
Sex, Money, and Paternity: The Evolutionary Psychology of Domestic Violence

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Three hundred sixty-five women, with children between six and 12 years of age, were interviewed and tested on various issues theoretically related to domestic violence. The sample was stratified into three subsamples of volunteer women recruited from: (1) a temporary shelter for battered women, (2) the local community and screened specifically for the reported presence of domestic violence, (3) the same community sources and screened only for the reported presence of children of the specified age group. Factor analytic structural equation models were constructed for the predictors of violence by the woman's main sexual partner toward the woman and towards the woman's child. Common factors were constructed for the four major dimensions of domestic violence—verbal, physical, escalated, and sexual—and for the three major predictors of domestic violence—sex, money, and paternity. The sex factor indexed the general quality of the sexual relationship dynamics, the money factor indexed the couple's socioeconomic relations, and the paternity factor indexed the genetic stakes held in the family by the woman's main sexual partner. These three factors jointly accounted for 60% of the variance in violence toward the woman. Violence towards the woman—the only significant direct effect—accounted for 26% of the variance in violence toward the child. These findings suggest that the principal perpetrators of domestic violence may be competitively disadvantaged males, pursuing coercive sexual and parental strategies without regard to the deleterious indirect effects upon their own genetic offspring.

KEY WORDS: Evolutionary psychology; Coercive sexual strategy; Coercive parental strategy; Wife battering; Spousal rape; Child abuse; Incest; Marital infidelity; Socioeconomic status; Genetic paternity.

INTRODUCTION

There are at least four manifestations of domestic violence that have historically been studied in mutual isolation: (1) spousal battery of women, (2) spousal rape of women, (3) paternal battery of children, and (4) paternal sexual abuse of children. Generally, research on

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domestic violence has treated both the different forms of abuse and different family relationships separately, rarely examining collinearities in the expression of violence or harm within the family system. However, in reviewing the results of his 1985 national survey of over 6,000 households, Straus (1990a) reported that physical child abuse is 14 times more common in families where there is marital violence. Jouriles, Barling, and O'Leary (1987) also reported that, according to the mothers' reports, the children of battered women in shelters are also likely to have been targets of their fathers' aggression. Nevertheless, few studies have attempted to integrate the various manifestations of family conflict or pathology, such as verbal aggression, physical abuse, escalated violence, and incest, across multiple family relationships. Clearly, it is important to understand how these different forms of aggression are interrelated in order to better understand the mechanisms of family conflict.

Of course, it is quite possible that the various distinct phenomena that we categorize as domestic violence are mutually independent and call for separate psychological explanation. From an evolutionary perspective, however, any of these four patterns of abusive behavior would be expected to produce reproductive consequences that are tightly interdependent. Abuse of the mother, for example, would adversely affect the child indirectly in a number of ways. Because behaviors with important reproductive consequences can be expected to become targets of natural selection, it therefore makes sense to explore the possibility that these various aggressive behaviors can be interpreted as tactics that constitute some coherent reproductive strategy. This hypothesis is plausible whether or not these tactics function adaptively in modern environments. Because there does not seem to be any prior general theory of domestic violence in evolutionary psychology, we will review the implications of more specific evolutionary theories for each of the four separate manifestations and then attempt an integration.

Battery of Women

There are at least two specific evolutionary theories that can be brought to bear upon the battery of women. The first theory is that of coercive sexual strategy (Thornhill and Thornhill 1992). Simply put, coercive sexual strategy is the sexual domination of women through the threat of physical violence. This strategy of sexual domination may also involve the involuntary "mate guarding" of women from rival males. The second theory is that of coercive parental strategy. This can be defined as the aggressive compulsion of women's parental investment in the genetic offspring of the perpetrator (cf., Trivers 1972, 1985).

A coercive sexual or parental strategy can represent either an alternative or a conditional reproductive strategy. An "alternative" strategy can be defined as an adaptive strategy that is obligate for the individual, but for which the genetic predisposition is polymorphic within the population. A "conditional" strategy can be defined as an adaptive strategy that is facultative for the

individual—contingent for its phenotypic expression upon environmental circumstances—but for which the genetic preparedness is monomorphic throughout the population. Although we favor the latter interpretation for coercive reproductive strategies in humans, there is little empirical evidence available to bear on this conceptual distinction. Nevertheless, conditional and alternative strategies are not mutually exclusive mechanisms. Certain microevolutionary processes, such as genetic assimilation (Waddington 1957), may produce developmental biases favoring the development of certain phenotypes over others in response to specific environmental contingencies. Thus, even within the context of conditional strategies, genetic polymorphism in the relative strength of these developmental biases could be generated in a population of otherwise facultative strategists. In addition, it is possible that the chance individual possession of independently heritable (but strategically relevant) characteristics may bias the selection of adaptive strategies. For example, an individual with a sexually attractive phenotype will be more effective at pursuing certain mating strategies than others.

Spousal Rape of Women

The theories of coercive sexual and parental strategy can also be brought to bear upon the spousal rape of women. There are at least two functions that spousal rape can serve in a coercive sexual strategy. The first is, of course, the immediate one of direct sexual access through forced copulation (Thornhill and Thornhill 1992). The second is that of sexual domination of women through sexual violence. Whether or not rape is sexually motivated in the ultimate sense, the violent component could also be serving the immediate function of chronic sexual terrorism, as part of a longer-term, indirect strategy of sexual domination. Thus, the perpetrator might be securing future, as well as immediate, sexual access through a regime of chronic sexual intimidation. This violent component of spousal rape is also the mechanism by which it can serve within a coercive parental strategy. This added function is the aggressive compulsion of the woman's parental investment in the offspring of the perpetrator by means of sexual violence towards the woman.

Battery of Children

The battery of children could also subserve an overall coercive sexual strategy. This mechanism involves the indirect use of the children as hostages to coerce women. In addition, there are three other specific theories that can be brought to bear upon the battery of children. The theory of sexually selected infanticide (cf., Hrdy 1984; Hrdy and Hausfater 1984) would predict that child abuse can serve an adaptive strategic function by the direct elimination of the offspring of the perpetrator's rivals. Alternatively, the theory of discriminative parental solicitude (cf., Daly and Wilson 1984, 1988) would predict that child abuse, even if short of true infanticide, can serve an adaptive strategic function by the

indirect reduction of competition over the woman's parental investment for the perpetrator's genetic offspring. Finally, the theory of kin-selected altruism (cf., Hamilton 1964) would generally predict an avoidance of harm to the perpetrator's own offspring. This latter is not an universally valid prediction, as there are various ecological circumstances that might favor a reduction in number of offspring. Nevertheless, unless certain theoretically specifiable circumstances obtain, the general expectation is against harm to one's own genetic offspring. These various theories are somewhat complementary and do not predict very different outcomes. Therefore, this study will not be able to empirically discriminate between them as rival hypotheses. Nevertheless, it will be informative to determine whether their common predictions are at all consistent with the data.

