Chapter 10
Two Behavioral Hypotheses for the Evolution of Male Homosexuality in Humans

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Homosexuality poses a challenge to evolutionary science. It appears to undermine the logic of reproductive success as the ultimate source of human psychological traits. This challenge rests on four observations: (1) homosexuality is heritable (Mustanski et al. 2005; Pillard and Bailey 1998), (2) homosexuality reduces fecundity (Bell and Weinberg 1978; King et al. 2005), (3) homosexuality is prevalent (Bagley and Tremblay 1998; Johnson et al. 1992; Sell et al. 1995), and (4) homoeroticism is ancient (Crompton 2006). A heritable trait that reduces fecundity is a trait that usually experiences negative selection, eventually being removed from the population. In this chapter, I present two mutually exclusive behavioral hypotheses for the maintenance of male homosexuality in the human population, following an introduction to the psychological study of male homosexuality.

Choosing an appropriate operational definition for homosexuality has challenged researchers for decades (Sell 1997), but three metrics are most often employed: sexual attraction, sexual behavior, and sexual orientation identity (Savin-Williams 2006). Comparing across these metrics and across time, sexual orientation in both sexes is more fluid than the common perception of fixed identities suggests (Diamond 2014; Savin-Williams 2006). In studies that attempt to quantify homosexuality, many respondents report overlapping and inconsistent sexual identities, behaviors, and attractions (Bogaert 2004; Wells et al. 2011; Santtila et al. 2008; Savin Williams 2006). For example, the majority of same-sex attracted individuals in the USA do not identify as homosexual (Laumann et al. 1994). Sixty percent of self-identified homosexual men report experiencing sexual attraction to the opposite sex in the past 12 months, and 25 % of heterosexuals report experiencing same-sex attraction in the past 12 months (Diamond 2014). In a longitudinal interview

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study of 13,305 high school students, of the boys who reported exclusive same-sex attraction in the first year of the study, only 11 % reported exclusive same-sex attraction in the second year, while 48 % reported exclusive opposite-sex attraction and 35 % reported no attraction to either sex (Udry and Chantala 2004).

The history of homosexuality as we know it in the West as a distinct and visible identity is only about one and a half centuries old, with the coinage of the term "homosexual" and the emergence of a large-scale cultural movement in protest of German anti-sodomy statutes arriving in 1869 (Beachy 2014). If psychological science allows the modern cultural categories of sexual identity to dictate theory, we will be ill-equipped to probe the ancestral functions and contexts that underlie the traits associated with homosexuality. By analogy, it would be unsatisfactory to "explain the Caucasian" without direct reference to the individually heritable, functional, and continuous traits associated with Caucasoids (e.g., reduced pigmentation, straightened hair, lengthened nose, etc.). The homosexual construct (like race) is a cultural heuristic, not a precise diagnostic. Replacing categorical notions of sexual orientation, the term *androphilia* will be used to describe sexual attraction to adult men and *gynephilia* will be used to describe sexual attraction to adult women (VanderLaan et al. 2013). Most sexual orientations can thus be defined as some combination of androphilic and gynephilic interests, the majority of which skew gynephilic in men and androphilic in women. Using this definition, *asexuals* possess neither androphilia nor gynephilia, and *bisexuals* possess some degree of both.

Relative to heterosexual men, self-identifying homosexual men demonstrate reduced gynephilia, in both self-reported and physiological measures of arousal (Cerny and Janssen 2011; Lippa 2013). Most evolutionary perspectives on this fact regard it as the inalienable reproductive cost associated with the genetic benefits of feminization (see Miller 2000). For example, the female relatives of androphilic men show greater fecundity than the female relatives of gynephilic men, in some samples (Camperio-Ciani et al. 2004). This work suggests that the genes that produce androphilia in men facilitate greater fecundity in the women who carry those genes. In this view, called *sexually antagonistic selection*, that men carry and express these genes is a nonadaptive byproduct of selection for genes that build adaptations in women. Alternatively, *overdominance* describes the possibility that homosexuality is reported by men who carry homozygous-recessive alleles, which when expressed in the more common heterozygotic form, confer selective advantages (e.g., more cooperative, more lingual, and less aggressive traits) (Gavrilets and Rice 2006; Zietsch et al. 2008). Here, androphilic men represent the tail of a distribution experiencing selection for feminine traits. Lastly, *kin selection* allows androphilic men to facilitate the transmission of the genes that contribute to homosexuality by providing alloparental care to close relatives who share those genes (Vasey et al. 2007). By improving the reproductive success of kin, the androphilic man may recoup the cost of their reduced participation in reproductive sex. Yet, reduced gynephilia again represents a significant and unexplained sacrifice of reproductive potential attached to an ancestrally adaptive advantage. These views assume a stable linkage between reduced gynephilia and ancestrally advantageous traits, ignoring the possibility that reduced gynephilia itself provides reproductive advantages.

