

Divorce, Remarriage, and Fertility in a Micronesian Population¹

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Abstract

The island of Yap in the western Caroline Islands, Micronesia suffered a substantial and prolonged reduction in population size beginning at least in the late 19th Century and continuing until the close of World War II; since 1946 the population has grown rapidly. Analysis of the marital and reproductive histories of a large sample of Yapese women reveals: the Yapese have high divorce and remarriage rates; among women born before 1927 (at least 20 years of age in 1946) there was a high incidence of sterility; and women born in 1927 or later exhibit a much increased level of fertility over that of the older women. In addition, there is a statistically significant negative correlation between numbers of spouses and numbers of pregnancies per woman among the older women, while among the younger women the correlation is positive. It has been argued that genito-urinary infections played a large role in the decline of the Yapese population, and it is proposed in the present paper that the negative correlation observed for the older cohorts is due to the increasing likelihood of acquiring a venereal infection with increasing numbers of sexual partners. After 1946, when antibiotics became available to the Yapese population, the widespread genito-urinary infections were eliminated, and thus, fertility increased and the negative correlation between spouses and pregnancies disappeared. It is also proposed that under pre-World War II conditions Yapese marriage and divorce practices present an example of a maladaptive cultural feature, contributing as they did to the spread of venereal disease among the population and, consequently, to the reduction of the Yapese population.

Background

The decline in population size observed in many Pacific island populations following European contact has long been of interest to students of Pacific peoples and cultures. Suggested causative factors responsible for this decline range from disease (epidemic, venereal, or both) to social malaise. In actuality a number of factors probably combined to produce the population reductions, each island experiencing its own unique set of circumstances and reacting to each factor in its own unique way (Hagaman, 1973).

The island of Yap, located in the western Caroline Islands of Micronesia, is a prime example of the drastic nature of the reduction in population size experienced by some Pacific populations. It is estimated that in pre-contact times the popula-

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tion of Yap was approximately 40,000 individuals; in 1902 the population was reported to be 7,464; and by 1946 this figure had dropped to 2,478. However, the Yapese population began increasing subsequent to World War II, and in 1966 the population had grown to 4,071 (Underwood, 1969). Schneider (1955) has attributed this near extinction of the Yapese population to the practice of self-induced abortion by the Yapese women. Recently, however, Underwood (1973) has presented demographic evidence refuting this view and has instead argued in favor of disease, especially genito-urinary infections, as a major cause of the low fertility of Yapese women prior to 1946. Following World War II, antibiotics became available to the Yapese; these infections were greatly reduced and the fertility rate increased. Further analysis of the demography of the Yapese population, presented in this paper, supports Underwood's thesis and indicates that certain Yapese social practices, namely high divorce and remarriage rates, served to aggravate the disease situation and, thus, to contribute to the decline in population size.

Divorce, Remarriage, and their Effect on Fertility

The data presented in this paper are drawn from a much larger body of demographic data collected on Yap by Professor Jane H. Underwood during the summer of 1964 and the period June, 1965 to September, 1966. The specific sample utilized here consists of the 406 women included in the anthropometric sample (411 females and 296 males) who had ever been married. Complete, or as nearly complete as possible, reproductive and marital histories are available for all members of the anthropometric sample.

Table 1 shows the distribution of women in the sample aged 40 years or older in 1966 (born prior to 1927) over the two variables, number of pregnancies and number of spouses (married consecutively). Table 2 presents a similar distribution for women aged 39 years or younger in 1966 (born after 1926). For both groups of women the number of pregnancies has been estimated by the sum of the number of reported liveborn and the number of reported stillborn. Admittedly, this is by no means a satisfactory measure of the total number of pregnancies per woman, but little or no accurate information is available on the number of spontaneous abortions each woman suffered.

Three outstanding features are apparent from a comparison of these two tables.

One is that in the course of her life-time a typical Yapese woman will marry several times. Neither marriage nor divorce on Yap is marked by any great formality. Basically marriage consists of a couple living together; and a marriage is dissolved simply by a wife leaving her husband's house and returning to the house of her father. After a suitable period of time (a few weeks) has elapsed, the woman then is eligible to remarry, and usually does (Hunt *et al.*, 1949). It has been estimated (Underwood, personal communication) that by the age of 65 a Yapese woman has had an average of five mates. Among the sample of older women considered here, one-third have had at least five husbands and over 10% have had seven or more hus-

Table 1. Distribution of Yapese Women According to Number of Spouses and Number of Pregnancies—Women Born 1926 and Earlier.