Sexual Abuse of Children

As with spousal rape, there are at least two functions that the sexual abuse of children can serve in a coercive sexual strategy. The first is, of course, the immediate one of direct sexual access to the children through forced copulation. To the extent that sexually immature individuals are biologically inappropriate sex objects, this pedophilic sexual interest can be considered pathological, from an adaptationist perspective, but may nevertheless be either a maladaptive or a selectively neutral consequence of a general coercive sexual strategy, as has been reported in sea lions and elephant seals (Campagna and Le Boeuf 1988; Campagna et al. 1988). It may be that the costs of discriminating against inappropriate sex objects do not outweigh the benefits of generalizing to all potential targets. The second is, again, the domination of women through harming the children, in this case, sexually. The sexual abuse of children could be serving the immediate function of sexual terrorism through the indirect use of the children as hostages to coerce women. In a recent study of incest perpetrators, for instance, Williams and Finkelhor (1990, 1992) have found that a substantial proportion of the fathers (classified by them as "angry retaliators") explain their incestuous use of children as an act of retaliation against their wives for neglect, abandonment, and either actual or presumed infidelity. Perhaps most interestingly, these fathers evidenced relatively little sexual arousal toward the children themselves.

These two aspects of rape, the sexual and the violent, which are not mutually exclusive, bring to bear two other specific evolutionary theories. To the extent that the rape of children is sexual, the theory of genetic incest avoidance (cf., Thornhill 1991) would predict an avoidance of sex—whether abusive or otherwise—with the perpetrator's genetic offspring. To the extent that the rape of children is violent, the theory of kin-selected altruism would predict an avoidance of any harm—whether sexual or otherwise—to the perpetrator's genetic offspring. To the extent that the mother has a genetic interest in the children, they can be used as hostages to coerce her, but to the extent that the father has a genetic interest in them, he might be expected to

exercise discrimination and selectively applied restraint in pursuing that particular coercive tactic.

Competitively Disadvantaged Males

Beyond the broader theoretical considerations described previously, there are certain auxiliary hypotheses that help us derive testable predictions from these evolutionary theories. To the extent that coercive sexual strategies and coercive parental strategies represent conditional or alternative mating and parental strategies, we may hypothesize that: (1) they are generally less successful and, therefore, hierarchically less preferred adaptive strategies (cf., Brunswik 1952, 1955; Petrinovich 1979), and (2) they are therefore disproportionately utilized by otherwise competitively disadvantaged males (CDMs), for whom the dominant, or “normal”, species-typical strategies are somehow less effective or available. We characterize them as otherwise competitively disadvantaged because the conditional or alternative strategies thereby become the contingently optimal selections for the CDMs. Conversely, we presume that if these strategies were generally more effective in the larger population they would be sexually selected as the dominant species-typical strategies rather than as those adopted primarily by the losers in the mainstream sexual competition.

It is important to note that these males are not necessarily a homogeneous group. This multivariate heterogeneity makes this population difficult to identify by bivariate correlational methods. Possible characteristics of these males may include any or all of the following: (1) CDMs may be less behaviorally competent in either sexual courtship or sexual and social relationships, (2) CDMs may be less physically attractive to women, and (3) CDMs may be less affluent financially relative to their mates. The common defining feature is that these individuals are at some relative disadvantage in the “sexual marketplace” (Symons 1979).

These additional theoretical considerations allow us to generate multiple testable predictions for CDMs, and, thus, for the proposed evolutionary psychology of domestic violence. In this study, the first two sets of hypotheses that were tested were relevant to specifying the environmental conditions favoring a CDM coercive sexual strategy. The first set of hypotheses relates to the quality of the women’s primary sexual relationships: (1) women may be less inclined to cohabit with CDMs, due to their low quality as mates, (2) women may feel less loved by CDMs, perhaps due to their deficient social skills or courtship abilities, (3) women may enjoy sex less with CDMs, due to their decreased affiliative or sexual attractiveness, (4) women may have more affairs with CDMs’ rivals, perhaps also indicating sexual dissatisfaction, (5) women may have more protracted affairs with CDMs’ rivals, perhaps indicating more serious efforts to find alternative mates, (6) women may characterize CDMs as more sexually jealous, perhaps accurately, due to the CDMs justifiable insecurities in that domain, (7) women may argue more with CDMs about CDMs’ jealousy, being less willing to accept enforced sexual fidelity to a

low-quality mate, (8) CDMs may not argue more about the women's jealousy, due to the CDMs' reduced alternative mating opportunities. We favor the hypothesis that there might exist some objective basis to these subjective characterizations, rather than automatically attribute them to some irrationality or cognitive distortion on the part of either the woman or her mate. For example, the popular view that these men are unnecessarily and pathologically jealous ignores the possibility that they might be truly disadvantaged in sexual competition. Although this does not constitute any moral justification whatsoever for their behavior, we hypothesize that CDMs might be quite accurate in their suspicions of either the actual or potential infidelity of their mates.

The second set of hypotheses relates to the socioeconomic dimensions of the relationship: (1) CDMs may have less financial income relative to their mates, (2) CDMs may have less social status relative to their mates, in terms of occupational prestige, (3) CDMs may argue more with their mates about money and chores, indicating conflict over their relative investment in the relationship. Because male wealth and status may continue to account for as much as two-thirds of the variance in male mating success in modern industrial societies (Perusse 1993), any deficiencies in that regard would constitute a serious competitive disadvantage in the mainstream sexual marketplace. Furthermore, the willingness of the male to invest in the female may indicate what proportion of his total resources is actually available to her.

The third set of hypotheses tested in this study were relevant to specifying the environmental conditions favoring a CDM coercive parental strategy. Specifically, CDMs can be expected to disproportionately coerce the women's parental investment when: (1) women have a higher number of children that are genetically CDMs', thus raising the CDMs' inclusive fitness benefits of the women's parental investment, (2) women have a lower number of children that are not genetically CDMs', thus reducing competition by nonrelatives for the women's parental investment, (3) women argue more frequently with CDMs about the children, indicating conflict over the women's parental investment. This last prediction is somewhat ambiguous, however, because arguments over parental care may indicate conflict over the inadequacy of the CDM's parental investment. Also, because all of the hypotheses relating to genetic paternity were partially confounded with certain biologically relevant demographics, the following additional variables were also included in the model to explore alternative hypotheses: (1) the ages of the women, (2) the ages of the children, and (3) the lengths of the women's relationships with the specified males.

Finally, the following testable hypotheses were also derived from the other relevant evolutionary theories described above. Theories of sexually selected infanticide and discriminative parental solicitude predict that: (1) CDMs may perpetrate battery of the women's children that are not genetically their own, (2) CDMs may also perpetrate sexual abuse of the women's children that are not genetically their own. Theories of kin-selected altruism predict that CDMs, like most fathers, will generally avoid: (1) the battery of their own genetic children, and (2) the sexual abuse of their own genetic children.

Theories of genetic incest avoidance predict that CDMs, like most fathers, will generally avoid sex—whether abusive or otherwise—with their own genetic children.

