

# It's All Relative: Sexual Aversions and Moral Judgments Regarding Sex Among Siblings

Debra Lieberman and Adam Smith

University of Miami

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## Abstract

Animals—human and nonhuman alike—rarely prefer close genetic relatives as sexual partners. Moreover, in the lab and in real life, humans typically react to thoughts of sex with their family members with extreme aversion. Scientists generally agree about why such aversions exist: The sexual avoidance of close genetic relatives evolved because the offspring of close relatives suffer increased risks of disease and death. But how do these sexual aversions develop? Recent research has addressed this question by focusing on people's aversions to sex with their siblings. Researchers have discovered a set of cues people use during development to estimate whether someone in their social world is likely to be a sibling. When present, these cues typically lead to the development of intense sexual aversions. When the cues are absent, as they are when siblings are reared apart, kin-based sexual aversions tend not to develop. This article discusses the kinship cues regulating the development of sibling sexual aversions and recent work suggesting that the intensity of people's sibling-directed sexual aversions colors their moral attitudes regarding the sexual behavior of others. Taken together, research on human inbreeding avoidance addresses fundamental questions pertaining to development and mate choice, as well as morality and social policy.

## Keywords

inbreeding avoidance, kin detection, Westermarck effect

## Introduction

Patrick S. and Susan K. are a modern-day Romeo and Juliet. Theirs is a story of young love and intense sexual attraction. Patrick and Susan met during their early adulthood and fell deeply in love. They decided to move in together and, over the course of 6 years, had four children together. But this story is indeed a tragedy: Patrick has served multiple jail sentences because of his relationship with Susan. Why?

Because Patrick and Susan are brother and sister.

When asked to think about sex with a sibling or another close genetic relative, such as a parent, most people have an intense disgust reaction—but some do not, as the story of Patrick and Susan illustrates. Recently, scientists have started to investigate how incest, particularly sibling incest, can generate such polar reactions.

In this article, we discuss some of the recent theoretical and empirical advancements in the science of sexual avoidance. We focus our discussion on sibling-incest avoidance and describe research that has uncovered the mechanisms that govern the development of sexual aversions toward siblings. We also discuss recent evidence indicating that the intensity of people's sexual aversions toward their own siblings shapes their moral views regarding sibling incest in general. The topic of incest avoidance offers a unique glimpse into how natural selection has shaped modern human psychology and how our biological heritage can shape our moral views.

## Why Is Incest “Bad”?

Sex with close genetic relatives can have negative consequences for the health of resulting offspring because of the effects of deleterious recessive genes and disease-causing organisms (Bittles & Neel, 1994; Tooby, 1982). Peppered throughout each of our genomes are genes that, because of various biological processes and entropic forces, have been transformed from functional genes into damaged or deleterious genes (Lewin, 1999). Many of these genes go undetected because they are recessive and paired with a functional counterpart inherited from the other parent. We all inherit damaged genes, but close relatives—say a brother and sister—have an increased risk of inheriting the same damaged genes from their parents. If siblings produce a child, there is a substantial chance that the child will inherit two copies of the same damaged genes, compromising whatever function (e.g., an immune, cardiac, or neural function) they performed. Further problems arise for inbred children because inbreeding creates similar biochemical environments between parent and child, which benefits the replication of disease-causing organisms that can be transmitted between family members (Tooby, 1982).

### Corresponding Author:

Debra Lieberman, Department of Psychology, University of Miami, P.O. Box 248185, Coral Gables, FL 33124-0751  
E-mail: [debra@miami.edu](mailto:debra@miami.edu)

In general, the closer the genetic relatedness of a mated pair, the greater the probability that the consequences of deleterious genes and pathogens will be realized in their offspring, resulting in premature death, congenital malformations, and disease (Bittles & Neel, 1994; Charlesworth & Charlesworth, 1999; Zlotogora, 2002). This was perhaps best illustrated by findings from a study by Seemanova (1971) on a population of Czech women who had children sired by a father or brother *and* children sired by an unrelated male. Compared with 7% of the children who had been fathered by a nonrelative, 42% of the children who had been fathered by a nuclear relative suffered severe birth defects or early mortality.<sup>1</sup> More recently, in a large-scale study, Bittles and Neel (1994) found that the rate of infant and early childhood mortality for children of first cousins was 4.4% greater than that for children of unrelated parents.

