

THE EVOLUTIONARY BIOLOGY AND ECONOMICS OF SEXUAL BEHAVIOR AND INFIDELITY

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December 2008

Abstract. Why might spouses cheat on one another? How might demographic or economic variables be implicated in sexual behavior and marital infidelity? Do patterns of infidelity differ depending on whether the cheating spouse in question is the husband or wife? How much might cheating matter for the economics of marriage and divorce? Answers to these questions are highly pertinent to our understanding of the economics of the family. For instance, divorce is associated with economic calamity—especially mothers and children—and a leading correlate of divorce is sexual infidelity. Despite the potential importance (and, as it turns out, *prevalence*) of infidelity, it is seldom addressed in the economics of the family. In contrast, cheating occupies a central role in biological models of mating behavior. I blend insights from biology and economics to generate hypotheses concerning the propensity to commit infidelity. Central to the biology-based approach is the idea that spouses behave as if reproductive concerns drive sexual behavior, and that the marked differences in female versus male reproductive biology imply corresponding differences in the incentives, concerns and interests of male versus female spouses. I investigate these hypotheses using the National Health and Social Life Survey (NHSLS), and find marked differences between husbands and wives, cohabiting partners and singles with respect to both attitudes and behavior regarding sexual activity and infidelity. These patterns are consistent with a “bio-founded” economic model of the family that gives a prominent role to the exigencies of reproductive biology. Such findings suggest significant potential of biological thinking for sharpening predictions of economic models of search, matching, mating, marriage and divorce. Such models seldom consider the possibility of cheating, but they should.

Keywords: Evolutionary biology; Hamilton’s rule; marriage; divorce; intergenerational transfers; paternity; infidelity; sexual behavior

JEL classification: A14; D10; I30; J13; J14; J26

Prepared for the ASSA Meetings, San Francisco, January, 2009. Financial support for this work was provided by a grant from the National Institute on Child Health and Human Development (R01-HD045637). The findings, interpretations and conclusions expressed in this paper are entirely my own and do not necessarily represent the views, opinions, or policy of the National Institutes of Health or of any other government agency. I wish to thank Thomas Chan for extremely helpful research assistance, and seminar participants at University of Maryland, Carleton University, University of California-Riverside, and Boston College for valuable comments on earlier drafts.

1. Introduction

When and why might one spouse cheat on the other? More fundamentally: What are the basic facts concerning sexual preferences and behavior as they might pertain to marital (and cohabitational) infidelity? In particular, is there evidence for male-female differences in inclinations to want to have sex with a stranger, or with respect to the number or variety of desired sex partners? Might there be sex differences in income or age-related effects associated with stepping out on one's mate? And how do patterns of infidelity square with theories—evolutionary-based theories in particular—about infidelity? Further: Under what conditions might infidelity matter for economics of the family? When might it be a non-issue?

At least on the face of it, sexual infidelity would seem highly pertinent to economic behavior and outcomes. For instance, it is well known that divorce is associated with economic calamity for families, especially women and children (e.g., McLanahan and Sandefur (1994)), and that a prominent correlate—and leading indicator—of marital disruption is infidelity (Kitson, Babri and Roach (1985), Amato and Rogers (1997)). Moreover, there is ample evidence that men and women differ in their preferences for short-term sexual liaisons (e.g., Clarke and Hatfield (1989), Schmitt (2005)). These relationships suggest potential value in attempting to connect the dots between sexual behavior, biological attributes, mating behavior, marriage, and economic variables.

Despite the potential importance of these relationships, there are hardly any studies of sexual infidelity in economics. Moreover, the few that exist predate decades' worth of rapid advancements in knowledge about infidelity that have accrued within

several disciplines. One has to go back nearly 30 years to find a high-profile study of the economics of extramarital affairs (Fair, 1978). His oft-cited empirical paper was pioneering in its day, but contains deficiencies that by today's standards would be considered glaring: for instance, he does not even perform separate empirical analyses by gender. Another drawback to Fair's work and many other empirical studies of sexual behavior (e.g., Hite (1981)) is their use of "convenience"—as opposed to representative—samples.¹

This study seeks to improve upon the previous economic literature with respect to both logic and evidence. The logic that guides the empirical inquiry is based in large part upon evolutionary thought, which posits that exigencies of survival and reproduction contribute to the formation of preferences associated with mating and sexual behavior. Evidence is drawn primarily from a pioneering but under-utilized survey that assesses sexual attitudes and practices for a representative sample of persons in the United States, the National Health and Social Life Survey (NHSL; Laumann, Gagnon, Michael and Michaels (1992)).

The evolutionary logic that connects sexual behavior with reproductive concerns generates several hypotheses that can be investigated with the NHSL data. With respect to logic, one key idea is that, while a well-provisioned, ambitious man can literally "go forth and multiply," a woman can only "go forth and add." Together with obvious considerations of the birds and the bees, these differences imply that male infidelity would be motivated by inclinations toward behavior whose ultimate goal would be to

¹Fair, for instance, used responses to surveys conducted by the magazines *Redbook* and *Psychology Today*, and Hite's survey was drawn from questionnaires dropped off at, *inter alia*, abortion rights groups and university women's centers. However there exists a recent paper, discussed in more detail below, which does use a nationally representative sample and performs separate analyses by gender (Elmslie and Tebaldi (2008)).

increase the *quantity* of children, whereas female infidelity would be motivated by a desire to increase the *quality* of children. One empirical implication, borne out by the NHLS data, is that poverty would be positively associated with female, but not male, infidelity. (The rationale being that poverty would spur a woman to seek extra sexual partners in order to secure additional resources for the provisioning of current or future offspring.) Another implication of the evolutionary perspective is that diminishing returns to sex partners would be relatively less important for men than women since the marginal effect of male (as compared to female) reproductive success—i.e., quantity versus quality of offspring—should not fall as quickly with additional sexual liaisons. Indeed, evidence from the NHLS concerning both stated preferences and behavior is consistent with this idea. For instance, there are huge male-female differences in attitudes toward having sex with multiple partners, and among spouses/partners engaging in who commit infidelity, fewer women than men have had more than one outside sexual liaison. Further evidence consistent with the evolutionary perspective concerns male-female differences in how the characteristics of outside sex partners compare to those of cheaters' spouses. Compared to women, men tend to have outside liaisons with partners that are younger than their spouse; compared to men, women tend to have liaisons with partners that are better educated than their spouse.

Another result—also arguably consistent with evolutionary logic—concerns sex differences in age patterns of infidelity. For women (but not men) infidelity appears concentrated among *younger* spouses. One interpretation of this pattern springs from connecting the facts of reproductive biology with the economic logic of matching and search. If a woman discovers herself to be tethered to an unacceptable mate, demands of

the biological clock imply that she had better not procrastinate in dumping him and moving on to someone with better prospects. Sexual liaisons with prospective mates may arguably be part of the search process. In contrast, men do not have to contend with the biological clock (at least not nearly to the same degree).

Further, the gender differences in age patterns of infidelity indeed mirror patterns in the initiation of divorce. Though seldom referenced in the literature on the economics of divorce, there exists a striking difference, by age, in the spouse that *initiates* divorce. In younger couples, divorces tend, overwhelmingly, to be initiated by the wife; for much older couples, initiator is just as likely to be the husband as the wife (Buckle, Gallup and Rodd, 1996).

I hasten to add that considerations of evolutionary biology do not obviate deliberate choice—hence the phrase “biology and *economics* of infidelity.” The central idea is that preferences emanate in part from biological concerns, but that behavior is the outcome of the interplay of deliberate choices that emerge from the interplay of such preferences and budget constraints. Nor do considerations of biology preclude considerations of, say, culture or social norms; as I argue below, culture and biology need not be presumed substitutes—indeed, they can emerge as complementary forces for shaping behavior. Further, readers should not take phrases such as “go forth and multiply” too literally, since people do *not* appear to be maximizing their contributions to the genepool (see, e.g., Bergstrom (1996)). Nonetheless, I wish to exploit the insights gained from positing that people behave *as if* sexual activity were tied up with reproductive concerns.²

² Obviously, it is not as if the two were unrelated! Yet in the social sciences reproduction and sexual behavior mostly occupy separate spheres. For instance: a JSTOR search of economics journals on the key

For instance, consider again the biological clock: the reproductive potential of males and females follow distinctly different age trajectories: women’s potential—as measured by her probability of conceiving and successfully giving birth—falls much faster with age than does a man’s, culminating in sterility upon menopause.³ And as noted above the NHLS data indicate sex differences in the propensity to commit infidelity that parallel these trajectories in fecundity. While such patterns could well emanate from forces other than (or complementary to) biological ones, nonetheless the evolutionary model turns out to be exceedingly instructive for analyzing the NHLS data.

Further, the patterns described below arguably matter for moving family economics forward in an evolutionary direction. For instance, the marked sex differences in the desire to end a marriage referred to above have hardly been mentioned in the economics literature on the family.⁴ In addition, the results suggest that standard models of matching, which derive their primary inspiration from worker-firm matching in labor markets, should give way to a broader approach that acknowledges a decidedly non-zero probability of cheating.⁵ Indeed, biologically based models are founded upon the idea of “mate guarding,” that is, an arrangement whereby mutually suspicious spouses protect their genetic interests.

So what are the details of the logic and evidence pertinent to the biology and economics of sexual infidelity? I turn discuss evolutionary considerations, and then turn to the evidence drawn from the NHLS and other data.

phrase “demand for children” turned up in the text of 336 economics articles; the phrase “sexual behavior” turned up in 210; but appeared together in only 6 articles.

³ For a recent study of the “bio-economics” of menopause see Chu and Lee (2008).

⁴ Several studies have shown that, among young couples, wives are far more likely husbands to initiate divorce, but that such differences attenuate with age (Buckle, Gallup and Rodd (1996), Sweeney (2002)).

⁵ For example, another JSTOR search of economics journals turned up over 1,800 studies containing the keywords “marriage” and “divorce,” but fewer than a dozen of these also contained the words “extramarital” or “infidelity.”

