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The health of a nation predicts their mate preferences: cross-cultural variation in women's preferences for masculinized male faces

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Recent formulations of sexual selection theory emphasize how mate choice can be affected by environmental factors, such as predation risk and resource quality. Women vary greatly in the extent to which they prefer male masculinity and this variation is hypothesized to reflect differences in how women resolve the trade-off between the costs (e.g. low investment) and benefits (e.g. healthy offspring) associated with choosing a masculine partner. A strong prediction of this trade-off theory is that women's masculinity preferences will be stronger in cultures where poor health is particularly harmful to survival. We investigated the relationship between women's preferences for male facial masculinity and a health index derived from World Health Organization statistics for mortality rates, life expectancies and the impact of communicable disease. Across 30 countries, masculinity preference increased as health decreased. This relationship was independent of cross-cultural differences in wealth or women's mating strategies. These findings show non-arbitrary cross-cultural differences in facial attractiveness judgements and demonstrate the use of trade-off theory for investigating cross-cultural variation in women's mate preferences.

Keywords: sexual selection; masculinity; health; cross-cultural variation

1. INTRODUCTION

Sexual selection can result in physical traits that advertise aspects of mate quality in one sex and corresponding preferences for such traits in the other sex (Andersson 1994). However, the utility of attention to different signals of mate quality may vary depending on the environment, selecting for facultative preferences that respond to environmental variation. Recent formulations of sexual selection theory emphasize how mate choice can be affected by environmental factors, such as predation risk and resource quality (see Jennions & Petrie (1997) for a review). Such facultative preferences can help explain geographical differences in mate choice in non-human animals (Jennions & Petrie 1997) and may contribute to cultural differences in preferences among humans (Low 1990; Gangestad & Buss 1993; Penton-Voak *et al.* 2004).

Several traits are proposed to signal men's mate quality (Thornhill & Gangestad 1996; Penton-Voak *et al.* 1999; Gangestad & Simpson 2000; Fink & Penton-Voak 2002; Gangestad & Scheyd 2005) and are consequently predicted by sexual selection theory (Andersson 1994) to be attractive to women. Such traits are likely to be honest signals of mate quality in order to drive selection for corresponding preferences; such traits are often expensive and not easy to fake (Johnstone 1995). One important trait that has generated much research and debate is sexual dimorphism. Masculine physical characteristics in men are positively correlated with measures of long-term medical health (Rhodes *et al.* 2003; Thornhill & Gangestad 2006), indices of reproductive potential (Puts 2005; Rhodes *et al.* 2005) and, in natural fertility populations, reproductive success (Apicella *et al.* 2007). Because the association between masculine traits and men's long-term health will lead to masculine men producing more viable offspring than their relatively feminine peers (Thornhill & Gangestad 1996; Penton-Voak *et al.* 1999; Gangestad & Simpson 2000; Fink & Penton-Voak 2002; Gangestad & Scheyd 2005; Jones *et al.* 2008), strong versions of sexual selection theory (Andersson 1994) predict that women should prefer masculine to feminine men (Thornhill & Gangestad 1996; Miller & Todd 1998; Gangestad & Scheyd 2005). Evidence that women demonstrate strong preferences for masculine partners over feminine partners is mixed, however, with many studies reporting surprisingly weak preferences for masculinity (Rhodes *et al.* 2003; Puts 2005; DeBruine *et al.* 2006; Little *et al.* 2008), or even preferences for men who are more feminine than average (Perrett *et al.* 1998; Penton-Voak *et al.* 1999; Little *et al.* 2001, 2002; Welling *et al.* 2007).

