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The “female fertility–social stratification–hypergyny” hypothesis of male homosexual preference: factual, conceptual and methodological errors in Barthes et al. [Commentary]

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CORRESPONDENCE

The “female fertility–social stratification–hypergyny” hypothesis of male homosexual preference: Factual, conceptual and methodological errors in Barthes et al. [Commentary]

1. Overview

Barthes, Godelle, and Raymond (2013, *Evolution and Human Behavior*, 34, 155–163) proposed a hypothesis to (1) identify the process by which genes influencing male homosexual preference (MHP) are passed on over evolutionary time, and (2) account for why life-course persistent MHP is restricted to humans. According to their hypothesis, certain genes lower reproductive success in male carriers by causing MHP, but these same genes promote fertility in female carriers (i.e., sexual antagonism). Barthes et al. proposed that the female carriers of genes for MHP have physical cues of fertility (i.e., beauty) that help them marry up the social class hierarchy (i.e., hypergyny). In doing so, these females experience increased access to resources, which allows them to increase reproduction further thereby compensating for the low fertility of their homosexual male relatives. To evaluate their hypothesis, Barthes et al. developed a mathematical model to determine whether their hypothesis was theoretically feasible. They also performed an ethnological analysis to assess whether MHP was more commonly found in societies with greater social stratification. Our criticisms of Barthes et al.’s article extend to many of the key conceptual and methodological aspects as well as much of the factual information.

2. Critique of the “female fertility–social stratification–hypergyny” hypothesis

2.1. Sexual antagonism and MHP

Barthes et al.’s hypothesis rests on the premise that sexually antagonistic genes promote elevated female fertility, which offsets the fitness costs associated with MHP. Yet, evidence supporting the existence of sexual antagonism in MHP is weaker than Barthes et al. lead the reader to believe. If genes underlying MHP have sexually antagonistic effects, then elevated reproduction by the aunts and sisters of homosexual males would constitute definitive supporting evidence. Elevated reproduction among mothers and grandmothers is inconclusive because their reproductive output is confounded by male relatives (i.e., fathers and grandfathers). Further, elevated offspring production by male relatives (i.e., uncles, brothers) of homosexual males would not be expected. To date, only two published studies showed elevated reproduction among the aunts, but not uncles, of homosexual men (Camperio Ciani, Corna, & Capiluppi, 2004; Iemmola & Camperio Ciani, 2009). A third study reported elevated reproduction

among homosexual men’s aunts, but was limited because it did not consider probands’ male relatives (Camperio Ciani & Pellizzari, 2012).

Many more studies provided ambiguous or contrary findings. One study found support for sexual antagonism in a White sample, but contrary evidence in a non-White sample (Rahman et al., 2008). In several other studies, homosexual male probands reported elevated offspring production among categories of female relatives that are influenced by male relatives’ fertility as well (Blanchard & Lippa, 2007; King et al., 2005; Schwartz, Kim, Kolundziji, Rieger, & Sanders, 2010; VanderLaan & Vasey, 2011; VanderLaan, Forrester, Petterson, & Vasey, 2012; Vasey & VanderLaan, 2007). Mothers of firstborn homosexual males¹ had more offspring in one of two Italian samples (Camperio Ciani et al., 2004; Iemmola & Camperio Ciani, 2009) and one US sample (Rieger, Blanchard, Schwartz, Bailey, & Sanders, 2012), but a large study of 40,197 heterosexual and 4784 homosexual firstborn male probands found that mothers of firstborn homosexual men had significantly fewer offspring than those of heterosexual men (Blanchard, 2012). Among firstborn probands, brothers, but not sisters, of homosexual men showed significantly elevated numbers of offspring (Rieger et al., 2012). Given the actual state of the empirical literature, the role of sexual antagonism in MHP is equivocal.

2.2. Social stratification and hypergyny

Barthes et al. argue that social stratification and hypergyny are features of human societies that explain why life-course persistent MHP is unique to humans. However, many non-human primate species form socially stratified groups (Kapsalis, 2004) and high dominance status enhances access to resources and, in turn, reproductive success in females (reviewed in Pusey, 2012). For example, in Japanese macaques, entire matriline can be ranked hierarchically (Koyama, 1967), with higher-ranking matrilines having greater access to food (Saito, 1996) and elevated reproductive success (Itoigawa et al., 1992).

