

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/258845876>

Male Androphilia in the Ancestral Environment: An Ethnological Analysis

Article in *Human Nature* · December 2013

DOI: 10.1007/s12110-013-9182-z · Source: PubMed

CITATIONS

55

READS

1,440

3 authors, including:



Doug P. Vanderlaan

University of Toronto

122 PUBLICATIONS 2,619 CITATIONS

[SEE PROFILE](#)



Paul L Vasey

University of Lethbridge

177 PUBLICATIONS 5,333 CITATIONS

[SEE PROFILE](#)

Some of the authors of this publication are also working on these related projects:



Mate choice and social relationships in primates. [View project](#)



The evolutionary psychobiology of male androphilia in cross-cultural perspective [View project](#)

Male Androphilia in the Ancestral Environment

An Ethnological Analysis

Doug P. VanderLaan · Zhiyuan Ren · Paul L. Vasey

Published online: 3 October 2013
© Springer Science+Business Media New York 2013

Abstract The kin selection hypothesis posits that male androphilia (male sexual attraction to adult males) evolved because androphilic males invest more in kin, thereby enhancing inclusive fitness. Increased kin-directed altruism has been repeatedly documented among a population of transgendered androphilic males, but never among androphilic males in other cultures who adopt gender identities as men. Thus, the kin selection hypothesis may be viable if male androphilia was expressed in the transgendered form in the ancestral past. Using the Standard Cross-Cultural Sample (SCCS), we examined 46 societies in which male androphilia was expressed in the transgendered form (transgendered societies) and 146 comparison societies (non-transgendered societies). We analyzed SCCS variables pertaining to ancestral sociocultural conditions, access to kin, and societal reactions to homosexuality. Our results show that ancestral sociocultural conditions and bilateral and double descent systems were more common in transgendered than in non-transgendered societies. Across the entire sample, descent systems and residence patterns that would presumably facilitate increased access to kin were associated with the presence of ancestral sociocultural conditions. Among transgendered societies, negative societal attitudes toward homosexuality were unlikely. We conclude that the ancestral human sociocultural environment was likely conducive to the expression of the transgendered form of male androphilia. Descent systems, residence patterns, and societal reactions to homosexuality likely facilitated investments in kin by transgendered males. Given that contemporary transgendered male androphiles appear to exhibit elevated kin-directed altruism, these findings further indicate the viability of the kin selection hypothesis.

Keywords Ethnology · Standard Cross-Cultural Sample (SCCS) · Sexual orientation · Human evolution · Kin selection · Transgenderism

D. P. VanderLaan (✉)
Gender Identity Service, Child, Youth and Family Services, Centre for Addiction and Mental Health,
Toronto, ON M6J 1H4, Canada
e-mail: doug.vanderlaan@camh.ca

Z. Ren · P. L. Vasey
Department of Psychology, University of Lethbridge, Lethbridge, AB T1K 3M4, Canada

Forms of Male Androphilia across Cultures

Androphilia refers to predominant sexual attraction and arousal to adult males, whereas *gynephilia* refers to predominant sexual attraction and arousal to adult females. The manner in which male androphilia is publically expressed varies across cultures (Murray 2000). This expression typically takes one of two forms, which are related to gender role enactment. These two forms are *sex-gender congruent* and *transgendered* male androphilia. Sex-gender congruent male androphiles occupy the gender role typical of their sex and identify as “men.” In contrast, transgendered androphilic males often occupy alternative gender role categories distinct from the categories of “men” and “women,” and they exhibit gender role presentation that is markedly similar to that of members of the opposite sex within their given cultural context. Both sex-gender congruent and transgendered male androphilia may occur within a given culture, but typically one or the other tends to predominate (Whitam 1983). For example, the sex-gender congruent form is more common in many Western cultures, whereas the transgendered form appears to be more common in a number of non-Western cultures.

Other authors have referred to sex-gender congruent male androphilia as “egalitarian male homosexuality” (Murray 2000) and “homophilic homosexuality” (Gorer 1966). However, the term “sex-gender congruent” androphilia highlights the critical role of gender role enactment in distinguishing the two forms of male androphilia under consideration here. “Androphilia” is the preferred term when undertaking cross-cultural comparisons of male same-sex sexuality for several reasons. First, the usage and meaning of the term “homosexuality” varies cross-culturally, rendering it a poor construct for the type of cross-cultural research presented here. Second, “androphilia” pertains to sexual attraction and arousal, not sexual behavior, which may be constrained by cultural circumstances (e.g., taboos against same-sex sexual behavior). As such, the term “androphilia” makes no assumptions about whether sexual behavior has been expressed. Third, this terminology makes no assumptions about the sexual orientation or the gender role enactment of the *sexual partners* of male androphiles. As such, although transgendered male androphiles routinely engage in sexual activity with masculine males who identify as “men” (Murray 2000), these men may or may not be androphilic themselves. This may seem perplexing from a Western cultural perspective in which sex-gender congruent male androphiles routinely seek out other sex-gender congruent male androphiles for sexual interactions. However, it is important to note that gynephilic males’ willingness to engage in sexual interactions with their less-preferred sex varies tremendously across cultures (Whitam and Mathy 1986). In cultures where transgendered male androphilia predominates, male gynephiles may, for example, experience relatively less sexual aversion to the idea of engaging in certain types of same-sex sexual interactions because, to some extent, transgendered male androphiles represent facsimiles of their preferred sex partners (i.e., adult females).

In addition to these two forms of male androphilia, a third form—transgenerational homosexuality—has also been reported in the literature. Transgenerational homosexuality involves sexual interactions between a sexually immature or younger male and a sexually mature or older male (Murray 2000). Comparative research on nonhuman primates suggests that transgenerational homosexuality has a different evolutionary origin than sex-gender congruent and transgendered androphilia (Dixson 2010). Furthermore, it is not clear that transgenerational homosexuality is motivated by

androphilia on the part of either the older or younger partner (Giles 2004). For example, in some instances these same-sex interactions might be enacted for primarily ritualistic purposes. Depending on the individual, the older partners in these interactions might be best characterized as either pedophilic (sexually attracted/aroused to prepubescent individuals), hebephilic (sexually attracted/aroused to peripubescent individuals) or gynephilic, not androphilic. Similarly, the younger partners might not be (pre)androphilic. Given these reasons, we do not consider transgenerational homosexuality in the analyses presented here. For a discussion of unique properties of transgenerational homosexuality from an ethnological perspective, see Crapo (1995).

Cross-Culturally Invariant Biodemographic and Developmental Correlates of Male Androphilia

Despite cultural variation in the expression of transgendered and sex-gender congruent male androphilia, these two forms nevertheless appear to have cross-culturally universal correlates. In terms of biodemographic correlates, across cultures, sex-gender congruent and transgendered male androphiles tend to be later born among their siblings (e.g., Blanchard 2004; VanderLaan and Vasey 2011; Vasey and VanderLaan 2007), have greater numbers of older biological brothers (e.g., Bogaert and Skorska 2011; VanderLaan and Vasey 2011; Vasey and VanderLaan 2007), exhibit larger family sizes (Blanchard and Lippa 2007; Camperio Ciani et al. 2004; Iemmola and Camperio Ciani 2009; King et al. 2005; Rahman et al. 2008; Schwartz et al. 2010; VanderLaan et al. 2012; VanderLaan and Vasey 2011; Vasey and VanderLaan 2007), and cluster within families (e.g., Schwartz et al. 2010; VanderLaan et al. 2013a, b). In addition, these two forms of male androphilia occur at similar prevalence rates across different populations (e.g., Smith et al. 2003; VanderLaan et al. 2013a; Whitam 1983).

Prospective and retrospective cross-cultural research on early psychosocial development among transgendered and sex-gender congruent male androphiles has shown that the childhood behavior of such males is characterized by greater levels of female-typical behavior (e.g., nurturing play with dolls) and lower levels of male-typical behavior (e.g., rough-and-tumble play) (Bailey and Zucker 1995; Bartlett and Vasey 2006; Cardoso 2005, 2009; Whitam 1983). In addition, both types of male androphiles express elevated cross-sex beliefs and wishes in childhood (e.g., “I think I really am a girl”) (Bailey and Zucker 1995; Vasey and Bartlett 2007; Whitam 1983). Traits of childhood separation anxiety (anxiety related to separation from major attachment figures, such as parents) tend to be more common among girls than boys (Shear et al. 2006); both sex-gender congruent and transgendered male androphiles also experience elevated traits of childhood separation anxiety (VanderLaan et al. 2011a; Vasey et al. 2011; Zucker et al. 1996). In adulthood, male androphiles from a range of cultures exhibit preferences for a variety of female-typical occupations and hobbies (e.g., interior design) (Lippa 2005; Whitam 1983).

Even though sex-gender congruent androphilic males are relatively feminine as boys compared with their gynephilic counterparts (Bailey and Zucker 1995), they behaviorally defeminize to varying degrees as they develop. This behavioral defeminization probably occurs in response to culturally specific gender role expectations, which hold that male-bodied individuals should behave in a masculine manner (Bailey

2003; Rieger and Savin-Williams 2012). In contrast, in cultures where transgendered male androphilia is the norm, feminine boys develop into feminine adult males. Consequently, adult sex-gender congruent male androphiles are relatively masculine when compared with transgendered adult male androphiles (Murray 2000). Conversely, they are, on average, relatively feminine when compared with adult male gynephiles (Bailey 2003; Lippa 2005). Thus, regardless of how it is manifested, male androphilia is associated with gender atypicality. However, the strength of this association varies depending on the manner in which male androphilia is publically expressed.