In the present study, we interviewed both battered and nonbattered women who had been either married or involved in some equivalent relationship with one primary sexual partner during the last year. The aim of our study was to assess the many facets of domestic violence, examining the prevalence of the different forms of aggression (i.e., verbal, physical, escalated, and sexual) through the different family relationships (e.g., husband to wife, father to child). We were also interested in uncovering what might be antecedent conditions to the violence, or, at least, co-occurring patterns that might shed some light on conflict within the family. Among the conditions we asked mothers about were: (1) the expressed reasons for fighting within the couple, (2) the financial resources and employment status of both partners during the last year, and (3) the mother's satisfaction with her sex life, including her feeling that this man loves her, and her involvement with other men while in the primary relationship. We also ascertained such demographic factors as: (1) the length of her primary sexual relationship, (2) the length of any secondary sexual relationships she might have been involved in, and (3) the genetic relationship of her primary partner to her children. Thus, we attempted to understand something of the quality of the primary relationship as it is experienced by the woman, as well as various economic and other biologically relevant circumstances that might influence both her experience and his aggression.

Finally, we tested an alternative structural model based upon the theory that male violence toward both the woman and the child might be a pathological symptom of an underlying brain dysfunction (e.g., genetic predisposition to violent behavior, birth injury, childhood brain injury) rather than the product of an evolved adaptive strategy. In this view, the various factors that we had hypothesized as the causal antecedents of domestic violence were instead modeled as the consequences of a nonspecific aggressive psychopathology. Although this was a plausible rival explanation, the alternative model did not fit our data as well as the theoretically specified models based on the hypothesized determinants of an evolved adaptive strategy. In our sample, only one of the men was identified as having a diagnosed brain abnormality (i.e., a hypothalamic tumor) that has been specifically associated with violent behavior. In that context, we deemed it prudent to consider different explanations for the coercive behavior of the others.

METHODS

Subjects

We recruited a stratified sample of 365 battered and nonbattered women with children between six and 12 years old. The stratified sample consisted of three

subsamples: (1) volunteer women recruited from a temporary shelter for battered women, (2) volunteer women recruited from the community and screened specifically for the reported presence of domestic violence, and (3) volunteer women recruited from the same community sources and screened only for the reported presence of children of the specified age group. One of the children (the "target" child) of each woman sampled was also randomly selected for interviewing and testing. As is commonly done with stratified samples, these three subsamples were collapsed for purposes of analysis.

These women and their children were recruited from a variety of sources in and around the city of Tucson, Arizona. Approximately half the total sample, 170 women were screened for the presence of interspousal violence during the year preceding the interview. Of these, 67 were recruited from battered women's shelters; the remaining 103 responded to posters displayed throughout the community in over 150 government agencies, food banks, hospitals, clinics, schools, stores, and neighborhood centers. The posters asked for women who had been "physically abused by a partner" in the last year. This latter group of battered women was included to control for some of the biases peculiar to a "clinical" sample of individuals actively seeking help in a battered women's shelter (cf., Straus 1990b).

Upon successfully recruiting this "outreach" subsample through the posting campaign, we withdrew all the flyers, replacing them several weeks later with different ones, with a different phone number to contact, merely asking for women with children between the ages of six and 12. In this "community" subsample, we accepted all such women who had been in a relationship with a man within the past year, provided only that the relationship had lasted over one month. In this representative subsample, 195 women were interviewed, some of whom had experienced violence in the last year and most of whom had not. Both the outreach sample of battered women and the representative community sample of women responded to advertisements placed in all the same establishments, though there were some differences in what establishments they were more likely to call from. Thus, the representative subsample was included as a demographically equivalent control group. Women were paid \$45.00 for participating in the study, and we believe that the relatively large sum of money, for a two- to three-hour interview, mitigated any possible biasing effects of volunteerism.

Forty-nine percent of the women were working full or part time, and 74% of their partners were employed full or part time. During the last year, 40% of the women and 30% of their partners had experienced job loss. Fifty-five percent of the women were married, 32% were either divorced or separated, 1% were widowed, and 12% were single but living with or closely involved with their partners. Fifty-four percent of the men were genetic fathers to the target child in the home, 27% were legal stepfathers, and 19% were both genetically and legally unrelated. Surprisingly, there were no significant differences in the rates of genetic paternity of the target children between the three subsamples, indicating that the entire social stratum of men that we indirectly

Table 1. Major Demographic Characteristics of Subsamples

Demographic Variable	Shelter (<i>n</i> = 65)	Outreach (<i>n</i> = 105)	Community (<i>n</i> = 195)	
Man's income (US\$/month)	589. _a	552. _a	1093. _b	**
Woman's non-AFDC income (US\$/month)	189. _a	358. _{ab}	405. _b	*
Woman's AFDC income (US\$/month)	378.	296.	299.	
Number of children (#)	2.9	2.9	2.9	
Age of children (years)	9.0	9.2	9.2	
Woman's age (years)	31.2. _a	32.0. _{ab}	34.0. _b	**
Woman's education (years)	11.1. _a	12.2. _{ab}	12.9. _b	**

p* < .05.*p* < .001.

sampled may have a substantially lower rate of genetic paternity of the children in the home than the population in general. Most of the men had lived with the target child throughout most of that child's life, and only 13% of the men had lived with the child for less than a year. The length of the woman's relationship with the man averaged 9.4 years, with a standard deviation of 5.9 years.

Table 1 compares the means for several major demographic variables across the three stratifications of the sample. The average numbers and ages of children in the family, as well as the monthly AFDC income received by the woman, were not found significantly different among the three subsamples. Although the average monthly AFDC income appears visibly larger for the "shelter" subsample, the standard deviations on this measure were generally about as large as the means for all three subsamples, swamping any apparent differences between the means. However, the following variables were found to differ significantly between subsamples: the man's monthly income ($F(2,362) = 15.36, p < .001$), the woman's non-AFDC income ($F(2,362) = 4.14, p < .05$), the woman's age ($F(2,362) = 8.45, p < .001$), and the woman's years of education ($F(2,362) = 13.53, p < .001$). Because these demographic differences among subsamples were consistent with the theoretically predicted antecedents of domestic violence, they were not deemed to represent either extraneous confounds or sampling errors. Instead, such demographic differences were to be expected among women who were systematically sampled for their varying levels of domestic violence in a stratified sampling design. Thus, statistically controlling for these demographics would have inappropriately underestimated the theoretically predicted variance (cf., Pedhazur 1982).

The ethnic composition of the sample reflected the general composition of this southwestern community, with 53.4% European-American, 35.0% Mexican-American, 5.5% African-American, 4.4% Native American, and 1.6% Asian-American or Pacific Islander. There were some significant ethnic differences with respect to monthly income ($F(3,361) = 4.66, p < .001$, with European-American families averaging more (\$1590) than either Mexican-American families (\$1270) or African-American families (\$1210). There was an equal number of girls and boys in the sample of target children. We excluded any children who had been born either premature or with medical

complications whenever possible, e.g., whenever another sibling of the same age range was available.

Procedures

Upon qualifying for the study, after a telephone intake procedure, the woman and one of her children came into the laboratory for an interview. Approximately 80% of the women originally scheduled were eventually interviewed, although, in some cases, their interviews would take place only after three or four missed appointments. Women and children were interviewed simultaneously, but separately, by female interviewers. All Mexican-American women were interviewed by Hispanic interviewers, and some interviews were conducted in Spanish. The interviews generally lasted between two and three hours.