Because women do not show consistently strong preferences for masculine men, many researchers have suggested that women who choose masculine partners may incur substantial costs and that the implications of these costs for reproductive success attenuate women's preferences for masculine men (Thornhill & Gangestad 1996; Perrett *et al.* 1998; Penton-Voak *et al.* 1999;

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Gangestad & Simpson 2000; Little *et al.* 2001, 2002; Fink & Penton-Voak 2002; Gangestad & Scheyd 2005; Jones *et al.* 2008). Indeed, there is compelling evidence that women ascribe anti-social traits and behaviours to masculine men. Women perceive masculine men as dishonest, uncooperative, more interested in short-term than long-term relationships, and even as 'bad parents' (Perrett *et al.* 1998; Kruger 2006; Boothroyd *et al.* 2007). Moreover, such perceptions may have a kernel of truth; masculine men report weaker preferences for long-term relationships than do relatively feminine men (Boothroyd *et al.* 2008) and masculine men report having had more short-term relationships than their feminine peers (Rhodes *et al.* 2005). Thus, many researchers have suggested that women's preferences for masculine versus feminine men are influenced by a trade-off between the benefits (e.g. healthy offspring) and costs (e.g. low investment) associated with choosing a masculine mate (Thornhill & Gangestad 1996; Perrett *et al.* 1998; Penton-Voak *et al.* 1999; Gangestad & Simpson 2000; Little *et al.* 2001, 2002; Fink & Penton-Voak 2002; Gangestad & Scheyd 2005; Jones *et al.* 2008; DeBruine *et al.* 2010).

A trade-off theory of women's masculinity preferences proposes that factors which alter the relative importance of the benefits and costs associated with choosing a masculine partner will affect the strength of women's preferences for masculine versus feminine men (Thornhill & Gangestad 1996; Perrett *et al.* 1998; Penton-Voak *et al.* 1999; Gangestad & Simpson 2000; Little *et al.* 2001, 2002; Fink & Penton-Voak 2002; Gangestad & Scheyd 2005). For example, the benefit of genetic health for offspring can only be attained when women are able to conceive and, accordingly, women demonstrate stronger preferences for masculine men during the most fertile phase of the menstrual cycle than during other phases (Penton-Voak *et al.* 1999; Gangestad *et al.* 2004; Jones *et al.* 2005; Puts 2005; Little *et al.* 2007*c*). Similarly, the putative costs of low investment are much less of a concern in short-term than long-term relationships and, accordingly, women demonstrate stronger masculinity preferences when judging men's attractiveness as possible short-term than long-term partners (Penton-Voak *et al.* 1999, 2003; Little *et al.* 2002; Puts 2005). Collectively, these findings demonstrate that women's preferences for masculine men are sensitive to some factors (i.e. women's own fertility and the temporal context of relationships) that alter the relative importance of the benefits and costs associated with choosing a masculine mate.

A strong theoretical prediction of a trade-off account of variability in women's preferences for masculine men is that women in environments where poor health is particularly harmful to survival (e.g. environments with high prevalence of pathogens and inaccessible or poor healthcare) will demonstrate stronger preferences for masculine men because such men are more likely to father healthy offspring (Thornhill & Gangestad 1996; Perrett *et al.* 1998; Penton-Voak *et al.* 1999; Gangestad & Simpson 2000; Little *et al.* 2001, 2002; Fink & Penton-Voak 2002; Gangestad & Scheyd 2005). However, the possibility that women's preferences for masculine versus feminine men are sensitive to such environmental cues has received surprisingly little attention from researchers. Indeed, only one study has investigated whether women's preferences for masculine versus feminine men vary according to environmental factors related to health, finding that women in rural Jamaica demonstrated stronger preferences for masculine characteristics in men's faces than did women in the UK (Penton-Voak *et al.* 2004). Although rural Jamaica has a higher prevalence of pathogens than the UK (Gangestad & Buss 1993), the fact that only two countries were compared in this study limits the conclusions that can be drawn.

In light of the above, our study tested for an inverse relationship between masculinity preferences and national health in a sample of over four and a half thousand women from 30 different countries. Specifically, we investigated the relationship between the average female preference for masculine versus feminine features in male faces (see the electronic supplementary material, figure S1 for example stimuli) in each country and a 'national health index' (NHI) that reflects the health of each country and was derived from eight World Health Organization statistics for mortality rates, life expectancies and the impact of communicable disease. While all of the countries in our sample have a high or very high human development index[1] and are mostly New World and European countries, this avoids confounding health factors with broader cultural differences that may also affect mate preferences (see Penton-Voak *et al.* (2004) for a discussion of such issues).