### Incest-Avoidance Mechanisms in Humans

Given the negative biological consequences of inbreeding, natural selection likely favored the evolution of mechanisms that enabled the sexual avoidance of close genetic relatives. Biologists have documented the presence of such mechanisms in many other species, ranging from wasps to lions to nonhuman primates (Fletcher & Michener, 1987; Hepper, 1991; Packer & Pusey, 1993), but little has been known about these mechanisms in humans until recently.

Over the past decade, evolutionary scientists have begun to uncover the mechanisms responsible for generating sexual aversions toward close genetic relatives. One advance was the specification of the kinds of psychological programs necessary to perform this function. To avoid incest, two basic systems are needed: one that detects kin—that is, one that estimates the probability that another person is one's own close genetic relative—and one that uses this probability to regulate sexual avoidance. Regarding sexual avoidance, researchers have identified disgust as the emotion that functions to avoid biologically costly sexual partners such as close genetic relatives (Fessler & Navarrete, 2003; Tybur, Lieberman, & Griskevicius, 2009). But how does kin detection operate?

Kin detection requires learning which individuals—of all the people in one's social environment—have a high probability of being a close genetic relative. At first, acquiring this information might seem to require no special computational operations, because throughout childhood, people are exposed to language that implies relatedness (e.g., “Share your cookie with your brother”; “Don't tease your sister”). Why did the process of natural selection not simply depend on the kinship inferences made possible by this type of language as the primary input for sibling recognition? One reason is that linguistic information might not be the most reliable way to learn about relatedness. Kin terms are commonly used to refer to individuals who are not blood relatives, and thus they blur genetic boundaries. For instance, “aunt” can refer to a parent's brother's wife (a nongenetic relative), and “brother” can refer

to an unrelated coalition member. Furthermore, nonhuman species without the capacity for language categorize individuals according to relatedness, a fact suggesting that more primitive mechanisms for kinship detection exist. It is unlikely that evolution would have jettisoned prior functional mechanisms in favor of mechanisms that relied on less reliable cultural and linguistic information.

Instead, it is probable that humans, like many nonhuman animals, rely on ecologically valid cues that correlated with genetic relatedness in ancestral environments. To the extent that different cues correlated with an individual's status as a particular type of relative (e.g., a parent vs. a child vs. a sibling), different detection mechanisms might exist.

Researchers have identified a short list of candidate cues that might govern the detection of siblings (Ackerman, Kenrick, & Schaller, 2007; DeBruine, 2005; Fessler & Navarrete, 2004; Lieberman, Tooby, & Cosmides, 2003, 2007). More recent findings have indicated that people use different cues to detect younger versus older siblings. For instance, seeing one's own mother caring for (e.g., breast-feeding) a newborn is a reliable cue to siblingship. Indeed, the close association of mother and newborn that is characteristic of mammalian species and that in humans lasts throughout the first few years of life creates a stable arrangement that can be used by others to infer relatedness. However, as potent a cue as mother-infant perinatal associations might be, it is available only to older siblings, individuals who are already present in the social environment. For the younger sibling in a sibling pair, this cue to siblingship is unavailable; therefore, younger siblings must rely on other cues to identify probable older siblings.

One such cue is parenting effort. Because parents are motivated to invest in their own genetic offspring, monitoring which children regularly receive care from one's own parents would allow one to reliably identify probable siblings. For instance, observing one's parents feeding or protecting another child provides evidence that this child might be a sibling. Moreover, the longer the duration of care observed, the more likely that the individual in question would have been a sibling under ancestral conditions. This cue—duration of shared parental care—has been operationalized as “childhood coresidence duration” and was first proposed by Edward Westermarck, a Finnish social scientist who noted that children reared in close physical proximity during childhood tend to develop a sexual aversion toward one another later in adulthood (Westermarck, 1891/1921). Westermarck's observation gave rise to what has come to be known as the Westermarck hypothesis (or Westermarck effect) and implies that childhood coresidence duration is a cue to siblingship.

In sum, then, humans appear to use at least two cues to identify probable siblings: maternal-infant perinatal associations (used to identify probable younger siblings) and the duration of childhood coresidence (a backup cue used mainly to identify probable older siblings; Lieberman et al., 2007).