Number of Pregnancies	Number of Spouses											Total
	1	2	3	4	5	6	7	8	9	10	11	
0	3	4	16	10	13	11	3	7		3		70
1	2	3	3	6	5	3	4	1	1	1		29
2	1	7	2	6	7	3	1	2				29
3	4	4	5	4	2	1		1				21
4	2	6	5	3	7	1	1					25
5	2	2	2	3	3		1					13
6	1	6	7	2	2		1					19
7	3	9	1	2	6							21
8	1	7	4	1		1					1	15
9	2	5	4	3								14
10	2	2	4	1	1							10
11+	3		1									4
Total	26	55	54	41	46	20	11	11	1	4	1	270
Pregnancies/ Woman	5.96	5.15	4.09	3.12	2.87	1.20	1.4					

Table 2. Distribution of Yapese Women According to Number of Spouses and Number of Pregnancies—Women Born 1927 and Later

Number of Pregnancies	Number of Spouses											Total
	1	2	3	4	5	6	7	8	9	10	11	
0	1	4	4	1	1							11
1	6	4										10
2	7	1	1	1								10
3	6	3	1	1								11
4	5	5	1			1						12
5	10	14	3	2		1						30
6	3	2	5	1	1	1						13
7	1	6	5	4								16
8	7	3										10
9	2	4		2								8
10			2	1								3
11+	1			1								2
Total	49	46	22	14	2	3	0	0	0	0	0	136
Pregnancies/ Woman	4.45	4.76	4.95	5.7								

bands. The women born in 1927 and later appear to be following the same pattern, also. Although, on the whole, they have had far less time to participate in the system, 14% of the younger women have been married four or more times already.

A second item of interest, one which dramatically illustrates the shrinkage of the Yapese population in the pre-World War II period and its expansion since the War, is the likelihood of pregnancy itself. Among women born in 1926 and earlier, the most common number of pregnancies experienced by a woman was zero (over

25% of the sample were never pregnant). On the other hand, among the women born after 1926, the most common number of pregnancies was five (22% of the women had five pregnancies)—and most of these women still had many reproductive years remaining to them when the data were collected. Obviously there has been a great increase in the fertility of Yapese women in recent times.

The third feature of interest found in Tables 1 and 2 results from a combining of the information concerning numbers of pregnancies with that concerning numbers of spouses. When, for each spouse category, the mean number of pregnancies per woman is calculated, very interesting and very different results are obtained for the two samples. For women born prior to 1927 the mean number of pregnancies per woman decreases rapidly as the number of spouses increases. Exactly opposite results are obtained for the women born in 1927 and later—numbers of pregnancies per woman increase with increasing numbers of spouses. These findings suggest that among the older women pregnancy is negatively correlated with number of spouses, while among the younger women the correlation is a positive one. Table 3 presents values of Pearson's *r* calculated for each 5-year cohort of the sample and for the two larger groups represented in Tables 1 and 2 and it is readily apparent that such is the case.³ For each cohort aged 40 years or older in 1966, there is a negative correlation between number of pregnancies and number of spouses, and, with the

Table 3. Correlation of Number of Spouses With Number of Pregnancies Among Yapese Women

Cohort	N	Spouses/ Woman	Pregnancies/ Woman	r
-1891	13	3.5	3.8	-.3877*
1892-1896	26	3.7	2.5	-.5138***
1897-1901	22	3.6	4.5	-.4309**
1902-1906	27	4.1	3.3	-.3579**
1907-1911	34	4.3	3.5	-.4246***
1912-1916	43	4.2	2.7	-.4974***
1917-1921	55	3.7	3.2	-.3432***
1922-1926	50	3.6	5.4	-.3590***
-1926	270	3.8	3.6	-.3975***
1927-1931	49	2.7	5.9	-.1624
1932-1936	41	2.0	4.8	+.2939**
1937-1941	29	1.7	4.7	-.0276
1942-	17	1.5	2.0	-.1266
1927-	136	2.1	4.8	+.1215*

