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BIAS TOWARD SONS

Presidents Preferred Sons

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Abstract. **Trivers and Willard (1973) argued that, in polygynous species, parents "in good condition" should bias investment toward sons, while parents "in poor condition" should bias investment toward daughters. Biographical evidence on men in the U.S. executive branch—including presidents, vice presidents, and cabinet secretaries—suggests they produced more sons than daughters in the first cohort (Presidents Washington through Garfield), but roughly equal numbers of sons and daughters in the second cohort (Presidents Arthur through Reagan). The same pattern holds for presidents' fathers and sons. Presidents' wills reflect the pattern again: men in the first cohort (Washington through Garfield) favored their sons, overall, slightly more than their daughters; for men in the second cohort (Arthur through Reagan), that bias disappears.**

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NATURAL SELECTION SHOULD PRODUCE individuals who allocate parental investment (Trivers, 1972) where it yields the greatest fitness returns (e.g., Fisher, 1958; Charnov, 1982; Frank, 1987). In many species, including humans, polygyny (access to multiple mates) can dramatically increase the reproductive potential of successful sons; and dominant males are often the most polygynous (e.g., Clutton-Brock, 1988; Cowlishaw and Dunbar, 1991; Ellis, 1995). For these reasons, it has been suggested that men and women "in good condition" should invest more in sons, while poorer ones should invest more in daughters (Trivers and Willard, 1973). This prediction rests on several assumptions (e.g., Hrdy, 1987; Sieff, 1990; Anderson and Crawford, 1993). For well-off parents, sons must not be so much more expensive to raise than daughters that greater costs of rearing offset their greater reproductive performance; in the same way, for poorer parents, costs of rearing must not offset the greater reproductive performance of daughters (e.g., Charnov, 1982). And conditions conducive to the production of sons among well-off parents, and of daughters among poorer parents, must have been stable for a sufficient portion of human evolutionary history to have allowed selection an opportunity to act (e.g., Betzig, 1989).

Plenty of anecdotal evidence suggests well-to-do parents have favored sons after their children were born (e.g., Dickemann, 1979a, b; Hartung, 1982; Betzig, 1992, 1993, 1995). Recent studies of seventeenth- to nineteenth-century Ostfriesland in Germany (Voland, 1984), medieval Portugal (Boone, 1986, 1988), Ifaluk atoll (Betzig and Turke, 1986), and the Kenyan Kipsigis (Borgerhoff Mulder, 1989) show high-status parents favored sons in a variety of ways, including female-biased infanticide, neglect, and disinheritance. Another recent study has shown that low-status Mukogodo pastoralists in Kenya favor daughters by paying better attention to their health (Cronk, 1989, 1991). In Massachusetts,

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Table 1. Sex Ratios of Legitimate Children Born to Men in the U.S. Executive Branch, including Presidents, Vice Presidents, and Cabinet Secretaries

Cohort	Executives' Children
Washington - Garfield	74 sons/31 daughters (*SR=2.39*)
Arthur - Reagan	262 sons/234 daughters (*SR=1.12*)

Source: *Who Was Who in American History*

Pennsylvania, and Canada over the last few centuries, well-to-do testators favored sons over daughters (Hrdy and Judge, 1993; Shammas, Salmon, and Dahlin, 1987; Smith, Kish, and Crawford, 1987), though in Sausalito, California, neither sex was preferred (Judge and Hrdy, 1992).

Other evidence suggests sex ratios at birth have been skewed according to status. Neither Yanomamö horticulturalists of Venezuela (Chagnon, Flinn, and Melancon, 1979) nor Kipsigis pastoralists of Kenya (Borgerhoff Mulder, 1989) appear to bear children with sex ratios biased according to status, although both are polygynous cultures (e.g., Chagnon, 1988; Borgerhoff Mulder, 1987). But evidence from more stratified societies suggests sex ratios at birth rise slightly with parents' status (e.g., Trivers and Willard, 1973). Well-to-do early American settlers (Winston, 1931), British royalty (Woods, 1939; Norton, 1940) and others (e.g., Müller, 1991, 1993) reported significantly more male than female births—though the actual differences are small. Some studies of more recent groups have failed to find the same result, including one comparing samples of 1979 *Social Register* and 1980 *Who's Who* listings to estimates from the U.S. census (James, 1987; Mackey and Coney, 1987; but see Mealey and Mackey, 1990; Gaulin and Robbins, 1991).