Various anthropological and psychological investigations have provided evidence that the human mind uses these cues

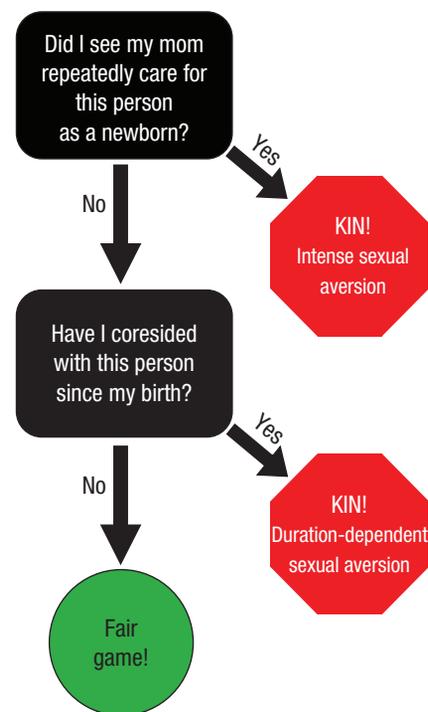
in the development of sibling-directed sexual aversions. The first of these investigations were on *natural experiments*, social arrangements created by cultural institutions that caused genetically *unrelated* children to be raised together throughout childhood. One natural experiment was created by the communal practices of Israeli kibbutzim. In traditional kibbutzim, starting a few weeks after birth, children were placed in a home, separate from that of their mother and father, with children from other families born around the same time (Shepher, 1983). This arrangement led to the coresidence of peers starting from early childhood and often lasting until young adulthood, when they left the kibbutz to fulfill their national military duty. Researchers who tested the Westermarck hypothesis found that children raised together rarely married each other, despite pressures from their parents to do so (Shepher, 1983; Talmon, 1964). The absence of marriages between these co-reared peers implies that they developed sexual aversions toward each other, and recent work has supported this claim: The longer a kibbutz member coresided with a peer of the opposite sex, the more intense the disgust that member reported in response to imagined sexual relations with the peer (Lieberman & Lobel, 2012).<sup>2</sup>

The Taiwanese custom of *minor marriage* (popular in the late 1800s, but outlawed in 1950) set the stage for a second natural experiment. In minor marriages, a newborn girl was adopted into her future husband's family and was reared alongside him until early adulthood, when the two were forced to wed. Anthropologist Arthur Wolf reasoned that if Westermarck's hypothesis were true, then the earlier a bride was adopted into her future husband's family (and the longer her duration of coresidence with him), the greater the sexual aversion that would develop between the couple. Indeed, Wolf (1995) found that compared with marriages between spouses who met during adulthood, minor marriages suffered decreased rates of fertility and increased rates of divorce and extramarital affairs. As with the absence of marriages between kibbutz peers, Wolf's findings imply that coresidence led to the development of strong sexual aversions.

In addition to the support Wolf's data provide for Westermarck's hypothesis regarding the effects of childhood coresidence duration on sexual aversions, these data also nicely illustrate that coresidence duration is mainly used by the younger siblings in sibling pairs. Upon closer inspection of his data, Wolf (2005) found that when the bride was the younger partner, as was typically the case, her age at adoption (and thus the duration of her coresidence with her husband-to-be) predicted the marital fertility of the couple. But for the very same couples, the age of the husband at the time of his wife's adoption (and hence his coresidence duration) did not. This pattern reveals the use of two separate cues for estimating siblingship (Lieberman, 2009). The older partner in the marriage would have observed his own mother caring for and even nursing his future bride (Wolf, 1995). It is plausible that his age at the time of his wife's adoption did not predict the couple's marital fertility because maternal-infant association is a potent cue and is

indicative of relatedness *regardless of coresidence duration*. However, for the younger partner, the bride, age at the time of adoption predicted marital fertility because coresidence duration was the primary kinship cue to which she would have been exposed.

