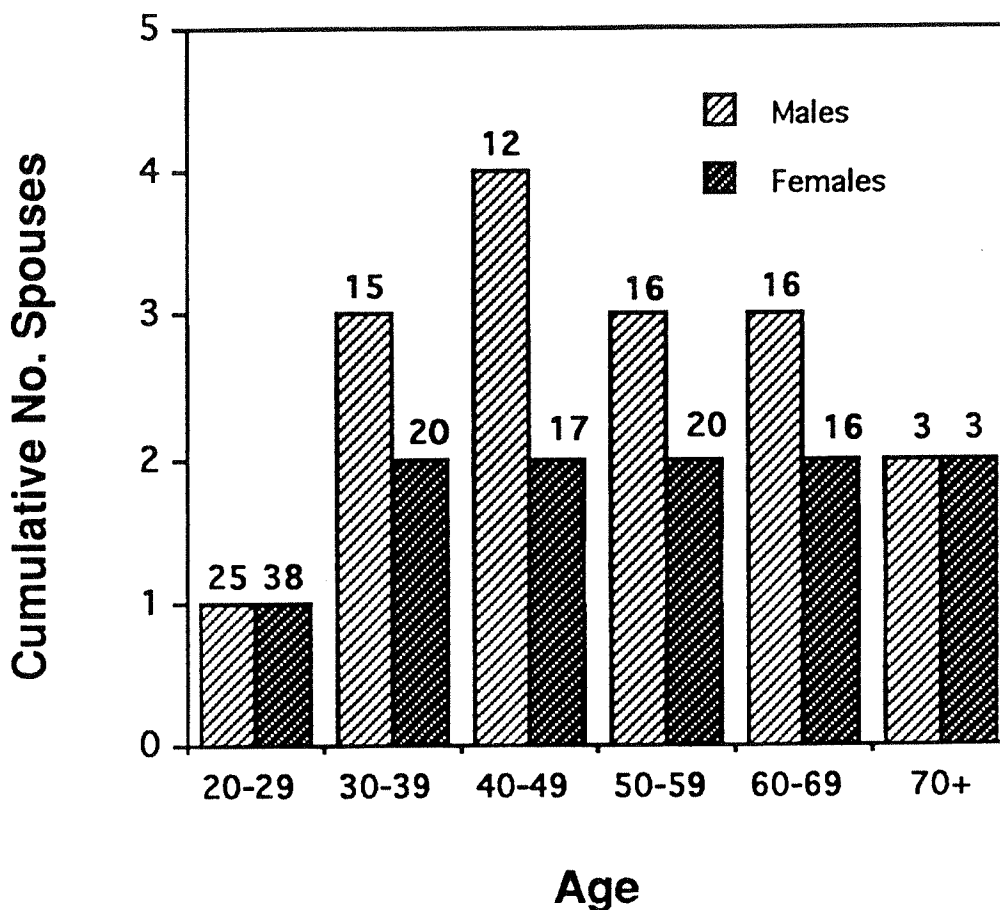


Figure 3. Median cumulative number of spouses by sex and age for the men ($n = 87$) and women ($n = 114$) of Sangui who were at least 20 years of age in June 1988. Numbers above bars refer to sample sizes. Note that marriages may be either village endogamous or exogamous. The men of Sangui own better-quality streamside land and therefore attract a net influx of women. This influx contributes to the female-biased sex ratio (0.76 males/females), the high incidence of polygynous marriages (58% of all women are in polygynous unions), and the greater cumulative number of spouses for males (233 wives) than for females (205 husbands).

cuckoldry from marrying a pregnant woman or from adultery. With the menstrual taboos in place, adultery seems to be uncommon or rare (see Calame-Griaule 1965:313; Cazes and Jacquard 1981; Paulme 1940:396, 407–408). However, the taboos themselves might have discouraged adultery. Therefore, this information does not shed light on which of the two risks is more important for maintaining the taboos.