The Evolutionary Paradox of Male Androphilia

Taken together, these lines of evidence suggest that sex-gender congruent and transgendered male androphilia are cultural variants of what is essentially the same phenomenon with a common set of developmental rudiments. The existence of culturally diverse forms of male androphilia across cultures, which nonetheless share similar phenomenology, is an evolutionary paradox. There appears to be some genetic influence on male androphilia (e.g., Bailey et al. 2000; Kendler et al. 2000; Långström et al. 2010), yet both sex-gender congruent and transgendered androphilic males reproduce at significantly lower rates than gynephilic males (e.g., King et al. 2005; Saghir and Robins 1973; Schwartz et al. 2010; Vasey et al. 2013; Whitam 1997). Consequently, one would have expected genes for male androphilia to become extinct given the relative reproductive benefits of male gynephilia. Nevertheless, prehistoric rock art and pottery suggests that male-male sexual activity has existed for millennia (e.g., Larco Hoyle 1998; Nash 2001; Yates 1993). Given what we know about the androphilic orientation of most “third” gender males (e.g., Murray 2000), prehistoric graves containing skeletal remains and artifacts indicative of “third” gender males (e.g., Hollimon 1997) are also suggestive of the presence of male androphilia in human antiquity. Moreover, the existence of male androphilia in genetically diverse populations at similar (albeit, low) frequencies is also consistent with this conclusion (e.g., Smith et al. 2003; VanderLaan et al. 2013a; Whitam 1983). A trait that lowers direct reproduction and persists over evolutionary time requires explanation when viewed within the context of natural selection, a process that favors the evolution of reproductively viable traits.

The Kin Selection Hypothesis for Male Androphilia

The kin selection hypothesis (Wilson 1975) postulates that genes for male androphilia could be maintained in a population if enhancing one’s indirect fitness offsets the cost of not reproducing directly. *Indirect fitness* is a measure of an individual’s impact on the fitness of kin (who share some identical genes by virtue of descent), weighted by the degree of relatedness (Hamilton 1963). Theoretically speaking, androphilic males could increase their indirect fitness by directing altruistic behavior toward close kin, which, in principle, would allow kin to increase their reproductive success.

To date, a number of studies have tested the basic prediction of the kin selection hypothesis that androphilic males should exhibit elevated kin-directed altruism compared with others. Studies conducted with samples of gay men in cultures where sex-

gender congruent male androphilia is predominant all failed to support this prediction (USA: Bobrow and Bailey 2001; Canada: Abild et al. 2013; Forrester et al. 2011; UK: Rahman and Hull 2005; Japan: Vasey and VanderLaan 2012). In contrast, data from the Polynesian island nation of Samoa, where transgendered male androphilia is predominant, have consistently and repeatedly supported this prediction. Samoan transgendered androphilic males (known locally as *fa'afafine*) exhibit greater avuncular (i.e., uncle-like) tendencies (VanderLaan and Vasey 2012; Vasey et al. 2007; Vasey and VanderLaan 2010a,b), even when compared with childless gynephilic men (Vasey and VanderLaan 2010a) and childless androphilic women (Vasey and VanderLaan 2009) who also lack direct parental care responsibilities. Several studies indicate that the avuncular cognition of *fa'afafine* is characterized by elements of adaptive design (VanderLaan and Vasey 2012, 2013a, b; Vasey and VanderLaan 2010c).

The expression of elevated kin-directed altruism in androphilic males thus appears to vary cross-culturally and may be contingent on a sociocultural context in which transgendered male androphilia is predominant (VanderLaan et al. 2011b; Vasey et al. 2007; Vasey and VanderLaan 2013). In those cultures in which sex-gender congruent male androphilia predominates, elevated kin-directed altruism might not be expressed by male androphiles. Hence, the viability of the kin selection hypothesis as a tenable explanation for the evolutionary maintenance of male androphilia critically depends on whether it is likely that transgendered male androphilia prevailed under the sociocultural conditions of the ancestral human evolutionary past.

Characteristics of Ancestral Human Sociocultural Conditions Examined in the Present Study

For the purposes of this work, we define “ancestral human” as *Homo sapiens* who exhibited tribal-level organization (i.e., organized social entities encompassing several distinct groups). The evolution of maximally inclusive kinship systems of descent and residence (i.e., bilateral descent, bilocal residence; see below) would have been contingent on the existence of tribal-level organization (Chapais 2008). Consequently, if kin selection played some role in the evolution of male androphilia within the context of maximally inclusive kinship systems of descent and residence (as argued below), then tribal-level organization would have been a necessary condition of the sociocultural environment. As Chapais (2008) cogently argued, pair-bonding was a necessary prerequisite for the evolution of tribal-level organization. Some authors have argued that pair-bonding (and presumably tribal-level organization) characterized *Homo erectus* (Wrangham et al. 1999), but others have argued that pair-bonding had not evolved at this stage in the evolution of the genus *Homo* (Hawkes et al. 2003). Given that this debate remains unresolved at present, the conclusions we present here should not necessarily be taken as representative of *Homo erectus*. Instead, our conclusions should be taken as representative of *Homo sapiens*, which appear in the fossil record about 195 kya (McDougall et al. 2005), and then only those *Homo sapiens* who exhibited tribal-level organization.

Ethnographic data derived from the study of hunter-gatherers have been widely used to model ancestral human sociocultural conditions. Because the sociocultural environment of modern hunter-gatherers differs in important ways from that of

ancestral humans (e.g., absence of warfare, depletion of large game, use of projectile weapons), the degree to which modern hunter-gatherer patterns reflect ancestral human patterns is debated (Hill et al. 2011; Marlowe 2005). Thus, although caution is advisable when attempting to reconstruct ancestral human sociocultural conditions using data derived from modern hunter-gatherers, there is widespread consensus that ancestral humans followed a hunter-gatherer pattern of subsistence until the beginning of the Holocene, and archaeological evidence supports this contention (McBrearty and Brooks 2000; Smith 1999). Importantly, Marlowe (2005) suggests that the bias toward marginal habitats, which is often said to characterize contemporary hunter-gatherers, is not as great as usually assumed.

Animal husbandry and agriculture emerged relatively late in human history (circa 10,000–7,000 calendar years before present) (Cowan and Watson 2006; Gupta 2004; Larsen 1995). The degree of reliance on animal husbandry and agriculture appears to be useful for assaying a society's deviation from ancestral hunter-gatherer sociocultural conditions. If it can be shown that, on average, certain sociocultural patterns distinguish modern hunter-gatherers from larger-scale societies that were characterized by animal husbandry and agriculture, then it seems parsimonious to assume that sociocultural conditions of ancestral hunter-gatherers were structured similarly to those of their modern counterparts. In what follows, we draw on evidence from the ethnographic literature on hunter-gatherers to assess the forms that likely characterized the ancestral human group size, sociopolitical system, and religious belief system.

First, it is likely that the residential groups in which human ancestors lived were relatively small (Ehrlich 2000; Klein 1999). Here, “residential group” refers to the same camp or settlement within which people regularly reside. Most hunter-gatherers exhibit a high degree of mobility, which is expressed in terms of a fission-fusion type of group organization whereby the residential group breaks apart into smaller foraging parties, which then reassemble later in the day or after spending a few nights away from camp (Marlowe 2005). Binford (2001) examined group size during the most aggregated phase of subsistence settlement for 219 non-equestrian¹ hunter-gatherer ethnolinguistic groups who varied according to primary food source exploited (i.e., terrestrial plants, terrestrial animals, aquatic resources) and mobility (i.e., mobile settlements, semi-sedentary settlements). His analyses indicated that group size for these hunter-gatherers is, on average, 69 individuals and ranges from a mean (*SD*) of 34.1 (10.8) individuals for those exploiting terrestrial plants and living in mobile settlements to a mean (*SD*) of 127 (132.9) individuals for hunter-gatherers exploiting aquatic resources and living in semi-sedentary settlements. Hunter-gatherers who live in semi-sedentary settlements form larger residential groups than those who form mobile settlements. Marlowe's (2005) analysis of warm-climate,² non-equestrian hunter-gatherer ethnolinguistic groups ($n=130$) indicates that residential groups contain a mean

¹ Beginning in the 1700s, after the Spanish introduction of the horse, various North American Plains Indian ethnolinguistic groups subsequently became specialists in hunting bison from horseback (Shimkin 1983). This specialization in foraging pattern influenced the group sizes, home ranges, hunting success rates, and travel costs of these groups. Because we are interested in reconstructing the sociocultural environment of ancestral humans prior to the domestication of the horse, we do not consider data from equestrian hunter-gatherers here.

² It is only during the past 30,000 years that the arctic has been occupied by modern *Homo sapiens* (Vaughan 1994). Occupation of this biome had concomitant influences on residential group size. Consequently, Marlowe (2005) argues that if we are interested in the period prior to 30,000 years ago, it is reasonable to exclude arctic foragers from analysis pertaining to residential group size.

(*SD*) of 37.46 (38.28) individuals, with a range of 13.1 to 250 individuals. Hill et al. (2011) analyzed data from 32 hunter-gatherer societies and found that mean band size was 28.2 individuals. If these results for mean hunter-gatherer residential group size can be taken as representative of the conditions that characterized ancestral humans, then these analyses point to the conclusion that, on average, ancestral humans formed relatively small residential groups of approximately 28–69 individuals.

Second, contemporary hunting and gathering societies that have economies based on immediate, rather than delayed, return of food resources are more egalitarian with respect to power, wealth, prestige, and religious beliefs/practices than state-based societies that are more reliant on animal husbandry and agriculture (Woodburn 1982). In immediate-return systems, all individuals have direct access to food resources, which are owned by no single individual. Food is neither elaborately processed nor stored. Social groupings are flexible and constantly changing in composition and, as such, there are no fixed dwellings, base camps, storage areas, hunting or fishing apparatuses (i.e., weirs), or ritual sites. Individuals have a choice of whom they associate with in terms of residence, food acquisition, trade, and ritual contexts. Movement between camps does not result in economic penalties. Although sharing and mutuality are stressed, individuals are not dependent on food sharing, nor are they involved in long-term binding commitments and dependencies of the sort that characterized delayed-return systems. Moreover, the accumulation of personal possessions is sanctioned. These societies have either no leaders at all or leaders who are constrained in terms of their ability to exercise authority or influence to acquire wealth and prestige. As reliance on animal husbandry and agriculture increases, the tendency for associated increases in ownership and storage of surplus food in turn supports greater population size and density (Hopfenberg and Pimentel 2001). Under such conditions, state-based political systems appear in which social organization becomes more complex and hierarchical (Given 2004; Kim and Kusimba 2008; Underhill 1975).