In addition to the above, we tested whether cross-cultural variation in women's average masculinity preference covaries with cultural differences in participants' average age, wealth (i.e. gross national product (GNP) *per capita*), or women's mating strategies (i.e. interest in short- versus long-term relationships as measured by the sociosexual orientation inventory (SOI); Simpson & Gangestad 1991). We considered these variables because individual differences in women's age, wealth and mating strategies may predict variation in their preferences for cues of men's long-term health (Little *et al.* 2002; Waynforth *et al.* 2005; Provost *et al.* 2008; Welling *et al.* 2008). Importantly, we also tested whether these potential confounds contribute to the predicted negative correlation between women's average masculinity preference and national health.

2. MATERIAL AND METHODS

(a) *Participants*

Participants were 4794 women from 30 countries (see the electronic supplementary material, table S1). All participants were between the ages of 16 and 40 years, with average ages for each country ranging from 22.0 to 25.2 years. Because sexually dimorphic facial cues have greater effects when women judge own-race faces than other-race faces (Perrett *et al.* 1998), participants were selected for indicating that their ethnicity was White. Additionally, participants who indicated that they preferred same-sex romantic partners were excluded. All countries with at least 10 participants were included.

The study was conducted online and participants were recruited by following links from various search engines and listings of online psychology experiments. The Internet Protocol address of each participant was used to determine country and checked to ensure no duplicate responses. Many studies of masculinity preferences have been conducted using similar web-based methods and have

demonstrated that online and laboratory studies of variation in masculinity preferences produce equivalent patterns of results (e.g. Jones *et al.* 2005, 2007; Little *et al.* 2007*b*; Welling *et al.* 2008).

(b) *Masculinity preference*

We assessed women's preferences for masculine versus feminine two-dimensional shape in men's faces using a method that is widely used in studies of individual differences in masculinity preferences (Jones *et al.* 2005; DeBruine *et al.* 2006; Little *et al.* 2007*b*; Welling *et al.* 2007). Masculinity preferences assessed using this method correlate highly with masculinity preferences assessed using other methods (DeBruine *et al.* 2006, in press) and with women's assessments of the masculinity of both their current and ideal male partner (DeBruine *et al.* 2006).

To experimentally manipulate two-dimensional face shape in our stimuli, we first constructed male and female symmetric face prototypes by averaging and symmetrizing the shape of 20 White male faces (age: m = 19.5 years, s.d. = 2.3 years) and 20 White female faces (age: m = 18.4 years, s.d. = 0.7 years) using methods described in previous research (Perrett *et al.* 1998). Using specialist software (Tiddeman *et al.* 2001), the vector differences between the average male and female faces were calculated and 50 per cent of these vector differences were added to or subtracted from the shape of 20 individual male faces. Previous studies have demonstrated that masculinized face stimuli manufactured using these methods are perceived to be more masculine than their feminized counterparts (Perrett *et al.* 1998; DeBruine *et al.* 2006; Welling *et al.* 2007, 2008; Jones *et al.* 2010). These stimuli (see the electronic supplementary material, figure S1 for examples) have been used in several previous studies of individual differences in masculinity preferences (e.g. Jones *et al.* 2007; Welling *et al.* 2007, 2008). Note that masculinized and feminized versions of faces differ only in sexually dimorphic aspects of face shape and not in other regards (e.g. they are identical in colour, texture and symmetry).

Participants were presented with 20 pairs of male faces, each pair consisting of a masculinized and feminized version of the same individual. The order of pairs and the side of the screen on which a given image was shown were both randomized across participants. Participants were instructed to choose which face they thought was more attractive for each pair. This method for assessing women's preferences for masculinized versus feminized versions of men's faces has been used in many previous studies of individual differences in women's masculinity preferences (e.g. Jones *et al.* 2005; DeBruine *et al.* 2006; Little *et al.* 2007*b*; Welling *et al.* 2007). In the current study, participants had the option of participating in English, Bulgarian, French, German or Romanian. The original instructions in English were translated by native speakers.