To clarify this issue, it may be helpful to consider who is responsible for enforcement. Because Dogon husbands and patrilineages enforce menstrual taboos, the argument that menstrual huts help men to avoid marrying pregnant women is problematic. It does not explain why women continue to go to the huts once they are married. Women who divorce and remarry go to another village (see above), which means that the man who avoids marrying a pregnant woman is the new husband in the new village—not the former husband or patrilineage who previously enforced the taboos. Avoiding marriage to a pregnant woman may therefore be an important but incidental function of Dogon menstrual huts. This function may help males to avoid cuckoldry, but not as a reward for enforcement. In fact, allowing other males to avoid cuckoldry may have become a cost of enforcement.³

The other two functions I hypothesized (assessing paternity and deterring adultery), however, may directly benefit husbands and patrilineages who enforce the taboos. According to the first of these two possibilities, the huts force women to signal their menstruations, which makes it easier for husbands to evaluate their probabilities of paternity. Furthermore, because fellow patrilineage members may detect adultery that has escaped notice by husbands, advertising menstruation to the patrilineage as a whole, rather than to the husband alone, may increase the likelihood that instances of uncertain paternity will be exposed. In effect, when menstruation is a public event, women may be subject to communitywide surveillance. Numerous people may compare the timing of adultery with the timing of the onset of pregnancy to determine whether cuckoldry is a risk. When the husband's paternity is in doubt, he and his patrilineage may withhold investment.

If menstrual huts make it difficult to conceal paternity, then women who are accused of adulterous pregnancies may be forced to pay a steep reproductive cost. Dogon informants alluded to this cost when they said that women who conceive outside of marriage are humiliated and usually undergo reproductive failure through abortion or infanticide (see also Paulme 1940:432–433). Fear of this outcome may coerce women to respect a relatively high standard of marital fidelity.

An alternative argument is that menstrual taboos deter adultery by identifying cycling women so husbands and patrilineages can actively guard them until they are pregnant. Among the Dogon, it is doubtful that this type of guarding is compatible with the division of labor between the sexes and the enormous female contribution to subsistence (Strassmann, unpublished data). For example, cycling women are not chaperoned by husbands and affines when they collect firewood. Wood is scarce, and women search fields several kilometers from the village.

Often they walk alone, but sometimes they are accompanied by a nursing baby or by a daughter old enough to assist. The insecurity of husbands is reflected by a taboo against sexual intercourse in the fields, but husbands do not accompany their wives on these excursions.

Cycling women also travel unchaperoned to the regional market, where they sell millet beer to scores of men from other villages (Strassmann, unpublished data). This market takes place every 5 days, so it provides frequent opportunities for fecund women to mingle with the opposite sex. In brief, during the two and a half years that I lived in Sangui, I found no indication that husbands and affines modulate their vigilance in response to female reproductive status (cycling, pregnant, or amenorrheic). I cannot, however, exclude the possibility of subtle changes in vigilance. For example, Flinn (1988) reported that Caribbean males with "fecund" mates have 1.5% more agonistic interactions with other males than do males with "infecund" mates. To test for similarly subtle effects, and to find out whether they are biologically meaningful, would require further study.

If such a study of mate guarding is conducted, it should focus on the first 24 hours after menses. Although Dogon husbands clearly do not sequester their wives throughout the waiting time to conception, they may attempt to guard their wives as they leave the menstrual hut to prevent them from divorcing. Then they might solicit intercourse as soon as possible. This suggestion is based on two factors: the Dogon belief that women are most ripe for conception immediately after menstruation, and the possibility that women remarry immediately after menstruation when they are demonstrably nonpregnant. Although proof of nonpregnancy may be a prerequisite for remarriage, a woman can divorce at any time and go to her parents home until she is able to remarry; therefore, guarding a woman as she leaves the hut is probably not an effective way to prevent divorce.

Many mate-guarding tactics may be more effective as permanent controls on female sexuality, enforced from menarche to menopause, rather than as behaviors that are switched on when women are cycling and switched off when they become pregnant. Permanent controls may be more easily obfuscated by other purposes that ostensibly serve female interests. They might also be more effective because husbands who adopt a permissive attitude toward wives who are not cycling may have greater difficulty exerting control when the same wives are again fecund. Moreover, male vigilance might be guided by sexual jealousy. Selection may have shaped this emotion to respond to any infidelity—regardless of whether it has immediate reproductive consequences.

