MARITAL COITAL FREQUENCY AND THE PASSAGE OF TIME: 
ESTIMATING THE SEPARATE EFFECTS OF SPOUSES' AGES AND 
MARITAL DURATION, BIRTH AND MARRIAGE COHORTS, AND 
PERIOD INFLUENCES*

GUILLERMINA JASSO
University of Minnesota

To the extent that marital coital frequency is linked to both within-couple and societal fertility and sex ratio, it may be implicated in a wide range of behavioral and social phenomena. Variation in marital coital frequency over the life course as well as across cohorts may thus affect many aspects of the social life. This paper reports estimates of the ceteris paribus cohort-free effects of spouses' ages, marital duration, and contemporaneous period influences on coital frequency, as well as of the correlations between coital frequency and birth- and marriage-cohort factors. These estimates are obtained by (a) using the properties of the fixed-effects statistical model in order to separate the effects of cohort influences from the age/duration and period effects and to control for the operation of couple-specific unobservables, and (b) using strictly monotonic nonlinear transformations in order to separate the effects of wife's age, husband's age and marital duration.

What are the effects of marital duration and of the spouses' ages on their coital frequency? Have the sexuality-relevant environments faced by American children, adolescents, and newlyweds produced observable differences in levels of sexual activity across birth and marriage cohorts? Have advances in contraceptive technology in the last twenty years produced secular increases in sexual activity? These questions are extremely difficult to answer, principally for two reasons: First, unobservable couple-specific factors may be correlated with the observable determinants of coital frequency, thus biasing the obtained estimates.1 Second, seven factors of substantive interest—the wife's and husband's birthdates and ages, the marriage date and marital duration, and the observation time period—are linearly dependent, so that at most four linear effects may be estimated, leading to composite estimates and, as Ryder (1968:550) puts it, to "the temptation to use age-cum-cohort as if it were age," thereby assuming zero effects for cohort influences and, in the process, obtaining possibly biased estimates of the effects of age (and, in the present case, of marital duration).2

There is much interest in obtaining estimates of the pure effects of the seven factors just listed, since by their relation to coital frequency they may be related as well to the determination of a wide range of behavioral and social phenomena. The study of sexual behavior derives its importance to sociology from the historical link between coitus and the production of new members for human society. Marital sexuality is of particular importance because of its dual role as "both an expression of and a conditioner of the general character of the marital relationship" (Rainwater, 1965:61), a relationship central to the institution of the family, which in turn is central to socialization of the young and to major features of social,

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*Direct all correspondence to: Guillermina Jasso, Department of Sociology, University of Minnesota, Minneapolis, MN 55455.

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2 The problem of identifying the separate effects of age, cohort, and period influences was brought to general scholarly attention by Ryder (1951, 1965, 1968). Illuminating discussion is found in Glenn (1976, 1977). It is well known that additional information is required in order to achieve identification; Mason et al. (1973) suggest the use of zero restrictions in cases where it is substantively reasonable to do so. Hobcraft et al. (1982) provide an excellent survey, noting especially the further difficulties posed by cases of double or triple identification problems (such as the present case, in which seven variables are linearly related to each other). Additional useful discussions are found in Mason et al. (1976), Farkas (1977), Fienberg and Mason (1978), Weiss and Lillard (1978), Rodgers (1982), Smith et al. (1982) and Clogg (1982).
economic, and political organization. Additionally, marital coital frequency is thought to affect fecundability (Keyfitz, 1977:315–17; James, 1979; Marini and Hodsdon, 1981; Rindfuss and Morgan, 1983) and to affect as well the gender of the conceptus (James, 1983b). Through these effects, coital frequency may operate not only on the biography of an individual couple, as a determinant of the number of children they have, of the children’s gender, of the length of the birth intervals, and hence of the healthiness, productivity, and other characteristics of the offspring, but also on the societal fertility rate and sex ratio, both of which may play important parts in virtually all aspects of the social life (Freedman, 1968; Guttentag and Secord, 1983; Keyfitz, 1983).

Other effects of coital frequency may be more subtle. For example, if coital frequency is systematically linked to a couple’s productivity-relevant attributes, then there would be generated correlations between family size and income and wealth and between gender and parental income and wealth. The latter correlation is particularly suggestive, as it would lead not only to gender inequalities in schooling and other wage-relevant opportunities but also to a society in which the three types of families (daughters-only, sons-only, and mixed-sex) are hierarchically arranged along the income continuum, potentially generating distinctive customs of mate selection, dowry and/or bridewealth, reckoning of kinship and descent, and naming practices. To illustrate, if in a village every bride came from a wealthier family than her groom, then a simple behavioral mechanism linking personal well-being (e.g., self-esteem) with social status would swiftly produce the custom of grooms taking their brides’ surnames at marriage.

If the direction of the correlation between coital frequency and the wage-relevant attributes were itself dependent on exogenous technological factors, then the direction of the correlations just discussed would vary systematically across societies and over time, giving rise to great variability in marriage- and family-related customs and laws, a variability we indeed observe (Marshall, 1968; Smith, 1968; Winch, 1968). Moreover, changes which altered the direction of the correlation would alter as well the cultural structures; an example might be the sudden and dramatic shift from a bridewealth to a dowry system which occurred in south India after Independence (Caldwell et al., 1983; see also Goode, 1963; Huber and Spitze, 1983; Huber, 1984).

More immediately pertinent to our present purpose, if coital frequency varies systematically over the life course—for example, if it varies with age—then age at the inception of noncontracepting married life would affect the family outcomes; put differently, ten years of married life begun at age 25 would produce a set of children of different quantity and quality than ten years of married life begun at age 15. Further, if coital frequency varies nonmonotonically over the course of the marriage (i.e., with the joint effects of spouses’ ages and marital duration), then the coital-frequency “growth” curve would reveal the time points at which the probabilities of having a child of a given sex are equal (a phenomenon discussed by Aristotle in On The Generation of Animals), as well as the effects on the offspring configuration of the timing of contraception. Thus, a couple’s decision to contracept for, say, the first two years of sexual union would alter the probable sex of the first-born, as would government policies which promoted such a childbearing delay.

As the foregoing suggests, although advances in the technologies for contraception and for in vitro fertilization and gestation signal the twilight of the link between coitus and reproduction, an understanding of the historical relationships may be central to an understanding of the formation of the social institutions and cultural structures we have inherited.3

An additional set of phenomena may be linked to cohort effects on the propensity for sexual activity. It is possible, for example, that systematic intercohort differences, if any, might lead to preferential cross-cohort mating (affecting such observable phenomena as age differences between spouses) and that cross-sex differences in the pace of intercohort changes might lead to accelerated marital disruption and intensified sex and age differentiation (visible, for example, in divorce rates and in sex-specific social movements).

Finally, obtaining estimates of the effects of contemporaneous influences is important because such estimates provide clues to structural changes, for example, in the price of privacy (as through housing costs) and in the price of contraception (as through discoveries concerning the safety of contraceptive methods).

It is widely believed that the composite effect of age and marital duration is negative—viz., that coital frequency decreases over the life course. Negative effects of age and/or marital duration have been reported by Trussell and Westoff (1980), Udry et al. (1982), and

3 Note that such understandings would further illuminate the relationships between biological traits and processes and behavioral and social phenomena. For some recent searching looks, see Barchas et al. (1975), Bennett (1983), Webster and Driskell (1983) and Rossi (1984).
James (1983a). These studies, however, are subject to the two kinds of bias noted above, arising from couple heterogeneity as well as from the confounding of cohort and age/duration effects. Thus, the findings could as easily be interpreted to support the proposition that American sexuality-relevant environments facing successive birth cohorts have provided increasing encouragement and reinforcement for sexual activity. Given the present state of knowledge, it is difficult to discern whether one or more of the following statements is correct: (1) Coital frequency decreases with age and marital duration. (2) In the last half-century, coital frequency has increased across birth and marriage cohorts. (3) In the last twenty years, coital frequency has increased, net of cohort and age/duration effects.