Marriage is, of course, a uniquely human cultural institution, but mating interactions between lower-ranking females and high-ranking males (i.e., mating up) are commonplace among animals. As a result of such mating, females can sometimes obtain social and material benefits. For example, during sexual consortships, female macaques from lower-ranking matrilines can form “bridging alliances” with their male partners and temporarily outrank intermediate ranking individuals (Takahata, 1991) and, as a

1. Some studies have examined the reproductive output of mothers of firstborn heterosexual vs. homosexual male probands as a means of controlling for the well-established finding that homosexual male probands tend to have significantly more older brothers. Thus, an analysis of firstborns’ mothers’ reproductive output isolates the potential fertility effect from alternative influences that might relate to this older brother effect.

result of these sexual associations, females can gain increased access to food resources (Dubuc, Hughes, Cascio, & Santos, 2012). Given that both social hierarchies and opportunities for females to obtain fitness-related benefits from higher-ranking male mates exist in other species, Barthes et al. require stronger rationale detailing why MHP is not commonly found among other species for their hypothesis to be considered tenable.

Barthes et al.'s hypothesis also includes the supposition that the female relatives of homosexual males are more sexually attractive and feminine than those of heterosexual males; however, this assumption has no empirical support. Even if this assumption were true, the effect size of the association between beauty and fertility is either small or non-existent. For example, in one study on beauty and fertility cited by Barthes et al. (Jokela, 2009), the effect for both men and women was found to be weak and in another not cited (Pawlowski, Boothroyd, Perrett, & Kluska, 2008) no effect was found.

Lastly, Barthes et al.'s hypothesis is not feasible if women who marry hypergynously do not produce more children than they would have otherwise. Regarding this point, building on the pioneering work of Dickemann (1979) on hypergynous dowry societies, it should be noted that in many hypergynous societies across West Asia and Asia, there is systematic infanticide and/or neglect of female offspring (Brooks, 2012), particularly in the highest classes (Miller, 2001), which would reduce the fertility of women who marry hypergynously. In addition, if dowry is insufficient, many women who marry up may be killed by their in-laws (bride burning or poisoning) or their families may be exorted into paying higher dowries (Shenk, 2007: pp. 260-261). In any case, Barthes et al. did not present any data on the fertility of women who marry hypergynously compared to lower class women who do not.

3. Critique of data reported by Barthes et al.

3.1. Mathematical model

Barthes et al. presented a mathematical model indicating that their hypothesis was theoretically feasible. Yet, the hypothesis is feasible only insofar as the model's postulates are likely to be true. The clear disjuncture between the postulates of the model and the existing empirical evidence raises doubt about this model's real-world applicability. Thus, we view Barthes et al.'s use of mathematical models in the absence of careful consideration of empirical data as putting the cart before the horse.

3.2. Ethnological analysis

Serious conceptual and methodological flaws hampered Barthes et al.'s ethnological analysis of social stratification in relation to the presence vs. absence of MHP in a society. First, equating a lack of ethnographic evidence for the presence of MHP in a society with its absence is highly problematic. The biodemographic and developmental correlates of MHP are consistent across diverse populations (reviewed in VanderLaan, Ren, & Vasey, 2013), and the most parsimonious interpretation of these consistencies is that MHP is a primitive trait that is likely present in the vast majority of, if not all, human populations. A more reasonable position, therefore, is that a lack of ethnographic evidence for the presence of MHP in a society may often be due to limitations of ethnographic sources rather than the actual absence of MHP.

