

## Book review

### Darwinian psychology: A modern-day Hercules

The topics of inbreeding avoidance and the incest taboo have had a long and peculiar history. In one sense, we are currently where we were at the turn of the 20th century when Edward Westermarck (1891/1922) first proposed his twin hypotheses: (a) close childhood association leads to the development of a sexual aversion, thereby avoiding the deleterious consequences of inbreeding; and (b) this personal sexual aversion is expressed at the cultural level as norms prohibiting incest. These ideas are as fresh today as they were then and have only recently been subject to extensive empirical investigation by researchers in the behavioral sciences. Part of the reason more progress was not made during the last century is that the social sciences have been on Mr. Toad's wild ride. By and large, approaches to understanding inbreeding avoidance and the incest taboo have been detached from the robust theoretical guide rails set down within the natural sciences. Consequently, rather than viewing biology as an important factor patterning cultural phenomena, the social sciences have long viewed culture as replacing biology.

But the tides are turning, and the recent edited volume by Wolf and Durham documents the progress as well as the outstanding questions relating to inbreeding avoidance, the incest taboo, and Westermarck's original proposals (*Inbreeding, Incest, and the Incest Taboo: The State of Knowledge at the Turn of the Century*, by A. P. Wolf and W. H. Durham, Stanford University Press, © 2004). Born from a conference held in 2000 at Stanford University, this volume represents the state of knowledge at the turn of the century in the fields of anthropology, biology, genetics, philosophy, primatology, and psychiatry.

According to Wolf, during the last century, progress has been made on two important fronts. First, we now have overwhelming evidence that inbreeding is indeed biologically deleterious. The chapter by Bittles reviews evidence that inbred offspring suffer increased rates of mortality and morbidity. Using data from offspring of first cousins to estimate effects of inbreeding in the nuclear family, Bittles estimates that offspring of sibling and parent–offspring unions incur a 22–36% rate of mortality and morbidity over and above population average. This represents a tremendous selection pressure against matings between close genetic relatives and provides the causal link for expecting

evolution to have shaped systems for avoiding close relatives as sexual partners.

The second important change during the last century is that there is now empirical evidence supporting Westermarck's hypothesis regarding the development of a sexual aversion between childhood associates. The natural experiments inadvertently created by cultural institutions in Taiwan and Israel demonstrate that regardless of actual relatedness, children reared in close physical proximity tend to avoid one another as marriage partners (Israeli Kibbutzim: Shepherd, 1983; Talmon, 1964) and, if forced to marry, suffer decreased rates of fertility and increased rates of divorce and extramarital affairs (Taiwanese minor marriages: Wolf, 1995). There are also studies on a range of nonhuman animals that indicate that close association from birth inhibits sexual behavior. The chapter by Pusey briefly reviews this literature and points to close association and sex-specific migration as two common inbreeding avoidance mechanisms.

Many of the chapters in this volume speak to one of three outstanding questions that remain after accepting the fact that inbreeding is deleterious and that close association inhibits sexual attraction: (a) What is the specific structure of inbreeding avoidance mechanisms in humans? (b) What, if any, relationship exists between inbreeding avoidance mechanisms and the incest taboo? (c) How can we explain cross-cultural variation in the incest taboo? These are addressed as questions of mediation, representation, and localization, respectively.

### 1. Questions of mediation

The chapter by Wolf is the primary empirical contribution to the question of mediation, that is, the mechanisms underlying the development of a sexual aversion in humans. Wolf returns to the archival data discussed in his 1995 book to evaluate whether (a) there exists a critical period during which close association is required to produce a strong sexual aversion and (b) this aversion is felt more strongly by females, as parental investment theory predicts. To answer these questions, Wolf concentrates on the fertility of minor marriages in which a young girl, typically a newborn, is adopted into her future husband's family and reared alongside her husband until the day they are wed. Wolf reasons that if Westermarck's hypothesis is correct, then the

earlier the age of coresidence initiation, the longer the childhood association and the greater the resulting sexual aversion, which should be reflected in marital fertility. Based on his data, Wolf proposes a ‘very sensitive period’ during the first few years of life required for the expression of an intense sexual aversion and a ‘sensitive period’ lasting throughout childhood, which continues to contribute to the development of an aversion.