Evolutionary science offers explanations for the presence of increased androphilia in some men (same-sex affiliation and sperm competition are two examples; Baker 1996, 1997; Kirkpatrick 2000; Muscarella 2000), but the relative absence of gynephilia is rarely addressed explicitly. Same-sex behavior has been reported in hundreds of nonhuman species, from birds and mammals to fish and insects (Bagemihl 1999). However, abstinence from heterosexual contact is rare among nonhumans; instead, bisexuality predominates (Bagemihl 1999, p. 50, 53). The reported absence of gynephilia in a majority of adult men who identify as homosexual (Gebhard 1972) does not align with our understanding of male reproductive strategies. In the logic of Trivers (1972) and Buss and Schmitt (1993), the maximum possible male reproductive success is achieved through reproductive frequency, because the minimum necessary investment in each offspring is nearly negligible. Taken in its simplest form, this logic predicts the continual escalation of male gynephilic attraction and intrasexual competition. No obvious reproductive benefits are gained through a relative or total disinterest in reproductive sex. The two arguments outlined below build from an adaptive *de-escalation* of direct intrasexual competition, such that men with reduced gynephilia have reduced motivation to participate in direct competition for sexual access to women. The first strategy follows a slow life-history marked by mate choosiness and committed parenting. The second strategy follows a fast life-history involving sneak copulations and elevated sperm competition. Throughout the discussion, it is essential to keep the ancestral human environment in view—the arguments made herein describe two possible evolutionary histories of homosexuality.

Paternal Investment Hypothesis

Gynephilia motivates heterosexual copulation in men. The more powerful an individual's gynephilic sexual arousal, the more frequently he can be expected to reproduce, all else equal. I speculate that *reduced* gynephilia in men facilitates more deliberate long-term mate-choice, while signaling heterosexual fidelity and long-term mate quality to women. In other words, men who find women less attractive will be less motivated to enter into frequent, hasty sexual relationships with women. Simultaneously, women will find those men who display reduced gynephilic interest to be more attractive as long-term partners, as it suggests low heterosexual promiscuity and the possession of long-term mate qualities (e.g., willingness to invest, parenting ability, low aggression). The primary prediction of this hypothesis is that men will be disinterested in sex with women to the extent that they are predisposed to high levels of paternal care and long-term mate investment. Men who are predisposed to committed investment in offspring cannot afford to be as gynephilic as men who are less disposed to such commitment. Powerful gynephilia motivates men to acquire new sexual relationships, and their ability to invest in any single offspring is reduced with each new reproductive partner. Reduced gynephilia thus complements a long-term, slow life history strategy, marked by reduced fecundity and increased offspring investment. The presence of androphilia in these men and the potential for homosexual infidelity may serve other purposes, but more importantly it does not entail the same dangers as heterosexual infidelity. First, the possibility of extra-pair offspring is removed, freeing the man to enjoy sex without parental consequences. Second, the probability of successfully concealing the affair is improved by the assumption of heterosexuality; the partner is less likely to suspect a homosexual infidelity and perhaps less likely to leave the man if it is discovered (Baker 1996).

To some extent, this strategy undermines the default heterosexual strategy, as the presence of men willing to commit to high paternal care in communities where women have control over their sex lives would draw women's attention away from men pursuing short-term strategies. In this and the following hypothesis, homophobia is interpreted as a cultural adaptation among masculine heterosexuals attempting to identify and degrade men pursuing sexual strategies that would disrupt male-dominance strategies. This will be discussed in greater detail in the final section.

Sex-atypical behavior, personality traits, and physical appearance are closely associated with homosexuality in men (Bailey and Zucker 1995; Lippa and Arad 1997; Udry and Chantala 2006). Consequently, the present hypothesis predicts that women will prefer sex-atypical (feminine) traits in men in long-term contexts. There is evidence that this is the case. Men with feminine facial features are perceived to be warm, kind, honest (Perrett et al. 1998), good long-term partners (Little et al. 2002), and good parents (Kruger 2006). Women have been shown to find men with androgynous personalities (i.e., both highly masculine and feminine) most attractive in all contexts, with feminine characteristics being more attractive than masculine characteristics in long-term mating contexts (Green and Kenrick 1994). There is also evidence that women who choose more feminine men subsequently benefit from improved offspring care. Psychologically feminine men in heterosexual couples spend more time, and a higher percentage of total parenting time, performing day-to-day care and engaging in play with their children than psychologically masculine men (Russell 1978). Gay men anticipate being better fathers than do heterosexual men, and gay men report more rapid gains in parenting skill when they become fathers than do heterosexual men (Goldberg and Smith 2009). Finally, adoptive gay fathers report lower levels of depression and parenting stress, and towards their children they are more interactive, express more warmth, are more responsive, and demonstrate less disciplinary aggression than do heterosexual adoptive parents (Golombok et al. 2014). The present hypothesis implies that freedom from the short-term, high gynephilia mating strategy allows men to be choosey in mate selection and more dedicated, effective fathers.