Consulting ethnographic sources for accurate and adequate information on human sexuality in general and homosexuality in particular is difficult for many reasons. In some cases the publisher is at fault. For example, in Holmberg's (1950: p. 64) famous ethnography on the hunting and gathering Siriono, we find the following editorial statement footnoted under a section on "The Life Cycle and Sex": "Considerable material relating to sexual

behavior was expurgated from the original manuscript. — Editorial board." Chiñas's work on the Isthmus Zapotec is particularly instructive. In the first edition of her ethnography, Chiñas made no mention of *muxe* (transgendered same-sex attracted males) because she had insufficient data and felt the then "homophobic" US public was unprepared (Chiñas, 1992: p. 3). In the second and subsequent editions, she included an entire chapter on them. In doing so she notes that one ethnographer concluded that all Zapotec women "are more or less lesbian" (Chiñas, 1992: p. 110), while another pointedly observed that homosexuality was completely absent. In other cases, ethnographers may be personally uncomfortable with the topic (Williams, 2000). And in some cases, native peoples know that outsiders regard their sexual practices as abhorrent and are reluctant to divulge information to the ethnographer (Crocker & Crocker, 2012: p. 98). Furthermore, the absence of a word for MHP in a culture should not be taken as evidence that MHP is not recognized (Boswell, 1982/1983). As far as homosexuality research is concerned, there are two major limitations with the Human Relations Area Files (HRAF)—the main database relied upon by Barthes et al. First, the Standard Cross-Cultural Sample (SCCS) is arguably a superior sample to work from because it provides a larger number of societies commonly used in quantitative ethnological research and, more importantly, includes additional societies that would have been coded as "MHP present" according to Barthes et al.'s criteria. Interestingly, using the SCCS, VanderLaan et al. (2013) found that societies for which transgenderism was reported (transgenderism was coded by Barthes et al. as "MHP present") also showed elevated ancestral human sociocultural conditions, including less social stratification, which are contra to Barthes et al.'s hypothesis.

Second, a limitation of the HRAF is that it does not contain all ethnographic information on each society in the sample. Consequently, some of the published codes are based on limited or erroneous information. Three of the present authors (Hames, Garfield, & Garfield) conducted an exhaustive search of research literature for societies in the SCCS to obtain as complete as possible information on MHP. In the Supplementary Online Information (SOI) (available on the journal's website at www.ehonline.org), we present text and comparative data tables on the MHP classifications of Hames et al. vs. those of Barthes et al. and VanderLaan et al., respectively. The Hames et al. recodes would tend to strengthen VanderLaan et al.'s findings regarding the presence of transgenderism and ancestral sociocultural conditions. Adopting the Hames et al. recodes and increasing their sample size by including additional SCCS societies would likely weaken Barthes et al.'s findings, although it is difficult to be certain because Barthes et al. only present data on 44 of the 48 societies that they state were included in their analysis (see SOI for Barthes et al., 2013).

In sum, Bathes et al.'s coding reflects whether MHP was documented in the HRAF, as opposed to whether it exists, in a given society. The accurate interpretation of their ethnological analysis is, therefore, that within the limited HRAF database MHP is more likely to be documented in more stratified societies. This finding may have little, if any, relevance to Barthes et al.'s hypothesis.

4. Concluding remarks

Critical problems in Barthes et al.'s article include: (1) tenuous empirical support for the tenets of their hypothesis, raising doubt about its plausibility and the real-world applicability of their mathematical model, and (2) conceptual and methodological flaws associated with the ethnological analysis that limit confidence in their claim that the presence of MHP is associated with greater social stratification. Until these problems are addressed in an adequate empirically based manner, enthusiasm for Barthes et al.'s hypothesis regarding the evolution of MHP in humans should be tempered.

Supplementary data to this article follows the References.

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Supplementary Information

Below, we (Hames, Garfield, & Garfield, n.d.) compare our HRAF codes with those of Barthes et al. (2013) and VanderLaan et al. (2013). In our cross-cultural examination of the presence and type of homosexuality, we restricted our research to the societies in the Standard Cross Cultural Sample of 186 societies. However, aside from information on those societies contained in the HRAF we also used published materials on those societies outside of the HRAF database. The sample from Barthes et al. is from the HRAF with some additional sources (Barthes et al., 2013: 158). But, it is unclear whether they used the 186-society Standard Cross-Cultural Sample or the 60-society Statistical Sample from the HRAF, and if the additional sources they also employed were reports on societies in one of the two HRAF samples as we did. In any event, our sample and the Barthes et al. sample have 17 overlapping cases. After we compare them, 13 of the 17 are in agreement (M=matches) while 4 are not (MM=mismatches, Table 1).

