Son-biased sex ratios in the 2000 United States Census

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We document male-biased sex ratios among U.S.-born children of Chinese, Korean, and Asian Indian parents in the 2000 U.S. Census. This male bias is particularly evident for third children: If there was no previous son, sons outnumbered daughters by 50%. By contrast, the sex ratios of eldest and younger children with an older brother were both within the range of the biologically normal, as were White offspring sex ratios (irrespective of the elder siblings' sex). We interpret the found deviation in favor of sons to be evidence of sex selection, most likely at the prenatal stage.

sex-selective abortion | son preference

The ratio of male to female births exceeds the biological norm of 1.05 (1) in a number of Asian countries, notably India (2, 3), China (4, 5), and South Korea (6, 7). Availability of prenatal sex determination and induced abortion have been identified as important factors (3, 8), to the point of the former being (ineffectively) banned in India and China. Sex selection is no less controversial outside Asian countries, but so far there has been little evidence of prenatal diagnostics being used to that end (an exception being ref. 9).

We document male-biased sex ratios among U.S.-born children to Chinese, Koreans, and Asian Indians in the U.S. The male bias is particularly evident for higher parities, echoing patterns in the corresponding Asian countries (4, 6, 10). At third parity, sons outnumbered daughters 1.51:1 if there was no previous son. As a comparison, for India, the corresponding figure was found to be 1.39:1 in a recent large-scale survey (2) and 2.25:1 for China in the 1990 Census (3).

Results

Using the 2000 U.S. Census, we find that the sex ratio of the oldest child to be normal, but that of subsequent children to be heavily male if there was no previous son. The sex ratio of the second child was 1.17 if the first child was a girl. At third parity, boys outnumbered girls by 1.51:1 if the two previous children were girls (Fig. 1 *Lower*).

By comparison, White offspring sex ratios varied only slightly with parity and sex composition of previous children, and the tendency was for repetition of the previous sex (Fig. 1 *Upper*).

Robustness. Similar results were obtained if we linked children to only mothers or only fathers. The found male bias at higher parity was true irrespective of the mother's citizenship status (a possible marker of cultural assimilation and expectations regarding future dependence on children for old age support). If anything, mothers with citizenship had more male-biased offspring sex ratios, but the difference was not statistically significant.

Discussion

We document son-biased sex ratios at higher parities in a contemporary Western society. We interpret the found deviation in favor of sons to be evidence of sex selection, most likely at the prenatal stage. Since 2005, sexing through a blood test as early as 5 weeks after conception has been marketed directly to consumers in the U.S., raising the prospect of sex selection becoming more widely practiced in the near future.

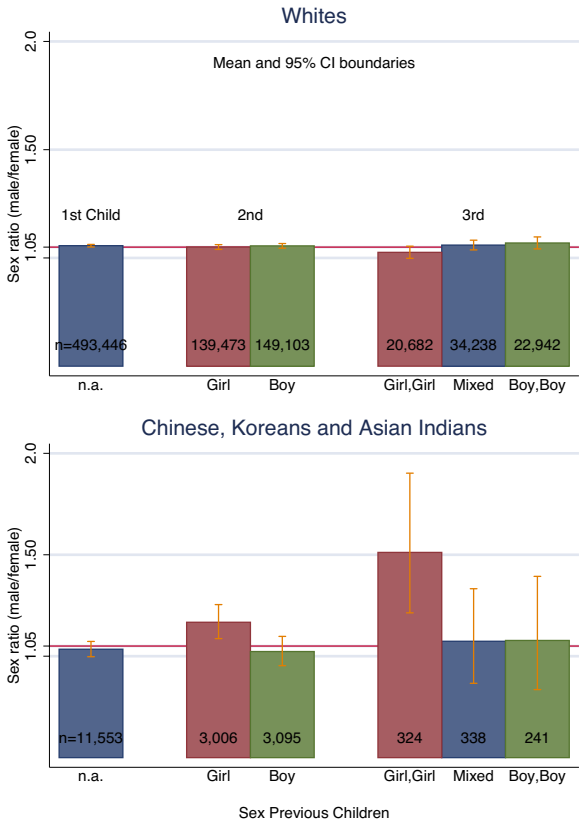

Fig. 1. Sex ratio by parity and sex of previous child(ren).

Son-biased sex ratios were found despite the absence of many of the factors advanced to rationalize son bias in India, China, and Korea, such as China's one-child policy, high dowry payments (India), patrilocal marriage patterns (all three countries) (11), or reliance on children for old age support and physical security.

Although the magnitude of the deviations we find for second and third children is comparable to that documented for India, China, and South Korea, the marriage market consequences for the U.S. are likely limited. Low fertility in the U.S. means that births are concentrated at lower parities, where sex ratios are closer to the biological norm. In addition, because Indians,

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Chinese, and Koreans make up <2% of the U.S. population, the effect on the breeding population sex ratio is small.

Finally, the male bias we find in the U.S. appears to be recent. In the 1990 U.S. Census, the tendency for males to follow females among Indians, Chinese, and Koreans is substantially muted.

Materials and Methods

We used the 2000 U.S. Census, 5% public use sample. We restricted the sample to families where both the mother's and the father's race was given as Chinese, Korean, or Indian, where either parent headed the household, and where all children were born in the United States (to ensure that the offspring sex composition was not the result of, for example, China's one-child policy). We excluded families with adopted or step-children. To reduce the probability that there was an eldest child not in the household, we also restricted our sample to families where the oldest child was 12 years or younger. Focusing on parity one through three yielded an analysis sample of 18,557 children in 11,553 families.

We investigated the sex ratio of children by parity (as calculated by the age of children reported in the household) and sex of previous children. In the absence of manipulation, we expected the sex ratio at each parity and sex composition of older siblings to be random, with a mean of 1.05 at birth. Lower parity children were older, but were born to younger mothers, two factors known to exert small and roughly offsetting effects on the sex ratio. As for sex of previous children, there may have been a small tendency toward repeating the same sex (1, 12).

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