Third, shamanism appears to be common among members of contemporary small-scale hunter-gatherers (Sanderson and Roberts 2008; Winkelman 2010).³ Some scholars have argued that shamanistic activity is depicted in Paleolithic rock art (Clottes and Lewis-Williams 1998; Deacon 1999). Taken together, these lines of evidence suggest that shamanism, which is closely associated with animism (the belief that spirits inhabit some or all natural objects and phenomena), represents the form of religion practiced by ancestral humans. Interestingly given the focus of the present study, transgendered male androphilia appears to be closely linked to shamanism in a number of societies (e.g., Bogoras 1907; Clark 1961; Heiman and Van Lê 1975; McLeod 1953; for review, see Williams 1992). Indeed, in some cultures such as the Mohave and the Yorok, all berdache (transgendered male androphiles) were shamans (e.g., Devereux 1937; Kroeber 1925). Animistic belief systems might facilitate the transgendered expression of male androphilia because they account for the femininity of male androphiles by appealing to the simultaneous presence of masculine and feminine spiritual entities (Totman 2003). In contrast, larger, hierarchically structured groups that rely more heavily on animal husbandry and agriculture

³ A religion is *shamanic* when a shaman is the center of most religious practice, a strong belief in animism is present, there are no calendrical rites, and laypersons rely on a shaman as the sole intermediary between themselves and the supernatural (Sanderson and Roberts 2008).

have a greater tendency to display polytheism and monotheism (Sanderson and Roberts 2008). This may be the case because the belief in a single deity, or relatively few deities, reinforces the social organization of societies that have centralized authority (Seters 2004).

With these insights concerning the prevailing conditions of human ancestral sociocultural environments in mind, the present study sought to evaluate whether these conditions are associated with transgendered male androphilia. If so, then this would bolster the argument that male androphilia was predominantly expressed in the transgendered form under ancestral conditions. To this end, a sample of nonindustrial societies with a predominance of transgendered male androphilia was compared with a sample of nonindustrial societies without a predominance of transgendered male androphilia to test whether the sociocultural environments of the former tend to bear greater resemblance to the ancestral sociocultural environment in which humans are believed to have evolved.

Some features of the ancestral human sociocultural environment would have been more relevant to the evolution of male androphilia than others. We reasoned that if kin selection played a role in the evolutionary maintenance of male androphilia, then unbiased access to extended kin networks should have been part of the Adaptively Relevant Environment (ARE) in which male androphilia evolved. AREs consist of those features of the environment that must be present in order for an adaptation to be functionally expressed (Irons 1998). Consequently, we examined whether the social organization of societies in which transgendered male androphilia was present facilitated investments in kin relative to a set of comparison societies.

Ethnologists have argued that bilateral descent systems⁴ and bilocal patterns of residence following marriage⁵ are maximally inclusive of kin because they do not bias individuals to interact with only one subset of relatives (Alvard 2002; Ember 1975; Kramer and Greaves 2011). In addition to providing opportunities for interactions with parents of both the husband and wife, bilaterality broadens access to collateral kin—siblings, in-laws, cousins, nieces, nephews, and other, more distant kin related to both members of the couple (Silberbauer 1972). Bilateral kin affiliation, in turn, expands the options for postmarital residence, resulting in residency patterns that are flexible, facultative, and variable over the lifespan (Kramer and Greaves 2011).

Bilocal residence following marriage is a common feature of hunter-gatherer societies (Alvarez 2004; Hill et al. 2011; Kelly 1995; Marlowe 2004). Maximizing potential kin association rather than constraining it may be especially relevant for hunter-gatherers because food sources often fluctuate throughout the year. Flexible residential organization can result in adaptive changes in labor organization and patterns of sharing in the face of variable food supply (Kramer and Greaves 2011). Although bilocal residence is maximally inclusive of the kin with whom one can potentially interact, analysis of 32 hunter-gatherer societies by Hill et al. (2011) indicates that individuals are not surrounded by kin in such groups. Co-residence with primary kin is typical, but contact with secondary kin is achieved via friendly contact among other residential groups. As such, bilateral kin networks are extensive, but dispersed. On the basis of this information, we were interested in whether

⁴ In bilateral descent systems, ego's mother's and father's lineages are equally important for emotional, social, spiritual, and political support, as well as for transfer of property or wealth.

⁵ Bilocal patterns of postmarital residence are characterized by regular alternation of a married couple's residence between the household or vicinity of the wife's kin and of the husband's kin. Bilocal residence is sometimes referred to as multilocal or duolocal residence.

societies with transgendered male androphilia would be characterized by bilateral descent systems and bilocal postmarital residence more often than control societies. With respect to the ancestral timeframe under consideration, bilocality and bilateral descent could only be achieved following the evolution of pair-bonding, male pacification leading to friendly contact between residential groups, and tribal-level group organization (Chapais 2008). Patrilocal and patrilineal descent likely preceded the evolution of residence patterns and descent systems such as bilocality and bilateral descent (Chapais 2008).

It seems likely that an androphilic male's ability to direct high levels of altruistic behavior toward kin would be constrained if he experienced familial censure and ostracism for his same-sex sexual behavior (Bobrow and Bailey 2001). Consequently, we also reasoned that if transgendered male androphilia were ancestral and kin selection played a role in its evolutionary maintenance, then acceptance of same-sex sexual behavior should also have been part of the ARE in which male androphilia evolved. As such, we examined whether negative reactions to same-sex sexuality would be relatively absent in societies with transgendered male androphilia.

Method

Data

To conduct an ethnological analysis, we used the current version of the Standard Cross-Cultural Sample (SCCS) (Murdock and White 1969). The SCCS contains a subset of the 1,250 societies listed in the *Ethnographic Atlas* (Murdock 1967), a comprehensive database that includes all the well-described nonindustrial societies in the world. These 1,250 societies are grouped into 200 sampling provinces based on their linguistic relationship, cultural resemblance, and geographic continuity (Murdock 1968). The most well-described and representative society from each of these provinces was selected for inclusion in the SCCS, which contains a total of 186 societies (omitting 14 cultural provinces) that are relatively independent from one another in these three dimensions. As such, the SCCS provides a sample of world societies that reduces the problem of non-independence due to cultural diffusion or common cultural derivation (i.e., Galton's problem).

The current version of the SCCS has 38 societies in which transgenderism is present (Crapo 1995). To increase the sample size for such societies, Murdock's (1968) guidelines for adding or replacing societies in the SCCS while maintaining the independence and representativeness of the societies included were followed. Specifically, Murdock (1968) has listed potential alternate representative societies for each province. Consequently, Cayaba and Comanche were replaced with Paez (Murray 2000) and Cheyenne (Lang 1998), respectively. In addition, Murdock (1968) provides a list of societies for each of 14 sampling provinces typically not represented in the SCCS. Using additional sources for these 14 provinces, the following societies for which transgenderism was reported as "present" were added: Batak (Murray 2002), Cagaba (Murray 2000), Ila (Murray 2000), Kongo (Murray and Roscoe 2001), Maidu (Lang 1998), and Zulu (Lee 1958). The final sample had 192 societies with 46 societies for which transgenderism has been reported as present (hereafter referred to as transgendered societies) and 146 societies for which transgenderism has

not been reported as present (hereafter referred to as non-transgendered societies). For a complete list of the societies included in this study, see the [Appendix](#).

Focal Variables

To test for possible differences between transgendered and non-transgendered societies, we examined variables coded in the SCCS that assayed group size, subsistence type, sociopolitical structures, and religion. “Community size” codes the number of individuals in the local community as: 1 = <50, 2 = 50–99, 3 = 100–199, 4 = 200–399, 5 = 400–999, 6 = 1000–4999, 7 = 5000–49999, and 8 = >50000. A number of variables code for the degree of dependency on the following modes of subsistence: gathering, hunting, fishing, animal husbandry, and agriculture. The degree of dependency on each is expressed in percentages, which are coded as: 1 = 0–5%, 2 = 6–15%, 3 = 16–25%, 4 = 26–35%, 5 = 36–45%, 6 = 46–55%, 7 = 56–65%, 8 = 66–75%, 9 = 76–85%, and 10 = 86–100%. “Level of sovereignty” codes the degree of hierarchical societal governance as follows: 1 = Stateless society, 2 = Sovereignty first hierarchical level up, 3 = Sovereignty second hierarchical level up, and 4 = Sovereignty third or higher hierarchical level. “Stage of religious evolution,” taken from Sanderson and Roberts (2008), is coded as: 1 = Shamanic, 2 = Communal,⁶ 3 = Polytheistic,⁷ 4 = Monotheistic,⁸ and 5 = Too missionized (societies that were too missionized were not included in the analysis).

To test whether the social conditions of transgendered societies tended to be more conducive to enabling investment in kin, we examined a number of additional variables in the SCCS. The SCCS codes the system of descent with the variable “Descent-Membership in Corporate Kinship Groups.” We compared transgendered versus non-transgendered societies for descent systems in which individuals identify as members of only their mothers’ or fathers’ lineages versus as members of both. Thus, matrilineal, patrilineal, and ambilineal descent,⁹ which were coded as 0, were compared with double and bilateral descent,¹⁰ which were coded as 1.

We also compared transgendered versus non-transgendered societies for postmarital residence pattern (the predominant pattern of residence [re]location following marriage). Bilocal residence was coded as 1; matrilineal (or uxorilocal), patrilineal (or virilocal), and avunculocal¹¹ residence were grouped (and coded as “2”)

⁶ A religion is *communal* when laypersons are the center of religious practice and calendrical or other collective rites of some sort are present. Although a shaman may be present, there are groups (e.g., kinship groups, age grades, or the whole society) that specialize in acting as a mediator between the people and the supernatural (Sanderson and Roberts 2008).

