AMERICAN INDIAN AND WHITE FERTILITY DIFFERENTIALS: A STATISTICAL ANALYSIS OF CENSUS DATA

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INTRODUCTION

Public recognition of the social and economic problems of American Indians, hereafter called Indians, has increased in recent years. "Both by exploration and circumstance," Indians were the first native Americans to inhabit this land since they left Siberia about 30,000 years ago. Since their first complete count in 1890, Indians in the United States have increased by 208 percent. In the last two decades the number of Indians more than doubled, going from 357,499 in 1950 to 763,594 in 1970 (U. S. Bureau of the Census, 1973a).

The published literature on minority fertility differentials in the United States is very extensive (see for instance Lee and Lee, 1952 and 1959; Petersen, 1969; Peterson, 1972; Hillery, 1966; Goldscheider and Uhlenberg, 1969; Sly, 1970; Presser, 1971; Taeuber and Taeuber, 1971; Kennedy, 1973; Weller, Sly and Terrie, 1974; Roberts and Lee, 1974; Hill and Spector, 1971; Sweet, 1974). Only a few of these studies, however, examined the fertility of Indians, but from a different perspective than the one utilized in this study.

The purpose of this paper is to (1) examine rural-urban fertility differentials of American Indians in the four geographical regions of the United States and compare them with those for the white population, (2) assess any existing trends in these differentials over time, and (3) determine the extent to which these fertility differentials are genuine or spurious.

DATA AND DEFINITIONS

The data used in this study come from the decennial censuses of the United States. The United States has been taking decennial censuses since 1790. However, data on Indians were not gathered on a regular basis until 1930, save for 1910 when a special enumeration of Indians was made. The 1960 and 1970 censuses were the only ones in which information on all races was obtained primarily through self-identification. Accordingly, the two censuses are considered to contain the most accurate information ever obtained about Indians. Moreover, it was the 1970 census that produced, for the first time, data on "children ever born" to "women ever married" in three 10-year age categories: 15 to 24, 25 to 34, and 35 to 44. Hence, this study is primarily concerned with the fertility of women ever married in these age groups, and to an extent with the child-woman ratio.

Definitions and explanations of basic concepts used in this study are given below.

Women Ever Married

In this study, women "ever married" comprise all women 15 to 44 years old who did not report themselves on the census date as "never married" (U. S. Bureau of the Census, 1962). Table 1 shows that the number of Indian and white women in this category in 1970 amounted to 180,080 (65.4 percent) and 25,568,636 (69.5 percent), respectively.

Age

In most societies age has both biological and social implications. In this study "age" refers to "biologic age," that is, "the person's relative functioning capacity as determined by the sum of genetic and environmental factors" (Petersen, 1969). The ages of the women and children in this study were determined as of April 1, of the census year. Table 1 shows the number and percentage of Indian and white females ever married in the given age groups by type of residence and region.

Race

Persons were considered white if they indicated their race as white, Mexican, Puerto Rican, or gave a response indicating Indo-European stock, (U. S. Bureau of Census, 1972a). On the other hand, individuals were classified as Indians if they declared their status as such, or if they reported the name of an Indian tribe or had such entries as "Mexican American-Indian," "Canadian-Indian," or "South American-Indian" (U. S. Bureau of Census, 1973b: IX).

Region

The U. S. Census divides the country into four geographical regions, namely, the Northeast, North Central, South and West. In this paper we use these same regions.

Urban Residence

"The urban population consists of all persons living in (a) places of 2,500 inhabitants or more incorporated as cities, villages, boroughs (except Alaska), and towns (except in the New England States, New York, and Wisconsin), but excluding those persons living in the rural portions of extended cities; (b) unincorporated places of 2,500 inhabitants or more; and (c) other territory, incorporated or unincorporated, included in urbanized areas" (U. S. Bureau of the Census,

1973b: App. 3). Table 1 reveals that, in 1970, the number of Indian women ever married residing in urban places was 55,463 (51.3 percent), as compared with 17,524,582 (71.5 percent) white women ever married.

Rural Residence

The rural population includes the "rural-farm population, which comprises all rural residents living on farms, and the rural-nonfarm population, which comprises the remaining rural population" (U. S. Bureau of the Census, 1973b: App. 3). The data in Table 1 indicate that in 1970 there were 52,617 (48.7 percent) Indian and 6,966,916 (28.5 percent) white women ever married living in rural areas.