2. The Evolutionary Logic of Sexual Preferences and their Implications for Infidelity—Preliminary Considerations

What does evolutionary thinking have to say about sexual preferences and spousal infidelity? How might such thinking contribute to our understanding of when and why husbands and wives might seek sexual partners outside of marriage? The short answer is that, if we imagine that sexual behavior is designed to further reproductive interests, the rather pronounced sex differences in reproductive biology dictate correspondingly pronounced sex differences in optimal strategies with respect to sexual infidelity.

Assume that both men and women care about their genetic legacy—more precisely, what is referred to by biologists as “fitness,” or reproductive success. Next, consider that while men and women have the same objectives *vis a vis* fitness (roughly, to get their genes into the next generation) a woman’s minimum biological costs of doing so far exceed those of a man. This so-called “sexual dimorphism” in human reproductive biology implies that male infidelity is a strategy primarily concerned with the “extensive margin” of reproduction—having sex with several nubile partners, for instance, can help spread his genetic material far and wide.

Female infidelity, on the other hand, is concerned with the “intensive margin”: since women (usually) produce children one at a time, and at great physical cost, sexual liaisons outside of marriage can be thought of as strategies for contributing to child quality, by, for instance, helping to secure financial resources or to create confusion in paternity so as to generate more than one credible fathers, should her husband be unwilling or unable to provide for her child.

The sexual lopsidedness in the biological costs of producing children has implications for search behavior as well. Whereas unmatched men can be expected to be

on the lookout for nubile mates, women would be concerned with other (ostensibly more difficult to discern) signs related to a man's inclinations and ability to provision offspring: earnings ability, for instance, and demonstrated willingness to commit to a long-term relationship.

Several other biological considerations complement the simple logic above. First, newborns remain essentially 12 months premature and needful of much support, including that of fathers and other relatives. Such demands can exert a check on male preferences for wanton polygyny. Indeed, the extreme helplessness of human babies places us much closer to avian species than to our primate cousins; monogamy is far more widespread among the former than it is among mammals. (Mammalian monogamy is in fact quite rare, on the order of 3-6 percent of species (Young and Carter (2008)).)

Second, even if, as evidence considered below indicates, male proclivities tend toward polygyny, it is one thing to harbor such preferences but quite another to successfully act upon them. "It takes two to tango," as they say, and such sexual arithmetic imposes obvious restrictions upon sexual licentiousness in general equilibrium. In a population of married couples characterized by faithful wives, for instance, even the most feckless husband would have no opportunity to engage in extramarital sex. In a world populated by entirely by married couples, for instance, female infidelity is an obvious necessary condition for male infidelity.

Considerations of, say, mixed populations of married and single people, homosexual activity, and prostitution complicate matters still further. Accordingly, these and other complexities call for an exacting treatment of the logic of infidelity, to which I take the (tentative) approach with analyses of:

- How sex differences in reproductive biology affect preferences for a mate and sexual proclivities.
- How this dimorphism might affect sexual strategies of men versus women.
- How sex differences in problems of finding a suitable mate could generate male-female differences in patterns of infidelity over the life-course.
- How economic considerations interact with biology in generating incentives for infidelity.

I now turn to an examination of each of these steps.

3. Male-Female Differences in Reproductive Systems Imply Differences in Sexual Preferences and Strategies

The decision to have sexual intercourse is qualitatively different for a woman than for a man, since it entails potentially enormous risks and costs for a woman that simply do not exist for a man. Pregnancy entails enormous caloric demands; childbirth involves risks that can be lethal. Indeed, childbirth is far more dangerous for humans than for our primate cousins, owing to our outsized encephalization. The tolerances for accommodating the typically large-headed infant's passage through the mother's birth canal are exceedingly narrow. Such physical investment costs and risks dwarf the minimum reproductive investment of the male, which amount to a few spasms worth of effort.

One might question the relevance of pregnancy-related concerns connected with female sexual behavior in light of advances in contraception such as the Pill. Indeed, economists have made a convincing case for a prominent role of the Pill for sexual behavior, mating, and marriage (see, e.g., Akerlof, Yellen and Katz (1996) and Goldin and Katz (2002)). Further, other (arguably) non-biological forces such as social norms,

religion, culture and law surely hold enormous sway over the sexual behavior of both men and women (see, e.g., Posner (1992)).

Despite these manifestly powerful crosscurrents, there exists compelling evidence for male-female differences in preferences related to sexual behavior and mating. For example, an experiment conducted by Clarke and Hatfield (1989) compared the responses of women and men to unsolicited sexual advances. When the female undergraduate students were presented with an offer to have sex with a moderately attractive member of the opposite sex, they uniformly refused and typically found such offers offensive and ridiculous. In contrast, 75 percent of the male undergraduates students that were approached were willing to have sex with a female stranger. Further—and consistent with the basics of reproductive biology (“go forth and multiply” versus “go forth and add”)—survey evidence indicates that men desire more sex partners than do women: as measured by self-reports of desired sex partners (Buss and Schmitt (1993)) and descriptions of sexual fantasies (Ellis and Symons (1990)). In addition, such gender disparities in reported preferences are highly robust across a variety of cultural contexts (e.g., Schmitt, et al., (2003)). (Evidence from the NHSLs presented below—e.g., willingness to engage in sex with strangers or with multiple partners—reinforces these findings.)

Trivers (1972) was the first analysis of the implications of sexual differences in reproductive costs for what biologists call *sexual selection*, i.e., behavior pertinent to the “reproduce” part of the Darwinian dictum of “survive and reproduce.” Sexual selection refers to the behavior and conditions that determine who gets to mate with whom. The key idea in Trivers’ seminal paper is that the sex that invests relatively *less* in offspring is

the one that must *compete* for the sex that invests relatively more in offspring.

Notwithstanding the considerable investment that fathers undertake on behalf of their offspring, if mothers invest more, Trivers' considerations would imply that, for humans, females choose among competing males.

Trivers was interested in the relationship between sex-specific parental investment and mating systems across various species. Indeed evidence organized along these lines are highly supportive of his hypothesis (see, e.g. Emlen and Oring (1977)). At one extreme, in species where males contribute little more than genetic material (e.g., sage grouse), mating systems can be characterized by *leks*, an extreme form of male-male competition in which females choose from an assemblage of males engaged in a group display of fitness, as evidenced, partly, by the quality of their secondary sexual characteristics. Such species are typically characterized by extreme polygyny, whereby successful males mate with a highly disproportionate share of females.

At the other extreme, male “pregnancy” is the norm for fishes of the family *Syngnathidae* (e.g., pipefishes and seahorses); males gestate the young in a special brood pouch, thus incurring a relatively large proportion of parental investment costs. Mirroring the reversal in investment costs is a sex-reversal in mating behavior in these species. For example, a recent study of Gulf pipefish (*Syngathus scovelli*) indicates strong sexual selection among females: more pronounced secondary sex characteristics among females and *polyandry*, i.e. multiple male partners accruing to the most successful females.

One attractive feature of the evidence for non-human animals is the absence of cultural forces—one would be hard pressed to argue that sage grouse or pipefish are in

the thrall of, say, social norms! Not that *environment* is unimportant: indeed it is frequently characterized as the key exogenous variable that determines how the mating systems of various species are shaped by species-specific habitat. For instance, food patches that are easy to monopolize and defend might contribute to the emergence of polygyny as an equilibrium mating system (e.g., Emlen and Oring (1977)).

Consider now our own species, and focus on the sexual disparity in (biological) investment costs and the value of biparental care owing to the helplessness and neediness of newborns. How might such disparities translate into corresponding differences in sexual strategies for men versus women? Since women incur possibly enormous costs from a sexual encounter, we might expect that they would set the bar higher in terms of deciding whether to have sex with a prospective mate compared to their male counterparts. We might also imagine that, while there might exist considerable overlap in qualities valued in a prospective mate (both men and women would be expected to value intelligence and health, for instance) that nonetheless preferences of women would be tilted toward finding mates with the resources and inclination to provision offspring—a willingness to commit, say—whereas men would tend to be on the lookout for women who exhibit signs of fertility potential.

Regardless of whether a gene inhabits a man or women, it (according to kin selection theory) follows the same directive of “survive and reproduce.” But its means for doing so depend crucially upon the sex of its “survival-and-reproduction” machine. Seeing how human offspring are born helpless, and are in dire need of extensive parental investments in order to themselves survive and reproduce, and seeing how the minimum required investment of women is nearly infinitely higher than that of men (nine months of

gestation and more, divided by a few seconds' worth of spasms) evolutionary theory predicts some pronounced differences in how women and men assess the quality of a prospective mate. Women have to be more careful to screen out losers: men who don't have the inclination or the wherewithal to provide support of offspring, or who lack the capability of sticking to a long-term commitment.

Our mammalian nature creates moral hazard problems for men. Once their mate is impregnated, they may be tempted to abandon her, in the hopes that she (perhaps with the help of her relatives) can invest in the child alone while he goes off in search of new mating opportunities. Hence, evolutionary theory predicts that women would be especially keen on avoiding *abandonment*. The downside from a mating experience gone awry is usually much lower for men; for instance, he might suffer the opportunity cost from spending time wooing and copulating with an infertile mate.

Hence, evolutionary theory suggests that men and women would be on the lookout for different things in a prospective mate. Women face the complex problem of assessing possibly hard-to-measure traits like future earning potential, ambition and loyalty. Men face the relatively simpler problem of identifying nubile mates.

Not that men and women wouldn't share some of the same preferences for potential mates. No one, for example, wants to risk his or her health by copulating with someone carrying a sexually transmitted disease. Likewise, no one would relish the thought of pairing off with a mean-spirited or abusive person, even if such an encounter were short lived but especially for the long haul.