⁷ A religion is *polytheistic* when a hierarchically organized priestly class is present to direct laypersons in ritual practices, and the center of worship is a pantheon of distinct gods (Sanderson and Roberts 2008).

⁸ A religion is *monotheistic* when a hierarchical priestly class is present to direct laypersons in ritual practices, but there is a belief in a single, all-powerful god rather than a pantheon of specialized and lesser gods (Sanderson and Roberts 2008).

⁹ Some sources treat ambilineal and bilateral descent systems as synonymous, but ambilineal descent systems are defined as existing when individuals have the option of choosing one of their lineages for membership.

¹⁰ In double descent systems, individuals receive some rights and obligations from the father's side of the family and others from the mother's side.

¹¹ Avunculocal residence involves a man moving to his mother's brother's household, or the newly married couple establishes their home near, or in, the groom's maternal uncle's house.

because they all involve a degree of constraint with respect to the kin categories with whom individuals may reside. Neolocal (both spouses leave their family of origin and jointly form a new household) was coded as 3.

For transgendered societies, we considered the societal acceptance of homosexuality (i.e., same-sex sexual interaction). Information on acceptance was included in the SCCS by Broude and Greene (1976) as: 1 = Accepted or ignored, 2 = No concept of homosexuality, 3 = Ridiculed, scorned, but not punished, 4 = Mildly disapproved, considered undesirable, but not punished, and 5 = Strongly disapproved and punished. Broude and Greene (1976) coded this information for seven transgendered societies listed in the SCCS (Burmese, Chiricahua, Kaska, Kutenai, Papago, Tanala, and Yurok).

Using additional sources, we obtained information on acceptance of homosexuality for Amhara (Greenberg 1988:61, code = 1), Batak (Money and Ehrhardt 1972:130, code = 1), Cagaba (Greenberg 1988:82, code = 1), Cheyenne (Lang 1998:176, code = 1), Chukchee (Murray 2000:323, code = 1), Eyak (Lang 1998:202, code = 3), Hausa (Murray 2000:339, code = 3), Hidatsa (Lang 1998:108, code = 1), Huichol (West and Green 1997:88, code = 1), Iban (Murray 2000:332, code = 1), Ila (Murray and Roscoe 2001:176, code = 1), Kongo (Murray and Roscoe 2001:2, code = 1), Koreans (Murray 2000:67, code = 1), Maidu (Lang 1998:92, code = 1), Maori (Greenberg 1988:59, code = 1), Marquesans (Murray 2002:120, code = 1), Paez (Murray 2000:297, code = 1), Samoan (Vasey et al. 2007:162, code = 1), Yokuts (Gayton 1948:107, code = 2), and Zulu (Murray 2000:164, code = 1). In total, we had information for 27 transgendered societies.

Results

Descriptive statistics (frequency counts) for community size, subsistence dependency, level of sovereignty, stage of religious evolution, descent system, and pattern of residency following marriage are presented in Tables 1, 2, 3, 4, 5 and 6, respectively. One of the primary aims of the present study was to test whether transgendered and non-transgendered societies differed for variables that assayed ancestral sociocultural conditions (i.e., community size, subsistence dependency, level of sovereignty, and stage of religious evolution). To reduce the number of comparisons performed on these variables, we used Principal Components Analysis (PCA), which is the data reduction technique often used with SCCS data (e.g., Chick 1997; Divale and Seda 2001). PCA was conducted across the entire sample. However, data were missing for at least one of these variables for 11 transgendered and 16 non-transgendered societies. Rather than employing an imputation method to provide values for this large number of missing data points, we limited the PCA to the remaining 165 societies for which there were no missing data for these variables. In Tables 1, 2, 3 and 4, we only provide frequency data for these 165 societies.

PCA on these variables for the 165 societies yielded a two-factor solution (i.e., all variables loaded most heavily on one of these two factors) (Table 7). The first factor accounted for 45.7% of the variance and the second factor accounted for an additional 15.2% of the variance. All the variables loaded most heavily on the first factor with the exception of animal husbandry. Nevertheless, animal husbandry had an

appreciable loading on the first factor. Thus, the first factor provided a suitable dimensional metric of the relative presence-absence of ancestral sociocultural conditions and was retained for subsequent analysis.

Binary logistic regression analyses were conducted to test for differences between transgendered and non-transgendered societies (Table 8). The relative presence of ancestral sociocultural conditions was greater in transgendered than in non-transgendered societies. Also, relative to non-transgendered societies, transgendered societies tended to use bilateral and double descent systems significantly more than unilateral descent systems (i.e., matrilineal, patrilineal, and ambilocal).

Additional two-tailed Pearson's correlation analyses were performed across the entire sample to test the relationship between Factor 1 (the relative presence-absence of ancestral sociocultural conditions) and descent system, and pattern of residency following marriage. As the absence of ancestral sociocultural conditions increased, the presence of double and bilateral descent systems decreased ($n=165$, $r=-0.39$, $p<0.001$) but the presence of constraining marriage relocation patterns increased ($n=165$, $r=0.26$, $p<0.001$).

With respect to the societal acceptance of homosexuality in transgendered societies, 20 societies accepted or ignored it, and one had no concept of it. Of the remaining transgendered societies for which this information could be coded, two ridiculed homosexuality but did not punish it, two mildly disapproved of homosexuality, and two strongly disapproved of homosexuality and punished those who engaged in it. A chi-square goodness-of-fit test showed that the significant majority ($n=21$) of transgendered societies accepted, ignored, or had no concept of homosexuality while the significant minority ($n=6$) showed some level of negative reaction to homosexuality ($\chi^2_1=8.33$, $p=0.004$).

Discussion

One focus of the present study was to gain insight into whether transgendered male androphilia was likely to have prevailed in the human ancestral past. To do so, we examined whether the sociocultural environment of contemporary transgendered societies tended to be more similar to that of the human ancestral past. As outlined above, ancestral humans were likely to be small-group hunter-gatherers with relatively egalitarian sociopolitical structures and shamanistic religious belief systems. Using the SCCS, which provides data related to a subset of the world's nonindustrial societies and circumvents Galton's problem (i.e., common cultural derivation and cultural diffusion), we compared 46 transgendered and 146 non-transgendered societies.

Based on PCA, the variables used here to assay ancestral sociocultural conditions were well represented by a single dimensional factor that indicated the relative presence-absence of such conditions. Compared to non-transgendered societies, transgendered societies had a significantly greater presence of ancestral sociocultural conditions. Given the association between transgendered male androphilia and ancestral human sociocultural conditions, it seems parsimonious to conclude that the ancestral form of male androphilia was the transgendered form. Consistent with this conclusion is the fact that sex-gender congruent male androphilia appears to be a historically recent phenomenon with little precedent outside of a Western cultural context until very recently (Murray 2000). Accordingly, caution needs to be exercised

Table 1 Frequency of community size for non-transgendered ($n=130$) and transgendered ($n=35$) societies

	<50	50–99	100–199	200–399	400–999	1000– 4999	5000– 49999	>5000
Non-transgendered	20 (15%)	17 (13%)	35 (27%)	18 (14%)	20 (15%)	12 (9%)	5(4%)	3 (3%)
Transgendered	4 (11%)	7 (20%)	7 (20%)	9 (26%)	5 (14%)	3 (9%)	0 (0%)	0 (0%)

Non-transgendered societies missing are numbers 15, 29, 30, 32, 33, 38, 55, 74, 88, 108, 109, 110, 111, 178, 180, and 181. Transgendered societies missing are numbers 106, 130, 147, 163, 168, 187, 188, 189, 190, 191, and 192. See [Appendix](#) for identities of these societies

in utilizing sex-gender congruent male androphiles (“gay” men) to test hypotheses pertaining to the evolution of male androphilia.

The other focus of the present study was to gain insight into whether transgendered societies were more likely than non-transgendered societies to show characteristics that may facilitate investment in kin. Ethnologists have argued that bilateral descent systems and bilocal patterns of residence following marriage are maximally inclusive of kin because they do not bias individuals to interact with only one subset of relatives (Alvard 2002; Ember 1975; Kramer and Greaves 2011). Humans have evolved, via kin selection, to preferentially allocate altruism toward close relatives (Daly et al. 1997). Consequently, it is reasonable to infer that these patterns of descent and postmarital residence would have allowed for more altruistic interactions with a full range of genetically related kin.

Relative to non-transgendered societies, transgendered societies were more likely to exhibit bilateral and double descent systems than patrilineal, matrilineal, and ambilocal descent systems. In addition, correlational analysis showed that as the presence of ancestral sociocultural conditions increased, so too did the presence of bilateral and double descent systems. Although our comparison of residence patterns following marriage failed to show a statistically significant difference across transgendered versus non-transgendered societies, correlational analysis showed that bilocal residence following marriage was associated with the presence of ancestral sociocultural conditions. Given this correlation and the fact that transgendered societies show significantly greater presence of ancestral sociocultural conditions, it seems likely that the lack of a significant difference between the two society types in terms of residence patterns following marriage represents a Type II error because of low statistical power. Thus, taken together, these analyses are consistent with the conclusion that bilateral descent and bilocal residence characterized ancestral humans, and that such patterns were features of ancestral societies in which male androphilia was expressed in the transgendered form.

