

Education of Women and Family Size in Two Micronesian Communities

LESLIE B. MARSHALL

College of Nursing, University of Iowa, Iowa City, Iowa 52242

and

MAC MARSHALL

Department of Anthropology, University of Iowa, Iowa City, Iowa 52242

Abstract—Household census and village records from two communities in Truk, Micronesia, were analyzed for marital history, number of children borne, educational attainment and current employment status for the 255 women residents aged 15–64. It was found that the proportion of women who were married in each community was lower among those with more education and among those who were either enrolled in school or currently employed outside the home. Current employment status was significantly associated with the attainment of more than an eighth grade education. Marital fertility was lower among younger women with more than an eighth grade education and among those employed in the wage economy at the time of the study. The published literature on employment, educational attainment and fertility was reviewed and compared with data obtained in this study in order to put the latter into a worldwide perspective. Differences between the two communities in attitudes toward and historical contacts with formal education were described. Small differences in the patterns of relationships among education, employment, marriage and fertility between the two communities were discussed, although no formal comparisons between them were attempted.

Introduction

Research in many parts of the world has shown that an increase in a woman's educational attainment is associated with important changes in her role in the family and society. The better educated woman tends to play a greater part in family decision-making, to work in nonsubsistence and higher status activities, and to bear fewer children (Rosen and Simmons, 1971; Piepmeier and Adkins, 1973; Janowitz, 1976). The inverse relation between education of women and fertility has been documented for developing and developed nations in most regions of the world (Janowitz, 1971; Ekanem, 1972; Piepmeier and Adkins, 1973; Glassman and Ross, 1978; Cleland and Rodríguez, 1980). However, the strength of the relationship, and sometimes even its existence, is affected by regional, historical and socioeconomic variables (Macisco, et al. 1969; Kiser, 1971; Janowitz, 1971, 1976; Simon, 1975; Fernando, 1977; Zei and Cavalli-Sforza, 1977; Cleland and Rodríguez, 1980). Knowledge of, attitudes toward, and practice of family planning techniques (modern or traditional) may also strongly influence the nature of the relationship (Cocharane,

1979). The relationship also is not obvious unless there is a wide range of educational attainment within the population under study (Knodel and Pitaktepsombati, 1973; Dow, 1971; Fernando, 1977).

It is only recently that attention has been given in the literature to the consequences of greater educational opportunities for residents of Micronesia. Hezel (1979) has documented what he calls the "education explosion" in Truk, and Marshall (1979a) has discussed some of the results of this "explosion" for social organization on a small atoll in Truk. Larson (1979) has examined the situation of Trukese college students in the United States and Ballendorf (1977) has forecast a "brain drain" from the islands. In this paper we explore a different aspect of this topic, namely, some of the changes for women associated with recent access to secondary and tertiary education in two communities in Truk State, Micronesia.

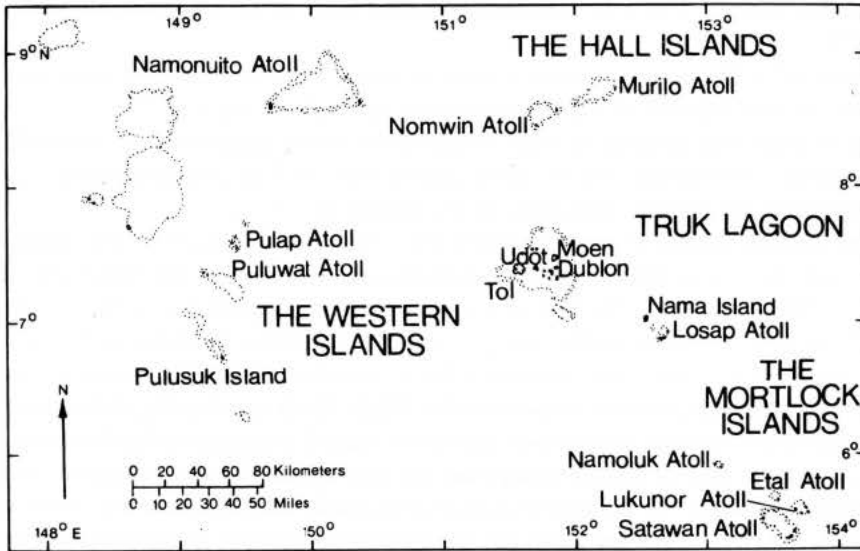
As a result of the recent expansion in educational opportunities for women in Truk, it has now become possible to investigate whether there exists an inverse relationship between education of women and fertility there. The existence of such a relationship at this point in time would have important consequences for the future population growth and social and economic development of Truk, which currently has an extremely high birth rate of approximately 4.5 per cent per annum.