4. Evidence of Male-Female Differences in Preferences about Sex and Mating

Evidence on Sex-related Preferences from the NHSLS

What are the key differences in preferences about sex and mating between men and women? For example, is there evidence that men might be driven to “go forth and multiply”? Do women appear to be on the lookout for prospective mates who have the wherewithal and inclination to support and nurture offspring? Do differences in preference about *sex* appear to mirror differences in *reproductive biology* discussed earlier? These questions are ostensibly central to understanding male-female differences in incentives to be unfaithful. The NHSLS offers a wealth of questions about the sexual inclinations of its respondents. These responses (plus findings from another household survey described below) indeed indicate concordance between reproductive anatomy and sexual urges. For example, consistent with their “go-forth-and-multiply” potential, far greater numbers of men said that they would find sex with multiple partners “appealing.” And, consistent with concerns about a partners’ ability to provision offspring, greater numbers of women placed higher relative value on a prospective mate’s earning potential and status.

Before getting to further detail, a few words about the NHSLS are in order (details are provided in Appendix I). The NHSLS canvassed a sample of 3,432 respondents about their sexual attitudes and practices (Laumann, Gagnon, Michael, Michaels (1994)). The NHSLS was path-breaking with respect to the detail of questions on a sensitive subject, the nationally representative sample (a nationally representative sample of 3,159 English speakers, plus an over-sample of 273 blacks and Hispanics) and the high (78 percent) response rate.

Respondents were asked about the appeal of various sexual situations, specifically: “On a scale of 1 to 4, where 1 is very appealing and 4 is not at all appealing, how would you rate each of these activities?” (Respondents were then handed a card from which they could choose their answers. I coded a “1” or “2” (very appealing, somewhat appealing) as simply “appealing.”)

One of the scenarios was sex with multiple partners (“having sex with more than one person at the same time”). Forty-two percent of the male respondents reported finding this scenario appealing compared to only 8 percent of female respondents. Such preferences accord with the nexus of evolutionary concerns (whereby one wishes to pass one’s genetic material on to the next generation) and reproductive biology (again, male “multiplication” versus female “addition). Together, these considerations imply that, from a male perspective, the marginal value of having another partner diminishes at a far smaller rate than it would from a female perspective (Table 1).

Table 1 also contains marked sex differences concerning preferences for having sex with a stranger, which ostensibly reflect a further aspect of our mammalian nature noted earlier—the marked sexual dimorphism in biological risks and costs associated with reproduction. Such imbalance would imply that chariness about having sex with someone that one does not know personally would be more prevalent among women than men.⁶ Further, if love is the bond that facilitates provision of resources to prospective offspring, we would expect women would be more reluctant than men to have sex with someone they do not love, as results in Table 1 suggest.

⁶ Of course, sex with a stranger need not be completely costless for a man, in light of, for instance, the risks associated with contracting a sexually transmitted disease. Further, evolutionary psychologists might argue that, given the likelihood that such diseases had prevailed during the so-called long sweep of prehistory when such preferences are posited to have been formed.

Table 1. Self-reported Preferences/Attitudes/Thoughts

	Men	Women
Sex with multiple partners 'appealing'	41.95	7.75
Sex with a stranger 'appealing'	30.85	8.26
Would not have sex unless in love	52.87	77.23
Being forced to do something against one's will	2.26	1.46
Think about sex at least once a day	52.96	19.05

Source: Author's tabulations from the NHLS.

Sample: All respondents with non-missing answers to these survey questions.

Of course there need not exist male-female differences in *every* aspect of behavior, and, indeed (for instance) hardly any of the male or female respondents in the sample reported finding any appeal in “being forced into doing something sexual that you don’t want to do.” Still, the excess of fitness benefits over costs for a sexual encounter can be expected to be greater for men than women, and, in light of this it is perhaps not surprising that a much higher proportion of men than women report thinking about sex on a daily basis.

Taking Care Not to Forget Norms and Incentives when Discussing Biology

Of course, such preferences might just as well have been formed by cultural influences, though there is little reason to automatically suppose that cultural or environmental factors need necessarily be substitutes for evolutionary forces, since the two might well be complements. (For instance, we wouldn’t have genes that code for proteins that build eyes if there were nothing to look at.) Further, there is overwhelming evidence that norms and incentives matter for all kinds of behavior, including sex, mating and marriage: Consider, for instance, the wealth of evidence that attests to the pronounced impact of a technology unknown in the Pleistocene—namely, oral contraception—on behavior pertinent to sex, family, work and marriage (again, see for example Akerlof,

Yellen and Katz (1996) and Goldin and Katz (2002)). Accordingly, in considering putatively biological influences on attitudes and behavior it is worth keeping in mind that they are but one of many possible forces—some complements, some substitutes—that can impinge upon behavior.⁷

Evidence on Preferred Qualities in a Mate

Do women and single men differ in their valuations of various traits of prospective mates? To address this issue I draw upon a different data set, the National Survey of Families and Households (NSFH), a nationally representative survey of 13,000 households begun in 1987, indicates the answer is “yes.” This data set is of interest because it queried *single* people about their preferences regarding desirability in a mate. Nearly all of the traits listed in a self-enumerated questionnaire given to singles in the first wave of the survey (diverse characteristics such as earning potential, looks, or having children from a previous partner) received differing average valuations from men versus women. Further, the sex differences in valuations are consistent with the hypothesis that “biological basics” play a role in mate choice.

Single respondents were given a battery of traits to rate; the mate preference question was worded as follows:

Listed below are considerations that are important to some people in thinking about WHETHER TO MARRY someone. Please circle how willing you would be to marry someone who...

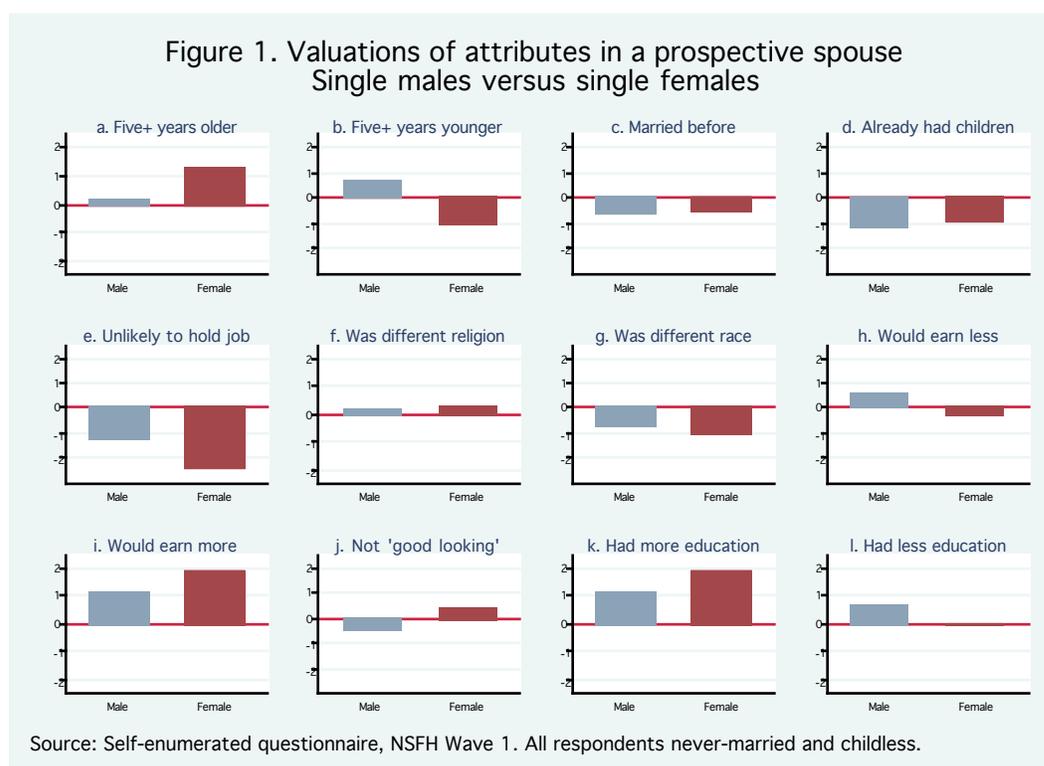
⁷ Nevertheless it would be noteworthy to locate a culture in which the sex differences in preferences were *exactly reversed*. Perhaps such an equilibrium would prove tenuous in the face of possible invasion of males from cultures whose preferences in line those of Table 1. Margaret Mead’s famous (1928) ethnography *Coming of Age in Samoa* depicted a culture in which young women’s sanguine attitudes toward casual sex clashed with Western norms of that time. A withering critique by Derek Freeman (1983), a good part of which castigated cultural anthropologists for ignoring biological influences, ignited a firestorm of controversy unresolved to this day. Yet to cast “nurture” and “nature” as mostly exclusive alternatives passes up a middle-ground route whereby norms and incentives act upon preferences shaped at least partly by biological forces.

- a. was older than you by 5 or more years
(the question continues by listing a dozen traits in all).

For each trait, respondents are given a Likert scale ranging from 1 (not at all willing) to 7 (very willing). (Intermediate numbers on the scale were not labeled.)

In constructing the figure I re-normed the Likert scale so that 4 was coded as 0, 1 was coded as -3, 7 was coded as +3, and so forth.

Sex differences in responses are depicted in Figure 1. Up to 670 men and 440 women answered the questions (samples differ slightly across questions). Samples were limited to never-married, childless singles. The averages depicted in Figure 1 differ significantly by sex for all but two traits: whether the prospective mate had been previously married (Figure 1-c) and whether the prospective mate was of a different religion (Figure 1-f). For the rest, average Likert scores differed by sex at the .01 level or lower.



The sex differences in reported preferences are consistent with Trivers' (1972) model of sexual selection with differential parental investment applied to humans. Our species' mammalian nature is very much in evidence in the sex differences in Figure 1. The fact that women bear the disproportionate share of minimal biological commitment to investment in offspring implies that they should place a high value on mates possessing resources for provisioning offspring. Men, on the other hand, should be more concerned with correlates of potential fertility, such as age and physical attractiveness.