Executive Branch Members Fathered More Sons

Data on United States presidents, their close kin, and their close political cronies suggest that they did in fact produce more sons than daughters early in American history, but have more recently produced roughly equal numbers of daughters and sons.

A preliminary indication of that trend comes from short biographies in *Who Was Who in American History* (Who's Who, 1947) on all members of the U.S. executive branch, including presidents, vice presidents, and cabinet secretaries (Table 1). Altogether, men in the executive branch under the first 20 presidents (Washington through Garfield) reported 74 legitimate male and just 31 legitimate female births (sex ratio = 2.39, $X^2 = 7.223$, $p = .0072$, tested against an expected sex ratio of 54 sons and 51 daughters), while those under the second 20 presidents (Arthur through Reagan) reported a secondary sex ratio of 262 legitimate sons and 234 legitimate daughters (sex ratio = 1.12, $X^2 = 0.145$, $p = .7029$, tested against an expected sex ratio of 255 sons and 241 daughters).

Table 2. Sex Ratios of Legitimate Children Born to U.S. Presidents, Their Fathers, and Their Sons

Cohort	Presidents' Children	Presidents' Fathers' Children	Presidents' Sons' Children
Washington - Garfield	55 sons/31 daughters (*SR=1.77*)	81 sons/56 daughters (*SR=1.45*)	73 sons/53 daughters (*SR=1.38*)
Arthur - Reagan	31 sons/27 daughters (*SR=1.15*)	64 sons/48 daughters (*SR=1.33*)	35 sons/36 daughters (*SR=0.97*)

Note: Data on presidents' fathers contain a built-in bias, as all U.S. presidents have been men.
Source: *Burke's*, 1981

This information is, however, incomplete. A possible explanation for the extraordinarily high sex ratio in the first cohort is a simple underreporting of female births. Both patriliny (the fact that U.S. sons usually inherit their father's name) and patriarchy (the fact that sons, especially early in U.S. history, were much more likely to make a "name" for themselves than daughters) should have biased the data in that direction.

Better information is available on the presidents themselves (Table 2). Altogether, according to *Burke's Presidential Families of the United States of America* (Burke's Peerage, 1981), the first 20 presidents (Washington through Garfield) produced 55 legitimate sons and just 31 legitimate daughters (sex ratio = 1.77, $X^2 = 2.380$, $p = .1229$, tested against an expected sex ratio of 44 sons and 42 daughters), while the second 20 presidents (Arthur through Reagan) produced 31 legitimate sons and 27 legitimate daughters (sex ratio = 1.15, $X^2 = 0$, $p = 1$, tested against an expected sex ratio of 30 sons and 28 daughters).

Several things might explain the apparent tendency of early families to produce more sons. The most obvious is faulty data. Again, both because they retained their fathers' names and because they were more likely to attract notoriety, sons may have been selectively remembered, especially early in American history. A comparison of biographical collections, however, suggests data on presidents are more complete than those on any other group in American politics; and *Burke's* is more complete than any other source. More convincingly, presidents' children reported in *Burke's* include 19 of 86 in the first cohort who died before reaching their fifth birthday (a mortality rate of 221 per 1000), and 8 of 58 in the second cohort who did the same (a mortality rate of 138 per 1000). These mortality rates are consistent with estimates from similar periods for the United States, primarily from groups of various status in Massachusetts (Vinovskis, 1972). Since children who died young, rather than those who survived to reproduce themselves, are the ones most likely to be omitted from any biographic source, these comparisons suggest that the *Burke's* data are nearly complete.