Our mismatches stem from different conceptions about the nature of MHP in the context of what we call “age stratified” and “juvenile egalitarian” systems. In regards to what we have classified as age stratified systems (two of the mismatches), Barthes et al. impute a male homosexual preference when married males simultaneously engage in sex with their wives and homosexual sex with unmarried or uninitiated males, and uninitiated or unmarried males engage in sex with married men and perhaps unmarried women in their own age range. In many of these systems young, unmarried males are required or encouraged to service mature males who are married. Given some degree of coercion and ideological manipulation that exists to induce boys to have sex (e.g., boys are told they will not be able to mature if they do not service older men) it is unlikely, in our view, that this represents a male homosexual preference. Although it may be a

preference for some, the fact that the mature men have wives suggests mature men have preferences for women and in any case, there is likely no fitness costs to this form of homosexuality.

What we call juvenile egalitarian homosexuality is even more problematic. In two of the cases in Table 1 unmarried juveniles occasionally have sex with each other. Crucially, this behavior does not persist after marriage and like homosexuality in age-stratified systems there is no reason to suspect that it would have negative fitness consequences.

Following Murray (2000) we use the term “gender stratified,” which is identical to VanderLaan et al.’s “transgendered,” to cover forms of male homosexuality where a male takes on the traditional role of a female while having sexual relations with males who take on male roles. It is more or less identical to Crapo’s (1995) “pathetic” homosexuality. As mentioned, we used sources on societies in the SCCS whether or not they were contained in the HRAF while VanderLaan et al. only used sources within in SCCS of the HRAF plus an additional 14 societies in the alternative SCCS HRAF sample. Consequently, our samples do not completely overlap. In Table 2, 27 of our societies overlap. Of those, seven are discordant. We have classified the discordant as “gender stratified” while VanderLaan et al. have classified them as “non-transgendered.” These mismatches are likely owing to a more exhaustive search of ethnographic sources on the part of Hames et al.

Table 1. Coding matches and mismatches in overlapping cases for Barthes et. al. and Hames et al.

Group	Barthes et al. Code ^a	Hames, Garfield, & Garfield	M=Match & MM=Mismatch ^b
Hausa	1	Gender-stratified	M
Azande	1	Age stratified	MM
Rwala Bedouin,	4	Present/Rare	M
Lepcha	4	Present/Rare	M
Alorese	4	Juvenile-egalitarian	MM
Aranda	4	Age-stratified	MM
Manus	2	Juvenile-egalitarian	MM
Ifugao	4	Gender-stratified	M
Chuckchee	1	Gender-stratified	M
Klamath	1	Gender-stratified	M
Hidatsa	2	Gender-stratified	M
Pawnee	1	Gender-stratified	M
Omaha	2	Gender-stratified	M
Creek	2	Gender-stratified	M
Natchez	2	Gender-stratified	M
Papago	2	Gender-stratified	M
Cuna (Tule)	1	Gender-stratified	M

^aCoded as 1 = presence of MHP; 2 = presence of MHP very likely; 3 = absence of MHP very likely; 4 = absence of MHP

^bDescriptions of sources supporting the Hames et al. coding for mismatches are presented in the Appendix.

Table 2. Coding matches and mismatches in overlapping cases in VanderLaan et. al. and Hames et al.

Society	VanderLaan et al. (T = transgendered; NT = non-transgendered)	Hames et al. (GS = gendered stratified)	M=Match & MM=Mismatch ^a
Hausa	T	GS	M
Iban	T	GS	M
Marquesans	T	GS	M
Chukchee	T	GS	M
Ingalik	T	GS	M
Kaska	T	GS	M
Eyak	T	GS	M
Bellacoola	T	GS	M
Yurok	T	GS	M
Pomo (Eastern)	T	GS	M
Yokuts (Lake)	T	GS	M
Klamath	T	GS	M
Kutenai	T	GS	M
Gros Ventre	T	GS	M
Hidatsa	T	GS	M
Pawnee	T	GS	M
Omaha	T	GS	M
Natchez	T	GS	M
Zuni	T	GS	M
Papago	T	GS	M
Thonga	NT	GS	MM
Bailinese	NT	GS	MM
Ifugao	NT	GS	MM
Gilyak (Nivkh)	NT	GS	MM
Saulteaux (Ojibwa)	NT	GS	MM
Creek	NT	GS	MM
Cuna (Tule)	NT	GS	MM
Timbira (Canela)	NT	GS	MM

^aDescriptions of sources supporting the Hames et al. coding for mismatches are presented in the Appendix.