For this hypothesis to work, the possibility of a sexual relationship between a man with reduced gynephilia and a woman will eventually depend on his interest in heterosexual copulation. The data on sexual fluidity presented in the introduction suggests that this shift is not unlikely. Diamond (2003) offers reason to believe that sexual activities do develop out of platonic friendships of this kind. She points to the chemistry of affection, noting that oxytocin informs the positive feelings of both mutual friendships and sexual bonds, making the introduction of sex into a friendship a matter of escalation rather than renaissance. Once trust is established, copulation can become an open possibility. Diamond (2014) reports that 78 % of adult men who initially come out as homosexual subsequently change their sexual identity (to bisexual, pansexual, unsure, etc.). Accordingly, 20 % of white American men who identify as homosexual report having been married to a woman at some time in their life, and 50 % of white American men who identify as homosexual report having produced at least one child (Bell and Weinberg 1978). The present hypothesis considers the assumption that self-identified homosexual men abstain from reproductive sex to be unwarranted.

One of the most robust correlates of homosexuality in men is the number of older brothers in the family; each older brother, but not older sister, increases the probability of an individual man identifying as homosexual by about 33 % (Blanchard and Bogaert 1996). This is referred to as the fraternal birth order effect. The mechanism of this effect may involve a reduction in prenatal androgen exposure (Hines 2011) or a maternal immunological response (Bogaert and Skorska 2011) producing changes in the developing brain. Regardless of the mechanism, mothers effectively feminize later-born sons. This effect may be explained by the ancestral reproductive futility of later-born boys who practice a highly gynephilic, intrasexually competitive strategy, as they are likely to compete with older, stronger brothers for sexual access to local women. A more effective strategy for a later-born boy may be to exercise a less immediately competitive, long-term strategy, experiencing relatively low gynephilia and thus allowing older brothers to pursue local mating opportunities uncontested. The proposed adaptation for diversified sexual strategies between brothers resides in the mother's prenatal environment—it is ultimately her inclusive fitness that benefits from the reduced gynephilia of later-born sons. In other words, the mother benefits from attenuating the degree to which her sons directly compete with one another for sexual access by predisposing them to differently-timed reproductive careers.

Sneak Copulation Hypothesis

Sperm competition research in humans provides a growing body of evidence for adaptations in human mating psychology and morphology designed to augment the probability of fertilization in multiply-mated females (Baker and Bellis 1995). Here I offer the hypothesis that reduced male gynephilia corresponds with a sexual strategy marked by sneak copulations and enhanced sperm competitive physiology. Reduced gynephilia and elevated androphilia may complement an ability in some males to find high-risk, low-cost reproductive opportunities through their associations with other males, by discretely inseminating females who affiliate with these target males. Reduced gynephilia would allow the male to enter into these relationships without being quickly motivated to compete for sexual access with local females; he is instead perceived by the target male(s) to be sexually nonthreatening, perhaps subordinate. Furthermore, in the effort to parasitize mating opportunities, increased androphilia benefits the male by motivating him to seduce and stimulate the target male, who will be more likely to tolerate his presence and less likely to inseminate his female partner (being sexually satisfied by the male). By sexually preoccupying the target male, he reduces the degree of sperm competition he will need to overcome to fertilize the female. The finding that self-identified homosexuals prefer sex-typical same-sex partners (masculine men and feminine women) may be explained by the greater likelihood that these partners can connect them to opposite-sex partners than more sex-atypical same-sex partners (feminine men and masculine women) (Bailey et al. 1997). More than the paternal investment strategy, this strategy undermines the common, competitive, gynephilic strategy. The sneak copulater has the opportunity to inseminate one or more females and escape, letting the target male invest in offspring that he incorrectly believes to be his genetic offspring. The pattern of feminized male sneak copulaters who engage in homosexual sex and circumnavigate the costs of direct competition is observed in several other species (see Oliveira et al. 2008, for review). To provide perspective on this hypothesis, one example is provided.

Among males of the lekking Ruff shorebird, there are three permanent morphs: independents, satellites, and faeders (female mimics). Independents are large and directly compete to dominate the lek territory. Satellites are moderately sized, orbit the lek, and attempt to copulate with incoming females without directly competing with independents. Faeders are small and resemble females; they enter the lek and allow themselves to be mounted by independents and satellites, while covertly mounting and inseminating females drawn to the lek (Jukema and Piersma 2006). This homosexual activity serves several purposes. On the one hand, it causes independents and satellites to spend reproductive effort on the faeder, directly reducing their reproductive success at the lek; the sexual activity serves to attract more females to the lek, as lek commotion and popularity stimulates female attention; it also allows faeders to remain on the lek, without being ousted by the dominant independents, granting them continued sexual access to arriving females (Jukema and Piersma 2006). The same adaptive logic that builds categorical strategic polymorphisms, as in the Ruff, can build continuous polymorphic blends, as may be present in humans; the major difference is in the number of genes involved (Gavrilets and Rice 2006; MacIntyre and Estep 1993). The purpose of the Ruff example is to affirm the logic of alternative strategies, not to suggest a discrete dimorphism or trimorphism of sexual strategies in humans. In species for which mating strategies, like sneak copulation, are permanent (nonconditional), the population distribution of individuals practicing these alternative strategies exhibits negative frequency-dependent selection (Dominey 1984). This means that an individual pursuing sneak copulations is the most successful when sneak copulaters are uncommon, becoming less successful as the strategy becomes more common. This results in a stable equilibrium point, a balanced polymorphism at which the average reproductive success of sneak copulaters matches the average reproductive success of more common strategies. The persistent, low rate of homosexuality across cultures might qualify as just such an equilibrium. Although self-identified homosexuals represent a minority of individuals who ever engage in sneak copulation, this hypothesis suggests that they are genetically equipped to specialize in this form of reproduction.