With respect to the effects of age, it should be noted that Kinsey and his associates (1948, 1953), in their pioneering empirical work on human sexuality, concluded that sexual responsiveness behaves in a nonmonotonic fashion with respect to age, increasing to a maximum and subsequently decreasing. They calculated that among males the maximum is reached at about the age of 17 years and sexual responsiveness immediately begins a very gradual decline, while among females the maximum is reached at an age somewhere between the late twenties and middle forties and sexual responsiveness does not begin to decline until menopause.

This paper uses longitudinal data drawn from the 1970 and 1975 rounds of the National Fertility Studies and exploits the properties of the fixed-effects statistical model in order to obtain estimates which are free of the biasing effects of the unobservable factors and which, for the first time, separate the effects of husband’s birth cohort, wife’s birth cohort, and marriage cohort from the effects of husband’s and wife’s age and their marital duration.

The sample consists of over 2000 continuously married couples, representing the following ranges in the substantive variables of interest: husband’s age, 17.25 to 58.58 years; wife’s age, 15.5 to 48.08 years; marital duration, one month to 25 years; birth cohorts from 1917 to 1953 for husbands and from 1927 to 1955 for wives; and marriage cohort, 1950 to 1970.

It is well known that the fixed-effects model is the only technique currently available that yields unbiased estimates in the presence of correlation between measured explanatory variables and unobservable individual-specific effects, other techniques achieving consistency at best (Hausman, 1978; Judge et al., 1980; Hausman and Taylor, 1981). However, it appears not to have been recognized that the fixed-effects model, since it holds constant all permanent attributes, holds constant as well all cohort influences which persist over time, and hence may be quite useful in separating age, cohort, and period effects.

Three sets of estimates are obtained. First, an unbiased estimate of the composite effects of wife’s age, husband’s age, marital duration, and the contemporaneous period effect is obtained. This estimate has the virtue of being completely free of contamination from cohort effects; however, it has the defect of combining four effects, so that at best it indicates that at least one of the four factors must have an effect of the same sign as the composite effect. Second, nonlinear assumptions are introduced in order to isolate the separate effects of age, marital duration, and observation period. These estimates, carried out within a fixed-effects framework, remain free of cohort effects and of heterogeneity bias but embody the additional albeit mild functional-form assumptions. Third, the residual from the fixed-effects equation is used to obtain estimates of the relationships between the birth and marriage cohorts and the unobservable propensity for sexual activity. These estimates are free of the effects of age, marital duration, and contemporaneous influences.

The results of this investigation suggest that, other things being equal, in the observed ranges of the variables, marital coital frequency decreases with marital duration and possibly with husband’s age (the slopes becoming successively less steep) and increases at a decreasing rate (again, less and less steeply) with wife’s age. Since in the sample the youngest husband is 17 years of age and the oldest wife is 48 years of age, these results are completely consistent with Kinsey et al.’s (1948, 1953) findings. Interestingly, the combined effects of spouses’ ages and marital duration are consistent with a curve of coital frequency which is nonmonotonic over the course of the marriage, decreasing to a minimum within two or three years of marrying, thereafter increasing. Moreover, the time point at which the minimum is reached is itself a function of age at marriage. For example, in the special case in which both spouses are the same age, the minimum is a strictly increasing function of age at marriage: if age at marriage is 24, then the minimum is predicted to occur at about two months before the second wedding anniversary.

With respect to cohort influences, the results (which are completely free of the biasing effects of age or period influences) indicate substantial differences in the propensity for sexual activity across birth and marriage cohorts, with more recent cohorts displaying higher esti-
mated sexuality levels. However, each of the three cohort variables exhibits a different pattern, suggesting, among other things, that the sexuality-relevant environments faced by girls changed more rapidly than those faced by boys. Finally, we find also that the 1975 environment was less conducive to sexual activity than the 1970 environment, suggesting that new information concerning the risks associated with the new contraceptive technology substantially increased the costs of contraception and led to a decline in coital frequency.

Since the birth- and marriage-cohort effects are positive, these results indicate that failure to control for cohort influences would downwardly bias the estimated effects of age and marital duration. Thus, these results suggest that the negative effect of marital duration is of smaller absolute magnitude than has been reported in previous (cohort-confounding) studies, that the effect of husband’s age is either zero or negative but of smaller absolute magnitude than has been previously reported, and that the effect of wife’s age is positive rather than negative as has been previously reported.

CONJECTURES ABOUT THE DETERMINATION OF MARITAL COITAL FREQUENCY

Concerning the Effects of Age and Marital Duration

The prevailing opinion among scientists and clinicians, as well as novelists, philosophers, theologians, and others who have thought about the matter, is that marital coital frequency decreases over time. This decrease is thought to be related both to the decline of healthiness, hormonal production, and (mental and physical) energy levels which are believed to accompany aging (Birren, 1968; Talmon, 1968; Udry et al., 1982), and also to the loss of novelty and the reduced need to bond which accompany marital duration (Udry, 1970:377).

Attributing components of this decline with the passage of time to the three factors—spouses’ ages and marital duration—is a more complicated matter. With respect to age effects, Kinsey et al. (1953:759–60) found evidence to support a conjecture that appears as early as Ovid, viz., that maximum sexual responsiveness is reached very early in the male (at about 17 years of age) and relatively late in the female (perhaps past the fortieth birthday). Thus, Kinsey et al. (1953:353) and others have argued that the observed decrease in marital coital frequency is, as Gebhard (1978:596) puts it in an authoritative article for the lay reader, “more often than not the result of male deteri-

oration.” On the other hand, Udry et al. (1982) argue that known facts about differential changes in hormonal production suggest a deterioration in female responsiveness. Students of aging effects suggest that the sexual drive slackens as age increases (Birren, 1968; Talmon, 1968). Shock (1978:308), in an authoritative article for the lay reader, noted that “Sexual activity, as reported in interview studies, diminishes progressively between the ages of 20 and 60 in both males and females.”

With respect to marital duration, the prevailing opinion is that it has a negative effect on coital frequency (Trussell and Westoff, 1980; James, 1983a), due to lack of novelty, reduced need to bond, and psychological fatigue (Udry, 1970). Yet Ovid and others have argued that if practice increases sexual skill and if sexual skill increases sexual pleasure, then marital duration should produce an increase in coital frequency (an experience effect in marriage).

The literature suggests that, in the ranges of the variables observed in this study, the ceteris paribus effects of spouses’ ages and marital duration are monotonic. However, disagreement in the literature about the direction of the effects makes it unwise to sign them a priori. Further, the literature suggests that these effects occur very gradually, perhaps becoming more and more gradual as age and marital duration increase. Thus, these effects may be modeled by linear functions or by nonlinear functions of the sort which become less steep, viz., increasing-and-concave or decreasing-and-convex functions.

Concerning the Effects of Birth and Marriage Cohorts

All individuals born at the same time (and in the same country) share certain features of a common environment, an environment encompassing medical beliefs and practices, recommended child-rearing practices, food supply, a range of toys and recreational activities, level of economic development, and a popular culture or folklore concerning love, sex, and marriage. Some of these features have permanent consequences for individuals (Ryder, 1951, 1965, 1968; Glenn, 1976, 1977; Elder, 1974, 1979). Thus, it is commonly held that the environment faced by children born during the Depression differs from that faced by children born during World War II and that both differ from that faced by children born during the baby-boom years (1946–1954), and that some of these differences have led to permanent differences between individuals born at those different times.