Table 3. Primary Beneficiaries of 30 Testate U.S. Presidents, from George Washington through Lyndon Johnson

	Ss	Ds	S>D	S=D	Ns & Ns
Ss only	JQA (6) MvB (8) MPF (13) CC (30) HH (31) DDE (34)				
Ds only		TJ (3) JMon (5) WW (28) HST (33) LBJ (36)			
Ss & Ds			JA (2) WHH (9) ZT (12)	JT(10) RBH (19) CAA (21) GC (22, 24) BH (23) TR (26) WHT (27) FDR (32) JFK (35)	
N & Ns					GW (1) JMad (4) JKP (11) FP (14) JB (15) WM (25) WH (29)

Note: S refers to surviving sons, or to their surviving heirs; D refers to surviving daughters, or to their surviving heirs; Ns & Ns refer to brothers' and sisters' children, or to their surviving heirs. Numbers in parentheses indicate presidency (e.g., JQA, John Quincy Adams, was the sixth president).

Presidents' Fathers and Sons Fathered More Sons

This pattern holds across presidents' fathers and sons (Table 2). According to *Burke's*, fathers of the first 20 presidents (Washington through Garfield) produced 81 legitimate sons and 56 legitimate daughters (sex ratio = 1.45, $\chi^2 = 1.475$, $p = .2245$, tested against an expected sex ratio of 70 sons and 67 daughters), while fathers of the second 20 Presidents (Arthur through Reagan) produced 64 legitimate sons and 48 legitimate daughters (sex ratio = 1.33, $\chi^2 = 0.450$, $p = .5023$, tested against an expected sex ratio of 58 sons and 54 daughters). Data on presidents' fathers contain, of course, a built-in bias, as all U.S. presidents have been male. Data on presidents' sons, on the other hand, contain no such bias, but show the same early tendency to favor males. According to *Burke's*, sons of the first 20 presidents (Washington through Garfield) produced 73 legitimate sons and 53 legitimate daughters (sex ratio = 1.38, $\chi^2 = 0.785$, $p = .3756$, tested against an expected sex ratio of 65 sons and 61 daughters), while sons of the second 20 presidents (Arthur through Reagan) produced 35 legitimate sons and 36 legitimate daughters (sex ratio = 0.97, $\chi^2 = 0$, $p = 1$, tested against an expected sex ratio of 36 sons and 35 daughters).

Presidents Favored Sons

Finally, evidence from presidents' wills shows that a slight son bias in the first cohort evaporated in the second (Table 3). Altogether, 12 presidents had children of both sexes, or their survivors, alive at the time they last made out their wills. In nine cases, the allocation of inheritance was indistinguishable according to sex (Collins and Weaver, 1976). The wills of three presidents, all of them members of the first cohort (Adams, 2nd president; Harrison, 9th; and Taylor, 12th), favored one sex over the other. In each case, sons were the favored sex. Many more presidents' sons than daughters were given expensive educations; this bias, too, was more marked early in U.S. history than late (e.g., Quinn and Kanter, 1983). These data, though suggestive, are not conclusive: samples are small, data are qualitative, and son bias was common to most U.S. testators through the mid-nineteenth century (e.g., Hrdy and Judge, 1993).

Conclusions

These findings are interesting for two reasons. One is that though samples of U.S. presidents, their cabinet members, and their kin are small, the results appear to be consistent with a decline in sex ratios at birth produced by other well-to-do Europeans and Americans over the last few hundred years. Though good data on sex ratios at birth are hard to find for historical groups, son-biased inheritance is a strong European tradition. Contrary to legislation from as early as the Twelve Tables of the fifth century B.C.—legislation mandating that Romans leave estates equally to legitimate daughters and sons—in Roman wills sons were consistently favored: they got bigger shares than daughters, and four out of five wills were written by men (Champlin, 1991; Betzig, 1992). In the Middle Ages, though some evidence suggests peasant daughters might be left at least as much as peasant sons (e.g., Hanawalt, 1985:77), among medieval elites the preferred heir to an estate was a first-born son (e.g., Pollock and Maitland, 1895; Duby, 1953). In modern times, the trend has very slowly reversed (e.g., Stone and Stone, 1984). To the extent that this decline is real, and widespread, it warrants an explanation. Further work must be done to substantiate either claim.

The results are interesting, too, because they fit with tentative evidence of a collapse in polygyny over the past few centuries (e.g., Betzig, 1994; Betzig and Weber, 1993). If natural selection has produced a mechanism by which humans skew sex ratios adaptively, and if conditions conducive to its operation have not changed radically over time, then drops in elite sex ratios suggest polygyny may have declined.

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