We also examined the acceptance of homosexuality in 27 transgendered societies for which information could be obtained. The significant majority of these societies expressed no negative reactions to same-sex sexual behavior. Two additional societies “ridiculed” homosexuality but did not punish it. It is possible that for these two societies ethnographers interpreted teasing of same-sex sexual behavior and male femininity as “ridicule.” Teasing of same-sex sexual behavior and male femininity occurs in some societies, but it is not necessarily indicative of a negative reaction

Table 2 Frequency of percentage of dependence on various modes of subsistence for non-transgendered ($n=130$) and transgendered ($n=35$) societies

	0–5%	6–15%	16–25%	26–35%	36–45%	46–55%	56–65%	66–75%	76–85%	86–100%
Gathering										
Non-transgendered	68 (52%)	31 (24%)	17 (13%)	5 (4%)	5 (4%)	1 (1%)	2 (1%)	0 (0%)	1 (1%)	0 (0%)
Transgendered	10 (29%)	11 (31%)	4 (11%)	4 (11%)	3 (9%)	2 (6%)	1 (3%)	0 (0%)	0 (0%)	0 (0%)
Hunting										
Non-transgendered	46 (35%)	38 (29%)	23 (18%)	12 (9%)	5 (4%)	3 (2%)	2 (2%)	1 (1%)	0 (0%)	0 (0%)
Transgendered	9 (26%)	4 (11%)	8 (24%)	6 (17%)	4 (11%)	2 (5%)	0 (0%)	1 (3%)	1 (3%)	0 (0%)
Fishing										
Non-transgendered	41 (32%)	44 (34%)	20 (15%)	10 (7%)	5 (4%)	4 (3%)	3 (2%)	1 (1%)	1 (1%)	1 (1%)
Transgendered	8 (23%)	6 (17%)	8 (23%)	3 (9%)	5 (14%)	3 (9%)	2 (5%)	0 (0%)	0 (0%)	0 (0%)
Animal husbandry										
Non-transgendered	45 (35%)	29 (22%)	21 (16%)	16 (12%)	7 (5%)	2 (2%)	1 (1%)	1 (1%)	4 (3%)	4 (3%)
Transgendered	23 (65%)	3 (9%)	6 (18%)	2 (5%)	0 (0%)	1 (3%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Agriculture										
Non-transgendered	24 (18%)	9 (8%)	4 (3%)	1 (1%)	11 (9%)	27 (20%)	25 (19%)	16 (12%)	9 (7%)	4 (3%)
Transgendered	15 (42%)	1 (2%)	0 (0%)	0 (0%)	4 (12%)	5 (15%)	7 (20%)	0 (0%)	3 (9%)	0 (0%)

Non-transgendered societies missing are numbers 15, 29, 30, 32, 33, 38, 55, 74, 88, 108, 109, 110, 111, 178, 180, and 181. Transgendered societies missing are numbers 106, 130, 147, 163, 168, 187, 188, 189, 190, 191, and 192. See [Appendix](#) for identities of these societies

Table 3 Frequency of level of sovereignty for non-transgendered ($n=130$) and transgendered ($n=35$) societies

	Stateless society	Sovereignty first hierarchical level up	Sovereignty second hierarchical level up	Sovereignty third or higher hierarchical level up
Non-transgendered	66 (51%)	18 (14%)	14 (10%)	32 (25%)
Transgendered	22 (63%)	7 (20%)	0 (0%)	6 (17%)

Non-transgendered societies missing are numbers 15, 29, 30, 32, 33, 38, 55, 74, 88, 108, 109, 110, 111, 178, 180, and 181. Transgendered societies missing are numbers 106, 130, 147, 163, 168, 187, 188, 189, 190, 191, and 192. See [Appendix](#) for identities of these societies

such as the pejorative term “ridicule” implies. As a Lakota informant of Williams (1992:41) stated, “*Winktes* [transgendered androphilic males] were both joked about and respected at the same time.” Williams (1992:41) argues that transgendered androphilic males who were shamans were feared and respected because they were thought to possess supernatural powers and that “this fear made for a nervousness that was sometimes alleviated by joking about it.” In this regard, it is important to note that teasing can be used to signal and reinforce the strength of a relationship bond between the teaser(s) and the individual or group of individuals being teased (e.g., Eisenberg 1986; Greenberg 1985; Radcliffe-Brown 1940). Consequently, individuals being teased can actually enjoy such interactions given the implicit message that the participants share a special relationship. Overall then, the same-sex sexual orientation of transgendered males in transgendered societies appears to be socially tolerated. Such tolerance, particularly on the part of the kin of transgendered androphilic males, might be considered essential for kin selection to be deemed as a plausible contributing factor toward the persistence of male androphilia over evolutionary time. Unless transgendered androphilic males are accepted by their families, their opportunity to invest in kin is likely limited.

In addition to the quantitative data presented here, qualitative sources suggest that transgendered androphilic males experience elevated ability to invest in kin. Transgendered androphilic males in a number of nonindustrial societies appear to experience elevated social status, including leadership roles in political or spiritual spheres (Callender and Kochems 1983; Nanda 1999; Williams 1992). With such

Table 4 Frequency of stages of religious evolution for non-transgendered ($n=130$) and transgendered ($n=35$) societies

	Shamanic	Communal	Polytheistic	Monotheistic
Non-transgendered	20 (15%)	69 (52%)	10 (8%)	31 (25%)
Transgendered	8 (22%)	20 (58%)	2 (6%)	5 (14%)

Non-transgendered societies missing are numbers 15, 29, 30, 32, 33, 38, 55, 74, 88, 108, 109, 110, 111, 178, 180, and 181. Transgendered societies missing are numbers 106, 130, 147, 163, 168, 187, 188, 189, 190, 191, and 192. See [Appendix](#) for identities of these societies

Table 5 Frequency of descent-membership in corporate kinship groups for non-transgendered ($n=146$) and transgendered ($n=38$) societies

	Matrilineal, patrilineal, or ambilocal descent systems	Double or bilateral descent systems
Non-transgendered	93 (63%)	53 (36%)
Transgendered	15 (39%)	23 (60%)

Transgendered societies missing are numbers 147, 168, 187, 188, 189, 190, 191, and 192. See [Appendix](#) for identities of these societies

elevated status, transgendered androphilic males might experience greater access to resources, which, in turn, may be allocated to kin. In addition, transgendered androphilic males are often described by the gender-normative members of their societies as being superior in terms of various labor practices, combining the best that men and women have to offer (Vasey and VanderLaan 2009; Williams 1992), which presumably would render them more proficient at investing in kin. Moreover, some transgendered androphilic males may believe it is their unique responsibility to care for their family members (Williams 1992). For example, one fa'afafine we spoke with on the island of Savai'i had this to say: "My brothers and sisters have all gone off and started their own families. Fa'afafine are more available if the family needs their support. They bring the family together." Similar statements concerning the focal importance of family for feminine, androphilic males are echoed repeatedly in the cross-cultural literature and are entirely consistent with the qualitative data we have collected on Samoan fa'afafine. For example, Williams (1992) quotes a Hupa berdache (from northern California) as saying: "You live your life around your family. My aunt says, 'I'm counting on you.' What she means is that someone like me has a special responsibility to help care for the elders" (1992:54).

The present study has some limitations worth noting. First, some may argue that alternate quantitative methodologies, such as comparing the incidence of transgendered androphilia in hunter-gatherer and non-hunter-gatherer societies would have furnished a superior methodological approach to the issues addressed by this study. Others might argue that cultural phylogenetic approaches (e.g., Currie et al. 2010) that utilize larger numbers of societies would have circumvented Galton's problem better than relying on SCCS societies. However, such methodologies require greater consistency and reliability in the coding of cultural variables of interest from one

Table 6 Frequency of postmarital residence for non-transgendered ($n=145$) and transgendered ($n=38$) societies

	Bilocal	Uxorilocal, virilocal, patrilocal, or matrilineal	Neolocal
Non-transgendered	8 (5%)	122 (84%)	15 (9%)
Transgendered	3 (7%)	33 (86%)	2 (5%)

Non-transgendered society missing is number 178. Transgendered societies missing are numbers 147, 168, 187, 188, 189, 190, 191, and 192. See [Appendix](#) for identities of these societies

Table 7 Principal components analysis factor loadings for variables used to assay societal characteristics

	Factor 1: presence-absence of ancestral sociocultural conditions	Factor 2: animal husbandry
Community size	0.63	0.40
Dependency on gathering	-0.68	-0.06
Dependency on hunting	-0.78	-0.04
Dependency on fishing	-0.50	0.36
Dependency on animal husbandry	0.47	-0.82
Dependency on agriculture	0.79	0.44
Level of sovereignty	0.73	0.08
Stage of religious evolution	0.75	-0.24

society to the next. Little cross-cultural information is available on male transgenerism and same-sex sexuality. As such, achieving sufficient consistency and reliability for a large number of societies would be difficult, if not impossible, given the limitations of existing ethnographic records and the difficulty involved in conducting research on aspects of human sexuality across cultures. Thus, the methodology employed here utilizes the best quantitative ethnological method available. Until the ethnographic record of the relevant cultural variables is more complete, the empirically based conclusions drawn here are among the most reliable ones possible.

Second, cross-cultural databases such as the SCCS are derived from ethnographic interviews and culturally stated ideal practices and beliefs, rather than actual observations. Cultural ideals often do not reflect the actual variation that is exhibited within a cultural group. Moreover, because cross-cultural databases are composed of aggregate data, they under-emphasize within-culture variation. Coding of ethnographic cases from studies for use in standard comparative samples (e.g., Binford 2001; Murdock 1967) involves further abstraction from sources that contain inherent differences in data collection methods and ethnographic detail (Kramer and Greaves 2011).

Third, some readers might argue that our test of the acceptance of homosexuality in transgendered societies may be biased. If ethnographers experienced difficulty obtaining accurate information for transgendered societies that are not accepting of homosexuality simply because members of such societies are less willing to discuss such aspects of their culture, then this would produce under-reporting of negative

Table 8 Binary logistic regression of societal variables on society type (non-transgendered societies coded as 0 and transgendered societies coded as 1)

Variables	<i>B</i>	<i>SE</i>	Wald χ^2	<i>p</i>	Cox-Snell <i>R</i> ²
Factor 1: presence-absence of ancestral sociocultural conditions	-0.58	0.20	8.38	0.004	0.053
Descent system	0.99	0.37	7.01	0.008	0.038
Marital residence	-0.28	0.47	0.34	0.559	0.002

attitudes toward homosexuality in transgendered societies. However, such a situation seems implausible. Given that transgendered male androphilia is so publically visible, it seems likely that it would have to be socially recognized and tolerated in order to persist. As such, our finding concerning the acceptance of homosexuality in transgendered societies is likely accurate.