This paper is concerned only with the sexuality-relevant elements (possessing per-
manent effects) of the environments. Did these change over time? Did boys and girls of the same vintage face different environments? Did the rate of change differ for the two sex-specific time series of environments?

Similarly, all couples married at the same time (and in the same place) share certain features of a common environment, features with long-lasting effects. They have available the same set of marriage manuals, receive similar “advice,” are exposed to the same “models” in popular culture (novelistic and cinematic portrayals of marriage). This paper asks: Did the sexuality-relevant environments facing marriage cohorts in the United States change between 1950 and 1970?

Most observers would probably agree that American birth cohorts since 1920 have faced environments increasingly supportive of sexual activity (Reiss, 1960, 1966). Hence, a priori we expect to find substantial differences across cohorts.

Concerning the Effects of the Contemporaneous Time Period

It is widely believed that changes in contraceptive technology have produced increases in marital coital frequency. Westoff (1974) reports a dramatic increase between 1965 and 1970. Trussell and Westoff (1980:247) suggest that the trend continued to 1975, but at “a slower pace.” It can be argued, however, that the cost of contraception increased between 1970 and 1975, as information spread about medical risks associated with the two most effective methods. Hence, the sign of the period effect cannot be predicted.

Concerning Interactions

Following the cogent reasoning of Ryder (1965, 1968) and Glenn (1976, 1977), it can be argued that the spouses’ ages and marital duration, as well as their birth and marriage cohorts, conditioned the response to the contraceptive revolution of the 1960s (Westoff and Ryder, 1977) and that that response had persistent consequences for sexual activity in 1970 and 1975. It can also be argued that the response to the contemporaneous influences is conditioned by age and marital duration; for example, information about the safety of contraceptives will be irrelevant to couples in which the wife is postmenopausal, and increases in the price of housing/privacy will be irrelevant to couples whose children have all grown and moved away. However, these latter interactions are not expected to operate in this study, given the observed ranges of wife’s age and marital duration.

DESIGN OF THE EMPIRICAL ANALYSES

Specification of the Marital Coital Frequency Equation

Unbiased (or at least consistent) estimation of the causal effects of one factor upon another depends upon correct specification of the equation describing the determination of the dependent variable, “specification” taken in its large meaning, viz., encompassing inclusion of relevant regressors as well as assumptions about the properties of the error term and its relation to included regressors.4

Concerning the set of regressors, if bias is to be avoided, then any factor which affects coital frequency and which is correlated with one or more of the factors of interest in this paper—age and marital duration, birth and marriage cohort, and time period of the observation—must appear in the equation (or be provided for by the estimation procedure). Scientific and clinical accounts (Rainwater, 1965; McCary, 1967; Masters and Johnson, 1970) suggest that any list of the basic determinants of coital frequency (CF) must include such factors as whether or not the wife is pregnant and whether or not the couple has a small child, which affect CF through their effects on healthiness and energy levels; both spouses’ employment, which affects energy levels; and possibly both spouses’ earnings, which provide leisure-time alternatives to sexual activity. Since all of these factors are correlated with age and/or marital duration, they must appear as regressors.

At this point it is clear that the determinants of CF include a set of linearly dependent terms. Wife’s age, husband’s age, and marital duration are each an exact transformation of time period and wife’s birth cohort, husband’s birth cohort, and marriage cohort, respectively. This problem is addressed below.

Turning to an examination of the error term and of its relation to the included factors, a priori it would appear reasonable to regard the unobserved term as correlated with the regressors. The scholarly and clinical literatures (Kinsey et al., 1953; Rainwater, 1965), as well as the popular personal-development literature (Brody, 1976), suggest the existence and operation of an unobserved couple-specific time-invariant propensity for sexual activity, a propensity which varies greatly across couples and which may affect many of a couple’s choices and behaviors. If, ceteris paribus, the greater an individual’s propensity for sexual activity, the younger he/she is at marriage and

4 Useful discussions are found in such texts as Judge et al. (1980), Judge et al. (1982) and Johnston (1984). See also Hausman (1978).
the younger is his/her chosen mate, then marital duration and at least one spouse's age (or, alternatively, the signed difference between the two spouses' ages) must be regarded as correlated with the unobserved term. Similar arguments can be made for pregnancy and for employment. Moreover, the couple's propensity for sexual activity may be correlated with the spouses' behavioral responses to the aging effects, if any: for example, the couple may reduce the time allocated to certain activities and increase the time allocated to others, may change their diet, etc. Indeed, if allowed to remain statistically uncontrolled, such behavioral responses could severely bias the estimated aging effects.

The foregoing comments suggest that all the regressors, except the age of one spouse, represent behaviors which are reasonably regarded as jointly determined with coital frequency. Thus, a priori it cannot be assumed that the CF equation satisfies the orthogonality assumption of ordinary least squares regression.

Estimation Procedures

Estimation of the coital frequency equation presents two distinct problems: (a) correlation between error and regressor, and (b) linear dependence among regressors. A technique that enables both separation of the cohort effects from the age/duration effects and statistical control of the unit-specific unobservable is the fixed-effects (FE) or "within" estimator. The fixed-effects estimator has many appealing properties (Judge et al., 1980; Judge et al., 1982). The fixed-effects estimator controls for all time-invariant unit-specific factors; it therefore controls for all time-invariant cohort-specific factors. Fixed-effects estimates of the effects of time-varying determinants are unbiased and consistent; they are efficient if and only if orthogonality fails. Since there are strong prior reasons for supposing that orthogonality fails and since when orthogonality fails no other estimator is unbiased, the fixed-effects estimator appears ideal for the present research. Moreover, since the age/duration factors vary over time and the cohort factors, with which they are exactly linearly dependent, are constant over time, the fixed-effects estimator solves the problem of separating them. Further, interactions between cohort or age/duration and events which took place in the past (such as age when the new contraceptives were introduced) are also absorbed into the fixed effect, leaving the age/duration factors free of cohort influences.

Although the two age variables, the marital-duration variable, and the observation date vary separately in their raw form, in the deviations-from-unit-means transformation employed by the fixed-effects estimator they become identical. Thus, if the operation of these four factors (the age/duration and period effects) is specified to be linear, then the FE estimator yields only one term for their composite effects.

In order to overcome this limitation, it is necessary to specify nonlinear operations for at least three of the four factors. Clearly, there is a trade-off between the number of maintained hypotheses and the number of estimated effects. Fortunately, in the present case it would appear reasonable to specify the three age/duration terms by nonlinear, strictly increasing transformations. The logarithmic transformation would appear to be particularly appropriate, both positive and negative coefficients representing changes that become less and less steep with the passage of time; it has been widely used to model processes of biological growth and decay, as well as social-psychological maturation. Of course, these estimates of the age/duration effects are also free of cohort effects.6

The fixed-effects estimator also yields an unbiased estimate of the unit-specific fixed effects. Since this estimate of the couple-specific fixed effect contains not only the true couple-specific fixed effect but also cohort-specific effects, it can be used to assess the extent and direction of cohort influences.

Data

The data to be analyzed are drawn from the 1970 and 1975 rounds of the National Fertility Studies (NFS), which contain longitudinal information on the 2361 white married couples who were in the 1970 national probability sample and remained intact in 1975.7 Interviews in random-effects or pooled time-series/cross-section producing biased estimates.

6 Note that it is "additional information" which permits identifying the coefficients. However, instead of assuming zero effects for some of the coefficients, as in the procedure proposed by Mason et al. (1973), we assume that some of the effects are nonlinear.