Background

The two populations examined in this study are from the rural outer island of Namoluk Atoll and the suburban village of Peniyesene, the former situated 120 miles southeast of and the latter located just 5 miles outside the administrative and commercial center on Moen Island, Truk. Namoluk has an elementary school with grades 1 through 8. Following completion of eighth grade, Namoluk pupils must move away from the atoll to continue their education, returning home only for summer vacation, if then. Although Peniyesene has no elementary school of its own, youngsters from the village have access to two such schools within walking distance and some village children attend a third school in the downtown area. Upon finishing eighth grade, Peniyesene students can attend junior and senior high school on Moen and return to their homes each evening.

Universal primary education in Truk did not exist before the American administrative period which began in 1945. Prior to that time formal educational opportunities were very limited (Ramarui, 1976). Until the Japanese moved into the islands at the beginning of World War I, formal education was entirely in the hands of the Christian missions and, with rare exceptions, was comprised of only one or two years of primary school—enough to establish literacy in the vernacular and to calculate simple mathematics.

Upon receiving a League of Nations Mandate over the islands of Micronesia in 1921, the Japanese set about establishing a system of public education for the more promising pupils (Fischer, 1961). In most cases students were limited to three years of schooling; particularly bright pupils were rewarded with an additional two years and,



Truk State, Federated States of Micronesia

Source: Association for Social Anthropology in Oceania

following that, a tiny elite was sent off to Palau for special carpentry training. The primary mission of the Japanese schools throughout Micronesia was to implant Japanese culture through the teaching of Japanese language and aspects of Japanese history. Students also were taught basic mathematics, but little more.

Whether the American system of public education introduced after World War II ultimately will prove a blessing or a curse for Micronesians is a controversial subject (e.g., Nevin, 1977) but the system definitely has brought more and better educational opportunities to those islanders who have grown up in the postwar era. Hezel (1979) has divided education in Truk during the American period into five distinct phases:

- (1) 1947–1951. During this time an early teacher training school (PITTS) was founded on Truk to service the Trust Territory and it offered a curriculum designed to train islanders to teach elementary grades in their own community schools;
- (2) 1952–1964. Coinciding with the changeover from naval to civilian administration, a central, Trust Territory-wide high school (PICS) was established on Truk (where it remained until 1959 before moving to Ponape). In 1953, the Catholic Mission opened Xavier High School on Truk for boys from all districts of the Trust Territory;
- (3) 1965–1969. In 1965, both the district public high school (Truk High) and a high school operated by the Protestant Mission (Mizpah High) opened on Moen

Island. Mizpah was a coeducational, interdistrict institution which closed in 1972;

- (4) 1970–1973. During these years a series of junior high schools covering grades 9 and 10 were opened at subdistrict centers throughout Truk;
- (5) 1974–1980. The facilities at Truk High School were expanded to accommodate increased enrollment and a rapid growth occurred in post-secondary study opportunities abroad, especially in the United States.

This general history of formal education in Truk has followed different paths in the two specific communities under examination in this paper. On Namoluk, the Protestant Mission offered the first formal schooling in the person of a Mortlockese pastor from Oneop trained in the mission school for pastors. He came to Namoluk shortly before 1920, and soon thereafter began conducting classes in reading and writing based on the Trukese version of the Bible. He was a strong and dynamic personality and it is much to his credit that all of the old people alive on Namoluk in 1969 were literate in their own language. By the mid-to-late 1920s, a Japanese school was opened 50 miles away on Oneop (Lukunor Atoll) to which quite a few Namoluk youngsters were sent. However, most of the limited openings in the Japanese school were filled by boys and relatively few Namoluk girls went away to school. All but one of the Namoluk pupils who progressed beyond three years of Japanese school were boys. By late 1942, the Japanese became increasingly preoccupied with the war in the Pacific and classroom education for Namoluk pupils ceased, not to resume for nearly a decade when community schools were set up on the outer islands by the American administration. Since the early 1950s, Namoluk has had its own elementary school, first offering grades 1–6 and later grades 1–8. Until the opening of the junior high school on Satawan Atoll in 1970, Namoluk students who scored well enough on the competitive, district-wide high school admission test went to boarding school on Moen, Truk, for four years at either Truk High School, Xavier High School, or Mizpah High School. Since Satawan began accepting boarding students in 1970, Namoluk pupils have gone there for ninth and tenth grades before transferring to Moen to complete their high school. Increasingly from the late 1960s, substantial numbers of Namoluk's young adults have gone on to tertiary educational institutions for further training (see Marshall, 1979a).