Measures

Whereas the interview protocol included numerous measures, those reported in this study primarily concerned the types and amounts of aggression between individuals within the family and the demographic and socioeconomic profiles of individuals within the family. All assessment instruments were translated by a native Spanish speaker who was experienced in such translation. Piloting and subsequent changes were supervised by a postdoctoral researcher from Mexico.

Family aggression. We administered 15 of the 19 items of the Conflict Tactics Scales (Straus 1979, 1990c) to the woman. In addition, we asked several further questions about “escalated,” life-threatening, or homicidal violence (e.g., “How often has he threatened to kill you if you left him?”, or “How often has he harmed or killed pets?”) and rape or sexual abuse within the relationship (e.g., “How often has he forced you to have sexual intercourse against your will, when you didn’t want to?”).

We also asked the woman items from the Conflict Tactics Scales assessing the aggression of her male partner toward the target child. These items included verbal abuse, such as yelling at the child, physical aggression, such as spanking or pushing the child, and “escalated” violence, such as throwing something at, burning, or beating the child. In addition, we asked the child detailed questions about both parents’ use of aggression toward them and their siblings. The woman’s and the child’s reports were significantly, though moderately, correlated, and these findings are reported in another article (McCloskey et al., in press). For the present causal model, only the woman’s reports are used in the assessment of family violence.

Although we used an augmented subset of items from the Conflict Tactics Scales, we constructed and psychometrically validated our own theoretically specified subscales and scoring systems for these items. This nonstandard

usage reflects our different theoretical orientation and the validity of our measures is not contingent upon that of the standard usage of this instrument by Straus and others. The psychometric properties of the measures we constructed, i.e., those directly relevant to this nonstandard usage, are briefly summarized below but are detailed at greater length in another article (McCloskey et al., in press).

Relationship dynamics. To better understand the dynamics of the women's primary sexual relationships, we asked the women certain questions relating to the general quality of that relationship. These questions included whether their partners were sexually jealous, whether the women believed their partners loved them, whether the women were satisfied with their sex life with their partners, and what were the perceived causes of arguments with their partners (e.g., money, chores, children, his jealousy, her jealousy, etc.). Later in the interview, we also asked the women about any sexual relationships outside of the primary one.

Demographics. Our demographic questionnaire assessed such items as the woman's marital status, the woman's and her partner's current employment status, their separate incomes from work and other sources (including Aid to Families with Dependent Children), and their current occupations. Measures of occupational prestige for both men and women were based on their self-reported current occupations and the Stevens and Hoisington's (1987) prestige scale of the American labor force. A seven-point ordinal scale was developed from the major occupational categories used by the 1980 U.S. Census Bureau, with "unemployed" added at the bottom, rank-ordered according to the relative prestige ratings as scored on the aforementioned scale. These rank orders were found to be invariant across the sexes, although the original scale scores were not (instead, generally favoring the men). Similarly derived nine-point ordinal scales, developed from the major occupational categories used by the 1970 U.S. Census Bureau, have been previously found to correlate as high as .927 with their continuous counterparts, such as the NORC ratings of occupational prestige, based upon sophisticated magnitude estimation techniques (Hollingshead 1975).

Statistical Analyses

These data were subjected to a multivariate causal analysis by factor analytic structural equations modeling (Bentler 1989). A factor analytic structural equations model consists of two major components: (1) a "measurement" model, and (2) a "structural" model. The measurement model is essentially a confirmatory factor analysis, wherein a number of directly measured variables (called manifest variables or indicators) are related to a smaller set of hypothetical constructs (called latent variables or common factors) presumed to be underlying the correlations between them. For present purposes, this procedure

is superior to traditional exploratory factor analysis in that the exploratory procedure derives the multivariate constructs empirically from the correlations between manifest indicators and consequently runs the risks of capitalization upon chance associations ("alpha slippage") and of equivocal post hoc interpretation of the factors (cf., Gorsuch 1983). Thus, exploratory factor analysis is better suited for the generation rather than the testing of hypotheses. Instead, confirmatory factor analysis permits the theoretical specification of the latent constructs as a priori hypotheses to be tested against the correlational data. By the exclusive prior assignment of each indicator to the theoretically specified hypothetical constructs, confirmatory factor analysis also reduces the number of factor loadings needed and so enhances the efficiency of parameter estimation. Because of the great multicollinearity among the hypothesized predictors in this study (Pedhazur 1982, Cohen and Cohen 1983), common factors were constructed for the three major hypothetical constructs relating to the proposed causes of domestic violence: (1) sex, (2) money, and (3) paternity.

The structural component of the model is essentially a path analysis among the latent constructs that were produced by the factor analysis. Path analysis, or structural equations modeling, consists of imposing a restricted set of causal pathways, also specified a priori, and testing them against the correlations among constructs. A saturated structural model is merely one that freely estimates the direct correlations among all of the common factors; any structural model that can adequately reproduce that pattern of intercorrelations with a reduced set of hypothesized causal pathways is deemed to be superior by the principle of parsimony. Structural equations modeling permits the modeling of factor intercorrelations by any combination of direct effects, indirect effects, spurious effects, and residual effects (James et al. 1982). In this study, because of the hypothesized indirect effects of the three causal factors on those of violence toward the child, a path analysis was done modeling those effects as mediated by violence toward the woman. Additional hypotheses relating to prespecified direct effects upon the target child were also tested.

Unlike most studies of family violence, that simply compute total scores for each set of related items, we initially treated all questionnaire items relating to conflict as separate variables. This procedure gave us more insight into the different types of aggression by different perpetrators and on different victims within the family system. The two statistical software packages that we used for these analyses were SAS (SAS Institute 1989) and EQS (Bentler 1989). Because it was not possible to analyze all the individual items within a single multivariate model simultaneously, due to limitations in computational resources, we used a hierarchical analytical strategy. First, we theoretically assigned the items to hypothesized lower-order "subscale" factors. We then computed and output item covariance matrices in SAS (PROC CORR), using listwise deletion of missing data for each item covariance matrix. Using these covariance matrices, we tested items for convergent validity using EQS. Thus,

we constructed lower-order factors for all the theoretically specified subscales by confirmatory factor analysis.

We computed unit-weighted common factor scores for all the subscales in SAS (PROC STANDARD and DATA), using the means of the standardized item scores for all nonmissing items on each subscale. We also computed and output the subscale covariance matrices in SAS (PROC CORR). Thus, we entered all subscale factors as manifest variables for both higher-order confirmatory factor analysis and multivariate causal analysis within a single structural equation model. All higher-order confirmatory factor modeling and structural equation modeling was performed by EQS. Standardized subscales were theoretically assigned to higher-order constructs and tested for convergent validity. Structural equation modeling among these constructs provided a multivariate causal analysis of the structural relations among higher-order constructs.

Finally, all nonsignificant effects were eliminated from the final, or restricted, causal models to enhance the efficiency of parameter estimation. No post hoc fitting of additional model parameters was done. Three residual correlations were specified a priori. The first of these was the necessarily positive relationship between the occurrence and the contingent duration of the woman's affair. This parameter was specified because of the logical dependency between these two variables. The second residual correlation was between the woman's income and her occupational prestige. This parameter was specified because the common factor for money primarily represented the male's socioeconomic status and did not model the positive component of that correlation. The third was the residual correlation between the sex and paternity factors. This parameter was estimated to determine whether that positive correlation was fully accounted for by the common causal influence of the money factor.