The second question Wolf attempts to answer is whether, according to parental investment theory, females experience a more intense sexual aversion compared to males. Wolf starts with the assumption that childhood coresidence is the mechanism by which sexual aversions develop. No effect of childhood coresidence, no aversion present. According to Wolf’s logic, then, if females exhibit stronger sexual aversions than males, then her age at first association and, hence, her coresidence duration should predict marital fertility. Furthermore, this should be true regardless of whether she is the older or the younger partner.

Wolf reports that when the wife is the younger partner, her age at first association predicts marital fertility—her older husband’s does not. This appears to confirm the presence of a stronger aversion in females. However, when the wife is the older partner, which occurred in a minority of cases, her age at first association does not predict fertility. Ergo, according to Wolf, females do not display a more intense aversion than males and parental investment theory is in need of serious reconsideration. Furthermore, Wolf claims that wives, especially younger wives, could not have been responsible for the aversion in such a male-dominated society. Although the wife’s age at first association predicts fertility when she is the younger partner, it must be because she forms an attachment to her husband during early childhood, thereby eliciting contrasexual feelings. Thus, Wolf, much like Erickson, weds Bowlby’s attachment theory to Westermarck’s hypothesis to help explain the development of sexual aversions.

Wolf’s logic is problematic for many reasons, but I shall focus on one: it does not follow that an absence of a relationship between childhood association and marital fertility indicates the lack of a sexual aversion. This assumes that coresidence duration is the only cue mediating the development of a sexual aversion. Upon closer inspection of Wolf’s data, when the female is the older partner, although her age at first association does not predict fertility, the fertility rates are low across the board—certainly not an indication of an absent aversion. Interestingly, this same pattern holds when the male is the older partner. That is, when older, his age of coresidence initiation does not predict marital fertility, yet fertility rates are low across the board. What is clear is that while Wolf’s data do not provide evidence for the absence of a female sexual aversion, they do show a difference in how the coresidence of the younger and older partner impacts marital fertility.

As valuable as Wolf’s data are, they allow for the investigation of psychological mechanisms mediating in-

breeding avoidance through a very dark lens (Lieberman & Symons, 1998). The question of mediation and sex differences can be directly addressed using the armaments of modern-day psychology. Living subjects can be brought into the lab, and their reactions to incest can be assessed. In this way, it is possible to investigate whether females are more sensitive to inbreeding than males using more direct dependent measures (e.g., disgust vs. marital fertility). Furthermore, as the chapter by Erickson suggests, it is possible to investigate how developmental parameters such as coresidence duration and other potential cues to relatedness influence the occurrence of and reactions to sexual relationships with one’s siblings. Therefore, although Wolf’s data valuably contribute to the discussion of inbreeding avoidance mechanisms, caution should be taken when interpreting them. Indeed, there are alternate explanations of Wolf’s data that do not require a retooling of parental investment theory and coincide nicely with recent empirical findings (Lieberman, Tooby, & Cosmides, 2007).

## 2. Questions of representation

Perhaps one of the more substantial debates in the behavioral and social sciences is the extent to which natural selection has shaped so seemingly a cultural phenomenon as morality. The incest taboo has played a key role in this debate. For many social scientists, the incest taboo represents the transition from nature to culture. Evidence that this taboo is grounded in our naturally evolved psychology threatens to bring down the entire house of cards occupied by many mainstream social scientific theories. A valuable contribution of this volume is that it explores the question of representation and presents a range of perspectives regarding the relationship between inbreeding avoidance mechanisms and the incest taboo.

At one end of the spectrum, Bateson suggests that it is unlikely that inbreeding avoidance and the taboo evolved by similar mechanisms. Whereas inbreeding avoidance evolved to direct one’s own mate choice, Bateson maintains the taboo came about through desires to conform to the group norm produced by the general disapproval of incest. Consequently, one holds particular views (e.g., moral views) regarding incest as a result of the recognition of group-wide disapproval rather than the development of sexual aversions toward one’s own kin. Durham also expresses concern with Westermarck’s explanation of the incest taboo, claiming that the taboo is absent in the very test cases used to support Westermarck’s sexual aversion hypothesis (e.g., Taiwanese minor marriages) and, thus, could not be produced by the same mechanism.