7 The National Fertility Studies were designed and directed by Norman B. Ryder and Charles F. Westoff. For more information, see Westoff and Ryder (1977). The data sets were deposited with the Data...
both rounds were conducted with the wives. The NFS are without doubt the best data set one can currently use for studying these questions. The chief advantages are the longitudinal nature of the data (which facilitates statistical control of the couple-specific fixed effect and hence, separation of the cohort effects from the age/duration and period effects) and the precise measurement of coital frequency.

**Sampling.** The 1975 round of the NFS reinterviewed respondents from the 1970 round who were white, less than 25 years of age when they married, in a first marriage for both husband and wife, still married, and married less than 25 years in 1975. The sample of married couples is thus censored by marital duration and wife’s age at marriage. Sample mortality occurred for a variety of reasons, the major ones being refusals (353) and failure to locate the respondent (81), bringing to 2361 the size of the sample of reinterviewed couples.

**Measurement procedures.** Both rounds of the NFS asked the question, “In the past four weeks, how many times have you had intercourse?” The answer was recorded precisely. The number who refused to answer

and Program Library Service of the University of Wisconsin, which makes them available for public use.

Unfortunately, the data do not permit assessment of the extent or determination of husband-wife differences in coital-frequency reports. Note, however, that, since the same individual (the wife) provided the information at both observation periods, the fixed-effects procedure yields our estimates of any biases that might arise from an individual-specific time-invariant tendency to under- or overestimate coital frequency.

If the propensities to marry, to marry at a certain age, to remain married, or to participate in a survey are permanent attributes of individuals and couples, then their operation is controlled for by the fixed-effects procedure and there is little cause for concern about bias due to selection mechanisms. Absent selectivity bias, general inferences may be drawn concerning the effects of age and of marital duration, as well as concerning the cohort and period effects (for the ranges of these variables observed in the study). Note that, were the data cross-sectional, correction for selectivity bias would require use of Heckman’s (1979) procedure.

Of course, as several colleagues have pointed out, the answer may or may not be accurate. If the results reported in this paper are interpreted as effects on *reported* coital frequency, then it is interesting that the story they tell is a systematic one. That is, respondents are providing information that is consistent with a somewhat complicated algorithm combining the effects of many factors. Such responses could arise from a situation in which respondents, consciously or unconsciously, (a) hold a theory of the determination of coital frequency, and (b) wish their behavior to appear consistent with the coital frequency item was 156 in the 1970 round and 183 in 1975. Of these, 43 respondents refused to answer in both years. Thus, a total of 296 cases were deleted due to missing data in either year, reducing the sample to a maximum of 2065 cases.

The time-related variables—wife’s date of birth (WIFEDOB), husband’s date of birth (HUSBDOB), date of marriage (MARDATE), date of interview in each round (DATINT)—were originally recorded in month and year and are coded for this investigation in decimal year (i.e., century month divided by 12). The ages of the spouses (HUSBAGE and WIFEAGE) and the marital duration variable (MARDUR) are constructed for each of the two survey rounds by subtracting the decimal-year date of birth and marriage from the corresponding interview-date term.

Turning to the other determinants of CF, dummy variables are included for whether or not the wife is pregnant (PREG) and for the wife’s and husband’s employment (WEMP and HEMP). An additional energy-related factor is likely to be the presence of young children. Ideally, one would want information on child-care arrangements and on the number of hours each child is in school. Such precise information being unavailable, information in the data set is used to construct a dummy variable (CH6) for presence of a child under six years of age (as of 31 December 1970 and 31 December 1975 for the two NFS rounds, respectively) and, presumably, not yet in school. Since age eligibility requirements vary across state, the last day of the calendar year is used as a convenient though arbitrary cut-off point.

The NFS measured annual earnings in 1970 in 12 categories, ranging from “Under $2,000” to “$15,000 and over,” and in 1975 in 17 categories, ranging from “Under $2,000” to “$35,000 and over.” For this investigation, earnings are coded by the midpoint of the bottom (c–1) categories and by “$17,000” and “$37,500” for the top categories in 1970 and 1975, respectively. To render comparable the earnings amounts in the two rounds, the 1975 amount is expressed in constant 1970 dollars, with the “all items” version of the Consumer Price Index used to calculate the correction factor.

**The Equations To Be Estimated**

The substantive considerations and the characteristics of the available data lead to the fol-
lows the following specification of the basic coital frequency equation:

\[
(1) \quad CF_{it} = \beta_1 PREG_{it} + \beta_2 CH6_{it} + \beta_3 WEMP_{it} + \beta_4 HEMP_{it} + \gamma_1 HUSBDOB_{it} + \gamma_2 WIFEDOB_{it} + \gamma_3 MARDATE_{it} + \alpha HUSBAGE_{it} + \alpha WIFEAGE_{it} + \alpha MARDUR_{it} + \tau DATINT_{it} + \omega_i + \epsilon_{it}
\]

\[(i=1,N; \ t=1,2),\]

where all variables are as defined in the previous section, \(\omega_i\) denotes the couple-specific time-invariant latent effect, \(\tau\) measures the effects of contemporaneous influences, the \(\gamma_i\) measure the effects of cohort-specific factors, and \(\epsilon_{it}\) denotes the random disturbance for the \(i\)th couple at time \(t\) and is assumed to have mean zero and constant variance and to be independently distributed across couples and over time. To this basic equation are added, in different specifications, the spouses' separate and combined earnings.

The fixed-effects estimator of (1) yields unbiased estimates of the \(\beta_j\) and one unbiased composite estimate, denoted \(\rho\), containing the sum of the effects \((\alpha_n + \alpha_w + \alpha_m + \tau)\) of the four variables whose deviations-from-unit-means transformations yield identical values.

Replacing the three age/duration terms in (1) by nonlinear transformations produces a new specification whose FE estimates include estimates of the effects \(\alpha^*_i\) of the transformed age and marital duration variables.

The fixed-effects estimator also yields an estimate, denoted \(\omega^*_i\) of the couple-specific fixed effects, obtained from the formula (Judge et al., 1980:331):

\[
(2) \quad \omega^*_i = Y_{it} - \Sigma \beta_j X_{ji}.
\]

where \(X_{ji}\) and \(Y_{it}\) denote each couple's own over-time mean. This estimate \(\omega^*_i\) includes not only the truly couple-specific fixed effect but also the effects of all time-invariant variables, which in this research include the effects of the three cohort variables (viz., \(\gamma_n, \gamma_w, \gamma_m\)) as well as a new random error.\(^{11}\) This estimate \(\omega^*_i\) will be referred to as the estimated sexuality propensity. Correlations of the estimated sexuality propensity and the cohort variables reveal the magnitude and direction of cohort influences.

**RESULTS**

*Characteristics of the Panel of Married Couples*

Since the purpose of this research is to estimate the effects of age, marital duration, factors associated with birth and marriage cohorts, and factors associated with the contemporaneous environment, this section begins with a description of these time-related characteristics of the panel.

Table 1 reports the frequency distributions of marriage dates and of husband's and wife's birthdates, arranged in five-year cohorts. As Table 1 shows, the birth cohorts represented in the panel span the period 1916 to 1955 for husbands and 1926 to 1955 for wives. The presence of the two earliest cohorts (1916–1920 and 1921–1925) among husbands only is due to the fact that the sample was selected by wife's age and to the observed tendency for women to marry men who are older than themselves. The sample thus includes persons born during the “booming” 1920s, during the Depression, during World War II, and during the baby-boom years.