RESULTS

Hierarchically Nested Models

Figures 1 and 2 display the inclusive and restricted factor analytic structural equation models, respectively. The inclusive model is the initial model with all the causal pathways originally hypothesized; the restricted model is the final model with all nonsignificant causal pathways eliminated. In Figure 1, the statistically significant causal pathways are represented as shaded arrows and the nonsignificant causal pathways are represented as unshaded arrows. In Figure 2, both factor loadings and causal pathways, estimated by generalized least squares, are expressed as standardized regression coefficients (β weights). Two additional models were also run that are not shown in the figures. As explained previously, the saturated model is the model with all the intercorrelations among the factors freely estimated; the alternative model was one

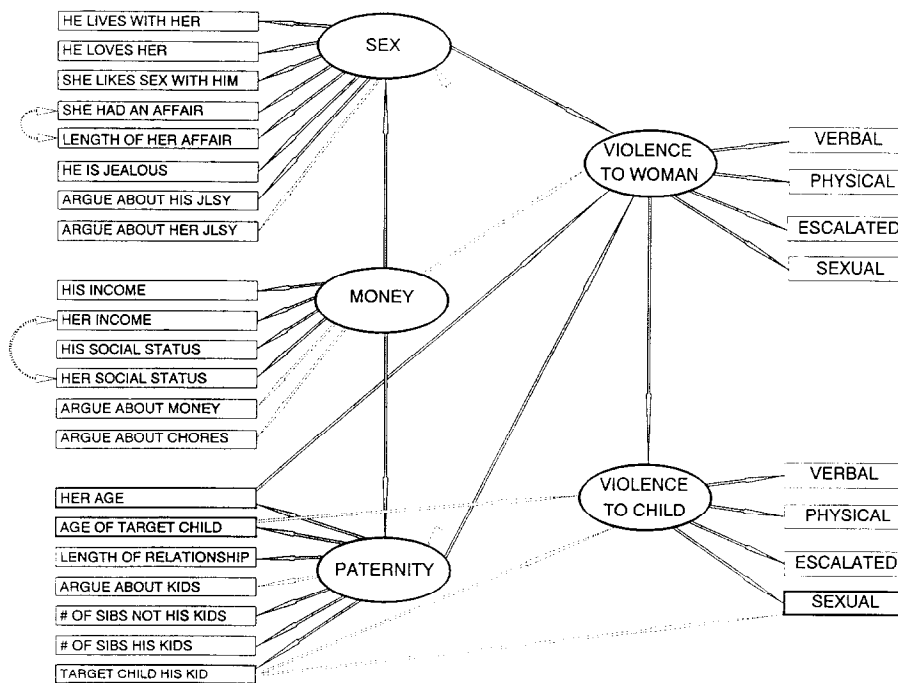


FIGURE 1. Inclusive factor analytic structural equations model for the effects of sex, money, and paternity upon domestic violence toward the woman and toward the target child, including nonsignificant causal pathways.

proposed by a reviewer of an earlier draft of this article, based upon a different theoretical perspective. Because the confirmatory factor analytic component is itself restricted and held constant across structural equations models, however, only the structural component of the “saturated” model is truly saturated.

Table 2 displays the statistical and practical indices of fit for all the nested factor analytic structural equation models. Although the chi-squared values for all four models were statistically significant, indicating that the models do not

Table 2. Statistical and Practical Indices of Fit for Nested Factor-Analytic Structural Equation Models

	DF	CHI ²	NFI	NNFI	CFI
Models					
(S)aturated	361	603.040**	.984	.993	.993
(I)nclusive	364	609.086**	.984	.993	.993
(R)estricted	373	610.672**	.984	.993	.994
(A)lternative	369	622.001**	.983	.992	.994
Differences					
(I) – (S)	3	6.046	.000	.000	.000
(R) – (I)	9	1.586	.000	.000	.001
(R) – (S)	12	7.632	.000	.000	.001
(A) – (S)	8	18.961*	-.001	-.001	.001

**p* < .05.
 ***p* < .001.

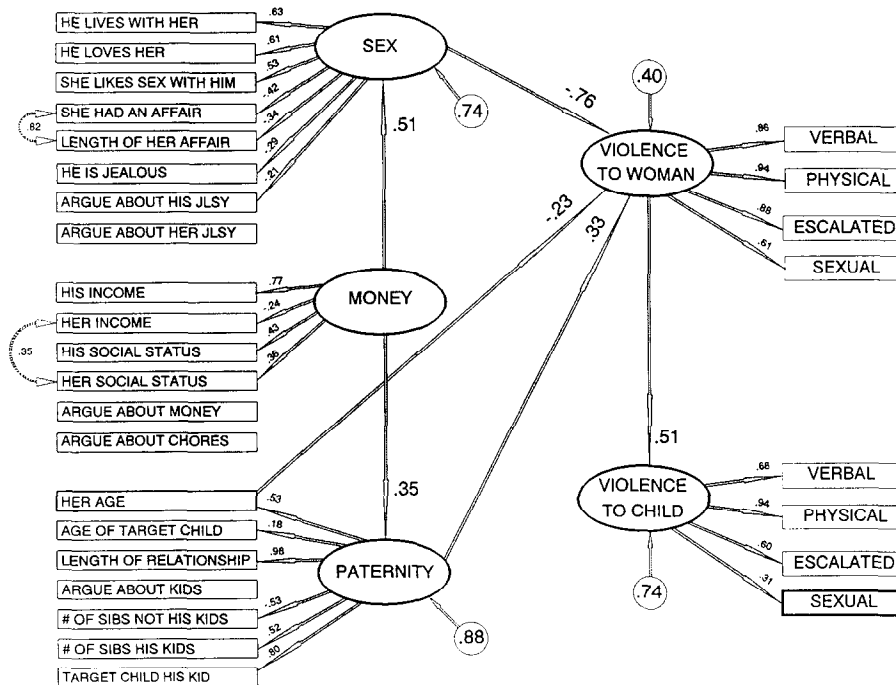


FIGURE 2. Restricted factor analytic structural equations model for the effects of sex, money, and paternity upon domestic violence toward the woman and toward the target child, including only significant causal pathways.

perfectly predict all the covariances between the subscales, all three of the practical indices of fit (NFI, NNFI, and CFI) for all the models were highly acceptable. The NFI is the Bentler-Bonett Normed Fit Index, the NNFI is the Bentler-Bonett Nonnormed Fit Index, and the CFI is the Comparative Fit Index. Such indices of fit exceeding .90 are considered acceptable for practical purposes (Bentler and Bonett 1980).