Because they do not defend mates and secure long-term access to mating opportunities, faeder Ruffs are under greater pressure to fertilize females in the few mating opportunities they have. Additionally, they can expect to be inseminating females who will be concurrently inseminated by other males in the lek. Because of this, faeders have testes that are 2.5 times the size of the testes of other males, allowing faeders to produce larger, higher-quality ejaculates to outcompete local rivals in the race for fertilization (Jukema and Piersma 2006). Larger testes and higher-quality ejaculates correspond with ancestrally heightened risk of sperm competition, between species with different mating systems and within species containing different sexual strategies (Dixson and Anderson 2004; Simmons et al. 2004). If men who possess reduced gynephilia and increased androphilia have larger testes, it may suggest an evolutionary history of heightened sperm competition associated with these traits. Additionally, there is reason to believe that penis size and shape reflects sperm competitive demands, as the penis can effectively displace and remove rival semen from the vagina (Gallup 2003). Larger penises among self-identified homosexuals have been documented (Bogaert and Hershberger 1999), but only one analysis of testes size has been published, conducted on a small clinical sample of 30 self-identified homosexual men (several of whom were azoospermic; Kolodny et al. 1971). The report found these men to have testes within the normal size range for heterosexuals. Baker (1997) has produced data demonstrating that men with homosexual experience produce smaller ejaculates than men without homosexual experience; however, the sample of men with homosexual experience consisted of just five men. At this time, there is very little data available to directly test the primary prediction that men with low gynephilia have enhanced sperm competitive traits.

It is possible that the two strategies outlined above are not mutually exclusive; in fact, they may represent conditional strategies, activated in the contexts that best facilitated ancestral reproductive success. If both hypotheses generate predictions that find empirical support, the present framework allows for a more nuanced interpretation of the traits associated with homosexuality. For example, it may be that in higher population densities with higher quality of life, the sneak copulatory strategy delivers a greater reproductive payoff, whereas in smaller communities with limited resources, the paternal investment strategy delivers a greater payoff. These context-dependent strategies may be settled during development or in the course of adult life; testes size is a relatively inflexible trait but the activation or deactivation of paternal investment may depend on proximal factors. Fathers of any sexuality with larger testes are, in fact, found to report lower levels of parental care and also show reduced brain activity in regions linked with nurturance and proactive care when viewing images of their own children (Mascaro et al. 2013). The negative correlation between testes size and parental care matches the predictions of life-history theory and suggests that sperm competitive physiology and paternal investment may be distinct developmental pathways. It remains to be seen if the same relationship holds in a nonheterosexual sample.

Identity and Exclusivity

On the seven point Kinsey scale (0 = exclusively heterosexual and 6 = exclusively homosexual) the majority of unmarried men expressing predominant homosexual attraction (scoring 4–6) consider themselves exclusively homosexual (scoring 6) (Gebhard 1972). In other words, men's reported sexual orientations skew towards exclusivity. Without invoking reporting bias or scale inaccuracy, this finding is difficult to integrate into the present framework of homosexuality as a heterosexual strategy; i.e., exclusive homosexuality is never an effective reproductive strategy. My response to this criticism is to make note of the cultural influence of the categorical sexual identity. I hypothesize that the high rate of reported exclusive homosexuality is an artifact of cultural pressures levied against androphilic men to practice and espouse exclusive homosexuality. These pressures may originate from adaptations in heterosexual men targeting men who practice mating strategies that undermine common heterosexual strategies, i.e., strategies not predicated on high gynephilia and direct intrasexual competition (sneak copulation, paternal investment, or otherwise). Almost nowhere in the nonhuman literature is it found that homosexual activity elicits the special attention, condemnation, or segregation demonstrated in humans (Bagemihl 1999, p. 54). The elaborate culture surrounding sexuality in humans has had a unique effect on how sex is perceived and practiced. I will argue that it is responsible, in part, for the reported exclusivity of gay men.