<table>
<thead>
<tr>
<th>Cohort Years</th>
<th>Husband's Birth Cohort</th>
<th>Wife's Birth Cohort</th>
<th>Marriage Cohort</th>
</tr>
</thead>
<tbody>
<tr>
<td>1916–1920</td>
<td>7</td>
<td>(0.34)*</td>
<td>-</td>
</tr>
<tr>
<td>1921–1925</td>
<td>38</td>
<td>(1.84)</td>
<td>-</td>
</tr>
<tr>
<td>1926–1930</td>
<td>219</td>
<td>(10.62)</td>
<td>(2.96)</td>
</tr>
<tr>
<td>1931–1935</td>
<td>380</td>
<td>(18.43)</td>
<td>(15.47)</td>
</tr>
<tr>
<td>1936–1940</td>
<td>494</td>
<td>(23.96)</td>
<td>(23.28)</td>
</tr>
<tr>
<td>1941–1945</td>
<td>532</td>
<td>(25.80)</td>
<td>(27.50)</td>
</tr>
<tr>
<td>1946–1950</td>
<td>361</td>
<td>(17.51)</td>
<td>(27.30)</td>
</tr>
<tr>
<td>1951–1955</td>
<td>31</td>
<td>(1.50)</td>
<td>(3.49)</td>
</tr>
<tr>
<td>1956–1960</td>
<td>-</td>
<td>-</td>
<td>(18.87)</td>
</tr>
<tr>
<td>1961–1965</td>
<td>-</td>
<td>-</td>
<td>(23.96)</td>
</tr>
<tr>
<td>1966–1970</td>
<td>-</td>
<td>-</td>
<td>(26.72)</td>
</tr>
<tr>
<td>1967–1970</td>
<td>-</td>
<td>-</td>
<td>(30.31)</td>
</tr>
</tbody>
</table>

\(^{11}\) The estimated fixed effect thus also includes the effects, if any, of the spouses' ages at marriage, their absolute and signed age difference, and their schooling at marriage. Note that the fixed-effects procedure prevents the operation of these time-invariant factors from biasing the estimates of the age and marital-duration effects.

\(^{a}\) Percentages shown in parentheses below corresponding frequencies.
Except for three couples married in the five post–World War II years, all the couples were married in the twenty years between 1951 and 1970. Almost twenty percent are potentially parents of baby-boom babies. Over half married during the decade of the 1960s, a period usually characterized by American involvement in the Vietnam War and by social activism on a range of domestic and foreign policy issues.

The period effects, if any, result from sexuality-relevant features of the environment at the time the interviews were conducted—at the time, that is, during which coital frequency was observed. In the 1970 round of the NFS, interviews were conducted from October 1970 to March 1971, and in the 1975 round, from September 1975 to April 1976, all months inclusive. The length of the interval between the two interviews (for each respondent) ranged from 54 months to 64 months, with the mean at about 58.82 months. Thus, any changes in coital frequency attributable to period effects are due to changes in sexuality-relevant features of the environment between the respondent’s interview dates in the two rounds.

Table 2 reports the means and standard deviations of the principal characteristics at each of the two survey rounds. All variables except earnings refer to the time of the interview; the earnings terms measure earnings in calendar years 1970 and 1975. The mean wife’s age in the 1970 round was 28.96 years and the mean husband’s age 31.53 years. The youngest wife in the 1970 round was 15.50 years of age; the oldest wife in the 1975 round was 48.08 years. Among husbands, the youngest age in 1970 was 17.25; the oldest age in 1975 was 58.58 years. The mean marital duration in the 1970 round was 8.98 years. The most recently married couple had been married one month at the time of the 1970 interview; the maximum marital duration in 1975 was twenty-five years.

Table 3 reports the means and standard deviations of the changes between the two survey rounds, as well as the proportions of the panel registering an increase, a decrease, or no change on each variable. Coital frequency, while displaying a mean reduced by about .7 times in a four-week period, decreased in less than half of the sample, increasing in about 40 percent and remaining unchanged in about 13 percent. All other characteristics—fewer pregnant wives, fewer couples with preschool children, increased wives’ labor-force participation, increased earnings—are what one would expect from knowledge of the respondents’ ages and of published tabulations from the 1970 Census and the 1976 Survey of Income and Education.

### Estimates of Age, Marital Duration, and Period Effects

Table 4 reports estimates of six specifications of the fixed-effects statistical model which, as discussed above, controls for all unmeasured time-invariant characteristics, including those associated with the birth and marriage cohorts. These estimates are thus free of all cohort effects. The six specifications differ in two ways. First, while the first two specifications contain no earnings term, specifications (3) and (4) add total family earnings to the basic set of regressors and specifications (5) and (6) add instead separate terms for wife’s and husband’s earnings. Second, specifications (1), (3) and (5) contain one linear term to capture all changes in husband’s age, wife’s age, and marital duration, as well as in the sexuality-relevant features of the contemporaneous environment, while specifications (2), (4) and (6) add to the

### Table 2. Characteristics of the Panel of Married Couples

<table>
<thead>
<tr>
<th>Variable</th>
<th>1970 round</th>
<th>1975 round</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>S.D.</td>
</tr>
<tr>
<td>Coital frequency (number in last four weeks)</td>
<td>8.9389</td>
<td>7.1063</td>
</tr>
<tr>
<td>Date of interview (decimal year)</td>
<td>71.0183</td>
<td>.1167</td>
</tr>
<tr>
<td>Wife’s age (decimal years)</td>
<td>28.9638</td>
<td>5.8668</td>
</tr>
<tr>
<td>Husband’s age (decimal years)</td>
<td>31.5265</td>
<td>6.6524</td>
</tr>
<tr>
<td>Marital duration (decimal years)</td>
<td>8.9754</td>
<td>5.6197</td>
</tr>
<tr>
<td>Wife pregnant (1 = yes)</td>
<td>.0912</td>
<td>.2879</td>
</tr>
<tr>
<td>Child under six (1 = yes)</td>
<td>.6004</td>
<td>.4899</td>
</tr>
<tr>
<td>Wife employed (1 = yes)</td>
<td>.3618</td>
<td>.4806</td>
</tr>
<tr>
<td>Husband employed (1 = yes)</td>
<td>.9534</td>
<td>.2107</td>
</tr>
<tr>
<td>Wife’s earnings* (thousands of 1970 dollars)</td>
<td>1.7198</td>
<td>2.5231</td>
</tr>
<tr>
<td>Husband’s earnings* (thousands of 1970 dollars)</td>
<td>9.6916</td>
<td>3.9976</td>
</tr>
</tbody>
</table>

N = 2062

* Missing data reduced the number of observations on wife’s and husband’s earnings to 1988 and on combined earnings to 2054.
### Table 3. Changes Between 1970 and 1975 in the Panel of Married Couples

<table>
<thead>
<tr>
<th>Variable</th>
<th>Change</th>
<th>Percent Negative</th>
<th>Percent Zero</th>
<th>Percent Positive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coital frequency</td>
<td>-0.7085</td>
<td>0.4651</td>
<td>0.1295</td>
<td>0.4054</td>
</tr>
<tr>
<td>Time</td>
<td>4.9021</td>
<td></td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Log wife's age</td>
<td>0.1621</td>
<td></td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Log husband's age</td>
<td>0.1502</td>
<td></td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Log marital duration</td>
<td>0.6644</td>
<td></td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Wife pregnant</td>
<td>-0.0582</td>
<td>0.0868</td>
<td>0.8846</td>
<td>0.0286</td>
</tr>
<tr>
<td>Wife under six</td>
<td>-0.1479</td>
<td>0.2866</td>
<td>0.5747</td>
<td>0.1387</td>
</tr>
<tr>
<td>Wife employed</td>
<td>0.9311</td>
<td>1.2088</td>
<td>0.6654</td>
<td>0.2139</td>
</tr>
<tr>
<td>Husband employed</td>
<td>0.00485</td>
<td>0.0335</td>
<td>0.9282</td>
<td>0.0383</td>
</tr>
<tr>
<td>Wife's earnings</td>
<td>0.4187</td>
<td>0.2993</td>
<td>0.2988</td>
<td>0.4019</td>
</tr>
<tr>
<td>Husband's earnings</td>
<td>1.8473</td>
<td>0.3189</td>
<td>0</td>
<td>0.6811</td>
</tr>
<tr>
<td>Combined earnings</td>
<td>2.1651</td>
<td>0.3276</td>
<td>0.0015</td>
<td>0.6709</td>
</tr>
</tbody>
</table>

a All variables are measured as reported in Table 2. The number of observations of wife's and husband's earnings is 1988, and of combined earnings is 2054.

linear term logarithmic transformations of the age and marital duration terms.