The “difference” statistical and practical indices of fit indicate the relative loss of fit of the model to the data entailed by the elimination of specific causal pathways. All structural models are, by definition, implicitly nested within the saturated model. Furthermore, the restricted model is hierarchically nested within the inclusive model. The first two difference tests shown in Table 2 are both statistically nonsignificant and negligible for practical purposes, indicating: (1) that the inclusive model performs nearly as well as the saturated model, and (2) that the restricted model performs nearly as well as the inclusive model, in predicting the observed covariances. The third difference test that is shown represents a summary of these first two comparisons, rather than an independent test, indicating the nesting of the restricted model directly within the saturated model. Thus, the restricted model is to be preferred based on the principle of parsimony. The fourth difference test represents a parallel nesting of the alternative model within the saturated model. Unlike those for the inclusive or the saturated models, however, this last difference test is

rejectable by the strict chi-squared statistical criterion, although acceptable by the practical indices of fit. Thus, the alternative model does not adequately predict or reproduce the observed correlations between the higher-order factors. The substantive aspects of these nested model comparisons will be discussed further.

Measurement Models

Lower-order common factor models. Lower-order common factors were constructed for the verbal, physical, escalated, and sexual subscales of domestic violence. These correlated lower-order subscale factors were separately confirmed for both dyadic facets of family violence: (1) male violence toward the woman, and (2) male violence toward the target child. The construction and validation of these subscales of domestic violence is fully detailed elsewhere (McCloskey et al., in press).

Higher-order common factor models. Higher-order common factors were confirmed for all the subscales under each dyadic facet of family violence, yielding one unitary common factor for violence toward the woman and another unitary common factor for violence toward the target child. For the factor representing violence toward the woman, all the subscales of domestic violence converged upon the construct with statistically significant factor loadings of substantial magnitude. For the factor representing violence toward the target child, all the subscales converged upon the construct with statistically significant factor loadings of generally comparable magnitudes, but for one. The subscale for sexual violence toward the child, although statistically significant, had a substantially lower factor loading on the higher-order factor than either: (1) the factor loadings of the other three subscales of violence towards the child, or (2) the corresponding factor loading of the subscale for sexual violence toward the woman. This suggests that the violent component is considerably higher and figures more prominently in the spousal rape of women than in the sexual abuse of children.

Common factors were also confirmed for the various predictors of domestic violence: (1) sex, representing male sexual capital in the relationship, (2) money, representing male financial capital in the relationship, and (3) paternity, representing male genetic capital in the family. The word capital is used here metaphorically to represent the various kinds of symbolic assets or equity that a male may possess in the different domains of the marital or family relationship, under the presumption that these may operate in a partially compensatory fashion in intrafamilial social exchange (cf., Dollahite and Rommel 1993). The sex factor indexed the general quality of the sexual relationship dynamics, the money factor indexed the socioeconomic relations, and the paternity factor indexed the genetic stakes held in the family by the woman's main sexual partner. Most predictors converged as hypothesized on

Table 3. Factor Intercorrelation Matrix (From Saturated Model)

Latent Constructs (Common Factors)	Sex	Money	Paternity	Violence to Woman
Sex factor				
Money factor	.523*			
Paternity factor	.166*	.357*		
Violence to woman factor	-.722*	-.282*	.182*	
Violence to child factor	-.276*	-.012	.169	.580*

* $p < .05$.

these three factors, with statistically significant factor loadings of roughly the expected relative magnitudes and directions.

On the sex factor, the woman's report that she lives with him, that he loves her, and that she enjoys sex with him loaded positively, as we hypothesized. On the same factor, the woman's report that she had an affair, the length of that affair, that she characterizes him as jealous, and that she argues with him about his jealousy loaded negatively. As we expected, only arguing about her jealousy loaded nonsignificantly on this factor. On the money factor, his income and his social status loaded positively as we expected. On the same factor, although her income loaded negatively, as we hypothesized, her social status also loaded positively, contrary to our prior expectations. Also contrary to our prior expectations, arguing about either money or chores loaded nonsignificantly on this factor. Finally, on the paternity factor, both whether the target child was genetically his and the number of additional siblings that were also genetically his loaded positively, as we expected. On the same factor, the number of additional siblings that were not genetically his loaded negatively, also as we hypothesized. In addition, the three biologically relevant demographics that are confounded with paternity—the woman's age, the child's age, and the length of the relationship—also loaded positively. Contrary to our expectations, arguing over the children loaded nonsignificantly on this factor. It appears that the reported contents of arguments were generally poor indicators of the common factors. Although the arguments about his jealousy were found statistically significant and in the expected direction, the magnitude of that factor loading was relatively low.

Structural Equations Models

Saturated model. The correlations among the higher-order factors are shown in Table 3. Although these correlations are estimated directly between each of the latent constructs, they are similar to those that one could compute for the subscale factor score totals or averages, but are more meaningful because they are corrected for errors in measurement. Whereas interpreting all the raw correlations in a 40×40 measured variable matrix would be impractical, this reduced set of factor correlations summarize the basic data to be fit by the directional causal pathways shown in the figures.

Inclusive and restricted models. As we hypothesized, increased male sexual capital in the relationship directly decreased male violence toward the woman. This finding is consistent with our CDM theory of coercive sexual strategy. Also as we expected, increased male genetic capital in the family—genetic paternity of offspring—directly increased male violence toward the woman. This finding is consistent with our CDM theory of coercive paternal strategy. Contrary to our prior expectations, however, increased male financial capital in the relationship did not directly increase or decrease male violence toward the woman. As we hypothesized, however, male financial capital in the relationship did directly increase both the male sexual capital in the relationship and the male genetic capital in the family. This finding implies a significant indirect effect of the money factor on violence toward the woman, mediated through the sex and the paternity factors. Furthermore, after the common causal influence of money was accounted for, the residual correlation of sex and paternity was found to be statistically nonsignificant. Due to the indirect nature of the causal relationship, however, this finding fails unequivocally to either support or falsify CDM theories of either coercive sexual strategy or coercive parental strategy. The structural model also shows that male violence toward the woman directly increased male violence toward the child. This finding is consistent with CDM theory of coercive sexual strategy but fails to either support or falsify CDM theory of coercive parental strategy.

In a factor analytic structural equation model, the causal relationships modeled are usually limited to those between the latent common factors (James et al. 1982). In this study, however, certain causal relationships were hypothesized involving specific measured variables, or manifest indicators, that were deemed to possess special evolutionary significance. The results of these tests are as follows. Because of its adverse impact on the woman's reproductive value (cf., Symons 1979, Buss 1989)—and, thus, the CDMs' expected benefits of sexually coercing her—the woman's increasing age was expected to decrease male violence toward her. This direct effect was found to be statistically significant in the specified direction. This reveals that the total effect of the woman's age is complex, consisting of: (1) a negative direct effect, and (2) a positive indirect effect (technically, a spurious one), mediated by the paternity factor. Nevertheless, path-analytic computations indicate that the total effect of her age is a net negative on the expected violence towards her. Because of its expected impact on required parental investment, the target child's increasing age was hypothesized to decrease male violence toward him or her (cf., Daly and Wilson 1984, 1988). This direct effect, however, was not found to be statistically significant. Finally, male genetic paternity of the target child did not directly decrease either male physical or sexual abuse of that child. The hypothesized direct effects of the child's age on both the general violence factor and the sexual violence subscale were statistically nonsignificant. This finding is at once inconsistent with the predictions of: (1) the theory of sexually selected infanticide, (2) the theory of discriminative parental solici-

tude, (3) the theory of kin-selected altruism, and (4) the theory of genetic incest avoidance.