One of the most effective mate-guarding tactics is impregnation. For example, it is possible that, before they go to the city, Dogon husbands

attempt to impregnate their cycling wives. If a baby is born and survives, the mother may be in lactational amenorrhea until after the husband's return. But this tactic probably does not require menstrual huts.

The foregoing analysis suggests that menstrual taboos may help Dogon males to avoid cuckoldry through three mechanisms that may operate simultaneously: (a) avoiding marriage to a pregnant bride, (b) assessing paternity, and (c) deterring adultery. Only the latter two mechanisms might reward the males who enforce the taboos. If Dogon menstrual huts help to deter adultery, this deterrence is probably accomplished primarily through the exposure of adulterous pregnancies, rather than through the enhanced vigilance of husbands when wives are cycling. A further test of all three mechanisms is an important focus for future research on menstrual taboos.

Attracting New Husbands. An alternative evolutionary hypothesis is that Dogon menstrual huts are a female strategy for attracting new husbands. This hypothesis is inconsistent with the following results: (a) husbands decide whether their wives are to be hut-goers or nonhut-goers, and wives do not have the latitude to decide for themselves; (b) the median number of remarriages for females is only one, but females go to the menstrual hut from menarche to menopause; and (c) females do not remarry within the same village, and menstrual huts are an inefficient way to advertise to men in other villages.

CONCLUSION

Previous investigators interpret menstrual taboos as cultural phenomena that have nothing to do with Darwinian fitness. I propose, instead, that menstrual taboos help males to direct their parental investment toward genetic, rather than nongenetic, offspring. According to this hypothesis, menstrual taboos are motivated by the conflict of interest between the sexes over the attribution of paternity. This conflict arises because females may benefit from deceiving males about their probabilities of paternity, whereas males may benefit from detecting the risk of cuckoldry. In this conflict, no physiological event may be more revealing than menstruation. When females control knowledge of menstruation, they can obscure the timing of the onset of pregnancy, an important component of paternity assessments. However, when females are forced to respect menstrual taboos, menstruation is signaled to husbands, affines, and other observers. These individuals can monitor female reproductive status, and successful deception becomes more difficult.

I tested this hypothesis with 29 months of field data on menstrual taboos among the Dogon. Data on menstrual hut visitation and statements by Dogon informants support the following predictions: (a) menstrual taboos are a reliable signal of menstruation, and (b) by advertising menstruation, menstrual taboos publicize female reproductive status, including the fecund waiting time to conception, nonpregnancy, and the onset of pregnancy. These findings provide the first indication that menstrual taboos convey this important reproductive information. The prediction that menstrual hut visitation is enforced primarily by husbands and patrilineages is also strongly supported by the Dogon data. This results excludes the possibility that Dogon menstrual taboos are the outcome of female strategies. The threat of supernatural sanctions is crucial for enforcement, which indicates that religious beliefs may have underlying reproductive agendas. In discussing the function of menstrual taboos, Dogon informants emphasized their fear of supernatural penalties and the usefulness of the taboos for preventing cuckoldry. Cuckoldry is a major Dogon concern, and paternal and lineage investment is directed exclusively toward offspring who are believed to be genetic relatives. Thus the anticuckoldry hypothesis provides helpful insight into the menstrual taboos of the Dogon and should be tested in other ethnographic settings.

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NOTES

1. Codes for the variable *descent* are from Murdock (1949), and those for *residence* are from Murdock (1962). I define menstrual taboos as conspicuous if one or more of the following were present: (a) menstrual huts, (b) menstrual

adornment, (c) menstrual confinement in the home, or (d) forbidden areas and work restrictions and other behavioral restrictions. They are inconspicuous if menstrual taboos were absent, or if they encompassed no more than two of the categories listed in (d). Fifty-four societies had conspicuous and 132 societies had inconspicuous taboos.

2. Menstrual taboos are the rule, not the exception, in human societies. Because some ethnographers do not discuss these customs, it is difficult to quantify the absences.

3. When a woman's brothers enforce menstrual taboos, allowing future husbands to avoid cuckoldry may be a reward for enforcement—as long as the enhanced paternal certainty entices investment from the future husbands.

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