Such differences show up most clearly with respect to age preferences. Women tend to prefer older men, whereas men tend to prefer younger women (Figures 1-a and 1-b). Older men are likely to have more resources for provisioning offspring; younger women are more likely to be able to bear offspring. Men also value physical attractiveness more than women (Figure 1-j) and one interpretation of this difference is that a woman who is 'not good looking' is less likely to be fertile.⁸

On the other hand, since, all else equal, child quality would be valued by both men and women, we might expect that men might not look too favorably on their prospective spouses' being unable to hold a steady job. Such preferences are in evidence for males in Figure 1-e. But note the sex difference in Figure 1-e; from a woman's perspective, being unlikely to hold a steady job is the kiss of

⁸ One of the most oft-cited papers dealing with female physical appearance and fertility potential is Singh (1993), who notes male preferences concerning female waist-to-hip ratio (WHR). An 'ideal' WHR (around two-thirds) is interpreted as a signal of fertility potential (e.g., having enough body fat to provision offspring, yet not already pregnant).

death for a prospective mate; this drawback is rates an average of -2.48 among women (recall that the lowest possible score is -3).

Relative socioeconomic status receives differing priority between men and women as well. Figures 1-h, 1-i, 1-k and 1-l suggest that, from a male perspective, having a prospective mate with higher earning potential or more education is desirable, but so is a prospective mate with lower earning potential or less education. From a female perspective, however, a mate with high socioeconomic status is strongly preferred to one with lower socioeconomic status. Again, these patterns are consistent with the idea that women place a relatively higher priority on a prospective mate's earning potential.

Not that men and women are expected to differ concerning all possible traits in prospective mates: not many of either sex are likely to find misanthropy or stupidity wildly attractive, for instance. Nor would many go head over heels at the sight of obvious symptoms of sexually transmitted diseases. Evolutionary psychologist David Buss (1989) found that both males and females assigned top rank to kindness and intelligence as desirable characteristics of a potential long-term mate or marriage partner. Buss found, however, two salient sex differences in how traits were ranked: females assigned a higher rank to good earning capacity than men did; males assigned a higher rank to physical attractiveness than males did.

While such mate preference patterns are consistent with considerations of evolutionary biology, they do not necessarily confirm the evolutionary hypothesis. Such preferences are also consistent, at least in principle, with values

that are entirely culturally constructed and socially learned. For instance, Naomi Wolff (1992) argues that a particular aesthetic for feminine beauty is foisted upon women by a male-dominated media industry. Of course, to repeat, there is no reason to presume that culture and biology are competing alternatives, since they might well work together (as in, for instance, biologically based preferences that impel powerful men to attempt to co-opt culture to serve their reproductive aims).

How Much Do Stated Preferences Reveal About Actual Preferences?

The evidence above concerns *stated* preferences, but such statements could conceivably be at odds with *actual* behavior. Recent experimental evidence conducted by economists on “speed dating”—whereby participants sample many prospective partners in a short period of time to decide whether they wish to date someone—indicates behavior consistent with the evidence discussed above (Fisman, Iyengar, Kamenica and Simonson (2006)). These authors examined decisions to date made among randomly matched pairs and found that men were more responsive to a potential date’s physical attractiveness than were women, while women showed a preference for men who grew up in wealthy neighborhoods.

Stated Reasons for Having Sexual Intercourse for the First Time

Sex differences in reasons given for having intercourse for the first time can likewise be interpreted in light of evolutionary and reproductive biology, and responses given in the NHLS appear to reinforce conclusions about sex preferences discussed above. About half of male respondents cited being “curious/ready for sex” as their main reason, compared to about one-quarter of female respondents (Table 2). Those proportions are

roughly reversed for the male-female differences in citing “affection for partner” as the primary reason. Further, “physical pleasure” was cited among 13 percent of the men compared to 3 percent of the women. Social norms (i.e., “peer pressure”) were seldom cited as a primary reason among either men or women.

Table 2. Reasons for Having Intercourse for First Time

	Men	Women
Curious/ready	51.52	24.76
Affection for partner	24.86	48.47
Pleasure	12.43	2.74
Peer pressure	3.91	3.23
Wanted to have a baby	.55	.81

Source: Author's tabulations from the NHSLs.

Note too the vanishingly small proportions of respondents who cited the desire to have a child as their primary reason for first intercourse. While it is not unexpected that first-time sex would not likely be intended for reproduction (such proportions would likely be higher among, say, respondents who were married and childless) nonetheless these entries in Table 2 touch upon an issue that deserves further discussion at this juncture—namely, the strength of the connection between sexual and reproductive behavior.

Having Sex and/or Making Babies: Proximate versus Ultimate Perspectives on Fitness Maximization

The evolutionary perspective on sexual behavior leans heavily on the link between sex and reproduction—the premise that preferences and proclivities (e.g., motives for infidelity) have been forged over the eons during which maladaptive inclinations were weeded out by natural selection. Consider for pedagogical purposes a somewhat

oversimplified scenario whereby individuals with hard-coded, “genes” for various sexual inclinations mingled together one generation after another, with those who manage to survive and reproduce leaving progeny who are apt to inherit the same genes. A (hypothetical) gene that encourages men to prize traits associated with female fertility will spread in the gene pool, as will one that encourages women to gravitate toward mates who exhibit the inclination and wherewithal to provision offspring.

Yet the term “hard-coded” — while perhaps appropriate for behaviors such as startle responses from sudden loud noises — veers toward a severely oversimplified caricature when applied to the complexities and nuances of mating decisions, which depend on not merely impulse but deliberate, conscious choice. (Indeed, the capacities that come with intelligence — the ability to ponder and assess marginal benefits and costs, say — are considered adaptations that more than compensate the expenses humans incur in connection with their large and physically demanding brains.)

Further, there is a welter of evidence (see, e.g., the discussion in Bergstrom (1996)) that people do *not* appear to maximize fitness, at least as measured, by, say, numbers of surviving grandchildren. Phenomena such as the demographic transition, and the current plunge in fertility in Southern Europe appear demonstrably at odds with the assumption of fitness maximization.

One way to resolve the dissonance between such outcomes and the assumption of fitness maximization is to posit that sex and reproduction are determined by the interplay of preferences (partly) due to evolutionary forces and deliberations affected by economic incentives, social norms and technology. A woman working to make partner in her law

firm decides to have sex with a man whom she finds attractive, but diligently adheres to her oral contraception regimen since it is not an opportune time for her to have a child.

But where do such considerations leave us with respect to predictive power and the formulation of falsifiable hypotheses? Isn't it possible to rationalize just about *any* result as being consistent with evolutionary forces? What, if anything, is the value-added in taking an evolutionary approach?

The answer is that evolutionary considerations make for clear cut predictions concerning *male-female differences* in underlying preferences regarding sexual behavior. In contrast to most economic models of matching, search and household behavior, whereby males and females are distinguished by little more than their subscripts, the evolutionary approach posits that male and female preferences pertaining to sexual behavior and infidelity can be expected to differ in predictable, systematic ways.

Setting the Bar—An Illustration of Predictable Sex Differences in Expectations for the Duration of a Relationship

If, as evolutionary theory posits, women are choosier than men when deciding whether to enter into a consensual sexual relationship, what can we predict regarding sex differences in expectations concerning the prospects of the relationship being a *long term* one? Some elementary reasoning suggests that women would tend to be more optimistic than men about the long-term prospects of the relationship, a result that is borne out by evidence from the NHLS, discussed below.

If women bear a disproportionate share of the costs of reproduction and prefer males who demonstrate a willingness to provision offspring over an extended period of time, they will be keen on screening out ne'er to wells eager to have sex a few times only

to move on to a new mate. Not that all men would be always inclined to short-term philandering, since the benefits of monogamy to them could outweigh the benefits of desertion. It is just that desertion is *relatively more costly* for women than for men. Accordingly, women should set the bar higher in terms of expected duration of the relationship.

Imagine that prospective duration of the relationship, R , is a random variable on the interval $\{0, R(max)\}$. Suppose too that women pay attention to a signal, s , before choosing to have a sexual relationship. The signal s is an unbiased, but noisy, indicator of R : $s = R + \varepsilon$, where $E(\varepsilon) = 0, \sigma_\varepsilon^2 > 0$. Being choosy entails setting a lower bound on s , say \bar{s} , in order for the woman to enter a sexual relationship. (Though men also might be choosy, we would expect them to be less so than women; accordingly let's assume that they do not attempt to assess the duration of a relationship with any given partner.) The sample of women who are in a sexual relationship will be those for whom $\varepsilon > \bar{s} - R$. Since $E(\varepsilon | \bar{s} - R) > 0$, women would tend to have more optimistic assessments than men concerning the prospective duration of the relationship.

Table 3 indicates a sex disparity in expectations that indeed conforms to this pattern. I examined samples of non-married respondents who said that they had sex with a partner in the past and that they had planned to have sex with him/her in the future. These individuals were asked how much longer the relationship was expected to last. Over one-third of the women—but only 15 percent of the men—reported they expected the relationship to “last a lifetime” (Table 3). Define a “long-term relationship” as one that lasts “for years” or “a lifetime.” Table 3 indicates that two-thirds of the women—but fewer than half of the men—reported being in a long-term relationship.

Table 3. Assessments of How Long Current Relationship Will Last
Non-cohabiting Singles in a Sexual Relationship with One Partner
Males versus Females

	Men	Women
Will last a lifetime	15.15	35.21
Will last for years	30.30	28.17
Will continue for months but end within one year	46.46	28.17
Will end in a matter of weeks	6.06	7.04
Will end in a matter of days	2.02	1.41

Source: Author's calculations from the NHSLs.
Sample: Males: n=99, Females, n=71.

Note that the percentages in Table 3 are not calculated for male-female relationship *pairs*, since the NHSLs did not set out to question pairs of persons in a relationship, be they married spouses, cohabitators or unmarried persons having a sexual relationship. Nevertheless, the NHSLs *did* set out to gather a nationally representative sample frame. Further, a sexual relationship is *reflexive*: If Joe has sex with Mary, Mary must have necessarily had sex with Joe. The survey is also quite explicit about what it means to have had sex—respondents are told that “having sex” is to be defined, for purposes of the survey, as activity involving direct genital-to-genital contact. Such a definition makes for an identity that implies that comparisons of reports in Table 3 might as well have been come from pairs of partners rather than randomly sampled individuals. (##Note: Must re-do Table 3 using sample weights.)