We also examined the possibility that the hypothesized direct causal relations between the specified measured variables and latent constructs were not found to be statistically significant in the more restricted models due to the statistical control of any indirect effects through intervening variables. This was done by estimating these direct effects within the saturated model. Of the four direct effects hypothesized, as in both of the more restricted models, only that of the woman's age upon male violence toward her was found statistically significant. Because the other three direct effects were not found to be statistically significant in the saturated model, where all the direct factor correlations were freely estimated, we may conclude that the null results in the restricted models were not due to casual mediation by any intervening variables. In addition, we may observe that our multivariate causal model has explained fully 60% of the variance in violence toward the woman, but only 26% of the variance in violence toward the child. Clearly, if our model performed so much better in predicting one dyadic facet of domestic violence than another, we might infer that there must remain many critical variables as yet unidentified or otherwise unknown to us in the etiology of child abuse. It is important to recall that the participants in this study were intentionally over-sampled for spousal violence, but not specifically screened for child abuse.

Alternative model. As stated earlier, this alternative model was proposed by a reviewer of an earlier draft of this study based upon a different theoretical perspective. This model is based upon the theory that male domestic violence toward both the woman and the child is a pathological symptom rather than the product of an evolved adaptive strategy. This alternative approach posits that some aspect of the man's violent nature, perhaps attributable to brain dysfunction, precipitates both his lack of social and economic resources and his poor relationship with the woman. This view posits the reverse causal interpretation of what we had originally hypothesized.

In this theory, brain dysfunction could represent several different variables, each potentially measured in various ways, including genetic predisposition to violent behavior, birth injury, childhood brain injury, etc. Because no direct measures of brain dysfunction were obtained in the present study, this construct was represented in the alternative model as a general violence factor underlying both violence toward the woman and violence toward the child. As a result, this alternative model is not specifically committed to brain dysfunction, per se, as the underlying etiology of the general violence. Only two indicators of this construct were specified, however, leaving it theoretically underidentified. To remedy this technical problem, an equality constraint was imposed between the corresponding factor loadings for violence toward the woman and violence toward the child from this general violence factor. An equality constraint sets two or more model parameters equal to each other.

According to this alternative theory, the general violence factor would have a negative direct effect upon the money factor and a positive direct effect upon the paternity factor. In addition, violence toward the woman would have a negative direct effect upon the sex factor. Finally, the sex factor would have a negative residual correlation with the paternity factor. As mentioned above, these alternative model specifications reverse several of the causal orders we originally hypothesized.

Of these hypothesized causal effects, however, only the effect of violence toward the woman upon the sex factor was found to be both statistically significant and in the predicted direction in the alternative model. The factor loadings for violence toward the woman and violence toward the child from the general violence factor were found statistically significant, but the hypothesized causal effects of the general violence factor upon both money and paternity were not found to be statistically significant. Furthermore, both the nonsignificant effects of general violence upon paternity and the nonsignificant residual correlation of sex with paternity were found to be in contrary directions to those predicted.

As an added technical consideration, we should note that had either of the hypothesized causal effects of the general violence factor been significant, they might have helped with the empirical identification of that factor, in spite of the theoretical underidentification (cf., James et al. 1982), and permitted the lifting of the equality constraint described previously. Instead, removing the constraint produced linear dependencies in the model. This result demonstrates that the poor performance of the alternative model was not due to any artificialities produced by the equality constraint. The basic findings remained the same.

In conclusion, we believe that this alternative model provides an inadequate path-analytic solution and an unsatisfactory theoretical explanation for the patterns of intercorrelation among these higher-order factors, both substantively and statistically. Few of the significant effects found in the other models are predicted or reproduced by the alternative model. This state of affairs was also indicated by the statistically rejectable chi-squared comparison of the alternative with the saturated model reported in Table 2. As compared directly with this alternative model, our final restricted model: (1) fits the data better, as indicated by a lower chi-squared, and (2) possesses greater model parsimony, as indicated by comparatively fewer model and more residual degrees of freedom. Although the practical indices of fit were roughly equivalent for all the models tested, it is possible that this was due to a swamping of the differences by the explanatory power of the larger confirmatory factor analytic component, which was held constant throughout. Thus, although these results do not definitively falsify the brain dysfunction hypothesis as an alternative causal theory of domestic violence, the present form of the alternative model derived from it does not perform well in comparison with the reported evolutionary models, by either statistical or substantive criteria. The current

empirical data can therefore be said to favor the reported evolutionary models over this particular alternative.

DISCUSSION

These findings suggest that the hypothesized CDMs appear to be pursuing levels of coercive sexual and parental strategies: (1) inversely proportional to their sexual capital in the relationship, (2) directly proportional to their genetic capital in the family, (3) indirectly related to their financial capital in the relationship, as mediated by its positive contributions to both sex and paternity. These coercive sexual and parental strategies are indicated by various forms of violence directed toward the woman and toward the target child, including verbal, physical, escalated, and sexual abuse.

The principal results of this study are generally consistent with the predictions of evolutionary psychology. However, our other findings also suggest that CDMs appear to be pursuing levels of coercive sexual and parental strategies without regard to the deleterious indirect effects of those strategies upon their own genetic offspring. This finding illustrates how an evolved adaptive strategy does not guarantee optimality, and might even have severe pathological consequences (cf., McCloskey et al., *in press*), outside of the ancestral environment.

The implied cost/benefit tradeoff suggests a reproductive strategy emphasizing mating effort over parental effort in CDMs. This pattern of resource allocation is also suggested by the relative magnitudes of the direct effects of the money factor upon the sex and paternity factors, respectively. The standardized path coefficient from money to sex was much higher than that from money to paternity. Squaring these bivariate coefficients, we see that money predicts over twice as much of the variance in sex (26%) as it does in paternity (12%). These results are generally consistent with Perusse's (1993) findings that a linear composite of male income and occupational prestige significantly enhances male mating success in modern industrialized societies.

In relation to the money factor, the discrepant roles of the woman's income and her occupational prestige suggests both that a certain assortative mating is occurring by culturally constructed social status, rather than by income, *per se*, and that the woman's occupational prestige represents less of a threat, whether real or perceived, to the male's sexual domination than her independent income. This result also suggests that we are observing a phenomenon beyond the simple sociological effects of a unitary socioeconomic status construct for the entire family (Hollingshead 1975). Instead, a sexual conflict within the family over the relative contribution of resources and over the relative distribution of economic power is implied.

This idea is similar to certain feminist theories of patriarchy that have been applied in interpersonal power research, such as ultimate resource theory. According to Yllo and Straus (1990):

under egalitarian norms, husbands dominate family decision making because they possess certain material goods or personal attributes that legitimize their power in the eyes of their wives. It is postulated that when husbands feel entitled to dominate yet lack the resources to do so "legitimately," they will turn to violence as the ultimate resource.