Maternal-infant associations and coresidence duration continue to operate as cues to siblingship in modern-day traditional families in which genetic siblings are raised together (Fessler & Navarrete, 2004; Lieberman et al., 2003, 2007; see Fig. 1). Lieberman et al. (2007) found that for older siblings who observed their mother caring for their opposite-sex sibling as an infant, coresidence duration *did not* predict sexual aversions toward that sibling during adulthood. Instead, across all durations of coresidence, sexual aversions were close to ceiling. By contrast, the coresidence duration of the younger siblings in sibling pairs *did* predict the intensity of sexual aversions, which were low for shorter coresidence durations and gradually increased with additional years of coresidence. Data have suggested that it takes approximately 14–15 years of coresidence



**Fig. 1.** A schematic for how sibling sexual aversions develop on the basis of maternal-infant association and childhood coresidence duration (Lieberman, Tooby, & Cosmides, 2007). First, individuals assess whether they have observed their mother caring for another child as a newborn. If they have, then that individual is categorized as a sibling and an intense sexual aversion develops. If individuals have not been exposed to this cue of maternal-infant association, as would be the case for the younger siblings in sibling pairs, then they can use the duration of coresidence with a given person to assess his or her probability of being a close genetic relative: The longer the duration, the greater the probability of genetic relatedness. Accordingly, sexual aversions will be sensitive to the duration of coresidence. If neither cue is observed, then the individual in question is not categorized as a sibling and can be considered as a potential sexual partner (see Lieberman et al., 2007, for additional discussion).

for younger siblings to reach the same level of sexual aversions reported by older siblings exposed to the cue of maternal-infant association. It may not be a coincidence that this intensity is reached by this age, given that it corresponds to the onset of sexual maturity in females.

Additional cues might also play a role in sibling detection, including facial resemblance (DeBruine, 2005) and olfactory cues, such as those derived from the catabolism of proteins associated with the major histocompatibility complex (MHC; Loisel, Alberts, & Ober, 2008; Wedekind & Furi, 1997). Future studies examining all candidate cues (i.e., coresidence duration, maternal-infant associations, facial resemblance, and MHC similarity) simultaneously will help paint a more comprehensive picture of how sibling sexual aversions develop.

### No Cues, No Disgust

One of the implications of this research is that in the absence of kinship cues, genetically related individuals will not categorize one another as kin and might not develop strong sexual aversions toward one another. The absence of a kinship-dependent sexual aversion is one factor that can help explain patterns of consensual sex between genetically related adults such as Patrick and Susan, as well as patterns of sexual abuse within families. If siblings, for instance, do not observe maternal-infant associations or do not live together for long durations beginning at birth, then they will be unlikely to develop kin-based sexual aversions. Patrick and Susan were basically strangers when they first met. Although they explicitly know that they are indeed genetic relatives, they have no tacit knowledge of relatedness as assessed by evolved mechanisms guiding inbreeding avoidance. Other genetic sibling pairs not exposed to kinship cues—for instance, because they were adopted into different families at birth or because they are the offspring of the same sperm donor—also might not develop kin-based sexual aversions. In fact, some evidence has suggested that “stranger siblings” might find each other to be slightly *more* attractive than nonrelated individuals because siblings are more likely to share similar attitudes, preferences, and even physical features (e.g., see Little, Penton-Voak, Burt, & Perrett, 2003; see Tooby & Cosmides, 1996, for a discussion of association value and deep engagements).

This same logic applies to other relationships within the family. If a man is not exposed to cues governing the detection of his possible offspring, then kin-based sexual aversions toward these offspring might be less likely to develop. Without this aversion, one might consider individuals who would otherwise be perceived as unsuitable sexual partners as potential mates. This could potentially help explain consensual sexual relationships between relatives (e.g., Woody Allen and his adopted daughter) as well as sexually abusive relationships, in which the abuser is often a stepparent or other individual lacking kinship-derived sexual aversions (Daly & Wilson, 1983; Finkelhor, 1984).

### From Personal Disgust to Moral Proscriptions

Assuming that evolved inbreeding-avoidance mechanisms are in place to prevent sex between close relatives, what ought we to do about cases like that of Patrick and Susan? Intuitions about incest as a social issue vary from person to person, but that variation is not random. Rather, feelings about sibling incest as a moral issue or policy matter are to some extent dependent on the disgust an individual experiences when thinking about sex with his or her own opposite-sex siblings. Specifically, researchers have found that the kinship cues that predict the sexual aversion toward one's own siblings also predict the intensity of moral judgments regarding sibling incest in general (Fessler & Navarrete, 2004; Lieberman & Lobel, 2012; Lieberman et al., 2003, 2007; but see Royzman, Leeman, & Sabini, 2008). This finding suggests that psychological adaptations guiding personal sexual decisions can color moral judgments about the behavior of other people.