Following previous studies of individual differences in women's masculinity preferences (Jones *et al.* 2005; DeBruine *et al.* 2006; Little *et al.* 2007*b*; Welling *et al.* 2007), masculinity preference was calculated as the proportion of trials on which the participant selected the more masculine face as the more attractive. Thus, scores could range from 0 (very low masculinity preference) to 1 (very high masculinity preference).

Following previous studies of cross-cultural variation in behaviours and attitudes (Gangestad & Buss 1993; Schmitt 2005; Nosek *et al.* 2009), we averaged individual participants' scores to calculate the average masculinity preference for each of the 30 countries. Table S1 in the electronic supplementary material lists the average and standard deviation for this measure by country.

(c) *National health index*

Eight national health statistics were taken from the World Health Organization Statistical Information Service.[2] Data were taken from the most recent year available: adult mortality rate, infant mortality rate, life expectancy at birth and under-5 mortality rate were from 2006, maternal mortality ratio was from 2005, neonatal mortality rate was from 2004, healthy life expectancy was from 2003 and years of life lost to communicable diseases was from 2002. See table S2 in the electronic supplementary material for how these variables correlate with the NHI and average masculinity preference.

Principal components analysis was used to form a single, composite NHI for each country. The first principal component accounted for 77.2 per cent of the variance among the eight manifest health variables. The reliability of the resultant factor scores created was high (coefficient $\theta = 0.96$). Scores were reflected (multiplied by -1) so that high values on this factor represented good health (i.e. low mortality). Table S1 in the electronic supplementary material lists this measure by country.

3. RESULTS

(a) *Health*

Table S1 in the electronic supplementary material shows descriptive statistics for the NHI, average masculinity preference and average age for each country. Table S2 shows correlations between each of the eight World Health Organization variables and both the NHI and average masculinity preference. High scores on the NHI indicate good health. Table S3 shows the correlations among the primary variables in our study: average masculinity preference, the NHI, GNP *per capita*, average age and average scores on the SOI. Two-tailed *p*-values are reported for all analyses.

As predicted, average masculinity preference was negatively correlated with the NHI ($r = -0.619$, $n = 30$, $p < 0.001$, electronic supplementary material, figure S2), demonstrating that average masculinity preference increased as national health decreased. This effect was linear: addition of polynomial functions of the NHI (i.e. NHI^2 and NHI^3) to the regression model did not produce a significant change in r^2. Linear regression using the weighted least squares (WLS) method showed that the NHI continued to explain a significant amount of the variation in average masculinity preference ($r^2 = 0.265$, $F_{1,28} = 10.1$, $p = 0.004$, $\beta = -0.515$) after controlling for the number of participants per country.

(b) *Wealth and age*

There was a strong correlation between GNP *per capita* and the NHI ($r = 0.821$, $n = 30$, $p < 0.001$). In light of this correlation, and because some previous studies have found that older women demonstrate stronger masculinity preferences (Little *et al.* 2002; Welling *et al.* 2008), we further analysed our data using hierarchical linear regression to control for possible effects of GNP and

average age of participants. Entry of GNP and average age into the regression model did not account for a significant proportion of the variance in average masculinity preference ($r^2 = 0.150$, $F_{2,27} = 2.39$, $p = 0.11$). However, addition of the NHI to this model produced a significant change in r^2 ($\Delta r^2 = 0.281$, $F_{1,26} = 12.8$, $p = 0.001$); r^2 for the final model was 0.431 ($F_{3,26} = 6.57$, $p = 0.002$). Thus, the ability of the NHI to predict average masculinity preferences cannot be attributed to its covariance with GNP, or to age effects.