The common public perception of nonexclusive sexuality (bisexuality) is that it represents an immature stage in the progression towards exclusivity, with bisexual men more often perceived to be "really homosexual" and bisexual women more often perceived to be "really heterosexual" (McLean 2007; Yost and Thomas 2012). The process of "coming out" is a well-studied rite of passage among Western homosexuals (Mosher 2001; Vargo 1998). A number of models propose a linear, staged process of overcoming fear, guilt, and doubt, culminating with a public declaration of one's new identity as a homosexual (this is sometimes called the "disclosure imperative"; Cass 1979; Coleman 1982; Dank 1971; McLean 2007). These models include an early recognition of attraction followed by a period of uncertainty and questioning, after which the individual must decide if they are homosexual. The linear progression from questioning to identity confirmation implies a fixed sexuality trajectory, set off in men by the experience of androphilia. Several studies report that bisexuals are perceived more negatively than homosexuals—as more promiscuous, dishonest, and immature (Eliason 1997; Herek 2002; Steffens and Wagner 2004; Yost and Thomas 2012). Heterosexual men show low tolerance for bisexual men and homosexual men, yet bisexual women are more tolerated (in part because they are sexualized). Heterosexual women show low tolerance for bisexual men and women, yet homosexual men are more tolerated (Eliason 1997; Steffens and Wagner 2004). It may be that heterosexual women feel that they can better trust homosexual men than bisexual men, as homosexual men disavow heterosexual intentions. I propose two mechanisms by which these common sentiments influence the sexual self-identification of androphilic men: homophobic bullying and the lesbian gay bisexual transgender queer (LGBTQ) movement.

Bullying is consistently linked with homophobic epithets and violence (Espelage and Swearer 2008; Poteat and Espelage 2005). One study reported that 26 % of bullied boys in a sample of 251 high school students indicated that they were abused by their peers for being perceived as gay. These boys received more severe and frequent bullying and experienced greater psychological distress than peers bullied for other reasons (e.g., getting good grades, wearing certain clothes, etc.; Swearer et al. 2008). A review of 28 school shootings between 1982 and 2001 indicated that the majority of gunmen (always young men) experienced intense, homophobic bullying, yet "from all available evidence, *none* of the school shooters was gay" (Kimmel and Mahler 2003, p. 1449). Espelage et al. (2008) found that students who were sexually questioning received the highest rates of bullying; they were more likely than self-identified heterosexuals *and* homosexuals to be teased and experience suicidal thoughts, abuse drugs and alcohol, and negatively rate their social environment. One interpretation of this form of bullying is that it assigns a homosexual identity to these young men. By labeling his sexually-questioning or bisexual peers as gay, the bully may influence their sexual self-perceptions, pushing them to publicly identify as exclusively homosexual. Supporting this interpretation, adults with more severe childhood histories of homophobic bullying (precipitating PTSD symptoms) "came out" at younger ages and grew up to be *more accepting* of their homosexual identity than less abused individuals (Rivers 2004). Rivers argues that the peer reinforcement of homophobic teasing encourages identity acceptance. I speculate that coming out as homosexual may be protective against the threat of bullying; it may placate the aggressive young men who would benefit from the social castration of their sexual rivals. The psychological and physical violence directed at young androphilic men by bullies may be alleviated with the avowal of homosexuality, the declaration of categorical noncompetition in the heterosexual marketplace.

Another possibility is that the LGBTQ community places a premium on what is anecdotally referred to as a "gold star gay," an individual who has never had sex with the opposite sex and promises that he or she never will (Queen 1999). Self-identified homosexual men who score high on scales measuring LGBTQ community involvement and identification report fewer sexual experiences with women in the past 6 months than self-identified homosexual men who report low community involvement and identification (Vanable et al. 1998, p. 408). This suggests that greater immersion in the LGBTQ community causes men to practice more exclusive homosexuality or bias their reporting to appear more exclusive. Of course, it may be that men who are more exclusively androphilic simply identify more strongly with the LGBTQ community, as they fit less comfortably in the larger heterosexual culture.

I submit that the discrediting of nonexclusive homosexual attraction and the special enmity and distrust targeting bisexual men motivates androphilic men to subdue and conceal their gynephilic tendencies and announce exclusive homosexuality. Men who advertise their homosexuality, who are "out and proud," will be loath to practice the heterosexual mating strategies that would otherwise undermine the predominant heterosexual strategy of direct intrasexual competition. If androphilia aligns with a sneak copulation strategy in men, for example, a culture celebrating conspicuous gay pride and abstinence from heterosexual contact, while cautioning against the dishonesty of bisexuals and unidentified nonheterosexuals, would effectively disarm potential sneak copulators. The homosexual identity may act as a reputational passport, with the relief and psychological benefits of coming out (Juster et al. 2013) coinciding with an escape from the obscurity and intolerance of mere nonheterosexuality, into a welcoming community of sexual refugees who promote identification and solidarity. It would not be controversial to suggest that the LGBTQ community established itself in response to the homophobic forces that perpetrate violence and discrimination against nonheterosexuals (Beachy 2014). What I am suggesting is that the homosexual identity was invented to placate these destructive social forces, that many exclusively homosexual men are the product of an androphilic genetic profile combined with a heterosexual culture that does not tolerate alternative sexual strategies.