Note too that while a sexual relationship is necessarily reflexive, the same is not true for a romantic relationship. For instance, the fact that Mary loves Joe does not imply that Joe necessarily loves Mary. Further, if males do not set a threshold for the duration of a prospective relationship with a prospective partner, then the male expectations for *R*, in contrast to those of females, would be free of bias.

Male-Female Differences in Numbers of Reported Sex Partners and the Tyranny of Sexual Arithmetic

Do male-female differences in preferences for sex translate into corresponding differences in actual behavior? A simple-minded, “partial equilibrium” answer to this question would seem to be “yes,” and, indeed, the average number of sex partners reported by men in the NHSLS appears to exceed the average number reported by women.

A breakdown is reported in Table 4. While the vast majority report having just one sex partner, a substantial minority of men report having more than one, a number that exceeds the corresponding value for women. Hence the seeming disparity in the average number of partners reported by men versus women. (It is not possible to calculate exact averages from the NHSLS data, however, since number of partners is reported in categories that are top-coded (at “100 or more”).)

Yet only slightly less simple, “general equilibrium” considerations render such a result suspect. For example, in a world of strictly heterosexual sex, the aggregate number of sex partners encountered by men must equal that of women. (And, in a world with equal numbers of men and women, the average number of sex partners should be equal.)

Of course, this construct is not realistic since it ignores homosexuality. The incidence of male homosexuality is greater than that of female homosexuality, which could generate disparities in numbers of sex partners. I did not include male homosexuals in Table 4, however, and still there exists a disparity in average number of partners.

In Appendix II, I attempt to reconcile the average numbers of sex partners for men and women, a task that is quite difficult, and requires making heroic assumptions

about a few outliers. Two men and one woman reported having 100 or more sexual encounters. Using sample weights, and assuming that the men are top-coded at exactly 100, the number of sex partners required for the sole, hyper-promiscuous woman (who reports that she is a prostitute and is not represented in Table 4 since not all of her partners were men) is 729.

Surely part of the discrepancy in reported number of partners could stem from inclinations on the part of men to exaggerate (and perhaps on the part of women to downplay) their sexual activity. Yet the NHSLS was extremely thorough in its efforts to gauge sex partners. For instance, respondents were asked early in the survey to write the number down privately and place it in an envelope; later, they were asked to report it again in the face-to-face interviews, and it was found that there was good concordance between the two measures (Laumann, et al., (1994)). Brewer, et al. (2000) find that virtually all of the discrepancy in reported partners for men versus women stems from both under-representation of prostitutes in national surveys and men's reluctance to report visiting them.

Table 4. Number of Sex Partners in the Past 12 Months
Heterosexual Males versus Heterosexual Females

	Unweighted		Weighted	
	Men	Women	Men	Women
None	9.79	13.49	8.2	11.91
One	67.62	74.72	72.52	78.28
Two	9.92	6.59	8.19	5.64
Three	5	2.55	4.9	1.75
Four	3.15	1.17	2.96	.92
Five or more	4.52	1.49	3.23	1.51

Source: Author's calculations from the NHSLS.

5. Infidelity

In light of the fact that one of the most serious consequences of inclinations to engage in sex is to do so outside of one's marriage, I now proceed to a discussion of infidelity, using the earlier material on the evolutionary logic and evidence about sex differences in preferences as a backdrop.

Pertinent questions include the following: How prevalent is infidelity? What are some of the basic patterns? Under what conditions might infidelity be a non-issue for the economics of the family? What are the basic patterns in infidelity? How do these square with the evolutionarily based arguments outlined above? How might infidelity fit into economic models of the search for partners and household behavior?

Before getting to details, I provide a partial list of (tentative) answers:

- Rates of infidelity are indeed non-trivial: for instance one-quarter of all ever-married men reported having had at least one extramarital affair.
- There exist marked sex differences in age patterns of infidelity. Women are far more likely to commit infidelity early in the relationship.
- Cheating men are more likely than cheating women to have sex an affair with someone younger than their spouse. On the other hand, cheating women are more likely than cheating men to have an affair with someone better educated than their current spouse.
- One possible interpretation of the pronounced prevalence of infidelity among younger women is that it reflects search for a new partner. Dictates of the biological clock suggest that, if a woman finds herself matched with an unsuitable partner, then she had better not procrastinate in seeking out a new mate, and extramarital affairs might reflect this search activity.
- Indeed, as it turns out, outside evidence indicates that young women are far more likely than young men to *initiate* a divorce. If a spell of infidelity is little more than a stepping stone to a new relationship, its economic significance may well be quite small—a divorce was in the cards, and infidelity would merely be a consequence of a poor existing match.

- Infidelity would be far more significant a problem, however, if cheaters had no intention of splitting from their spouses, something evolutionary psychologists call a “short-term” mating strategy. For instance, it has been posited that a poor woman, concerned about provisioning her offspring, might seek relations outside her marriage with the aim of garnering additional resources. Indeed, it turns out that poverty is correlated with infidelity among female respondents (but not among males).
- However, there is little evidence that rich men are more prone to infidelity, counter to evolutionary-based claims that economically successful men are able to garner more than their fair share of mates.

Basic Patterns

Some elementary patterns of infidelity are listed in Table 5. Men are more likely than women to have ever had committed infidelity (25 versus 14.5 percent). However, much of the infidelity that men commit is with prostitutes—the incidence of ever having committed infidelity falls to 19 percent among the subsample of male respondents who said that they had never paid for sex (female respondents were not asked).

Infidelity is correlated with divorce. The percentage ever divorced is far higher among cheaters than non-cheaters, and this disparity is larger for women than for men. Also—and not surprisingly—infidelity is more prevalent once the relationship is expanded to include cohabitation along with marriage.

A focus on the incidence of extramarital affairs within the previous 12 months generates reported infidelity rates among men that are more than double those among women—7.6 versus 3.5 percent. Such disparity persists among a narrower sample that excludes men engaging in homosexual sex, paid sex of within couples who have been together for less than a year (Table 5, row 5).

While there is nothing in this disparity that necessarily violates the dictates of sexual arithmetic, it is useful to think of an instances where it would, for example, as in a

Table 5. Infidelity Patterns

	Men	Women
1. Percent ever having had an extramarital affair	25.18	14.48
Percentage of cheaters ever divorced	49.37	56.72
Percentage of non-cheaters ever divorced	29.47	30.99
Percent ever paying for sex	18.07	\a.
Percentage of cheaters ever paying for sex	40.64	\a.
2. Percent ever had affair but never paid for sex	18.98	14.48
3. Percent ever having affair: married once & marriage intact	18.55	8.32
4. Percent having extramarital affair prev yr	7.61	3.53
5. Percent having extramarital affair prev yr, select sample \b.	6.15	2.95
6. Percent cohabitators cheating prev yr	34.23	23.24
7. Percent cohabitators cheating prev yr, select sample \b.	24.19	15.29

a. Women were not asked if they had ever paid a man for sex.

b. Excluding those engaging in homosexual sex, paid sex, or those together < 1 year.

population consisting entirely of married couples (whom, should they decide to have an extramarital affair, have just one). Of course not everyone is married and part of the sex disparity could have been generated by a corresponding, and opposite, disparity in the propensity for single men versus single women to consort with married people.

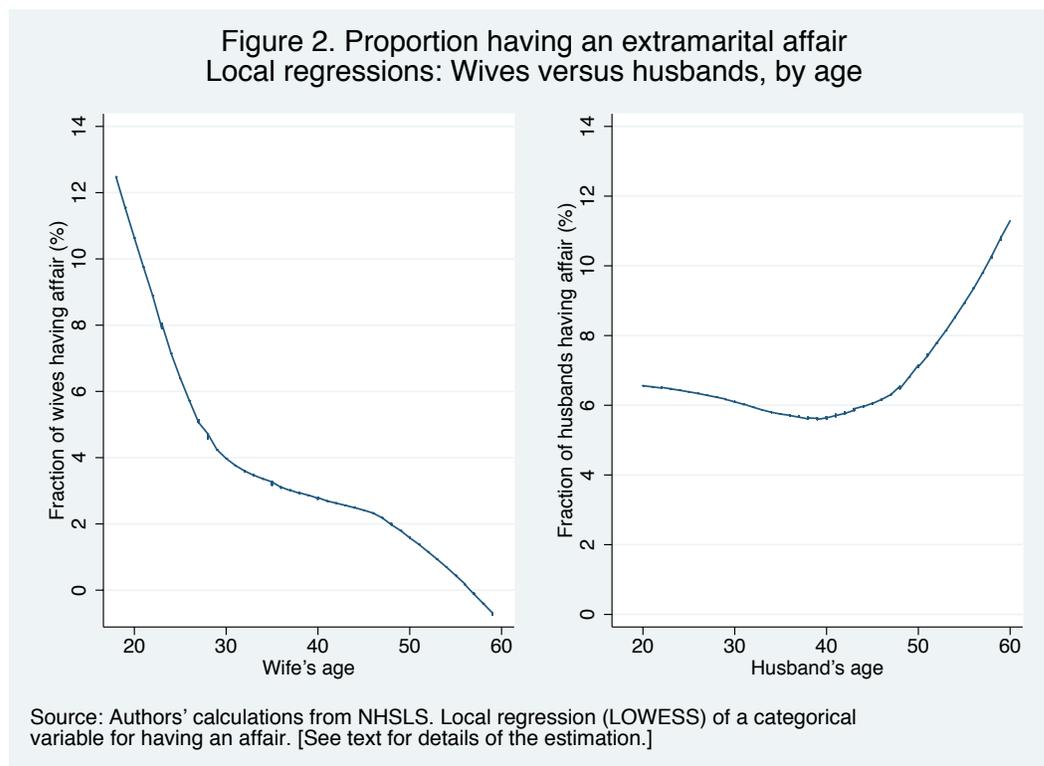
(Unfortunately, however, the NHSLS did not collect this information.)