(c) *Mating strategies*

The SOI (Simpson & Gangestad 1991) is a questionnaire that measures individual differences in mating strategies. Previous research suggests that individual differences in women's mating strategies, as indicated by SOI scores, predict variation in masculinity preference, with women who are more willing to engage in short-term relationships demonstrating stronger masculinity preferences (Waynforth *et al.* 2005; Provost *et al.* 2008). Previous research also suggests that cross-cultural variation in women's average SOI is correlated with some of the variables included in our NHI (Schmitt 2005). Thus, we carried out further analyses to investigate whether cross-cultural variation in the NHI or cross-cultural variation in average SOI is the better predictor of variation in average masculinity preference. Average SOI scores for women were taken from a previous study of cross-cultural variation in mating strategies (Schmitt 2005) and were available for 22 of the 30 countries in our sample. First, we used linear regression to control for possible effects of cross-cultural variation in average SOI on average masculinity preference. Although a correlation analysis showed that average SOI was marginally correlated with the NHI ($r = 0.386$, $n = 22$, $p = 0.076$), hierarchical linear regression indicated that average SOI alone did not explain a significant amount of the variation in average masculinity preference ($r^2 = 0.016$, $F_{1,20} = 0.32$, $p = 0.58$). However, addition of the NHI to this model produced a significant change in r^2 ($\Delta r^2 = 0.452$, $F_{1,19} = 16.1$, $p = 0.001$); r^2 for the final model was 0.467 ($F_{2,19} = 8.34$, $p = 0.003$). These analyses suggest that the NHI is a better predictor of average masculinity preference than is cross-cultural variation in average SOI. Indeed, Williams' test (Steiger 1980) confirmed that the NHI explained significantly more of the variance in average masculinity preference than did average SOI ($t_{19} = 2.71$, $p = 0.014$).

(d) *Additional analyses*

All analyses above were repeated controlling for participant number using the WLS method with the number of participants for each country as the WLS weight. The pattern of significant results was not changed for any analysis.

4. DISCUSSION

We found that cross-cultural variation in women's average masculinity preference was predicted by a NHI derived from eight World Health Organization statistics for mortality rates, life expectancies and the impact of communicable disease. Consistent with predictions from sexual selection theory, as national health decreased, women's average masculinity preference increased. The correlation between the NHI and average masculinity preference was not explained by cross-cultural variation in the age of our participants or GNP *per capita*. Furthermore, the NHI explained significantly more of the variation in women's average masculinity preference than did cross-cultural variation in women's mating strategies, as measured by culture-specific female norms on the SOI (Schmitt 2005).

Trade-off theory proposes that women's masculinity preferences are sensitive to factors that alter the relative importance of the benefits and costs associated with choosing a masculine partner (Thornhill & Gangestad 1996; Perrett *et al.* 1998; Penton-Voak *et al.* 1999; Gangestad & Simpson 2000; Little *et al.* 2001, 2002; Fink & Penton-Voak 2002; Gangestad & Scheyd 2005). As masculine characteristics in men's faces are associated with men's long-term health (Rhodes *et al.* 2003; Thornhill & Gangestad 2006) and masculine men will therefore father healthier offspring (Thornhill & Gangestad 1996; Penton-Voak *et al.* 1999; Gangestad & Simpson 2000; Fink & Penton-Voak 2002; Gangestad & Scheyd 2005), the inverse relationship between average masculinity preference and the NHI found in our sample of 30 countries is strong evidence that women do indeed value masculine characteristics in potential mates more in environments where poor health is particularly harmful to survival (e.g. environments with high prevalence of pathogens and inaccessible or poor healthcare).

Moreover, the inverse relationship between the NHI and women's average masculinity preference suggests that sexual selection for masculine male characteristics may be stronger in countries where health is poor. Such differential sexual selection for masculine characteristics may contribute to cross-cultural variation in average face shape. Indeed, Low (1990) predicted that pathogen stress will select for a greater emphasis on female choice and therefore greater sexual dimorphism. Low did not find a relationship between sexual dimorphism in height and degree of pathogen stress in a small ethnographic sample, but suggested that degree of sexual dimorphism in height may be too remotely and indirectly related to current health or heritable variability. It remains to be seen whether indices of national health can predict cross-cultural variation in men's facial masculinity in addition to women's preferences for male facial masculinity.