At the other end of the spectrum, Wolf, Arnhart, and Sesardic generally defend Westermarck’s proposal of a direct relationship between inbreeding avoidance mechanisms and the incest taboo. Sesardic addresses Durham’s concern that Westermarck’s two hypotheses are in a zero-sum relationship; that is, evidence that sexual aversions

develop in the absence of societal norms is evidence against the hypothesis that sexual aversions give rise to societal norms. Sesardic claims that the natural experiments brought to bear on Westermarck's sexual aversion hypothesis might be epistemologically peculiar and, thus, not fair game for criticism.

But considering for a moment that they are fair game, these natural experiments do not directly address Westermarck's hypothesis regarding the generation of norms. In the cases Durham uses as examples (e.g., minor marriages and kibbutzim), the parents encourage marriage between childhood associates. To my knowledge, in none of these cases do we have a measure of how sexually averse childhood associates felt toward one another. We also do not know how morally reprehensible childhood associates perceived marrying and mating with one another to be. I take Westermarck's proposal to indicate that the aversion and moral prohibition develop by similar mechanisms in the head of the same individual (e.g., see Fessler & Navarrete, 2004; Lieberman, Tooby, & Cosmides, 2003, 2007). It says nothing about others holding contrary views.

### 3. Questions of localization

A third class of outstanding questions relates to the cross-cultural variation in the incest taboo. Chapters by Gates and Scheidel speak to this issue. For example, Scheidel discusses sibling marriage in ancient Egypt and dissects the 40 sibling marriages known to exist from available census records. Although cultural variation regarding the incidence of sibling marriage certainly exists, the chapter by Scheidel illustrates that such variation is the exception, not the rule. Furthermore, this issue raises the question of whether marriage is the same thing as sex. Taking seriously the proposal that they are not, it would be interesting to learn the paternity of children born to married siblings who reportedly lived in close physical proximity throughout childhood. Not that it could not happen (as Wolf's data indicate), but matings between individuals who categorize one another as siblings are most likely rare events across cultures and throughout history.

### 4. The next hundred years

This volume is a useful overview of the state of knowledge regarding inbreeding avoidance and the incest taboo and illustrates that although questions remain, Westermarck's hypotheses are alive and well. However, one framework not addressed in this volume is the adaptationist framework employed by evolutionary psychologists. Wolf points out that solving the mystery of his data (i.e., why the coresidence duration of the younger partner and not the older partner in minor marriages predicts marital fertility) requires a modern-day Hercules. Darwinian psychology fits this bill.

An evolutionary psychological framework offers an answer to Wolf's puzzle of why the coresidence duration of the younger but not the older partner predicts marital fertility: the mind uses multiple cues to identify siblings and to regulate sibling-directed behavior (e.g., sexual avoidance and altruism). Recent empirical findings show that these cues include (a) seeing one's mother caring for a newborn, a cue available only to older siblings, and (b) coresidence duration, a cue used mainly by younger siblings to detect older siblings (Lieberman et al., 2007). For younger siblings, coresidence duration predicts sexual aversions toward their older siblings. For older siblings, seeing one's mother caring for their younger sibling as a newborn predicts sexual aversions, not coresidence duration. This nicely mirrors the pattern found in Wolf's data. Furthermore, psychological measures indicate that females find sexual behavior with a sibling more disgusting than males do, rescuing parental investment theory from premature dismissal.

In closing, I suspect that, in another century when a future researcher is ready to take stock, we will see a great deal of progress in our understanding of inbreeding avoidance mechanisms and how our evolved psychology patterns cultural phenomena in research programs that consider how ancestral environments shaped our evolved information-processing circuitry. Although research and ideas surrounding inbreeding avoidance and the incest taboo have had a tumultuous childhood, with the incorporation of an adaptationist perspective, we have the resources to support the growth and maturity of a field of study that has long been central to the social and behavioral sciences.

Debra Lieberman  
Department of Psychology  
University of Hawaii  
Honolulu, HI 96822, USA  
E-mail address: [debra@debralieberman.com](mailto:debra@debralieberman.com)

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