Children Ever Born

The number of children ever born includes "children born to the woman before her present marriage, children no longer living, and children away from home, as well as children born to the woman who were still living in the home." (U. S. Bureau of the Census, 1972a: App. 14). Though this measure of cumulative fertility undoubtedly includes some illegitimate births, these are not apt to seriously detract from the validity of the results obtained in this paper.

Child-Woman Ratio

Since the 1960 population census did not produce fertility data comparable to those offered by the 1970 census, the child-woman ratio is used here as an approximate index for the changes in fertility of the two populations over time. The child-woman ratio is the number of children under five years old per thousand women between the ages of 15 and 44.

THE ANALYSIS

We are concerned in this study with numerical as well as the statistical significance of the differences between the fertility levels of the two populations.

Descriptive Analysis

Table 2 presents a numerical comparison of Indian and white fertility in 1970, expressed in terms of the mean number of children ever born per thousand women ever married, by age of women, region and type of residence. According to the information presented, the average number of children ever born by an Indian woman ever married is 3.2 children. The comparable figure for whites is 2.3 children per woman. Data on child-woman ratios (Table 3) indicate that fertility of Indians declined from 896 children per 1,000 women of childbearing age in 1960 to 555 children in 1970. The corresponding white figures were 546 and 392 for 1960 and 1970, respectively. Thus, to the extent that the fertility ratio can be trusted, both Indian and white fertilities in 1970 are on a retreat from the high level they occupied in 1960, with the retreat being faster among Indians than among whites. This generalization may be verified by comparing the two ratios in 1960 (896/546 = 1.64, Table 3) with those for 1970 (555/392 = 1.42, Table 3, or 3,221/2,285 = 1.41, Table 2). The generalization holds for regions and for type of residence as well, except in the North Central rural areas where the decline of white fertility exceeded that for the Indians (see the percent change columns in Table 3).

Among the four major geographical regions of the United States, Table 2 shows that Indians in the western region had the highest fertility (3,399), followed by Indians in the North Central (3,358), Southern (2,291), and the Northeastern (2,678) regions. This sequence did not hold for the whites, though the differences were less pronounced, where the highest fertility characterized the North Central region, followed by Northeast, Western, and Southern regions. A very apparent observation from Tables 2 and 3 is that rural residents have higher fertility than urban residents both for Indians and whites in the four regions without exception.

It is of interest to note that the data in Table 2 shows that fertility differences between younger Indian women and their white counterparts are smaller than those for the older ones, a pattern observable in rural and urban United States. This provides a plausible interpretation which suggests that the Indians are in the process of a demographic transition.

Statistical Analysis

In order to ascertain whether the observed numerical fertility differentials of the two populations were statistically significant or not, an analysis of variance was applied to the data in Tables 2 and 3.

A three-way classification model was applied to the data in Table 2 to test the main effects of type of residence (two levels), race (two levels), age (three levels), and interaction effects on fertility. Only age is an interval measure, the other factors are nominal. The data consisted of four observations on each of 12 different treatment combinations (type of residence, race, and age). Based on this formulation, the design was assumed to fit the following model:

$$X_{ijkl} = \quad + \ _i + \ _j + \ _k + (\quad)_{ij} + (\quad)_{ik}$$

$$+ (\quad)_{jk} + (\quad)_{ijk} + \ _{ijkl},$$

i = type of residence levels = 1, 2; j = age levels = 1, 2, 3; k = race levels = 1, 2; l = regional levels =

1, 2, 3, 4. (See Dunn and Clark, 1974).

Table 4 summarizes analysis of variance for the data in Table 3, namely the F tests of seven null hypotheses (H_n's). For main effects, three H_n's were tested: H_{n1}: $_i$'s = 0; H_{n2}: $_j$'s = 0; and H_{n3}: $_k$'s = 0. For two-factor interactions, we tested H_{n4}: $(\ )_{ij}$'s = 0; H_{n5}: $(\ )_{ik}$'s = 0; H_{n6}: $(\ )_{jk}$'s = 0. The H_{n7} stated that the three-factor interactions, $(\ )_{ijk}$'s, were zero. Based on the calculated variance ratios shown in Column 5, Table 4, H_{n1} to H_{n6}, inclusive, were rejected; the first five of them at .01 and the sixth at .05. Due to second-order interactions, we were unable to reject H_{n7} at the .05 level. Accordingly, we might conclude that the effects of type of residence, race and age on the observed fertility differentials were independent.