6. Long Term Mating Strategies: Age Patterns, Matching and Search

To what extent might an extramarital affair be a means for moving on to a new relationship? For instance, a spouse may decide that his or her partner might not be a worthwhile match, and set out to find someone new, and, in the process, begin sexual relations with that someone.

Evolutionary psychologists would refer to this form of infidelity as a “long term” mating strategy if it represents part of a decision to transition to a new, long-term relationship. There is some circumstantial evidence, based upon sex differences in age patterns of infidelity, that there may be some veracity in this idea. Young female spouses are far more likely to have affairs than their male counterparts. Further, evolutionary considerations suggest that we might expect these sex differences in the eagerness with which a spouse would wish to end a shaky relationship, since reproductive potential falls faster for women than for men.

The (unconditional) incidence of extramarital affairs during the past year by age for wives and husbands is depicted in Figure 2, which is a local regression of affairs on age. Figure 2 illustrates a rather pronounced declining pattern with age for women.



(##Statistical inference is an important piece of unfinished business here, and it is important to note that the number of non-limits in the first panel of Figure 2 is only 28, and, for the second panel, 44.)

Some Considerations Pertaining to the Evolutionary Logic of Sex Differences in Mating, Matching, and Search

Economic models of matching, search and marriage take much of their inspiration from a rather brilliant and compelling analogy with models of the labor market (see, e.g., Mortensen (1988)). Nonetheless, a potential drawback of this approach is that that they are often gender blind, cast in a “person 1/person 2” framework, paying little attention to the distinct problems that males and females face in the labor market.⁹

While it is true that just about everyone wishes for a mate who is healthy, intelligent and kind, evolutionary considerations suggest that men and women might nonetheless confront some distinct problems in searching for a mate. For instance, if we adhere to an (admittedly, overly strict) reading of an evolutionary approach, males should be on the lookout for (relatively) easy-to-gauge indicators of fertility potential, whereas women must attempt to judge possibly harder-to-read indicators of earnings and commitment potential, parenting skills, and the like.

Further, within this framework, the biological clock complicates the problem since women and men face different age trajectories for reproductive potential. Indeed, this demand, coupled with the (assumed) inscrutability of men, would combine to make search especially vexing for women relative to men. Female searchers would be torn between (possibly) noisy signals of mate quality—which would compel her to hold out

⁹ Exceptions include Siow (1998) who considers the implications of the biological clock for women’s work and family decisions, and Chiappori and Oreffice (2008), who analyze the relationship between the availability of oral contraception and household decision making.

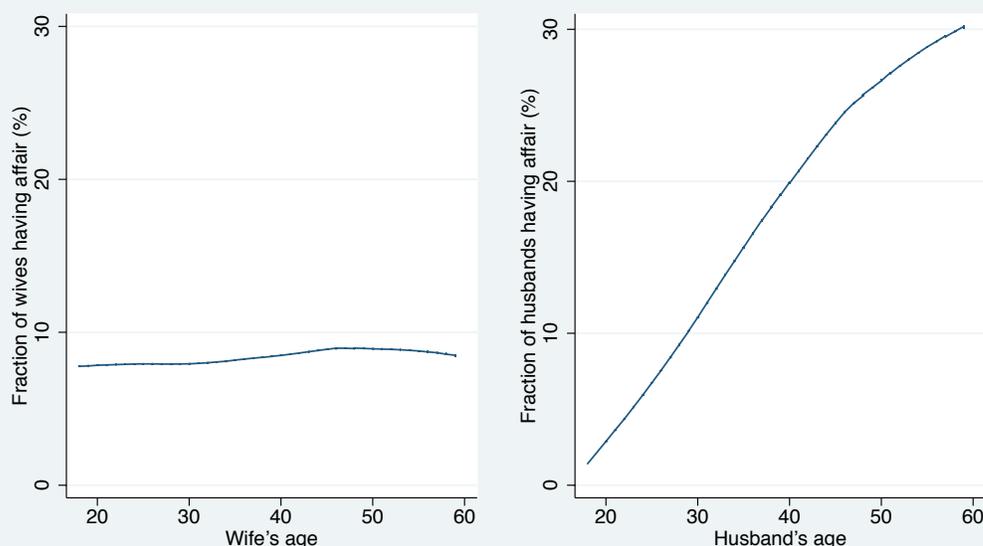
longer for “Mr. Right”—and the exigencies of the biological clock, which might impel her to hasten her decision to accept a proposal for marriage or some other form of serious relationship.

Further, if, as is supposed in several labor market models, a marriage or cohabitational relationship is an “experience good”—so that much information about its quality is revealed only after it has begun—then a woman, having discovered that the quality of her current spouse appears to falling short of its initial promise, might have an incentive to terminate the relationship quickly. (In addition, it could be that the “clock” is not just governed solely by the approach of menopause, but also by the trajectory of reproductive potential, which peaks in a woman’s early 20’s.)

Indeed, it is perhaps noteworthy that age sex-specific age trajectories tend to mirror those associated with female-male differences in the initiation of divorce ((Buckle, Gallup and Rodd (1996), Sweeney (2002)). Such patterns suggest that infidelity might indeed be part of a “long-term” mating strategy as evolutionary psychologists argue.

Yet, the “infidelity-as-stepping-stone” hypothesis is not likely to be the whole story, as Figure 3 indicates. The figure tracks sex-specific infidelity-age profiles of a different sort: the fraction of spouses who have *ever had* an affair, and *also* have been married only once, and have remained in that marriage. Figure 3 belies the same age effects as Figure 2: if women have an affair, they do so when young; the trajectory of having had an affair hardly increases at all with age. (Of course, it is impossible to separate age from cohort effects with these cross-sectional data, and some of the curve’s flatness is likely attributable to trends in sexual mores and (perhaps) the availability of oral contraception.) In contrast, the fraction of husbands ever having had an affair is a

Figure 3. Proportion ever having an extramarital affair
Spouses who married once and are still married
Local regressions: Wives versus husbands, by age



Source: Authors' calculations from NHLS. Local regression (LOWESS) of a categorical variable for having had an affair. [See text for details of the estimation.]

sharply increasing function of age. (Further, the same contrast by sex holds up if duration of marriage, rather than age, is tracked on the horizontal axis.)

One possible reason why someone might have had an affair in the past, yet remained in his or her current marriage might be that the past infidelity was part of a long term search for an acceptable mate, except that the quality of the paramour was subsequently revealed to fall short of that of the current spouse. Another possible explanation, though, is that the infidelity was part of what evolutionary psychologists call a *short term* mating strategy, something I turn to in the next section.

7. Short Term Mating Strategies: Polygyny, Polyandry, and Income

Another rationale for infidelity is that it is part of a short-term mating strategy, whereby (for instance) a man is motivated to have one (or more) sexual encounters—the proximate means to achieve the ultimate objective of “go forth and multiply.” Or, a

woman might be motivated to seek an extra sex partner with the aim of gaining additional resources with which to provision her offspring. For instance, a woman whose current mate risks, in 9 months time, being unemployed (or incarcerated, or murdered) might have an incentive to create so-called “paternity confusion,” so as to have another credible father available in the wings, if the need should arise (Hrdy (1999)).

From an evolutionary perspective, the sex difference in mating strategies is consistent with earlier discussions whereby male infidelity was presumed to be motivated by child *quantity* and female infidelity by child *quality*.

One implication of this gender-based quality/quantity distinction is that the marginal value of an additional sex partner should be subject to arguably sharply diminishing returns for women but not for men. For example, if a woman has *one* extra man waiting in the wings, how much value added could a *second* offer? In contrast, the “go forth and multiply” logic of male infidelity implies that such diminishing returns should not set in so quickly. To blend evolutionary and economic jargon: the marginal value of one more so-called “extra-pair-copulation” (EPC) should be higher for a man than for a woman.

I investigated the implications of this idea by examining sex differences, among cheating spouses, to take on a *second or more* extra partner, the results of which are shown in Table 6. The table indicates that the fraction of male cheaters who have sex with two or more extra partners is indeed significantly larger than the comparable figure for women.

Table 6. Cheating Spouses Having EPC with Two or More Partners
Infidelity Occurred during Previous 12 Months
Men versus Women

	Men	Women	p-value \a.
Those having extramarital affair	27.59	13.89	.05
Those having extramarital affair, select sample \b.	25	7.14	.02
Affairs include cohabiting cheaters	34.38	18.84	.01
Affairs include cohabiting cheaters, select sample \b.	25.42	12.2	.04

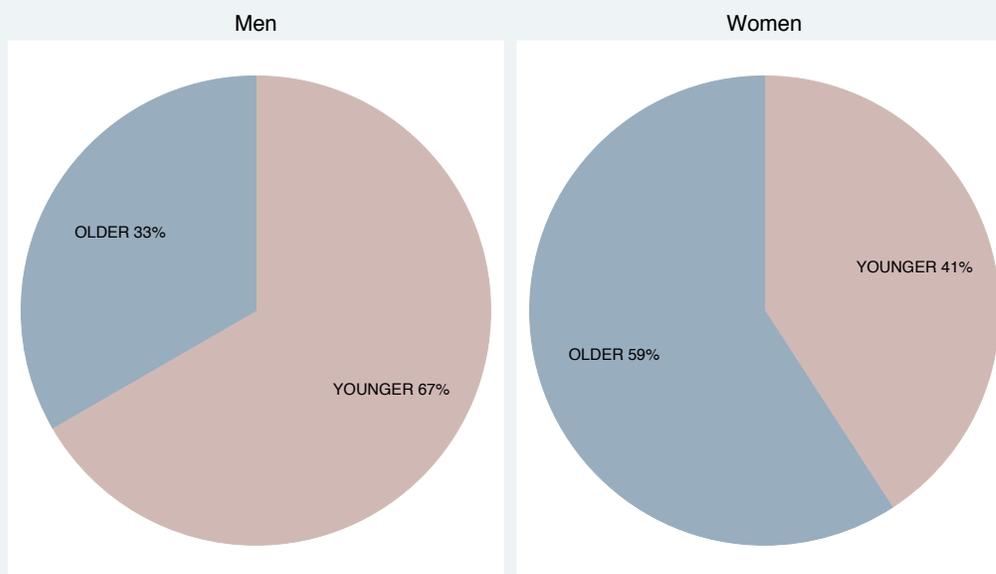
Source: Author's tabulations from the NHSLs.

a. One tailed test.

b. Excluding those engaging in homosexual sex, paid sex, or those together < 1 year.