A final limitation worth noting is related to the manner in which we increased our sample size for transgendered societies. We did so by swapping out non-transgendered societies in favor of transgendered societies from the same sampling province. Societies belong to the same sampling province based on cultural similarity. Thus, non-transgendered and transgendered societies can be culturally similar. Such similarity highlights that the presence of particular sociocultural conditions may not necessarily be sufficient to account for the presence of transgenderism. Future research should, therefore, examine why culturally similar societies nevertheless differ in terms of the presence of transgenderism.

The significant association between transgendered male androphilia and ancestral human sociocultural conditions should not be taken as evidence that the sociocultural factors under consideration here (small residential group size, egalitarian political system, shamanistic religion, bilateral descent, bilocal residence, acceptance of same-sex sexuality) are *causally* related to the evolution of transgendered male androphilia. That being said, certain sociocultural factors we examined here are likely to be important aspects of the ARE (Irons 1998) in which transgendered male androphilia evolved. For example, bilocal residence, bilateral descent, and societal acceptance of male androphilia would have contributed to an ARE in which conditions were positive for the expression of elevated kin-directed altruism by ancestral transgendered male androphiles. If transgendered male androphilia was closely associated with shamanism, as some contemporary research suggests (e.g., Bogoras 1907; Clark 1961; Heiman and Van Lê 1975; McLeod 1953; for review, see Williams 1992), then the occupation of such respected social roles may have further facilitated elevated kin-directed altruism in ancestral transgendered male androphiles by providing them with increased access to resources. Significantly, contemporary transgendered male androphiles in Samoa exhibit elevated tendencies for kin-directed altruism (VanderLaan and Vasey 2012; Vasey et al. 2007; Vasey and VanderLaan 2009, 2010a, b, c), whereas sex-gender congruent male androphiles in a range of industrialized societies do not (USA: Bobrow and Bailey 2001; Canada: Abild et al. 2013; Forrester et al. 2011; UK: Rahman and Hull 2005; Japan: Vasey and VanderLaan 2012). Because key aspects of the transgendered androphilic male ARE likely facilitated elevated kin-directed altruism, the data presented here are consistent with the notion that kin selection played some role in the evolution of male androphilia. As such, the increased kin-directed altruism documented in Samoan fa'afafine is more likely to be characteristic of ancestral androphilic males than is the lack thereof documented in sex-gender congruent androphilic men from industrialized cultures.

Acknowledgments The authors thank the Editor, Drew Bailey, J. Michael Bailey, Raymond Hames, Martin Lalumière, Sergio Pellis, and two anonymous reviewers for their helpful suggestions on a previous version of this paper. This research was supported by the University of Lethbridge, by a Canada Graduate Scholarship (Doctoral Level 3) from the Natural Sciences and Engineering Research Council (NSERC) of Canada, a Ralph Steinhauer Award of Distinction, and a Sexual Medicine Society of North America (SMSNA) Fellowship awarded to DPV, as well as a NSERC of Canada Discovery Grant to PLV.

Appendix

Table 9 Standard Cross-Cultural Sample (SCCS) society numbers and names for the societies included in the present study according to society type

Society number	Society name
Transgendered societies	
26	Hausa
37	Amhara
71	Burmese
81	Tanala
83	Javanese
85	Iban
104	Maori
105	Marquesans
106	Western Samoans
107	Gilbertese
116	Koreans
121	Chukchee
122	Ingalik
123	Aleut
126	Micmac
128	Slave
129	Kaska
130	Eyak
132	Bellacoola
134	Yurok
135	Pomo (Eastern)
136	Yokuts (Lake)
137	Paiute (North)
138	Klamath
139	Kutenai
140	Gros Ventre
141	Hidatsa
142	Pawnee
143	Omaha
146	Natchez
147	Cheyene
148	Chiricahua
149	Zuni
151	Papago
152	Huichol
162	Warrau
168	Paez
177	Tupinamba
184	Mapuche
185	Tehuelche

Table 9 (continued)

Society number	Society name
187	Batak
188	Cagaba
189	Ila
190	Kongo
191	Maidu
192	Zulu
Non-transgendered societies	
1	Nama Hottentot
2	Kung Bushmen
3	Thonga
4	Lozi
5	Mbundu
6	Suku
7	Bemba
8	Nyakyusa
9	Hadza
10	Luguru
11	Kikuyu
12	Ganda
13	Mbuti
14	Nkundo Mongo
15	Banen
16	Tiv
17	Ibo
18	Fon
19	Ashanti
20	Mende
21	Wolof
22	Bambara
23	Tallensi
24	Songhai
25	Pastoral Fulani
27	Massa (Masa)
28	Azande
29	Fur (Darfur)
30	Otoro Nuba
31	Shilluk
32	Mao
33	Kaffa (Kafa)
34	Masai
35	Konso
36	Somali
38	Bogo

Table 9 (continued)

Society number	Society name
39	Kenuzi Nubians
40	Teda
41	Tuareg
42	Riffians (Siwans)
43	Egyptians
44	Hebrews
45	Babylonians
46	Rwala Bedouin
47	Turks
48	Gheg Albanians
49	Romans
50	Basques
51	Irish
52	Lapps
53	Yurak Samoyed
54	Russians
55	Abkhaz
56	Armenians
57	Kurd
58	Basseri
59	Punjabi (West)
60	Gond
61	Toda
62	Santal
63	Uttar Pradesh
64	Burusho
65	Kazak
66	Khalka Mongols
67	Lolo
68	Lepcha
69	Garo
70	Lakher
72	Lamet
73	Vietnamese
74	Rhade
75	Khmer
76	Siamese
77	Semang
78	Nicobarese
79	Andamanese
80	Vedda
82	Negri Sembilan
84	Balinese

Table 9 (continued)

Society number	Society name
86	Badjau
87	Toradja
88	Tobeloese
89	Alorese
90	Tiwi
91	Aranda
92	Orokaiva
93	Kimam
94	Kapauku
95	Kwoma
96	Manus
97	New Ireland
98	Trobrianders
99	Siuai
100	Tikopia
101	Pentecost
102	Mbau Fijians
103	Ajie
108	Marshallese
109	Trukese
110	Yapese
111	Palauans
112	Ifugao
113	Atayal
114	Chinese
115	Manchu
117	Japanese
118	Ainu
119	Gilyak
120	Yukaghir
124	Copper Eskimo
125	Montagnais
127	Saulteaux
131	Haida
133	Twana
144	Huron
145	Creek
150	Havasupai
153	Aztec
154	Popoluca
155	Quiche (Yucatec)
156	Miskito
157	Bribri

Table 9 (continued)

Society number	Society name
158	Cuna (Tule)
159	Goajiro
160	Haitians
161	Callinago
163	Yanomamo
164	Carib (Barama)
165	Saramacca
166	Mundurucu
167	Cubeo (Tucano)
169	Jivaro
170	Amahuaca
171	Inca
172	Aymara
173	Siriono
174	Nambicuara
175	Trumai
176	Timbira
178	Botocudo
179	Shavante
180	Aweikoma
181	Cayua
182	Lengua
183	Abipon
186	Yahgan

References

- Abild, M., VanderLaan, D. P. Vasey, P. L. (2013). Does proximity influence the expression of avuncular tendencies in Canadian androphilic males? *Journal of Cognition and Culture* (in press).
- Alvard, M. S. (2002). Carcass ownership and meat distributions by big game hunters. *Research in Economic Anthropology*, 21, 99–131.
- Alvarez, H. P. (2004). Residence groups among hunter-gatherers: A view of the claims and evidence. In B. Chapais & C. M. Berman (Eds.), *Kinship and behavior in primates* (pp. 420–442). New York: Oxford University Press.
- Bailey, J. M. (2003). *The man who would be queen: The science of gender-bending and transsexualism*. Washington, DC: Joseph Henry Press.
- 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., Dunne, M. P., & Martin, N. G. (2000). Genetic and environmental influences on sexual orientation and its correlates in an Australian twin sample. *Journal of Personality and Social Psychology*, 78, 524–536.
- Bartlett, N. H., & Vasey, P. L. (2006). A retrospective study of childhood gender-atypical behavior in Samoan *fa'afafine*. *Archives of Sexual Behavior*, 35, 559–566.
- Binford, L. R. (2001). *Constructing frames of references: An analytical method for archaeological theory building using hunter-gatherer and environmental data sets*. Berkeley: University of California Press.