To be sure, a three-way variable of analysis of variance, similar to the one used above, was applied to the data on child-woman ratios in Table 3. Table 5 provides a summary for the F-tests of seven H_n's. Only four (three for main effects and the first order interactions for year and race) were significant at the one-percent level.

CONCLUSION

This paper fulfilled three tasks: First, it examined and compared rural-urban fertility differentials of American Indians and white women in the four geographical regions of the United States; second, it assessed any existing trends in these differentials over time; and third, it determined the genuineness of these differentials. Descriptive and inferential statistical analyses show that fertility differentials are real on the racial, residential and temporal levels.

These findings have significance for the students of social change as well as of social organization. They suggest that the original native Americans are passing through a period of demographic transition. Whether this transition is a product of their integration with the larger society or to other patterns of social interaction is, undoubtedly, a matter beyond the scope of this research. Suffice it to say that the steady decline in Indian fertility indicates that America is a melting pot, even for its original settlers.

TABLE 1. NUMBER AND PERCENTAGE OF INDIAN AND WHITE WOMEN EVER MARRIED BY REGION, TYPE OF RESIDENCE AND AGE, 1970

Region and Type of Residence			Age 15-24		25-34		35-44		Total	
			Indian	White	Indian	White	Indian	White	Indian	White
Northeast	Urban	No.	1,361	852,371	2,253	1,766,353	1,856	1,911,090	5,470	4,529,814
		Pct.	78.43	77.95	75.25	76.32	72.96	77.93	75.21	77.30
	Rural	No.	374	241,131	741	547,948	688	541,317	1,803	1,330,396
		Pct.	21.57	22.05	24.75	23.68	27.04	22.07	24.79	22.70
N. Central	Urban	No.	3,206	1,162,797	4,574	1,983,536	3,930	1,914,948	11,710	5,061,281
		Pct.	63.09	72.51	57.67	69.40	57.02	69.20	58.83	70.01
	Rural	No.	1,876	440,827	3,357	874,735	2,962	852,463	8,195	2,168,025
		Pct.	36.91	27.49	42.33	30.60	42.98	30.80	41.17	29.99
South	Urban	No.	3,925	1,254,427	5,587	1,922,996	4,577	1,847,452	14,089	5,024,875
		Pct.	51.97	65.10	51.43	64.13	49.68	64.44	50.99	64.49
	Rural	No.	3,628	672,356	5,276	1,075,679	4,636	1,019,386	13,540	2,767,421
		Pct.	48.03	34.90	48.57	35.87	50.32	35.56	49.01	35.51
West	Urban	No.	6,722	921,847	10,201	1,553,529	7,271	1,437,417	24,194	3,912,793
		Pct.	51.71	85.35	45.99	83.32	40.19	82.50	45.42	83.48
	Rural	No.	6,278	158,169	11,980	310,947	10,821	304,915	29,079	774,031
		Pct.	48.29	14.65	54.01	16.68	59.81	17.50	54.58	16.52
Total	Urban	No.	15,214	4,191,442	22,615	7,226,414	17,634	7,110,907	55,463	18,528,763
		Pct.	55.59	73.48	51.43	72.01	48.00	72.35	51.32	72.47
	Rural	No.	12,156	1,512,483	21,354	2,809,309	19,107	2,718,081	52,617	7,039,873
		Pct.	44.41	26.52	48.57	27.99	52.00	27.65	48.68	27.53

Sources: U. S. Bureau of the Census, Census of Population: 1970. Final Reports PC(1)-C, Parts 2-52, General Social and Economic Characteristics, Table 52. Washington, D.C.: U.S.G.P.O., 1972; Final Report PC(2)-1F, American Indians, Table 3. Washington, D.C.: U.S.G.P.O., 1973.