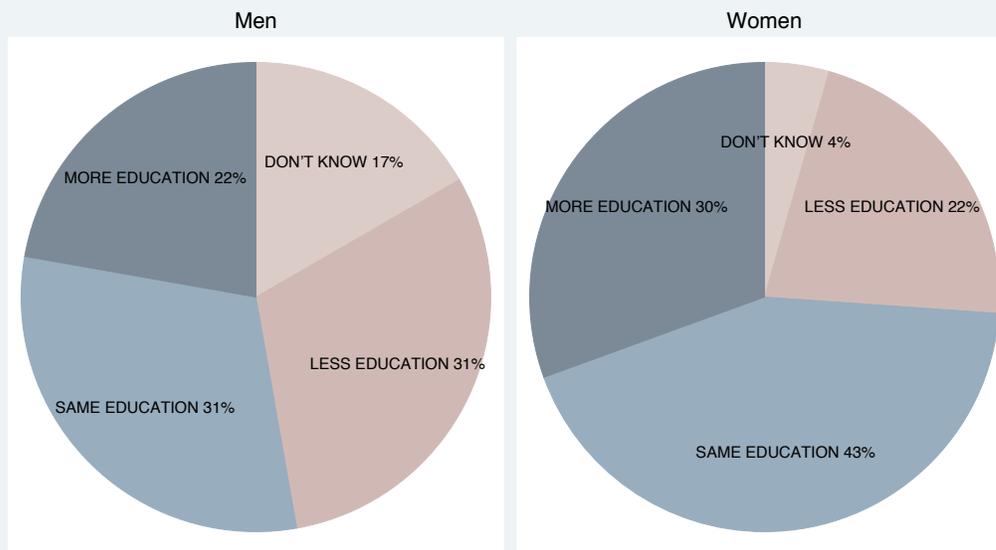
Another component of the evolutionary logic of EPC's is that men should tend to seek youth; women, status. This idea appears to be borne out in Figures 4 and 5. The former depicts proportions of husbands and wives having extramarital affairs with persons younger versus older than their current spouse. The latter depicts the same figures, except for education. Though sex differences are not overwhelmingly large, they do tend to go in the direction suggested by evolutionary considerations.

Figure 4. Percentages having affairs with younger versus older partner among married spouses who are having affairs
Men versus women



Source: Author's calculations from NHSLs—married respondents having at least one EPC. Sample sizes: Men, 36; Women, 22. One-sided p-value for male-female differences: .03.

Figure 5. Percentages having affairs with less versus more educated partners among married spouses who are having affairs
Men versus women



Source: Author's calculations from NHLS—married respondents having at least one EPC.
Sample sizes: Men, 36; Women, 23. One-sided p-value for male-female differences in frequency of less ed/DK: .05.

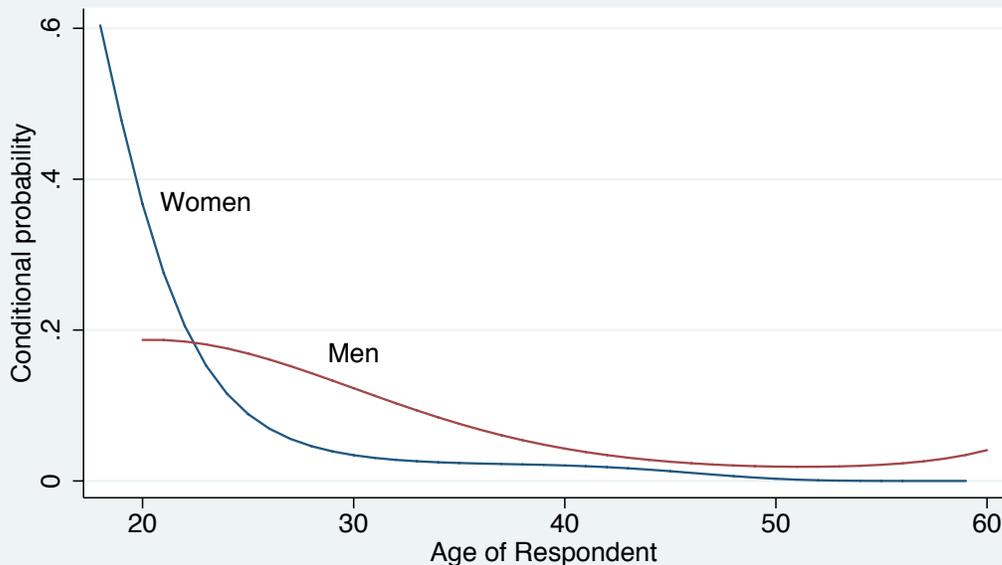
Finally, I consider an exploratory regression, in an attempt to make a first pass at estimating the partial correlation of income with the propensity to engage in an extramarital affair. The probit estimates in Table 7 (which control for a cubic in age, race/ethnicity, and spousal age) indicate a rather strong partial correlation of poverty status with female—but not male—infidelity. Further, the age profiles of female versus male infidelity, depicted in Figure 6, indicate that even after adjusting for the other covariates in Table 7, the propensity to commit infidelity falls faster with age for wives than for husbands.

Table 7. Probit estimates of marital infidelity during the past year: Wives versus husbands (Coefficients are estimated partial effects)

Explanatory variable	Wives			Husbands		
	Coeff.	t-val.	Mean	Coeff.	t-val.	Mean
In poverty	0.045	2.78	0.08	-0.033	-0.91	0.06
Rich	0.015	1.32	0.15	0.027	1.08	0.17
Age of respondent	-0.040	-2.39	38.71	0.028	0.70	40.14
Age of resp. squared/100	0.106	2.21	15.96	-0.095	-0.93	17.07
Age of resp. cubed/1000	-0.009	-2.12	69.58	0.009	1.06	76.35
Age of spouse	0.001	1.55	41.60	0.004	1.98	38.83
Black	0.016	1.39	0.10	0.067	1.82	0.08
Hispanic	-0.012	-1.20	0.05	-0.017	-0.35	0.03
Constant	1.000	2.12	1.00	0.000	1.00	1.00
Dependent variable mean		0.027			0.060	
Pseudo R-squared		0.137			0.041	
Number of observations		858			636	

Source: Author's tabulations from the NHLS.

Figure 6. Probability of Having an Affair by Age Conditional on Income Indicators and Other Covariates Married Men versus Married Women



Source: Authors' calculations from estimates in Table 7.

8. Conclusion: Unfinished Business, Future Directions

Rather than reiterating the key results, which were listed at the outset, I focus on what I see are the salient remaining issues to be addressed.

First, despite having emphasized the connection between sexual behavior and reproduction, I have not yet broached the evidence pertaining to the relationship between fertility and sexual behavior. Key questions remain concerning—just to cite a single example—how strongly childlessness might be related to infidelity. (Moreover, any attempts at making causal inferences about this connection are likely to prove daunting—fertility and the propensity for extramarital affairs, for example, are clearly jointly determined.)

Second, the material pertaining to the logic of infidelity clearly needs to be developed formally.

Third, seeing how it “takes two to tango,” this logic clearly needs to be fleshed out in a general equilibrium framework. Indeed, there is a well-developed literature in evolutionary biology, pioneered by John Maynard Smith, on so-called “frequency dependent selection” as it might pertain to fitness maximization and sexual behavior. Maynard Smith’s model can generate a population, that comprises—in addition to diligently investing parents of both sexes—promiscuous females and philandering males. Maynard Smith’s framework would appear to lend itself naturally to broaching what are expected to be rather daunting matters of general equilibrium.

References

- Akerlof, George A., Janet L. Yellen, and Michael L. Katz. 1996. "An Analysis of Out-of-Wedlock Childbearing in the United States." *Quarterly Journal of Economics*, 111 (2): 277-317.
- Amato, Paul R. and Stacy J. Rogers. 1997. "A Longitudinal Study of Marital Problems and Subsequent Divorce." *Journal of Marriage and the Family*, 59(3): 612-624.
- Bergstrom, Theodore C. 1996. "Economics in a Family Way." *Journal of Economic Literature*, 34(4): 1903-1934.
- Brewer, Devon D., John J. Potterat, Sharon B. Garrett, Stephen Q. Muth, John M. Roberts, Jr., Danuta Kasprzyk, Daniel E. Montano, William W. Darrow. 2000. "Prostitution and the sex discrepancy in reported number of sexual partners." *Proceedings of the National Academy of Sciences*, 97(22): 12385-12388.
- Buckle, Leslie, Gordon G. Gallup, Jr., and Zachary A. Rodd. 1996. "Marriage as a Reproductive Contract: Patterns of Marriage, Divorce, and Remarriage." *Ethology and Sociology*, 17(6): 363-77.
- Buss, David M. 1989. "Sex Differences in Human Mate Preferences: Evolutionary Hypotheses Tested in 37 Cultures," *Behavioral and Brain Sciences*, 12 (1): 1-49.
- Buss, David M., and David P. Schmitt. 1993. "Sexual Strategies Theory: An Evolutionary Perspective on Mating." *Psychological Review*, 100(2): 204-32.
- Chiappori, Pierre-Andre, and Sonia Oreffice. 2008. "Birth Control and Female Empowerment: An Equilibrium Analysis." *Journal of Political Economy*, 116(1): 113-140.
- Cox, Donald. 2007. "Biological Basics and the Economics of the Family," *Journal of Economic Perspectives*, 21(2): 91-108.
- Chu, C. Y. Cyrus, Ronald D. Lee 2008. "Menopause and the Division of Labor: An Economic Analysis."
- Clarke, Russell D., and Elaine Hatfield. 1989. "Gender Differences in Receptivity to Sexual Offers," *Journal of Psychology and Human Sexuality*, 2(1): 39-55.
- Ellis, Bruce J., and Donald Symons. 1990. "Sex Differences in Fantasy: An Evolutionary Psychological Approach." *Journal of Sex Research*, 27(4): 527-56.
- Elmslie, Bruce, and Tebaldi, Edinaldo. 2008. "So, What Did You Do Last Night? The Economics of Infidelity." *Kyklos*, 61(3): 391-410.