That average masculinity preference is better predicted by the NHI than by average scores on the SOI suggests that cross-cultural variation in women's average masculinity preference is not simply a consequence of variation in women's mating strategies, specifically their preferences for short-term versus long-term relationships. This is noteworthy, as women typically demonstrate stronger attraction to masculine men as short-term partners than as long-term partners (Penton-Voak *et al.* 1999, 2003; Little *et al.* 2002; Puts 2005) and individual differences within a culture in women's mating strategies predict variation in women's masculinity preferences (Waynforth *et al.* 2005; Provost *et al.* 2008). Indeed, in our sample, average SOI did not explain a significant amount of the cross-cultural variation in average masculinity preference. This finding highlights that cross-cultural differences in average masculinity preference are not necessarily sensitive to all factors that predict individual differences in masculinity preferences within a culture. However, cross-cultural variation in women's

mating strategies may predict women's average masculinity preference in samples that include a wider range of mating strategies (i.e. samples that include polygynous societies; Low 1990).

Similarly, we cannot rule out the possibility that other variables not considered in our study mediate the association between national health and women's masculinity preferences. For example, cross-cultural variation in women's masculinity preferences may reflect differences in the prevalence of violent crime, women's rights or wealth distribution, which may increase the importance of women having a strong, physically dominant partner. Indeed, masculine facial characteristics in men are positively correlated with indices of their physical strength (Fink *et al.* 2007) and perceptions of their dominance (Perrett *et al.* 1998; Boothroyd *et al.* 2007; Jones *et al.* 2010). We suggest that establishing the extent to which factors such as these contribute to cross-cultural differences in women's masculinity preferences is an important topic for future research.

Further research is needed to determine whether our findings generalize outside of countries with a relatively high human development index from a limited geographical range. While our limited sample avoids extensively confounding the NHI with other cultural differences, the association we show between national health and women's masculinity preference may not be linear over a broader range of NHIs. For example, in areas with extremely poor health, other factors such as limited availability of mates may reduce or eliminate the association between poor health and increased masculinity preferences, leading to a nonlinear relationship between these variables across a broader range of national health. However, evidence that rural Jamaican women show stronger preferences for male facial masculinity than UK women do (Penton-Voak *et al.* 2004) and that the Hadza of Tanzania prefer facial symmetry more than UK participants do (Little *et al.* 2007*a*) suggests that women from very poor-health nations will demonstrate strong preferences for cues of male long-term health.

Furthermore, focusing on a narrow range of relatively wealthy countries may exacerbate problems of non-independence (i.e. the individual countries, which serve as our units of analysis, may not necessarily be best treated as independent data points). However, we note here that the correlation we observed between national health and average masculinity preferences is both very strong and robust to changes in degrees of freedom (e.g. that which occurred when countries without SOI data were excluded). While this suggests that our findings are unlikely to be driven solely by non-independence of data points, we acknowledge that further research is needed to clarify this issue.

Consistent with predictions from trade-off theory, we report an inverse relationship between cross-cultural variation in women's average masculinity preference and the NHI reflecting variation in mortality, longevity and the impact of communicable disease. Across cultures, as national health decreases, women's preferences for masculine men increase. While previous research has emphasized systematic individual variation in women's masculinity preferences within a single culture (Penton-Voak *et al.* 1999; Little *et al.* 2001; Jones *et al.* 2005; Waynforth *et al.* 2005; Little & Mannion 2006; Little *et al.* 2007*c*; Provost *et al.* 2008), our findings demonstrate systematic cross-cultural variation in women's average masculinity preference.

All participants gave informed consent before the experiment.

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ENDNOTES

[1]'Human development indices'. United Nations Development Programme. http://hdr.undp.org/en/media/HDR_2009_EN_Complete.pdf.
[2]World Health Organization Statistical Information Service, 2008, http://www.who.int/whosis/.