A man who considers himself a homosexual today, had he lived in an ancestral environment, may have never applied such a label to himself, nor advertised it to his family and friends. Do we expect that he would have suffered from an inability to mature sexually? Would he be stunted in his sexual expression, stifling a deeper identity? I argue that he would have no need for an intellectually imposed sexual schema, living contentedly with his natural androphilic and gynephilic arousals and repulsions. In many such modern men, low levels of gynephilic interest may be sublimated in the cultural process of homosexual identity formation. Likewise, among heterosexuals, low levels of androphilic interest may be sublimated in the process of heterosexual identity formation (Adams et al. 1996).

References

Adams, H. E., Wright, L. W., & Lohr, B. A. (1996). Is homophobia associated with homosexual arousal? *Journal of Abnormal Psychology, 105,* 440–445.

Bagemihl, B. (1999). *Biological exuberance: Animal homosexuality and natural diversity.* New York: St. Martin's Press.

Bagley, C., & Tremblay, P. (1998). On the prevalence of homosexuality and bisexuality, in a random community survey of 750 men aged 18 to 27. *Journal of Homosexuality*, *36,* 1–18.

Bailey, J. M., & Zucker, K. J. (1995). Childhood sex-typed behavior and sexual orientation: A conceptual analysis and quantitative review. *Developmental Psychology, 31,* 43–55.

Bailey, J. M., Kim, P. Y., Hills, A., & Linsenmeier, J. A. (1997). Butch, femme, or straight acting? Partner preferences of gay men and lesbians. *Journal of Personality and Social Psychology, 73,* 960–973.

Baker, R. R. (1996). *Sperm wars: Infidelity, sexual conflict, and other bedroom battles.* London: Fourth Estate.

Baker, R. R. (1997). Copulation, masturbation, and infidelity: State-of-the art. In A. Schmitt, K. A., Atzwanger, K. K., Grammer, & K. Schäfer (Eds.), *New aspects of human ethology* (pp. 163–188). New York: Plenum Press.

Baker, R. R., & Bellis, M. A. (1995). *Human sperm competition: Copulation, masturbation, and infidelity.* London: Chapman & Hall.

Beachy, R. (2014). The German invention of homosexuality. *The Journal of Modern History, 82,* 801–838.

Bell, A. P., & Weinberg, M. S. (1978). *Homosexualities*. New York: Simon and Schuster.

Blanchard, R., & Bogaert, A. F. (1996). Homosexuality in men and number of older brothers. *The American Journal of Psychiatry, 153,* 27–31.

Bobrow, D., & Bailey, J. M. (2001). Is male homosexuality maintained via kin selection? *Evolution and Human Behavior, 22,* 361–368.

Bogaert, A. F. (2004). The prevalence of male homosexuality: The effect of fraternal birth order and variations in family size. *Journal of Theoretical Biology, 230,* 33–37.

Bogaert, A. F., & Hershberger, S. (1999). The relation between sexual orientation and penile size. *Archives of Sexual Behavior, 28,* 213–221.

Bogaert, A. F., & Skorska, M. (2011). Sexual orientation, fraternal birth order, and the maternal immune hypothesis: A review. *Frontiers in Neuroendocrinology, 32,* 247–254.

Buss, D., & Schmitt, D. (1993). Sexual strategies theory: An evolutionary perspective on human mating. *Psychological Review, 100,* 204–232.

Camperio-Ciani, A., Corna, F., & Capiluppi, C. (2004). Evidence for maternally inherited factors favouring male homosexuality and promoting female fecundity. *Proceedings of the Royal Society*, *Biological Sciences, 271,* 2217–2221.

Cass, V. C. (1979). Homosexual identity formation, a theoretical model. *Journal of Homosexuality, 4,* 219–235.

Cerny, J., & Janssen, E. (2011). Patterns of sexual arousal in homosexual, bisexual, and heterosexual men. *Archives of Sexual Behavior, 40,* 687–697.

Coleman, E. (1982). Developmental stages of the coming-out process. *American Behavioral Scientist, 25,* 469–482.

Crompton, L. (2006). *Homosexuality and civilization*. Boston: Harvard University Press.

Dank, B. (1971). Coming out in the gay world. *Psychiatry, 34,* 180–197.

Diamond, L. M. (2003). What does sexual orientation orient? A biobehavioral model distinguishing romantic love and sexual desire. *Psychological Review, 110,* 173–192.

Diamond, L. M. (2014). *I was wrong! Men are pretty darn sexually fluid, too*. PowerPoint presentation at the annual meeting of the Society for Personality and Social Psychology, Sexuality Preconference, Austin, Texas.

Dixson, A. F., & Anderson, M. J. (2004). Sexual behavior, reproductive physiology and sperm competition in male mammals. *Physiology & Behavior, 83,* 361–371.

Dominey, W. (1984). Alternative mating tactics and evolutionarily stable strategies. *American Zoologist, 24,* 385–396.

Eliason, M. J. (1997). The prevalence and nature of biphobia in heterosexual undergraduate students. *Archives of Sexual Behavior, 26,* 317–326.

Espelage, D. L., & Swearer, S. M. (2008). Addressing research gaps in the intersection between homophobia and bullying. *School Psychology Review, 37,* 155–159.