Many theorists have offered explanations for why personal disgust shapes moral attitudes (e.g., DeScioli & Kurzban, 2009; Haidt, 2001; Haidt & Joseph, 2008). But understanding why personal disgust reactions shape moral attitudes does not clarify what attitudes we ought to have. If disgust is indeed an emotion that influences moral judgments (e.g., judgments regarding incest and homosexuality), should it play a privileged role in the codification of legal restrictions on personal sexual freedom? Some say yes and advocate the notion that emotions such as disgust should guide morality, whereas others are skeptical and warn against building our ethical and legal systems on the foundations of evolved intuitions (Kelly, 2011).

In the modern world, there is an increasing variety of family arrangements in which kinship cues are absent and in which we therefore can expect more instances of attraction among relatives. It is therefore critical to understand the systems that evolved to limit the occurrence of these relationships, how they might operate in novel modern conditions, and how they influence our views of morality and punishment.

### Recommended Reading

- Fessler, D. M. T. (2007). Neglected natural experiments germane to the Westermarck hypothesis: The Karo Batak and the Oneida Community. *Human Nature, 18*, 355–364. A paper presenting another natural experiment that tested the Westermarck Hypothesis and provides an overview of the natural experiments discussed in this article.
- Lieberman, D., Tooby, J., & Cosmides, L. (2007). (See References). A paper presenting original empirical evidence that the mind uses two separate cues for identifying siblings.
- Park, J. H., Schaller, M., & Van Vugt, M. (2008). Psychology of human kin recognition: Heuristic cues, erroneous inferences, and their implications. *Review of General Psychology, 12*, 215–235. An accessible overview of what is known about kin detection in humans.
- Wolf, A. P., & Durham, W. H. (2005). *Inbreeding, incest, and the incest taboo*. Stanford, CA: Stanford University Press. An edited volume on the state of knowledge in the field at the turn

of the century, with a good overview of the debates that continue in the social and behavioral sciences regarding inbreeding.

### Declaration of Conflicting Interests

The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

### Notes

1. Patrick and Susan did not escape these odds: Two of their four children have been reported to have disabilities (Connolly, 2007).
2. Israeli kibbutzim have discontinued the practice of rearing children communally.