Before turning to examine the parameter estimates, some general comments concerning all six specifications are in order. The fixed-effects statistical model may be estimated in at least two ways (Judge et al., 1980), viz., by performing an OLS regression in which all terms appear in their deviations-from-unit-means transformations and by performing an OLS regression in which all variables appear in raw form and to the regressors are added a set of N dummies, one for each unit; when the number of time periods represented in the data is two, as in the present case, estimation may also be accomplished by performing an OLS regression in which all variables appear in their first-differenced transformations. While the three procedures lead to the same parameter estimates and to the same residual vector (Judge et al., 1982:478–82), they may lead to different estimates of the error variance, of the

### Table 4. Fixed-Effects Estimates of the Determinants of Marital Coital Frequency

<table>
<thead>
<tr>
<th>Specification</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date of interview</td>
<td>-0.2213</td>
<td>-0.7231</td>
<td>-0.2387</td>
<td>-0.7509</td>
<td>-0.2358</td>
<td>-0.7290</td>
</tr>
<tr>
<td></td>
<td>(6.24)*</td>
<td>(3.06)</td>
<td>(6.40)</td>
<td>(3.16)</td>
<td>(6.01)</td>
<td>(3.01)</td>
</tr>
<tr>
<td>Log wife's age</td>
<td>0.0664</td>
<td>0.2769</td>
<td>0.2385</td>
<td>0.1208</td>
<td>0.6673</td>
<td>0.4019</td>
</tr>
<tr>
<td></td>
<td>(2.05)</td>
<td>(0.52)</td>
<td>(2.09)</td>
<td>(1.00)</td>
<td>(2.02)</td>
<td>(1.00)</td>
</tr>
<tr>
<td>Log husband's age</td>
<td>0.00485</td>
<td>0.00485</td>
<td>0.00485</td>
<td>0.00485</td>
<td>0.00485</td>
<td>0.00485</td>
</tr>
<tr>
<td></td>
<td>(0.49)</td>
<td>(0.49)</td>
<td>(0.49)</td>
<td>(0.49)</td>
<td>(0.49)</td>
<td>(0.49)</td>
</tr>
<tr>
<td>Log marital duration</td>
<td>0.00485</td>
<td>0.00485</td>
<td>0.00485</td>
<td>0.00485</td>
<td>0.00485</td>
<td>0.00485</td>
</tr>
<tr>
<td></td>
<td>(3.08)</td>
<td>(3.08)</td>
<td>(3.08)</td>
<td>(3.08)</td>
<td>(3.08)</td>
<td>(3.08)</td>
</tr>
<tr>
<td>Wife pregnant</td>
<td>0.00485</td>
<td>0.00485</td>
<td>0.00485</td>
<td>0.00485</td>
<td>0.00485</td>
<td>0.00485</td>
</tr>
<tr>
<td></td>
<td>(7.63)</td>
<td>(7.63)</td>
<td>(7.63)</td>
<td>(7.63)</td>
<td>(7.63)</td>
<td>(7.63)</td>
</tr>
<tr>
<td>Child under six</td>
<td>-0.8429</td>
<td>-0.5571</td>
<td>-0.7977</td>
<td>-0.5050</td>
<td>-0.7231</td>
<td>-0.4486</td>
</tr>
<tr>
<td></td>
<td>(3.06)</td>
<td>(1.86)</td>
<td>(2.89)</td>
<td>(1.68)</td>
<td>(2.53)</td>
<td>(1.45)</td>
</tr>
<tr>
<td>Husband employed</td>
<td>0.3867</td>
<td>0.2941</td>
<td>0.4613</td>
<td>0.2701</td>
<td>0.2724</td>
<td>0.2700</td>
</tr>
<tr>
<td></td>
<td>(1.29)</td>
<td>(1.29)</td>
<td>(1.29)</td>
<td>(1.29)</td>
<td>(1.29)</td>
<td>(1.29)</td>
</tr>
<tr>
<td>Wife's earnings</td>
<td>0.00485</td>
<td>0.00485</td>
<td>0.00485</td>
<td>0.00485</td>
<td>0.00485</td>
<td>0.00485</td>
</tr>
<tr>
<td>Husband's earnings</td>
<td>0.00485</td>
<td>0.00485</td>
<td>0.00485</td>
<td>0.00485</td>
<td>0.00485</td>
<td>0.00485</td>
</tr>
<tr>
<td>Combined earnings</td>
<td>0.00485</td>
<td>0.00485</td>
<td>0.00485</td>
<td>0.00485</td>
<td>0.00485</td>
<td>0.00485</td>
</tr>
<tr>
<td>R² (1)</td>
<td>0.0427</td>
<td>0.0475</td>
<td>0.0438</td>
<td>0.0488</td>
<td>0.0411</td>
<td>0.0458</td>
</tr>
<tr>
<td>R² (2)</td>
<td>0.6656</td>
<td>0.6673</td>
<td>0.6660</td>
<td>0.6678</td>
<td>0.6635</td>
<td>0.6652</td>
</tr>
<tr>
<td>N</td>
<td>2062</td>
<td>2062</td>
<td>2054</td>
<td>2054</td>
<td>1988</td>
<td>1988</td>
</tr>
</tbody>
</table>

a Absolute values of t-ratios appear in parentheses under corresponding parameter estimates.
standard errors, and of $R^2$. With respect to the standard errors, the correct standard errors have in the numerator the ratio of the residual sum of squares to the factor $(N(T-1)-k)$, where $k$ denotes the number of explanatory variables (excluding, of course, the units' dummies); these correct standard errors can be obtained directly from either the dummy-variable or the first-differences procedures or can be calculated by applying a correction factor to those obtained from the deviations-from-unit-means procedure. The correct standard errors are larger than the incorrect ones by a factor slightly greater than the square root of two (approximately 1.4); hence, obtaining the correct standard errors is essential for calculating t-ratios and levels of statistical significance. The t-ratios reported in Table 4 are based on the correct standard errors.

With respect to $R^2$, the deviations-from-unit-means and the first-differences procedures lead to the same value of $R^2$, denoted in Table 4 by the suffix "1"; this measure may be interpreted as the proportion of variation explained in the transformed dependent variable by the transformed regressors. The dummy-variable procedure leads to a different value of $R^2$, denoted in Table 4 by the suffix "2"; this measure may be interpreted as the proportion of variation explained in the raw dependent variable by all the explanatory variables together with the unit-specific dummies. As Table 4 shows, the explanatory variables explain about 4–5 percent of the within-couple variation in coital frequency; the explanatory variables together with the couple dummies explain about two-thirds of the total variation.