Espelage, D. L., Aragon, S. R., Birkett, M., & Koeng, W. (2008). Homophobic teasing, psychological outcomes, and sexual orientation among high school students: What influence do parents and schools have? *School Psychology Review, 37,* 202–216.

Gallup, G. (2003). The human penis as a semen displacement device. *Evolution and Human Behavior, 24,* 277–289.

Gavrilets, S., & Rice, W. R. (2006). Genetic models of homosexuality: Generating testable predictions. *Proceedings of the Royal Society*, *Biological Sciences, 273,* 3031–3038.

Gebhard, P. H. (1972). *Incidence of overt homosexuality in the United States and Western Europe.* National institute of mental health task force on homosexuality: Final report and background papers, pp. 22–29.

Goldberg, A. E., & Smith, J. Z. (2009). Perceived parenting skill across the transition to adoptive parenthood among lesbian, gay, and heterosexual couples. *Journal of Family Psychology Psychology, 23,* 861–870.

Golombok, S., Mellish, L., Jennings, S., Casey, P., Tasker, F., & Lamb, M. E. (2014). Adoptive gay father families: Parent-child relationships and children's psychological adjustment. *Child Development, 85*, 456–468.

Green, B. L., & Kenrick, D. T. (1994). The attractiveness of gender-typed traits at different relationship levels: Androgynous characteristics may be desirable after all. *Personality and Social Psychology Bulletin, 20,* 244–253.

Herek, G. M. (2002). Heterosexuals' attitudes toward bisexual men and women in the United States. *Journal of Sex Research, 39,* 264–274.

Hines, M. (2011). Prenatal endocrine influences on sexual orientation and on sexually differentiated childhood behavior. *Frontiers in Neuroendocrinology, 32,* 170–182.

Johnson, A., Wadsworth, J., Wellings, K., Bradshaw, S., & Field, J. (1992). Sexual lifestyles and HIV risk. *Nature, 360,* 410–412.

Jukema, J., & Piersma, T. (2006). Permanent female mimics in a lekking shorebird. *Biology Letters, 2,* 161–164.

Juster, R. P., Smith, N. G., Ouellet, É., Sindi, S., & Lupien, S. J. (2013). Sexual orientation and disclosure in relation to psychiatric symptoms, diurnal cortisol, and allostatic load. *Psychosomatic Medicine, 75,* 103–116.

Kimmel, M. S., & Mahler, M. (2003). Adolescent masculinity, homophobia, and violence: Random school shootings, 1982–2001. *The American Behavioral Scientist, 46,* 1439–1458.

King, M., Green, J., Osborn, D. P. J., Arkell, J., Hetherton, J., & Pereira, E. (2005). Family size in white gay and heterosexual men. *Archives of Sexual Behavior, 34,* 117–122.

Kirkpatrick, R. C. (2000). The evolution of human homosexual behavior. *Current Anthropology, 41,* 385–413.

Kolodny, R., Masters, W., Hendryx, J., & Toro, G. (1971). Plasma testosterone and semen analysis in male homosexuals. *New England Journal of Medicine, 285,* 1170–1174.

Kruger, D. J. (2006). Male facial masculinity influences attributions of personality and reproductive strategy. *Personal Relationships, 13,* 451–463.

Laumann, E. O., Gagnon, J., Michael, R. T., & Michaels, S. (1994). *The social organization of sexuality: Sexual practices in the United States*. Chicago: University of Chicago Press.

Lippa, R. A. (2013). Men and women with bisexual identities show bisexual patterns of sexual attraction to male and female swimsuit models. *Archives of Sexual Behavior, 42,* 187–96.

Lippa, R. A., & Arad, S. (1997). The structure of sexual orientation and its relation to masculinity, femininity, and gender diagnosticity: Different for men and women. *Sex Roles, 37,* 187–208.

Little, A. C., Jones, B. C., Penton-Voak, I. S., Burt, D. M., & Perrett, D. I. (2002). Partnership status and the temporal context of relationships influence human female preferences for sexual dimorphism in male face shape. *Proceedings of the Royal Society, Biological Sciences, 269,* 1095–1100.

MacIntyre, F., & Estep, K. W. (1993). Sperm competition and the persistence of genes for male homosexuality. *Bio Systems, 31,* 223–233.

Mascaro, J. S., Hackett, P. D., & Rilling, J. K. (2013). Testicular volume is inversely correlated with nurturing-related brain activity in human fathers. *Proceedings of the National Academy of Sciences, 110,* 15746–15751.

McLean, K. (2007). Hiding in the closet? Bisexuals, coming out, and the disclosure imperative. *Journal of Sociology, 43,* 151–166.

Mosher, C. M. (2001). The social implications of sexual identity formation and the coming-out process: A review of the theoretical and empirical literature. *The Family Journal, 9,* 164–173.

Miller, E. M. (2000). Homosexuality, birth order, and evolution: Toward an equilibrium reproductive economics of homosexuality. *Archives of Sexual Behavior, 29,* 1–34.