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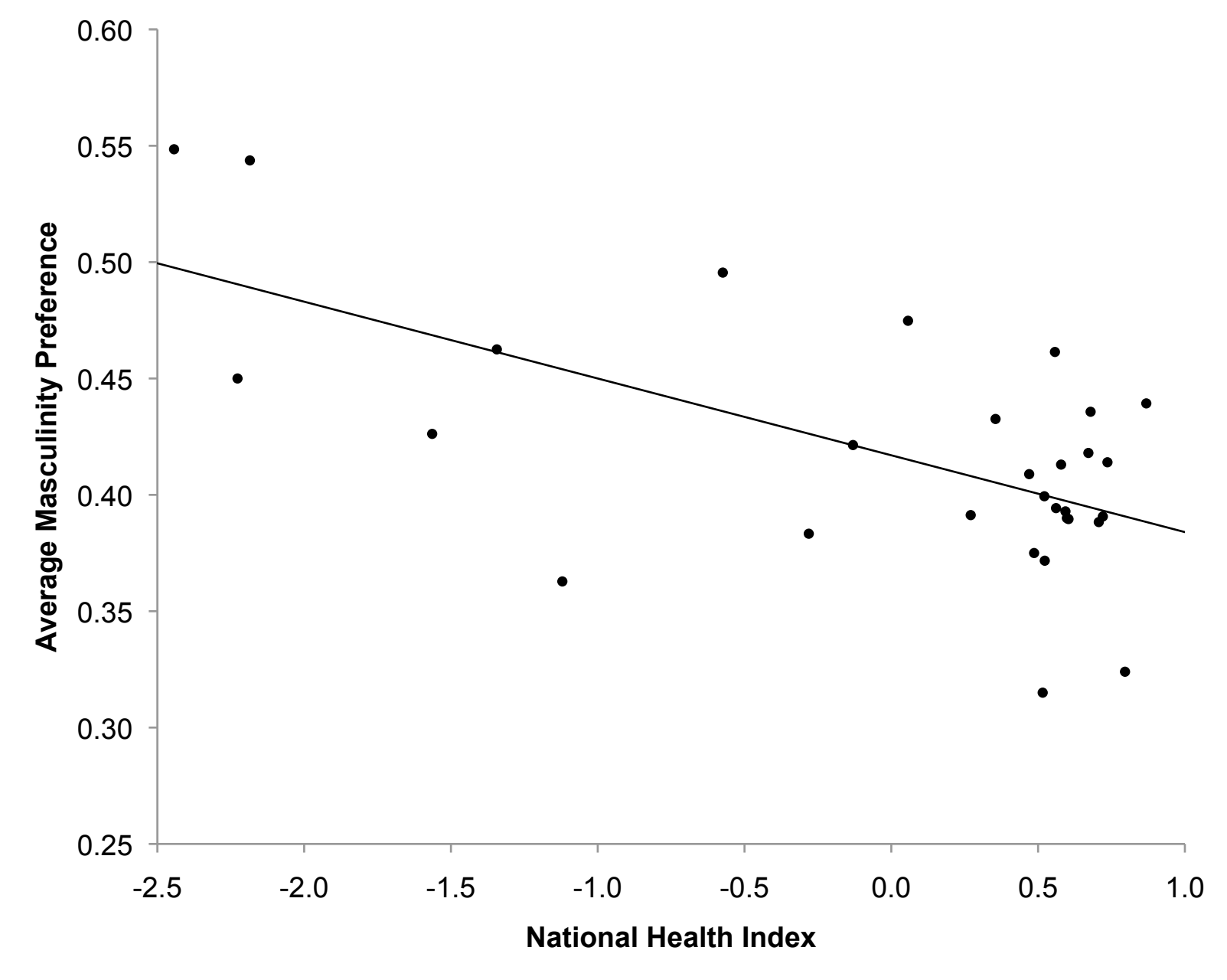
0.60
0.55
0.50
0.45
0.40
0.35
0.30
0.25
Average Masculinity Preference
-2.5
-2.0
-1.5
-1.0
-0.5
0.0
0.5
1.0
National Health Index

Supplemental Materials - Table 1

Descriptive statistics for countries included in our sample. High scores on the national health index indicate good health (e.g. low mortality rates and high longevity).