- Blanchard, R. (2004). Quantitative and theoretical analyses of the relation between older brothers and homosexuality in men. *Journal of Theoretical Biology*, 230, 173–187.
- Blanchard, R., & Lippa, R. A. (2007). Birth order, sibling sex ratio, handedness, and sexual orientation of male and female participants in a BBC Internet research project. *Archives of Sexual Behavior*, 36, 163–176.
- Bobrow, D., & Bailey, J. M. (2001). Is male homosexuality maintained via kin selection? *Evolution and Human Behavior*, 22, 361–368.
- Bogaert, A. F., & Skorska, M. (2011). Sexual orientation, fraternal birth order, and the maternal immune hypothesis: a review. *Frontiers in Neuroendocrinology*, 32, 247–254.
- Bogoras, W. (1907). The Chuckchee, Part 2: Religion. *Memoirs of the American Museum of Natural History*, 11. Leiden and New York: E. J. Brill and G. E. Stechert & Co.
- Broude, G., & Greene, S. J. (1976). Cross-cultural codes on twenty sexual attitudes and practices. *Ethnology*, 15, 409–429.
- Callender, C., & Kochems, L. M. (1983). The North American berdache. *Current Anthropology*, 24, 443–456.
- Camperio Ciani, A., Corna, F., & Capiluppi, C. (2004). Evidence for maternally inherited factors favoring male homosexuality and promoting female fecundity. *Proceedings of the Royal Society of London, Series B: Biological Sciences*, 271, 2217–2221.
- Cardoso, F. L. (2005). Cultural universals and differences in male homosexuality: the case of a Brazilian fishing village. *Archives of Sexual Behavior*, 34, 103–109.
- Cardoso, F. L. (2009). Recalled sex-typed behavior in childhood and sports preferences in adulthood of heterosexual, bisexual, and homosexual men from Brazil, Turkey, and Thailand. *Archives of Sexual Behavior*, 38, 726–736.
- Chapais, B. (2008). *Primeval kinship: How pair-bonding gave birth to human society*. Cambridge: Harvard University Press.
- Chick, G. (1997). Cultural complexity: the concept and its measurement. *Cross-Cultural Research*, 31, 275–307.
- Clark, C. A. (1961). *Religions of old Korea*. Seoul: Christian Literature Society of Korea.
- Clottes, J., & Lewis-Williams, D. (1998). *The Shamans of prehistory: Trance and magic in the painted caves*. New York: Harry N. Abrams.
- Cowan, C. W., & Watson, P. J. (2006). *The origins of agriculture: An international perspective*. Tuscaloosa: University of Alabama Press.
- Crapo, R. H. (1995). Factors in the cross-cultural patterning of male homosexuality: a reappraisal of the literature. *Cross-Cultural Research*, 29, 178–202.
- Currie, T. E., Greenhill, S. J., Gray, R. D., Hasegawa, T., & Mace, R. (2010). Rise and fall of political complexity in island South-East Asia and the Pacific. *Nature*, 467, 801–804.
- Daly, M., Salmon, C., & Wilson, M. (1997). Kinship: the conceptual hole in psychological studies of social cognition and close relationships. In J. A. Simpson & D. Kenrick (Eds.), *Evolutionary social psychology* (pp. 265–296). Mahwah: Erlbaum.
- Deacon, H. J. (1999). *Human beginnings in South Africa: Uncovering the secrets of the stone age*. CA: Altamira Press.
- Devereux, G. (1937). Institutionalized homosexuality of the Mohave Indians. *Human Biology*, 9, 498–527.
- Divale, W., & Seda, A. (2001). Modernization as changes in cultural complexity: new cross-cultural measurements. *Cross-Cultural Research*, 35, 127–153.
- Dixon, A. (2010). Homosexual behaviour in primates. In A. Polani (Ed.), *Animal homosexuality: A biosocial perspective* (pp. 381–400). Cambridge: Cambridge University Press.
- Ehrlich, P. R. (2000). *Human natures: Genes, cultures, and the human prospect*. Washington: Island Press.
- Eisenberg, A. R. (1986). Teasing: Verbal play in two Mexican homes. In B. B. Schieffelin & E. Ochs (Eds.), *Language socialization across cultures* (pp. 182–198). Cambridge: Cambridge University Press.
- Ember, C. R. (1975). Residential variation in hunter-gatherers. *Cross-Cultural Research*, 10, 199–227.
- Forrester, D. L., VanderLaan, D. P., Parker, J., & Vasey, P. L. (2011). Male sexual orientation and avuncularity in Canada: implications for the kin selection hypothesis. *Journal of Culture and Cognition*, 11, 339–352.
- Gayton, A. H. (1948). *Yokuts and Western mono ethnography*. Berkeley: University of California Press.
- Giles, J. (2004). Sambian sexual culture: essays from the field (book review). *Archives of Sexual Behavior*, 33, 413–417.
- Given, M. (2004). *The archaeology of the colonized*. New York: Routledge.
- Gorer, G. (1966). *The danger of equality*. London: Cresset.
- Greenberg, D. (1985). Why was the berdache ridiculed? *Journal of Homosexuality*, 11, 179–189.
- Greenberg, D. F. (1988). *The construction of homosexuality*. London: University of Chicago Press.
- Gupta, A. K. (2004). Origin of agriculture and domestication of plants and animals linked to early Holocene climate amelioration. *Current Science*, 87, 54–59.
- Hamilton, W. D. (1963). The evolution of altruistic behavior. *American Naturalist*, 97, 354–356.

- Hawkes, K., O'Connell, J. E., & Blurton Jones, N. G. (2003). Grandmothers and the evolution of human longevity. *American Journal of Human Biology*, *15*, 380–400.
- Heiman, E. M., & Van Lê, C. (1975). Transsexualism in Vietnam. *Archives of Sexual Behavior*, *4*, 89–95.
- Hill, K. R., Walker, R. S., Bozicevic, M., Eder, J., Headland, T., Hewlett, B., Hutado, A. M., Marlow, F., Wiessner, P., & Wood, B. (2011). Co-residence patterns in hunter-gatherer societies show unique human social structure. *Science*, *331*, 1286–1289.
- Hollimon, S. E. (1997). The third gender in California: Two-spirit undertakers among the Chumash, their neighbours. In C. Claassen & R. A. Joyce (Eds.), *Women in prehistory: North America and Mesoamerica* (pp. 173–188). Philadelphia: University of Pennsylvania Press.
- Hopfenberg, R., & Pimentel, D. (2001). Human population numbers as a function of food supply. *Environment, Development and Sustainability*, *3*, 1–15.
- Iemmola, F., & Camperio Ciani, A. (2009). New evidence of genetic factors increasing sexual orientation in men: female fecundity increase in the maternal line. *Archives of Sexual Behavior*, *38*, 393–399.
- Irons, W. (1998). Adaptively relevant environments versus the environment of evolutionary adaptiveness. *Evolutionary Anthropology*, *6*, 194–204.
- Kelly, R. L. (1995). *The foraging spectrum*. Washington, D.C.: Smithsonian Institution Press.
- Kendler, K. S., Thornton, L. M., Gilman, S. E., & Kessler, R. C. (2000). Sexual orientation in a U. S. national sample of twin and nontwin sibling pairs. *American Journal of Psychiatry*, *157*, 1843–1846.
- Kim, N. C., & Kusimba, C. M. (2008). Pathways to social complexity and state formation in the Southern Zambezi region. *African Archaeology Review*, *25*, 131–152.
- King, M., Green, J., Osborn, D. P. J., Arkell, J., Hetherington, J., & Pereira, E. (2005). Family size in white gay and heterosexual men. *Archives of Sexual Behavior*, *34*, 117–122.
- Klein, R. G. (1999). *The human career: Human biological and cultural origins*. Chicago: University of Chicago Press.
- Kramer, K. L., & Greaves, R. D. (2011). Postmarital residence and bilateral kin associations among hunter-gatherers: Pumé foragers living in the best of both worlds. *Human Nature*, *22*, 41–63.
- Kroeber, A. L. (1925). *Handbook of the Indians of California*. Bureau of American Ethnology Bulletin 78. Washington, D.C: Smithsonian Institution.
- Lang, S. (1998). *Men as women, women as men*. Austin: University of Texas Press.
- Långström, N., Rahman, Q., Carlström, E., & Lichtenstein, P. (2010). Genetic and environmental effects on same-sex sexual behavior: a population study of twins in Sweden. *Archives of Sexual Behavior*, *39*, 75–80.
- Larco Hoyle, R. (1998). *Arte erotico en el antigua Peru*. Lima: Museo Arqueologico Rafael Larco Herrera.
- Larsen, C. S. (1995). Biological changes in human populations with agriculture. *Annual Review of Anthropology*, *24*, 185–213.
- Lee, S. G. (1958). Social influences in Zulu dreaming. *Journal of Social Psychology*, *47*, 265–283.
- Lippa, R. A. (2005). Sexual orientation and personality. *Annual Review of Sex Research*, *16*, 119–153.
- Marlowe, F. W. (2004). Marital residence among foragers. *Current Anthropology*, *45*, 277–284.
- Marlowe, F. W. (2005). Hunters-gatherers and human evolution. *Evolutionary Anthropology*, *14*, 54–67.
- McBrearty, S., & Brooks, A. S. (2000). The revolution that wasn't: a new interpretation of the origins of modern human behavior. *Journal of Human Evolution*, *39*, 453–563.
- McDougall, I., Brown, F. H., & Fleagle, J. G. (2005). Stratigraphic placement and age of modern humans from Kibish, Ethiopia. *Nature*, *433*, 733–736.
- McLeod, E. (1953). White Cindy, mystery figure. *Siskiyou Pioneer and Siskiyou Country Historical Society Yearbook*, *2*, 32–34.
- Money, J., & Ehrhardt, A. A. (1972). *Man & woman, boy & girl: The differentiation and dimorphism of gender identity from conception to maturity*. Northvale: Jonson Aronson.
- Murdock, G. P. (1967). *Ethnographic atlas: A summary*. Pittsburgh: The University of Pittsburgh Press.
- Murdock, G. P. (1968). World sampling provinces. *Ethnology*, *7*, 305–326.
- Murdock, G. P., & White, D. R. (1969). Standard cross-cultural sample. *Ethnology*, *8*, 329–369.
- Murray, S. O. (2000). *Homosexualities*. Chicago: The University of Chicago Press.
- Murray, S. O. (2002). *Pacific homosexualities*. Lincoln: Writers Club Press.
- Murray, S. O., & Roscoe, W. (2001). *Boy-wives and female husbands: Studies of African homosexualities*. New York: Palgrave.
- Nanda, S. (1999). *Gender diversity: Cross-cultural variations*. Long Grove: Waveland Press.
- Nash, G. (2001). The subversive male: Homosexual and bestial images on European Mesolithic rock art. In L. Bevan (Ed.), *Indecent exposure: Sexuality, society and the archaeological record* (pp. 43–55). Glasgow: Cruithne Press.
- Radcliffe-Brown, A. R. (1940). On joking relationships. *Africa: Journal of the International African Institute*, *13*, 195–210.