Notwithstanding the strong indications given by the values of $R^2$, the hypothesis of no unit-specific effects was formally tested using the F-test of a set of linear restrictions described in Judge et al. (1982:484–85). This test is implemented by comparing the residual variance obtained from the fixed-effects equation with the residual variance obtained from an OLS regression on the pooled, raw data. The values of the F-statistic obtained for the six specifications reported in Table 4 range from 1.7840 to 1.8252; at approximately 2000 degrees of freedom in each the numerator and denominator, these values are statistically significant to well beyond the .01 level. Thus, the null hypothesis of no couple effects (i.e., of inter-couple homogeneity) is rejected. It can be concluded that there are operating in these data time-invariant couple-specific latent effects. Whether these couple-specific effects are related to the spouses' birth and marriage cohorts will be addressed below.

Turning to the parameter estimates, the results obtained from specifications (1), (3) and (5) show that a decrement in marital coital frequency of about .22 to .24 of one time in a four-week period is associated with each passing year. This estimate, as discussed above, compounds four effects—age, marital duration, and period effects—so that at most it can be concluded that at least one of the four effects is negative. The decrement at the mean interval between interviews (about 4.90 years) thus ranges from slightly over one time to almost one-and-one-fifth times in a four-week period. That is, the total decrement in coital frequency associated with the passage of time (including advancing age and increasing marital duration) and incorporating changes in the sexuality-relevant features of the contemporaneous environment between 1970 and 1976 is about three times in a year for each passing year. This decrement is consistent with a wide variety of underlying structures, including the following three: (a) the period effect is negative and of such large magnitude that it offsets positive effects of age and marital duration; (b) there was no change in the sexuality-relevant features of the environment between 1970 and 1976, and all three age and marital duration variables have negative effects; and (c) the period effect is positive but offset by the negative effects of age and marital duration.

In order to separate the period effect from the age and marital-duration effects (and the latter from each other), nonlinear transformations were applied to the three age and marital duration terms. Four sets of transformations were applied in tandem, producing new specifications which left unchanged all other features of the initial specification, including the linear passage-of-time term. The four transformations applied were: (a) logarithmic, or $\ln x$; (b) square root, or $x^{1/2}$; (c) negative-reciprocal, or $-x^{-1}$; and (d) exponential, or $e^x$. These four transformations were chosen because (a) they define strictly increasing functions, so that the estimated coefficients indicate the effects of increases in age and marital duration, and (b) they differ in concavity, the exponential function being concave upwards while the other three are concave downwards. The results (not shown) were remarkably similar—in level of statistical significance and in the direction and magnitude of effects—across the specifications containing the logarithmic, square-root, and negative-reciprocal transformations; in contrast, the exponential terms produced estimates approaching zero (with, for example, 26 zeroes to the right of the decimal point). Thus, these data reject the proposition that coital frequency either increases or decreases more and more steeply with age and marital duration. The effects of these variables appear instead to be
either increasing and concave or decreasing and convex, that is, less and less steep as age and marital duration increase. Put differently, the absolute magnitudes of both increments and decrements decrease over time. Thus, each passing year brings with it a smaller change than the previous year.

Since the results of the three increasing- and-concave transformations are so similar, we report only the results of one set of specifications. We chose those including the logarithmic transformations, since they are probably the most widely used to model processes of growth and decay and the simplest to manipulate and interpret.12 These results, reported in columns (2), (4) and (6) of Table 4, indicate that the effect of wife’s age on coital frequency is positive, statistically significant beyond the .04 level, and of rather large magnitude (estimates ranging from 27.61 to 28.66). In contrast, the effects of both husband’s age and marital duration are negative, that of husband’s age unambiguously not statistically significant but of absolute magnitude ranging from 6.43 to 7.92, that of marital duration highly statistically significant (beyond the .003 level) and of absolute magnitude hovering about 1.5. The linear time-period effect is highly statistically significant (beyond the .003 level), negative, and increases to an absolute magnitude ranging between .72 and .75 per year, or about triple the net negative effect estimated in specifications (1), (3) and (5). Thus, these data suggest that husband’s age and marital duration, as well as changes in the environment between 1970 and 1976, are associated with decrements in coital frequency, while wife’s age is associated with an increase in coital frequency.

The obtained estimates of the period effect suggest that changes in the contemporaneous influences on coital frequency are associated with a decline between the two survey periods of about one time per week. Put differently, the “environment” appears to have been less conducive to, less reinforcing of, marital sexual activity in 1975 than in 1970.

Since the coefficient for log wife’s age is positive, these results indicate that CF increases at a decreasing rate as the wife grows older—at least for the age range represented in the sample, 15.50 to 48.08 years. The results show that the ceteris paribus effect of a five-year increase in wife’s age is an increase in CF of about 6.16–6.39 times in a four-week period if initial age is 20, about 4.26–4.42 times if initial age is 30, and about 3.25–3.38 times if initial age is 40.

Though the coefficient for log husband’s age is not statistically significant, its negative sign suggests that CF decreases at a decreasing rate as the husband grows older—at least for the age range represented in the sample, 17.25 to 58.58 years. The results suggest that the ceteris paribus effect of a five-year increase in husband’s age is a decrease in CF of about 1.43–1.77 times in a four-week period if initial age is 20, about .99–1.22 times if initial age is 30, about .76–.93 times if initial age is 40, and about .61–.75 times if initial age is 50. Thus, the predicted decrease in CF attributable to advancing age of the husband, if any, is extremely small.

The decrease in CF attributable to marital duration is very large during the first year of marriage, but subsequently declines less and less steeply. The decrement in CF that occurs in one year, counting from the lowest observed marital duration in the sample—one month—is about 3.85–3.94 times per four-week period. In the next year, however, CF decreases only .98–1.00 times per four-week period. That is, a couple’s predicted coital frequency at the 13-month wedding anniversary is once a week less than at the one-month anniversary; at the 25-month wedding anniversary it is once a month less than at the 13-month anniversary. Looking at five-year intervals, the predicted decrement is about 1.04–1.06 times per four-week period between the fifth and tenth wedding anniversaries, declining to about .33-.34 between the twentieth and twenty-fifty anniversaries.

Figure 1 depicts the graphs of the ceteris paribus effects of the spouses’ ages and marital duration, over the ranges observed in the present study, estimated under the logarithmic-form assumptions.

Because, among continuously married couples, both spouses’ ages and their marital duration increase by the same amount over time and because these effects, as shown, differ in direction and magnitude, it would be useful to examine their joint activity with the passage of time. As husband’s age, wife’s age, and marital duration jointly increase, does coital frequency increase or decrease? In order to answer this question, one can construct a passage-of-time function. From (1), the combined effect on CF of age and marital duration can be expressed as a function of the passing of k years. The first and second partial derivatives reveal the total effect of the passage of time. It can be shown that this function depends on the form of the function assigned to the age and marital-duration variables, as well as on the age at marriage of the two spouses.

12 Note that the magnitudes of the estimated effects are sensitive to the particular form of the transformation employed. Thus, while these results indicate the signs of the first and second derivatives, they do not permit precise assessment of the steepness of the slopes.
Figure 1. Estimated Ceteris Paribus Effects of Spouses’ Ages and Marital Duration on Coital Frequency

Notes: Graphs depict the estimates obtained in specification (4) reported in Table 4. Coital frequency is measured as the number of times in the four-week period prior to the interview.

In the case where logarithmic transformations are employed (as in the specifications reported in Table 4), the results indicate that coital frequency varies nonmonotonically over the course of the marriage, decreasing to a minimum with some rapidity, then increasing—first at an increasing rate, then at a decreasing rate—over the ranges of age and marital duration observed in this study. The two critical points—the minimum and the point of inflection—are themselves strictly increasing functions of the spouses’ ages at marriage. For example, in the special case in which both spouses are the same age, if they marry at 20, then the minimum occurs at about the 18-month wedding anniversary and the point of inflection three months after the 7th wedding anniversary; if they marry at 25, then the minimum occurs one month before the second wedding anniversary and the point of inflection occurs one month after the 9th wedding anniversary. Figure 2 depicts graphs of the combined effects of spouses’ ages and marital duration, for four combinations of age at marriage, for the logarithmic-transformation case.