TABLE 2. CHILDREN EVER BORN PER THOUSAND WOMEN EVER MARRIED BY AGE, REGION, AND TYPE OF RESIDENCE OF AMERICAN INDIANS AND WHITES, 1970

Region and Type of Residence		Age						Total	
		15-24		25-34		35-44			
		Indian	White	Indian	White	Indian	White	Indian	White
Northeast	Urban	1,189	886	2,577	2,164	3,311	2,863	2,481	2,219
	Rural	1,561	1,078	3,389	2,466	4,087	3,203	3,276	2,514
	Total	1,269	929	2,778	2,236	3,521	2,938	2,678	2,286
North Central	Urban	1,339	902	2,994	2,311	4,208	3,120	2,948	2,293
	Rural	1,719	1,113	3,985	2,678	5,302	3,527	3,942	2,693
	Total	1,479	960	3,414	2,424	4,678	3,245	3,358	2,413
South	Urban	1,179	849	2,870	2,154	3,528	2,836	2,613	2,079
	Rural	1,375	1,050	3,304	2,422	4,632	3,117	3,242	2,344
	Total	1,273	919	3,081	2,250	4,083	2,936	2,921	2,173
West	Urban	1,259	892	2,922	2,231	3,950	2,997	2,769	2,197
	Rural	1,570	1,101	3,711	2,653	5,525	3,419	3,924	2,638
	Total	1,409	923	3,348	2,301	4,892	3,071	3,399	2,270
Total	Urban	1,249	881	2,890	2,216	3,831	2,952	2,739	2,197
	Rural	1,535	1,078	3,642	2,536	5,222	3,296	3,729	2,515
	Total	1,376	933	3,255	2,306	4,554	3,047	3,221	2,285

Sources: U. S. Bureau of the Census, 1972a, 1973b.

TABLE 3. CHILD-WOMAN RATIOS OF AMERICAN INDIANS AND WHITES BY TYPE OF RESIDENCE AND REGION, 1960 and 1970

Region and Type of Residence		Indian			White		
		1960	1970	Pct. Change	1960	1970	Pct. Change
Northeast	Urban	799	399	-48.8	488	373	-23.6
	Rural	856	508	-40.7	598	446	-25.4
	Total	806	425	-47.3	511	388	-24.1
North Central	Urban	871	508	-41.7	560	392	-30.0
	Rural	961	716	-25.5	635	448	-29.4
	Total	925	598	-35.4	583	408	-30.0
South	Urban	791	461	-41.7	516	367	-28.9
	Rural	838	538	-35.8	553	412	-25.5
	Total	823	504	-38.8	530	382	-27.9
West	Urban	804	492	-38.8	544	382	-29.8
	Rural	976	652	-33.2	635	426	-32.9
	Total	930	538	-42.2	563	389	-30.9
Total	Urban	813	479	-41.1	525	378	-28.0
	Rural	936	629	-32.8	597	431	-27.8
	Total	896	555	-38.1	546	392	-28.2

Sources: U. S. Bureau of the Census, 1972b, 1973b.

TABLE 4. ANALYSIS OF VARIANCE TABLE FOR FERTILITY OF INDIANS AND WHITES: 1970

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	Calculated Variance Ratio, F
(A) Type of residence	3,258,334.06	1	3,258,334.06	46.18*
(B) Age	52,649,338.00	2	26,324,669.00	373.12*
(C) Race	7,844,067.00	1	7,844,067.00	111.18*
AB	488,566.50	2	244,283.25	3.46**
AC	576,846.75	1	576,846.75	8.18*
BC	1,180,749.00	2	590,374.50	8.37*
ABC	X	X	X	X
Residual	2,681,035.94	36+2	70,553.58	
Total	68,678,937.25	47		

XSum of squares (SS) for interaction effect, ABC (220,078 with two degrees of freedom) have been added to residual SS (2,460,957.94) because of their insignificant contribution (F=1.61) at .05.

*Significant at .01 **Significant at .05.

TABLE 5. ANALYSIS OF VARIANCE TABLE FOR CHILD-WOMAN RATIOS OF INDIANS AND WHITES, 1960 and 1970

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	Calculated Variance Ratio, F
(A) Type of residence	67,620.03	1	67,720.03	25.41*
(B) Year	471,663.28	1	471,663.28	177.25*
(C) Race	355,957.03	1	355,957.03	133.77*
AB	X	X	X	X
AC	X	X	X	X
BC	54,367.53	1	54,367.53	20.43*
ABC	X	X	X	X
Residual	71,847.82	24+3	2,661.03	X
Total	1,021,455.69	31		

XSum of squares (SS) of first order interactions (AB,166.53 and AC,5,277.53) and of second order interactions (ABC,2,161.52) were incorporated in the error SS (64,292.24) because of the statistical insignificance of their effects.

*Significant at .01.

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