- Rahman, Q., & Hull, M. S. (2005). An empirical test of the kin selection hypothesis for male homosexuality. *Archives of Sexual Behavior*, *34*, 461–467.
- Rahman, Q., Collins, A., Morrison, M., Orrells, J. C., Cadinouche, K., Greenfield, S., & Begum, S. (2008). Maternal inheritance and familial fecundity factors in male homosexuality. *Archives of Sexual Behavior*, *37*, 962–969.
- Rieger, G., & Savin-Williams, R. C. (2012). Gender nonconformity, sexual orientation, and psychological well-being. *Archives of Sexual Behavior*, *41*, 611–621.
- Saghir, M. T., & Robins, E. (1973). *Male and female homosexuality: A comprehensive investigation*. Baltimore: Williams & Wilkins.
- Sanderson, S. K., & Roberts, W. W. (2008). The evolutionary forms of the religious life: a cross-cultural, quantitative analysis. *American Anthropologist*, *110*, 454–466.
- Schwartz, G., Kim, R. M., Kolundzija, A. B., Rieger, G., & Sanders, A. R. (2010). Biodemographic correlates of sexual orientation in men. *Archives of Sexual Behavior*, *39*, 93–109.
- Seters, J. V. (2004). *The pentateuch: A social-science commentary*. New York: T&T Clark International.
- Shear, K., Jin, R., Ruscio, A. M., Walters, E. E., & Kessler, R. C. (2006). Prevalence and correlates of estimated DSM-IV child and adult separation anxiety disorder in the National Comorbidity Survey replication. *American Journal of Psychiatry*, *163*, 1074–1083.
- Shimkin, D. D. (1983). Introduction of the horse. In W. L. D’Azevedo (Ed.), *Handbook of North American Indians vol 11: Great Basin* (pp. 517–524). Washington, D.C.: Smithsonian Institution Press.
- Silberbauer, G. B. (1972). The G/wi bushmen. In M. G. Bicchieri (Ed.), *Hunters and gatherers today: A socioeconomic study of eleven such cultures in the twentieth century* (pp. 271–326). New York: Holt, Rinehart, and Winston.
- Smith, A. B. (1999). Archaeology and the evolution of hunter-gatherers. In R. B. Lee & R. Daly (Eds.), *The Cambridge encyclopedia of hunters and gatherers* (pp. 384–390). Cambridge: Cambridge University Press.
- Smith, A. M., Rissel, C. E., Richters, J., Grulich, A. E., & de Visser, R. O. (2003). Sex in Australia: sexual identity, sexual attraction, and sexual experience among a representative sample of adults. *Australian and New Zealand Journal of Public Health*, *27*, 138–145.
- Totman, R. (2003). *The third sex kathoey: Thailand’s ladyboys*. London: Souvenir Press.
- Underhill, R. (1975). Economic and political antecedents of monotheism: a cross-cultural study. *American Journal of Sociology*, *80*, 841–861.
- VanderLaan, D. P., & Vasey, P. L. (2011). Male sexual orientation in Independent Samoa: evidence for fraternal birth order and maternal fecundity effects. *Archives of Sexual Behavior*, *40*, 495–503.
- VanderLaan, D. P., & Vasey, P. L. (2012). Relationship status and elevated avuncularity in Samoan *fa’afafine*. *Personal Relationships*, *19*, 326–339.
- VanderLaan, D. P., & Vasey, P. L. (2013a). Birth order and avuncular tendencies in Samoan men and *fa’afafine*. *Archives of Sexual Behavior*, *42*, 371–379.
- VanderLaan, D. P., & Vasey, P. L. (2013b). Evidence of cognitive biases for maximizing indirect fitness in Samoan *fa’afafine*. *Archives of Sexual Behavior* (in press).
- VanderLaan, D. P., Gothreau, L. M., Bartlett, N. H., & Vasey, P. L. (2011a). Recalled separation anxiety and gender atypicality in childhood: a study of Canadian heterosexual and homosexual men and women. *Archives of Sexual Behavior*, *40*, 1233–1240.
- VanderLaan, D. P., Gothreau, L. M., Bartlett, N. H., & Vasey, P. L. (2011b). Separation anxiety in feminine boys: pathological or prosocial? *Journal of Gay and Lesbian Mental Health*, *15*, 30–45.
- VanderLaan, D. P., Forrester, D. L., Petterson, L. J., & Vasey, P. L. (2012). Offspring production among the extended relatives of Samoan men and *fa’afafine*. *PLoS ONE*, *7*, e36088.
- VanderLaan, D. P., Forrester, D. L., Petterson, L. J., & Vasey, P. L. (2013a). The prevalence of *fa’afafine* relatives among Samoan gynephilic men and *fa’afafine*. *Archives of Sexual Behavior*, *42*, 353–359. doi:10.1007/s10508-012-0015-7.
- VanderLaan, D. P., Vokey, J. R., & Vasey, P. L. (2013b). Is transgendered male androphilia familial in non-Western populations? The case of a Samoan village. *Archives of Sexual Behavior*, *42*, 361–370. doi:10.1007/s10508-012-0037-1.
- Vasey, P. L., & Bartlett, N. H. (2007). What can the Samoan *fa’afafine* teach us about the Western concept of “Gender Identity Disorder in Childhood”? *Perspectives in Biology and Medicine*, *50*, 481–490.
- Vasey, P. L., & VanderLaan, D. P. (2007). Birth order and male androphilia in Samoan *fa’afafine*. *Proceedings of the Royal Society of London, Series B: Biological Sciences*, *274*, 1437–1442.
- Vasey, P. L., & VanderLaan, D. P. (2009). Maternal and avuncular tendencies in Samoa: a comparative study of women, men and *fa’afafine*. *Human Nature*, *20*, 269–281.
- Vasey, P. L., & VanderLaan, D. P. (2010a). Avuncular tendencies in Samoan *fa’afafine* and the evolution of male androphilia. *Archives of Sexual Behavior*, *39*, 821–830.

- Vasey, P. L., & VanderLaan, D. P. (2010b). Monetary exchanges with nieces and nephews: a comparison of Samoan men, women, and *fa'afafine*. *Evolution and Human Behavior*, *31*, 373–380.
- Vasey, P. L., & VanderLaan, D. P. (2010c). An adaptive cognitive dissociation between willingness to help kin and non-kin in Samoan *fa'afafine*. *Psychological Science*, *21*, 292–297.
- Vasey, P. L., & VanderLaan, D. P. (2012). Male sexual orientation and avuncularity in Japan: implications for the kin selection hypothesis. *Archives of Sexual Behavior*, *41*, 209–215.
- Vasey, P. L., & VanderLaan, D. P. (2013). Evolutionary perspectives on exclusive male androphilia in humans. In T. Shakelford & V. Weekes-Shakelford (Eds.), *Evolutionary perspectives on human sexual psychology and behavior*. New York: Springer (in 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.
- Vasey, P. L., VanderLaan, D. P., Gothreau, L. M., & Bartlett, N. H. (2011). Traits of separation anxiety in childhood: a retrospective study of Samoan men, women, and *fa'afafine*. *Archives of Sexual Behavior*, *40*, 511–517.
- Vasey, P. L., Parker, J. L., & VanderLaan, D. P. (2013). Comparative reproductive output of androphilic and gynephilic males in Samoa. *Archives of Sexual Behavior* (in press).
- Vaughan, R. (1994). *The arctic: A history*. Dover: Sutton.
- West, D. G., & Green, R. (1997). *Sociolegal control of homosexuality: A multi-nation comparison*. New York: Plenum Press.
- Whitam, F. L. (1983). Culturally invariant properties of male homosexuality: tentative conclusions from cross-cultural research. *Archives of Sexual Behavior*, *12*, 207–226.
- Whitam, F. L. (1997). Culturally universal aspects of male homosexual transvestites and transsexuals. In B. Bullough, V. Bullough, & J. Elias (Eds.), *Gender blending* (pp. 189–203). Amherst: Prometheus.
- Whitam, F., & Mathy, R. M. (1986). *Male homosexuality in four societies: Brazil, Guatemala, the Philippines and the United States*. New York: Praeger.
- Williams, W. L. (1992). *The spirit and the flesh: Sexual diversity in American Indian culture*. Boston: Beacon.
- Wilson, E. O. (1975). *Sociobiology: The new synthesis*. Cambridge: Belknap.
- Winkelman, M. (2010). *Shamanism: A biopsychosocial paradigm of consciousness and healing*. Santa Barbara: Praeger.
- Woodburn, J. (1982). Egalitarian societies. *Man*, *17*, 431–451.
- Wrangham, R. W., Jones, J. H., Laden, G., Pilbeam, D., & Conklin-Brittain, N. (1999). The raw and the stolen: cooking and the ecology of human origins. *Current Anthropology*, *40*, 567–594.
- Yates, T. (1993). Frameworks for an archaeology of the body. In C. Tilley (Ed.), *Interpretive archaeology* (pp. 31–72). Providence: Berg.
- Zucker, K. J., Bradley, S. J., & Lowry Sullivan, C. B. (1996). Traits of separation anxiety in boys with gender identity disorder. *Journal of the American Academy of Child and Adolescent Psychiatry*, *35*, 791–798.

Doug P. VanderLaan PhD, completed his doctoral research in the Department of Psychology at the University of Lethbridge. This research focused on elucidating the developmental and evolutionary bases of same-sex sexual behavior. Presently, he continues to investigate gender and sexual orientation development as a Canadian Institutes of Health Research Postdoctoral Fellow in the Gender Identity Service, which is part of the Child, Youth and Family Services at the Centre for Addiction and Mental Health in Toronto, Ontario.

Zhiyuan Ren earned his BA (Hon) degree in psychology from the University of Lethbridge. His research interests include evolutionary approaches toward sociality and sexuality in humans as well as non-human animals.

Paul L. Vasey PhD, is a professor in the Department of Psychology at the University of Lethbridge. His research interests and publications focus on issues pertaining to non-conceptive sexuality as viewed from a biosocial, cross-species, cross-cultural perspective. From 2000 to 2012, he conducted field research on female homosexual behavior in free-ranging Japanese monkeys at Arashiyama, Japan and prior to that he conducted similarly themed research for 5 years on a captive troop derived from the Arashiyama population. In 2012, he began research on free-ranging, all-male groups of Japanese macaques at Minoo, Japan. Since 2003, he has also conducted research within the *fa'afafine* community of Samoa, examining developmental and evolutionary aspects of male androphilia. He has co-edited two books: *Homosexual Behaviour in Animals: An Evolutionary Perspective* and *The Monkeys of Stormy Mountain: 60 Years of Research at Arashiyama*, both of which are published by Cambridge University Press.