Muscarella, F. (2000). The evolution of homoerotic behavior in humans. *Journal of Homosexuality, 40,* 51–77.

Mustanski, B. S., Dupree, M. G., Nievergelt, C. M., Bocklandt, S., Schork, N. J., & Hamer, D. H. (2005). A genomewide scan of male sexual orientation. *Human Genetics, 116,* 272–278.

Oliverira, R., Taborsky, M., & Brockmann, H. J. (Eds.). (2008). *Alternative reproductive tactics: An integrative approach*. Cambridge: Cambridge University Press.

Perrett, D., Lee, K., & Penton-Voak, I. (1998). Effects of sexual dimorphism on facial attractiveness. *Nature, 394,* 884–887.

Pillard, R., & Bailey, J. (1998). Human sexual orientation has a heritable component. *Human Biology, 70,* 347–365.

Poteat, V. P., & Espelage, D. L. (2005). Exploring the relation between bullying and homophobic verbal content: The homophobic content agent target (HCAT) scale. *Violence and Victims, 20,* 513–528.

Queen, C. (1999). Strangers at home: Bisexuals in the queer movement. In L. P Gross & J. D. Voods (Eds.), *The Columbia reader on lesbians and gay men in media, society, and politics* (pp. 105–108). New York: Columbia University Press.

Rivers, I. (2004). Recollections of bullying at school and their long-term implications for lesbians, gay men, and bisexuals. *Crisis: The Journal of Crisis Intervention and Suicide Prevention, 25,* 169–175.

Russell, G. (1978). The father role and its relation to masculinity, femininity, and androgyny. *Child Development, 49,* 1174–1181.

Santtila, P., Sandnabba, N. K., Harlaar, N., Varjonen, M., Alanko, K., & von der Pahlen, B. (2008). Potential for homosexual response is prevalent and genetic. *Biological Psychology, 77,* 102–105.

Savin-Williams, R. (2006). Who's gay? Does it matter? *Current Directions in Psychological Science, 15,* 40–44.

Sell, R. L. (1997). Defining and measuring sexual orientation: A review. *Archives of Sexual Behavior, 26,* 643–658.

Sell, R., Wells, J., & Wypij, D. (1995). The prevalence of homosexual behavior and attraction in the United States, the United Kingdom and France: Results of national population-based samples. *Archives of Sexual Behavior, 24,* 235–248.

Simmons, L. W., Firman, R. C., Rhodes, G., & Peters, M. (2004). Human sperm competition: Testis size, sperm production, and rates of extrapair copulations. *Animal Behaviour, 68,* 297–302.

Steffens, M. C., & Wagner, C. (2004). Attitudes toward lesbians, gay men, bisexual women, and bisexual men in Germany. *Journal of Sex Research, 41,* 137–149.

Swearer, S. M., Turner, R. K., Givens, J. E., & Pollack, W. S. (2008). "You're so gay!": Do different forms of bullying matter for adolescent males? *School Psychology Review, 37,* 160–173.

Trivers, R. (1972). Paternal investment and sexual selection. In B. Campbell (Ed.), *Sexual selection and the descent of man* (pp. 136–179). New York: Aldine de Gruyter.

Udry, J. R., & Chantala, K. (2004). Risk factors differ according to same-sex and opposite-sex interest. *Journal of Biosocial Science, 37,* 481–497.

Udry, J. R., & Chantala, K. (2006). Masculinity-femininity predicts sexual orientation in men but not in women. *Journal of Biosocial Science, 38,* 797–809.

Vanable, P. A., McKirnan, D. J., & Stokes, J. P. (1998). Identification and involvement with the gay community scale. In C. M. Davis, W. L. Yarber, R. Bauserman, G. E. Schreer, & S. L. Davis (Eds.), *Handbook of sexuality-related measures* (pp. 407–409). Thousand Oaks: Sage.

VanderLaan, D. P., Ren, Z., & Vasey, P. L. (2013). Male androphilia in the ancestral environment: An ethnological analysis. *Human Nature, 24,* 375–401.

Vargo, M. (1998) *Acts of disclosure: The coming-out process of contemporary gay men*. New York: Harrington Park Press.

Vasey, P. L., Pocock, D. S., & VanderLaan, D. P. (2007). Kin selection and male androphilia in Samoan fa'afafine. *Evolution and Human Behavior, 28,* 159–167.

Wells, J. E., McGee, M., & Beautrais, A. L. (2011). Multiple aspects of sexual orientation: Prevalence and sociodemographic correlates in a New Zealand national survey. *Archives of Sexual Behavior, 40,* 155–168.

Yost, M. R., & Thomas, G. D. (2012). Gender and binegativity: Men's and women's attitudes toward male and female bisexuals. *Archives of Sexual Behavior, 41,* 691–702.

Zietsch, B., Morley, K., Shekar, S., Verweij, K., Keller, M., & Macgregor, S. et al. (2008). Genetic factors predisposing to homosexuality may increase mating success in heterosexuals. *Evolution and Human Behavior, 29,* 424–433.