### References

- Ackerman, J. M., Kenrick, D. T., & Schaller, M. (2007). Is friendship akin to kinship? *Evolution & Human Behavior*, *28*, 365–374.
- Bittles, A. H., & Neel, J. V. (1994). The costs of human inbreeding and their implications for variation at the DNA level. *Nature Genetics*, *8*, 117–121.
- Charlesworth, B., & Charlesworth, D. (1999). The genetic basis of inbreeding depression. *Genetical Research*, *74*, 329–340.
- Connolly, K. (2007, February 26). Brother and sister fight Germany's incest laws. *The Guardian*. Retrieved from <http://www.guardian.co.uk/world/2007/feb/27/germany.kateconnolly>
- Daly, M., & Wilson, M. (1983). *Homicide*. New York, NY: Aldine de Gruyter.
- DeBruine, L. M. (2005). Trustworthy but not lust-worthy: Context-specific effects of facial resemblance. *Proceedings of the Royal Society B: Biological Sciences*, *272*, 919–922.
- DeScioli, P., & Kurzban, R. (2009). Mysteries of morality. *Cognition*, *112*, 281–299.
- Fessler, D. M. T., & Navarrete, C. D. (2003). Domain-specific variation in disgust sensitivity across the menstrual cycle. *Evolution and Human Behavior*, *24*, 406–417.
- Fessler, D. M. T., & Navarrete, C. D. (2004). Third-party attitudes toward sibling incest: Evidence for Westermarck's hypotheses. *Evolution and Human Behavior*, *25*, 277–294.
- Finkelhor, D. (1984). *Child sexual abuse*. New York, NY: Free Press.
- Fletcher, D. J. C., & Michener, C. D. (1987). *Kin recognition in animals*. Chichester, England: Wiley.
- Haidt, J. (2001). The emotional dog and its rational tail: A social intuitionist approach to moral judgment. *Psychological Review*, *108*, 814–834.
- Haidt, J., & Joseph, C. (2008). The moral mind: How five sets of innate intuitions guide the development of many culture-specific virtues, and perhaps even modules. In P. Carruthers, S. Laurence, & S. Stich (Eds.), *The innate mind* (Vol. 3, pp. 367–391). New York, NY: Oxford University Press.
- Hepper, P. G. (1991). *Kin recognition*. New York, NY: Cambridge University Press.
- Kelly, D. (2011). *Yuck! The nature and moral significance of disgust*. Cambridge, MA: MIT Press.
- Lewin, B. (1999). *Genes* (Vol. 7). New York, NY: Oxford University Press.
- Lieberman, D. (2009). Rethinking the Taiwanese minor marriage data: Evidence the mind uses multiple kinship cues to regulate inbreeding avoidance. *Evolution and Human Behavior*, *30*, 153–160.
- Lieberman, D., & Lobel, T. (2012). Kinship on the Kibbutz: Coresidence duration predicts altruism, personal sexual aversions, and moral attitudes among communally reared peers. *Evolution and Human Behavior*, *33*, 26–34.
- Lieberman, D., Tooby, J., & Cosmides, L. (2003). Does morality have a biological basis? An empirical test of the factors governing moral sentiments regarding incest. *Proceedings of the Royal Society B: Biological Sciences*, *270*, 819–826.
- Lieberman, D., Tooby, J., & Cosmides, L. (2007). The architecture of human kin detection. *Nature*, *445*, 727–731.
- Little, A. C., Penton-Voak, I. S., Burt, D. M., & Perrett, D. I. (2003). Investigating an imprinting-like phenomenon in humans: Partners and opposite sex parents have similar hair and eye colour. *Evolution and Human Behavior*, *24*, 43–51.
- Loisel, D. A., Alberts, S. C., & Ober, C. (2008). Functional significance of MHC variation in mate choice, reproductive outcome, and disease risk. In S. C. Stearns & J. C. Koella (Eds.), *Evolution in health and disease* (pp. 95–108). New York, NY: Oxford University Press.
- Packer, C., & Pusey, A. E. (1993). Dispersal, kinship, and inbreeding in African lions. In N. W. Thornhill (Ed.), *The natural history of inbreeding and outbreeding* (pp. 375–391). Chicago, IL: University of Chicago Press.
- Royzman, E. B., Leeman, R. F., & Sabini, J. (2008). “You make me sick”: Moral dyspepsia as a reaction to third-party sibling incest. *Motivation and Emotion*, *32*, 100–108.
- Seemanova, E. (1971). A study of children of incestuous matings. *Human Heredity*, *21*, 108–128.
- Shepher, J. (1983). *Incest: A biosocial view*. New York, NY: Academic Press.
- Talmon, G. Y. (1964). Mate selection in collective settlements. *American Sociological Review*, *29*, 408–491.
- Tooby, J. (1982). Pathogens, polymorphism, and the evolution of sex. *Journal of Theoretical Biology*, *97*, 557–576.
- Tooby, J., & Cosmides, L. (1996). Friendship and the Banker's Paradox: Other pathways to the evolution of adaptations for altruism. In W. G. Runciman, J. Maynard Smith, & R. I. M. Dunbar (Eds.), *Evolution of social behaviour patterns in primates and man. Proceedings of the British Academy*, *88*, 119–143.
- Tybur, J., Lieberman, D., & Griskevicius, V. (2009). Microbes, mating, and morality: Individual differences in three functional domains of disgust. *Journal of Personality and Social Psychology*, *97*, 103–122.
- Wedekind, C., & Furi, S. (1997). Body odour preferences in men and women: Do they aim for specific MHC combinations or simply heterozygosity? *Proceedings of the Royal Society B: Biological Sciences*, *264*, 1471–1479.
- Westermarck, E. A. (1921). *The history of human marriage*. London, England: Macmillan. (Original work published 1891)
- Wolf, A. P. (1995). *Sexual attraction and childhood association: A Chinese brief for Edward Westermarck*. Stanford, CA: Stanford University Press.
- Wolf, A. P. (2005). Explaining the Westermarck effect, or, what did natural selection select for? In A. P. Wolf & W. H. Durham (Eds.), *Inbreeding, incest, and the incest taboo* (pp. 76–92). Stanford, CA: Stanford University Press.
- Zlotogora, J. (2002). What is the birth defect risk associated with consanguineous marriages? *American Journal of Medical Genetics*, *109*, 70–71.