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Appendix:

Hames et al.'s coding sources for mismatches with Barthes et al. and VanderLaan et al.

Group	Hames, Garfield, & Garfield	Ethnographic Source
Azande	Age stratified	Murray, S. O. (2000: 161-163). <i>Homosexualities</i> . Chicago: University of Chicago Press Evans-Pritchard, E. E. (1970). Sexual inversion among the Azande. <i>American Anthropologist</i> , 72, 1428-34.
Alorese	Juvenile-egalitarian	Greenberg, D. F. (1988:67). <i>The construction of homosexuality</i> . Chicago: University of Chicago Press. DuBois, C. A. (1944) <i>The people of Alor: a social-psychological study of an East Indian Island</i> . Minneapolis: University of Minnesota Press. Kardiner, A., Linton, R., DuBois, C., West, J. (1945). <i>The psychological frontiers of society</i> . New York: Columbia University Press.
Aranda	Age-stratified	Murray, S. O. (2000: 26). <i>Homosexualities</i> . Chicago: University of Chicago Press Róheim, G. (1932). Psychoanalysis of primitive cultural types. <i>International Journal of Psychoanalysis</i> , 13, 1-254. Ford, C. S., & Beach, F. A. (1951). <i>Patterns of sexual behavior</i> . New York: Harper and Row.
Manus	Juvenile-egalitarian	Mead, M. (1930). <i>Growing up in New Guinea: a comparative study of primitive education</i> . New York: W. Morrow & company.
Ifugao	Gender-stratified	Kwiatkowski, L. M. (2003). Ifugao. In C. R. Ember & M. Ember (Eds.), <i>Encyclopedia of Sex and Gender: Men and Women in the World's Cultures</i> (pp. 498-507). New York: Kluwer Academic/Plenum Publishers.
Creek	Gender-stratified	Greenberg, D. F. (1988: 86). <i>The construction of homosexuality</i> . Chicago: University of Chicago Press. Swanton, J. R. (1925). Aboriginal culture of the Southeast. <i>Annual Report of the Bureau of American Ethnology</i> , 42, 697.

Cuna (Tule),	Gender-stratified	Tice, K. E. (1995). <i>Kuna crafts, gender, and the global economy</i> . Austin: University of Austin Press. Howe, J. (2003). Kuna. In C. R. Ember & M. Ember (Eds.), <i>Encyclopedia of Sex and Gender: Men and Women in the World's Cultures</i> (pp. 581-591). New York: Kluwer Academic/Plenum Publishers.
Thonga	Gender-stratified	Murray, S. O. (2000: 164). <i>Homosexualities</i> . Chicago: University of Chicago Press. Junod, H. (1927). <i>Life of a South African tribe</i> . London: MacMillan. Greenberg, D. F. (1988:61). <i>The construction of homosexuality</i> . Chicago: University of Chicago Press.
Balinese	Gender-stratified	Parker, L. (2003). Balinese. In C. R. Ember & M. Ember (Eds.), <i>Encyclopedia of Sex and Gender: Men and Women in the World's Cultures</i> (pp. 303-313). New York: Kluwer Academic/Plenum Publishers.
Gilyak (Nivkh)	Gender-stratified	Black, L. (1973). <i>The Nivkh (Gilyak) of Sakhalin and the Lower Amur</i> . Madison: University of Wisconsin Press.
Saulteaux (Ojibwa)	Gender-stratified	Callender, C., & Kochems, L. M. (1983). The North American berdache. <i>Current Anthropology</i> , 24, 443-470.
Timbira (Canela)	Gender-stratified	Crocker, W. H. (2003). Canela. In C. R. Ember & M. Ember (Eds.), <i>Encyclopedia of Sex and Gender: Men and Women in the World's Cultures</i> (pp. 303-313). New York: Kluwer Academic/Plenum Publishers.