Thus, earning power outside of the home corresponds to domestic power, in part because wage earners have liquid assets outside of the family that they can summon when they want to leave the marriage (England and Farkas 1986). When women acquire these resources, or men lose them, the traditional asymmetry in power between wives and husbands may contract or invert. These findings are consistent with the observations of sociologists that role changes occur during times of economic crisis (e.g., World War II and the recession of 1947). Ball-Rokeach (1980) has suggested that as women make independent economic gains their power within the home will increase but might exacerbate husbands' violence toward them and their children. Some studies indicate that husbands are more violent toward wives who are better educated or have higher occupational status (O'Brien 1974, Gelles 1980). In a study of over 800 working couples, Hornung et al. (1981) found that more conflict occurred in marriages as women's occupational prestige increases. However, Claes and Rosenthal (1990), in their study of 21 batterers, found that men who battered were married to women with less education. Men were more likely to batter their wives if they perceived them as having more reward power, or the power to dispense rewards and benefits, as opposed to coercive or leadership power.

We believe that these findings in the social sciences are generally consistent with our evolutionary theoretical interpretations. What both feminist and interpersonal power theories do not adequately specify is precisely why most men are so desirous of controlling women. Our results indicate that the relevant effects of economic power inequality within the family are primarily both causally mediated and ultimately motivated by sex. The critical difference in perspective is precisely what we mean by sex in this context. What we mean is not some collective, presumably altruistic, effort on the part of all men to contribute to a patriarchal social structure that benefits all fellow males, but a selfish effort on the part of certain disadvantaged individuals to selectively enhance their otherwise failing competitive sexual struggle against other men. These men apply various means of physical intimidation to keep their spouses home.

It should also be emphasized that domestic violence should not be characterized as an exclusively lower socioeconomic class phenomenon, as much of the available correlational data might seem to suggest (cf., Kantor and Straus 1990, Straus and Smith 1990). Because of the well-documented tendency toward assortative mating by socioeconomic class among humans, it is quite likely that one's main sexual competitors are to be found within one's class-bounded community. Therefore, disadvantage in sexual competition is relative to members of one's social class, rather than absolute. Although the present study sample consists primarily of lower and lower-middle class

subjects, there is no compelling reason to believe that the same basic causal processes may not operate at every level of a hierarchical society.

Nevertheless, certain ambiguities remain over the interpretation of some of our latent common factors, particularly the paternity factor. The statistical convergence of hypothesized indicators, although consistent with the favored theoretical interpretation, does not guarantee that the true underlying causal process is the one reified by the verbal label given to the factor. In response to such criticisms, we included certain biologically relevant demographic variables in the paternity factor as a test of discriminant validity (Ferketich et al. 1991, Figueredo et al. 1991). The factor loadings of these extra variables were found to be both statistically significant and substantial in magnitude, indicating a potential threat to the construct validity of that common factor. For example, the number of children fathered by a given male, as opposed to any prior males, may represent a simple function of the length of his relationship with that woman.

The possibility is therefore undeniable that the observed increase in domestic violence may be attributable to this third variable rather than to the proposed genetic construct. Furthermore, in a sample limited to women of childbearing age, the magnitude of the correlation is so great that any attempt at statistical control of this confound would be completely futile and likely to capitalize on residual sampling error (Pedhazur 1982, Cohen and Cohen 1983). In a slowly reproducing species, such as humans, there is little hope of disambiguating cumulative reproductive output from the time required to achieve it.

It is, indeed, a common observation among those working in this area that the severity of the domestic violence is roughly correlated to the length of the relationship (cf., Straus 1990b). The problem with this observation as an alternative hypothesis is that, unlike the paternity construct, it lacks the persuasive force of a plausible causal mechanism. Although critics have correctly warned evolutionary theorists against creating adaptive “just so stories,” we must be equally wary of creating arbitrary “just not so stories” and uncritically accepting any alternative explanation as long as it is not an adaptationist hypothesis. For example, the numerals of the pre-Columbian Maya were decoded many years before their hieroglyphic writing was deciphered (Coe 1992). Being able to read only the dates inscribed on their monuments created, in the minds of many, the peculiar impression of a people obsessed with celebrating the passage of time in imperishable stone. When the writing was finally deciphered, it was revealed that the mighty monuments instead commemorated important events in the history of that people, mostly dealing with the familiar human themes of kings and battles, warriors and priests. For that reason, we favor the evolutionary hypothesis that the causal efficacy of this latent construct is attributable to the shaping sexually selective pressure of genetic paternity and not to the mere passage of time.

There are other alternative hypotheses, however, that are more difficult to discount. These hypotheses involve the possible reproductive strategies that the

women may be pursuing in response to an abusive relationship. For example, women who are battered might enjoy sex less with their partners—and, thus, have more frequent and longer affairs—as a consequence of the domestic violence. Similarly, women whose children are battered might be more motivated to seek less abusive partners—and, thus, have more frequent and longer affairs—as a consequence of the domestic violence. By merely reversing the hypothesized causal directions in the model, these perspectives place emphasis on the woman's active role as a strategist and not simply as the passive object of her partner's reproductive strategies. However, in a cross-sectional study, such as this one, it is not possible to establish a unique causal direction (James et al. 1982). Thus, although these hypotheses are post hoc, rather than a priori, it is not possible to reject these alternative interpretations on the basis of the present data. Unfortunately, these reversals of causal direction would leave us with domestic violence at once highly consequential and completely unexplained. Future studies are planned to examine the interactive role of the women's reproductive strategies in conjunction with those of the men.

Other plausible hypotheses involve alternative unmeasured causal mechanisms for the same effects. For example, women who have greater numbers of children with abusive partners might be more motivated to remain in the relationship and, thus, tolerate increased domestic violence. It is also possible that women who have greater numbers of children with their partners might tend to have partners with higher income as a spurious function of the partners' age. Unfortunately, the ages of the men were simply not recorded in this study. The effects confirmed for the age of the women, used as a convenient proxy variable, do not seem to corroborate this hypothesis in that her age is directly correlated with paternity, but not with money. Thus, the influence of her age would fail to support a spurious relationship between paternity and money. Nevertheless, that negative result alone is inconclusive due to the imperfect correlation that presumably exists between the ages of the partners.

In conclusion, these data are highly consistent with the CDM theories of coercive sexual and parental strategies that we have proposed, but not uniquely so. Paradoxically for evolutionary psychology, the unmitigated indirect effects of these coercive strategies upon the genetic offspring of the perpetrators run dramatically counter to our prior predictions. More research is clearly needed on this important area of human behavior so that the various ambiguities that remain in the critical interpretation of these findings may be resolved. For the present, we have offered a general theory of the evolutionary psychology of domestic violence as a coherent, if imperfect, reproductive strategy and at least corroborated it with a converging array of supporting empirical data. Although a patchwork quilt of ad hoc "just not so stories" can probably be constructed for every individual effect in our causal model, we know of no other consistent theoretical perspective that can simultaneously account for the entire multivariate pattern of our data. The one alternative model that we did test, based on a pathology hypothesis of generalized violence, did not perform as well as might have been expected. Thus, we believe that the evolutionary approach to the

study of domestic violence represents what contemporary philosophers of science, such as Lakatos (1970, 1978), has characterized as a progressive—as opposed to a degenerating—research program. In addition, we believe that this approach provides a powerful heuristic and interpretive framework for this serious social problem.

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