* .05 < P < .10

** .01 < P < .05

*** P < .01

³ The calculations were carried out using the SPSS program PEARSON CORR and the facilities of the University of Arizona Computer Center. The use of these facilities which the University of Arizona provides students is greatly appreciated. I also wish to thank fellow graduate student Dave Taylor for patiently instructing and assisting me in the use of computers and computer programs.

exception of the oldest cohort (consisting of only 13 women), every value of r is significant at the 0.05 level, at least. For all the women born before 1927, $r = -.3975$ and is highly significant. Among the younger women the results are not so clearcut, no doubt due at least in part to the fact that most of these women had incomplete reproductive and marital histories at the time the data were collected. For the individual cohorts represented by these younger women only one has a statistically significant positive value of r ; the other three cohorts are nonsignificantly negative. However, the value of r for all four cohorts combined is positive with $0.05 < P < 0.10$. Admittedly, this is not a high level of significance, but it is certainly evident that pregnancies are not negatively associated with numbers of spouses as they are among the sample of older women.

Discussion and Conclusions

As noted earlier, Underwood (1973) has argued, plausibly it seems, that genito-urinary infections were a major factor in the Yapese population decline. It has long been recognized that syphilis and gonorrhea adversely affect fertility, but other infections, such as herpesvirus, are now known to also decrease fetal and neonatal viability. Infants born to mothers infected with genital herpes can themselves become infected in passing through the mother's genital tract at birth, resulting in a generalized herpesvirus infection which is usually fatal to the infant (Wheeler and Huffines, 1965). Naib *et al.* (1970) have also found a statistically significant association between genital herpesvirus infection and spontaneous abortion. In their study women who became pregnant after detection of herpes infection had a much higher abortion rate (33.3% of the pregnancies ended in abortion) than did either women whose pregnancies occurred before herpes was detected (10.8% ended in abortion) or women in whom herpes was detected during pregnancy (9.9% ended in abortion). According to Rawls and Gardner (1972) there is "little doubt" that herpesvirus type 2 is typically transmitted venereally. They also point out that about 80% of susceptible women who have sexual contact with infected males contract the disease and that the prevalence of the infection in a population correlates with the "degree of sexual promiscuousness" of that population.

These considerations, the relatively high prevalence of genito-urinary infections among the Yapese population prior to 1946 and the adverse effects such infections are known to have on fertility, provide a possible explanation for the correlation between numbers of pregnancies and numbers of spouses observed on Yap. Since the likelihood of acquiring a venereal disease increases as the number of sexual partners increases, those women who have several husbands run a greater risk of infection than do those who have only one or two husbands. If such diseases are relatively common and if no effective means of treatment are available, we could expect that the fertility of a large proportion of the population would be diminished, with the greatest effects observed among that segment of the population having the largest number of mates. This is exactly the situation which prevailed on Yap

prior to 1946, when the U. S. government introduced antibiotics to the island. Yapese women born in 1926 and earlier (and, thus, at least 20 years of age in 1946) experienced low fertility in general and decreasing fertility with increasing numbers of husbands. Most of these women had spent many or all of their sexually active years in an environment of high risk of infection with no available treatment. On the other hand, those women born after 1926 (aged 19 or younger in 1946), who are spending the greater part of their reproductive lives in an environment of low risk of infection with treatment available, exhibit high fertility and, if anything, increasing fertility with increasing numbers of spouses.

It is clear that if an adaptive cultural trait or practice is defined (loosely) as one which promotes or favors the preservation, well-being, and/or reproduction of a society or its members, then under pre-1946 conditions Yapese marriage and divorce practices must be categorized as being nonadaptive or maladaptive. Since increasing numbers of sexual partners meant increasing likelihood of becoming infected with one or more venereal diseases and, thus, increasing likelihood of sterility, the Yapese custom of divorcing and remarrying at frequent intervals could but serve to increase the rate of sterility and so contribute to the decline in the size of the Yapese population. The situation on Yap illustrates well the proposition that culture may be man's adaptive mechanism, but this does not mean that every cultural practice is necessarily beneficial at all times and under all circumstances. "... it may be necessary to identify specific cultural features as eufunctional, afunctional or dysfunctional in biological adaptation" (Hainline, 1965).

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