- Emlen, Steven T., and Lewis W. Oring. 1977. "Ecology, Sexual Selection, and the Evolution of Mating Systems." *Science*, 197(4300): 215-23.
- Fair, Ray. 1978. "A Theory of Extramarital Affairs." *Journal of Political Economy*, 86(1): 45-61.
- Fisman, Raymond, Sheena S. Iyengar, Emir Kamenica, Itamar Simonson. 2006. "Gender Differences in Mate Selection Evidence from a Speed Dating Experiment." *The Quarterly Journal of Economics*, 121(2): 673-697.
- Freeman, Derek. 1983. *Margaret Mead and Samoa*. Cambridge, London: Harvard University Press.
- Goldin, Claudia and Lawrence F. Katz. 2002. "The Power of the Pill: Oral Contraceptives and Women's Career and Marriage Decisions." *Journal of Political Economy*, 110 (4): 730-770.
- Hite, Shere. 1981. *The Hite Report: A Nationwide Study of Female Sexuality*. New York: Seven Stories Press.
- Hrdy, Sarah Blaffer. 1999. *Mother Nature*. New York: Ballantine Books.
- Kitson, Gay C., Karen Benson Babri, and Mary Joan Roach. 1985. "Who Divorces and Why: A Review." *Journal of Family Issues*, 6(3): 255-93.
- Laumann, Edward O., John H. Gagnon, Robert T. Michael, and Stuart Michaels. 1992. *National Health and Social Life Survey, ICPSR Version*. Chicago, IL: University of Chicago and National Opinion Research Center (producer), 1995. Ann Arbor, MI; Inter-university Consortium for Political and Social Research (distributor), 1995.
- Laumann, Edward O., John H. Gagnon, Robert T. Michael, and Stuart Michaels. 1994. *The Social Organization of Sexuality: Sexual Practices in the United States*. Chicago: The University of Chicago Press.
- McLanahan, Sara, and Gary Sandefur. 1994. *Growing Up with a Single Parent: What Hurts, What Helps*. Cambridge, MA: Harvard University Press.
- Mead, Margaret. 1928. *Coming of Age in Samoa*. New York: William Morrow.
- Michael, Robert T., John H. Gagnon, Edward O. Laumann, and Gina Kolata. 1994. *Sex in America: The Definitive Survey*, New York: Warner Books.

- Mortensen, Dale T. 1988. "Matching: Finding a Partner for Life or Otherwise." *The American Journal of Sociology*, 94 (Supplement: Organization and Institutions: Sociological and Economic Approaches to the Analysis of Social Structure): S215-S240.
- Posner, Richard A. 1992. *Sex and Reason*. Harvard University Press.
- Schmitt, David P. 2005. "Fundamentals of Human Mating Strategies." In *The Handbook of Evolutionary Psychology*, edited by David Buss (258-291). Hoboken, NJ: John Wiley and Sons, Inc.
- Schmitt, David P. et al. 2003. "Universal Sex Differences in the Desire for Sexual Variety: Tests from 52 Nations, 6 Continents, and 13 Islands." *Journal of Personality and Social Psychology*, 85(1): 85-104.
- Singh, Devendra. 1993. "Adaptive Significance of Female Physical Attractiveness: Role of Waist-to-Hip Ratio." *Journal of Personality and Social Psychology*, 65(2): 293-307.
- Siow, Aloysius. 1998. "Differential Fecundity, Markets, and Gender Roles." *Journal of Political Economy*, 106(2): 334-54.
- Sweeney, Megan M. 2002. "Remarriage and the Nature of Divorce: Does It Matter Which Spouse Chose to Leave?" *Journal of Family Issues*, 23(3): 410-40.
- Trivers, Roberts L. 1972. "Parental Investment and Sexual Selection." In *Sexual selection and the descent of man*, edited by Bernard G. Campbell (136-179). Chicago, IL: Aldine.
- Wolff, Naomi. 1992. *The Beauty Myth*. New York: Doubleday.
- Young, Larry J. and Sue C. Carter. 2008. "Sex Differences in Affiliative Behavior and Social Bonding." In *Sex Differences in the Brain: From Genes to Behavior*, edited by Jill B. Becker, et al. (139-154). New York: Oxford University Press.

Appendix I. The NHSLS Data: Details

How much faith can we place in a survey that sets out to collect information about such a sensitive and private a subject as sexual behavior? Do those canvassed constitute a representative sample? How likely are they to be providing truthful and accurate answers to questions about their sex-related attitudes and practices?

Though questions concerning data integrity are germane to any empirical study, they are especially salient for one such as this. Accordingly, in addition to the more standard sorts of data-related information typically recounted in a section such as this, I devote a significant amount of attention to assessing the more fundamental question of how much the NHSLS data can tell us about sexual behavior and infidelity in particular.

A key bottom line is that the NHSLS appears virtually unparalleled compared to its closest competitors. In more detail:

- The NHSLS indeed appears to encompass a representative sample of United States households.
- The survey designers took great pains to assess the internal consistency of responses about potentially sensitive issues such as number of sexual partners (e.g., by posing certain questions more than once, and in different ways) and such checks have produced encouraging results.
- They also included a small subset of overlapping questions (e.g., number of sexual partners—eleven overlapping questions in all) in a completely different survey instrument (the General Social Survey) and obtained remarkably similar results as those in the NHSLS.
- The NHSLS was conducted by a well-established survey organization, the National Opinion Research Center using seasoned, highly qualified survey personnel, who collected information from face-to-face interviews an hour and one-half in duration, on average. The average cost per completed interview was \$450.
- Despite the sensitive nature of the questions, the NHSLS had a response rate of 78 percent, a rate comparable to high-profile surveys such as the Health and Retirement Study.

Nonetheless, the survey does not seem to be completely free of possible inconsistencies. Most important, there exist gender differences in reported numbers of sex partners that are difficult to reconcile.

Why was the survey conducted?

Though a major catalyst for the survey was the problem of HIV/AIDS, from the outset the designers planned to go beyond purely epidemiological aims. Rather, the intent was to try to learn about sexual behavior for a representative sample of United States households using modern survey methods, something never before attempted. Indeed, the major impetus for the NHSLS was a pronounced dissatisfaction with popular sources of information about sexual behavior, nearly all of which were *ad hoc*, low-cost surveys gleaned from so-called “convenience” samples, such as the questionnaire published in the women’s magazine *Redbook* in its October, 1974 issue (one of the data sets used by Fair (1978)).

The designers of the NHSLS found such survey techniques to be wanting, for obvious reasons. For example, the aforementioned *Redbook* survey was included in an issue that sold 4,700,000 copies, yet only 2 percent of those who purchased the issue returned filled-out questionnaires, and only a fraction of these ever made their way into end-product tabulations (Michael, Gagnon, Laumann and Kolata (1994)). Accordingly, they set out to canvass a random sample of households from a representative sampling frame.

In an advance letter, prospective respondents were told that the survey was intended to help “doctors, teachers, and counselors better understand and prevent the spread of diseases like AIDS and better understand the nature and extent of harmful and

of healthy sexual behavior in our country” (Laumann, Gagnon, Michael and Michaels (1994, p. 55)). (The timing of the survey, which was conducted between February and September 1992, may well have been somewhat fortuitous in the wake of two high-profile sex related news stories the previous fall, the announcement that pro basketball star Magic Johnson had been diagnosed as HIV-positive and the Supreme Court confirmation hearings of Clarence Thomas.)

Appendix II. Reconciling male-female differences in average number of reported sex partners

In a world with only heterosexual sex, the aggregate number of sexual encounters for men and women must be equal. Note too that it is possible to get situation where results in Table 4 obtain if there are just a few especially promiscuous females in the population--the 'prostitution' equilibrium. Below, I merely wish to see if the data could conceivably support such an equilibrium, with complete and truthful reporting (i.e., hyper-promiscuous women included in the sample).

The average number of partners for the 1,464 strictly heterosexual men who answered the question is 1.73, compared to 1.19 for the 1,921 who answered the question. How could these averages possibly balance? Answer: It is difficult, though not impossible, to balance them. Here is one thought experiment: Imagine that the 2 hyper-promiscuous men, i.e., those who report 100 or more partners, are coded at exactly 100. In addition, let's initially ignore the fact that males tend to be underrepresented in the sample, something which, when we take into account, makes the problem of balancing more difficult.

Now, it turns out that there is one woman in the sample who reported having 100 or more partners. Though not all of those partners were men, assume this is the case. In addition, it turns out that she is a sex worker: she answered 'yes' to the question of whether she had received money for sex. So how many partners would she have to have had in order for the aggregate male and female partners to balance? Answer: 344.

But recall that there is the problem of under-representation of males. What if we repeat the exercise using sample weights? Then the answer is 729. The bottom line is that, even assuming hyper-promiscuity on the part of the reportedly most promiscuous woman in the NHLS data set, it is difficult to reconcile the male-female differences in the number

of partners. Of course, there are factors that could bring the numbers closer, such as likely under-representation of female sex-workers in the sample. However, the numbers still appear to leave the impression that males could be exaggerating their number of partners relative to females.

Again, see the study by Brewer, et al. (2000) who find explain most the male-female discrepancy in reporting to both under-representation of prostitutes in national surveys and men's reluctance to report going to them.