Estimates of the Association Between the Propensity for Sexual Activity and Birth and Marriage Cohort

As discussed above, the fixed-effects specifications reported in Table 4 yield estimates of the total couple-specific time-invariant latent effect. The estimate \( \omega^*_i \) contains the combined
Figure 2. Combined Estimated Effects of Spouses' Ages and Marital Duration on Coital Frequency over the Course of the Marriage

Notes: Graphs depict the combined effects, from the estimates obtained in specification (4) of Table 4, for four combinations of wife's and husband's age at marriage (W and H, respectively). Coital frequency is measured as the number of times in the four-week period prior to the interview.

effects of all unmeasured time-invariant factors, contains, that is, not only the truly couple-specific sexuality propensity \( \omega \), but also the cohort effects \( (\gamma_h, \gamma_w, \gamma_m) \), compounding as well a new random error due to sampling variability. The question whether individuals of different birth cohorts and couples of different marriage cohorts are in marriages which display a higher or lower sexuality propensity can be answered by inspecting the zero-order correlations between the estimated sexuality propensity and the dates of birth and marriage.13 Three sets of correlations were obtained, corresponding to the estimates of \( \omega \), obtained from the preferred specifications, (2), (4) and (6), reported in Table 4. Table 5 reports these correlations. All are positive, indicating that each successive cohort displays an increase in the propensity for sexual activity. The correlation between the estimated sexuality propensity and wife's vintage is the strongest, ranging from .6606 to .6713. The correlation of the estimated sexuality propensity between \( \omega \) and both age at marriage and the age difference between the spouses, unbiased estimates cannot be obtained (see Hausman and Taylor 1981). What are obtainable are estimates of the correlation between the estimated sexuality propensity and each of the three cohort terms.

13 While it would be desirable to obtain estimates of the causal effects of each of the birth and marriage cohorts, unfortunately, due to the correlation between \( \omega \) and both age at marriage and the age difference between the spouses, unbiased estimates cannot be obtained (see Hausman and Taylor 1981). What are obtainable are estimates of the correlation between the estimated sexuality propensity and each of the three cohort terms.
Table 5. Correlations Between Birth and Marriage Cohorts and Estimates of the Couple’s Sexuality Propensity

<table>
<thead>
<tr>
<th>Cohort Variable</th>
<th>Estimated Sexuality from Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(2)</td>
</tr>
<tr>
<td>Wife’s Birth Date</td>
<td>.6606</td>
</tr>
<tr>
<td>Controlling for Wife’s Education</td>
<td>.6585</td>
</tr>
<tr>
<td>Husband’s Birth Date</td>
<td>.5754</td>
</tr>
<tr>
<td>Controlling for Husband’s Education</td>
<td>.5762</td>
</tr>
<tr>
<td>Marriage Date</td>
<td>.5886</td>
</tr>
<tr>
<td>Controlling for Both Spouses’ Education</td>
<td>.6069</td>
</tr>
</tbody>
</table>

* Zero-order correlations are reported on the first, third, and fifth rows. Partial correlations are reported on the second, fourth, and sixth rows.

sity with husband’s birth vintage, though less strong than that with wife’s vintage by almost 9–10 percentage points, is nevertheless strong, with estimates ranging from .5692 to .5834. The correlation with marriage date lies between the other two, with estimates ranging from .5855 to .5966. These strong correlations suggest the operation of a positive trend in the sexuality-relevant features of the environments facing American children born between 1917 and 1955 and by American couples married between 1950 and 1970.

It is important to examine as well the partial correlations, holding constant schooling at marriage since the observed differences in the propensity for sexual activity across cohort could be due to differences in schooling. Table 5 also reports these partial correlations, which show that the correlations with birth cohort change by less than half of a percentage point and that those with marriage vintage change by two percentage points. Thus, net of differences in schooling, the sexuality-relevant features of the environments faced by American children, adolescents, and newlyweds appear to have been moving in the direction of supporting and reinforcing a greater quantity of marital sexual activity.14

In order to capture more precisely the differences across birth and marriage cohort, especially any nonlinearities which would not be captured in the correlations, the estimated sexuality propensity was regressed on a set of cohort dummy variables, each representing a five-year interval, separately for husband’s birth cohort, wife’s birth cohort, and marriage cohort, and both with and without the school-

14 For a probing look at trends in other features of the environments faced by children and adolescents, see Alwin (1984).
toward the latter and those who married in 1961–1965, an increase of about 3.8–4.1. Between the 1961–1965 and the 1966–1970 cohorts, however, the increase was smaller, of magnitude about 3.0–3.1. While this decline in the rate of increase could be due to sampling variability, it also suggests that the environment faced by couples who married in 1966–1970 might have substituted away from additional reinforcement of sexual activity toward reinforcement of other activities, such as those usually denoted by the term “social activism.”

SUMMARY

This paper reported estimates of the ceteris paribus effects of spouses’ ages, marital duration, and contemporaneous period influences on coital frequency, as well as of the correlations between coital frequency and birth- and marriage-cohort factors, based on data drawn from a panel of over 2000 married couples interviewed in the 1970 and 1975 rounds of the National Fertility Studies. These estimates were obtained by (a) using the properties of the fixed-effects statistical model in order to separate the effects of cohort influences from the age/duration and period effects and to control for the operation of couple-specific unobservables, and (b) using strictly monotonic nonlinear transformations in order to separate the effects of wife’s age, husband’s age, and marital duration.

Our main findings are as follows: Among women between the ages of 15 and 48, coital frequency increases at a decreasing rate as the wife grows older. Though we cannot reject the hypothesis that, among men between the ages of 17 and 58, age has no effect on coital frequency, the estimated coefficients suggest that there may be a slight negative effect, such that coital frequency decreases, the absolute magnitude of the decrement declining. For marital durations between one month and twenty-five years, coital frequency decreases, also less and less steeply, as marital duration increases. The combined effects of spouses’ ages and marital duration reported in this paper are consistent with a curve of coital frequency which is non-monotonic over the course of the marriage, decreasing to a minimum within two or three years of the wedding, thereafter increasing—first at an increasing rate, then shifting to a decreasing rate at about the sixth to tenth wedding anniversary.

The sexuality-relevant environments faced by successive birth and marriage cohorts in the United States appear to have changed in the direction of supporting and reinforcing a greater amount of marital sexual activity. In the birth cohorts observed (1917–1955) the environments faced by females changed at a considerably faster rate than those faced by males.
Moreover, while the rate of change of the environments faced by female birth cohorts was constant if not increasing, the rate of change of the environments faced by male birth cohorts shifted from increasing to decreasing after World War II.

With respect to period effects, we found the 1975 environment less conducive to sexual activity than the 1970 environment.

Thus, our work suggests that, when the strongly positive cohort effects are controlled by the estimation procedure, the effect of wife’s age, at least prior to menopause, is positive, as almost universally believed from Ovid to Kinsey. With respect to husband’s age, there is a tendency in the data to support the classical view that male sexual responsiveness begins to decline at the early age of 17 years; however, even if correct, the magnitude of the decline is very slight. Our analyses do not support the strongly negative effects of aging reported in recent years and, indeed, imply that such findings result from the combination of (a) strongly positive cohort effects, and (b) the use of estimation procedures that do not account of these cohort effects.

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