Country	N	National health index	Average masculinity preference (SD)	Average age in years (SD)
Argentina	12	-1.34	0.46 (0.22)	24.0 (4.1)
Australia	115	0.68	0.44 (0.22)	24.1 (6.0)
Austria	53	0.60	0.39 (0.21)	22.1 (3.6)
Belgium	30	0.52	0.32 (0.21)	22.9 (5.4)
Brazil	33	-2.44	0.55 (0.23)	22.4 (5.0)
Bulgaria	11	-0.57	0.50 (0.26)	22.7 (5.1)
Canada	290	0.56	0.46 (0.24)	23.5 (6.0)
Denmark	23	0.52	0.37 (0.20)	25.0 (6.0)
Finland	61	0.56	0.39 (0.25)	22.1 (4.8)
France	168	0.59	0.39 (0.21)	22.3 (5.1)
Germany	416	0.58	0.41 (0.23)	23.2 (5.0)
Greece	20	0.60	0.39 (0.23)	24.6 (5.6)
Hungary	15	-0.28	0.38 (0.30)	24.8 (5.0)
Iceland	14	0.87	0.44 (0.29)	24.1 (3.5)
Ireland	28	0.47	0.41 (0.24)	23.7 (5.8)
Italy	50	0.74	0.41 (0.24)	24.5 (5.0)
Mexico	24	-2.18	0.54 (0.21)	23.8 (5.7)
Netherlands	83	0.52	0.40 (0.23)	24.1 (5.5)
New Zealand	26	0.49	0.38 (0.24)	24.8 (6.9)
Norway	25	0.67	0.42 (0.23)	24.7 (5.7)
Poland	49	-0.13	0.42 (0.19)	23.1 (4.4)
Portugal	23	0.27	0.39 (0.25)	25.2 (6.3)
Romania	39	-1.12	0.36 (0.19)	23.2 (5.1)
Russian Federation	42	-1.56	0.43 (0.22)	24.0 (5.6)
Spain	47	0.71	0.39 (0.25)	25.1 (6.2)
Sweden	75	0.80	0.32 (0.19)	22.0 (5.1)
Switzerland	54	0.72	0.39 (0.22)	24.3 (6.2)
Turkey	16	-2.23	0.45 (0.17)	24.3 (3.5)
United Kingdom	505	0.36	0.43 (0.23)	22.9 (5.8)
United States	2447	0.06	0.48 (0.24)	23.5 (5.7)

Supplemental Materials - Table 2

The eight component variables that comprised the national health index. Correlations are Pearson's *r* with *n* = 30 for all analyses. There was also a significant negative correlation between the national health index and average masculinity preference (*r* = -.619, *n* = 30, *p* < .001).

Component variables	Correlation with national health index	Correlation with average masculinity preference
Adult mortality (probability of dying between 15 to 60 years per 1000 population)	-.716**	.301
Maternal mortality ratio (per 100,000 live births)	-.857**	.654**
Neonatal mortality (per 1000 live births)	-.957**	.574*
Infant mortality (per 1000 live births)	-.930**	.647**
Under 5 mortality rate (probability of dying by age 5 per 1000 live births)	-.922**	.645**
Life expectancy at birth (years)	.858**	-.401*
Healthy life expectancy (HALE) at birth (years)	.918**	-.454*
Years of life lost to communicable diseases	-.852**	.638**

*2-tailed p < .05

**2-tailed p ≤ .001

Supplemental Materials - Table 3

Correlations among the primary variables in our study: average masculinity preference, the national health index (NHI), gross national product per capita (GNP), average age, and average scores on the sociosexual orientation inventory (SOI). Correlations are Pearson's *r*.

	Average masculinity preference	NHI	GNP	Average age
NHI (*n* = 30)	-0.619**			
GNP (*n* = 30)	-0.383*	0.821**		
Average age (*n* = 30)	-0.071	0.077	0.029	
Average SOI (*n* = 22)	-0.126	0.376	0.487*	-0.391

*2-tailed $p < .05$

**2-tailed $p \leq .001$