We know little of education in Peniyesene during the early mission period, although it can be assumed that some persons from Peniyesene probably were trained in the Protestant Mission headquarters station established in the early 1880s 8 miles away at Anapau on Moen. However, based on the fact that many older persons in Peniyesene were illiterate in 1976, we can guess that mission education did not have as great an impact in Peniyesene as on Namoluk. The Japanese constructed an elementary school in Peniyesene during the early 1930s to serve several villages and this meant that many of Peniyesene's school-age children obtained at least three years of Japanese education during the 1930s. By the end of that decade, however, the ridges and hilltops near Peniyesene were being fortified by the Japanese military and with the outbreak of World War II a large concentration of Japanese troops was

billeted in the village. To make way for them, village people were forcibly relocated and the school ceased to function. The classroom building subsequently was destroyed by Allied bombs and has not been rebuilt. Informal classes were held in Peniyesene early in the American period but subsequently all school children from the village have attended public or parochial schools located elsewhere. Although Peniyesene students have easy physical access to junior and senior high schools on Moen, not as many have gained admittance by competitive examination as have their Namoluk counterparts. Compared with Namoluk, too, very few Peniyesene high school graduates have gone on for tertiary training.

Methods

The two populations to be analyzed here were chosen as examples—one rural and one suburban—from a single cultural group. The people in each community speak closely related languages that are mutually intelligible, they have had a long history of contact with each other, and there is a great deal of overlap between the matrilineal clans in the two communities as well as some intermarriage. The populations are not precisely equivalent because the basis for enumeration used in the two community censuses differed slightly, and no formal comparisons have been drawn between the two populations because of the differences in the manner of selection. The Namoluk population consists of a standard *de jure* count made of Namoluk persons regardless of location in March 1976. The Peniyesene population is made up of all persons who were resident in the village for one week or more during March 1976. There are three exceptions to this: we have added three women to the Peniyesene resident population who were away from the village in March 1976 but who usually resided there. These three women had attained much more education than most Peniyesene women and we felt that to exclude them from consideration would falsely skew the data, given the small numbers with which we are dealing.

Despite this difference in the method of enumeration, there are ethnographically sound reasons for treating these two populations as comparable units. For example, being a person from either Namoluk or Peniyesene is a meaningful social identity in Truk, each community has occupied a well defined territory for a long time, each community has its own established lineages and historical traditions, and the like. In both cases, the data to be presented below concern only the female members of these two communities aged 15 to 64 years.

Information regarding age, marital history, number of children ever borne, educational attainment and employment status as of March 1976 were obtained from household census records and genealogies collected by the authors in each community. We consider these data to be reliable. They were compiled from in-depth interviews with all adults in each community, cross-checked with key informants, compared with whatever written records existed, and followed up for clarification wherever conflicting information was encountered. In most cases data gathered from an individual were reconfirmed independently by other sources.

There were 126 women aged 15-64 in the Namoluk population and 129 in the Peniyeseone one. The women in these populations have been divided into standard five-year age cohorts which in turn have been grouped into three categories for purposes of discussion. These three categories correspond to the educational opportunities that were available to women at the time. 'Older women' were those over 40 years of age who obtained their education before or during the Japanese administrative period when no more than a few years of elementary education were available. 'Transitional women' were those between 30 and 39 years of age who were of school age during and immediately after World War II. Although the war disrupted the educational system completely, most of these women attended at least elementary school in the early years of the American administration. 'Younger women' were those aged 15 to 29, nearly all of whom had been enrolled in elementary schools in the American period and a majority of whom had progressed beyond the eighth grade in either an academic or a vocational program.

Results

Table 1 indicates the proportions of women in each age group in each community who either were students or were employed in the wage economy as of March 1976. Since only one 'older woman' was employed for wages, this group is not divided into cohorts here. Most women from these two communities who were employed for wages were between the ages of 20 and 40, and the great majority of

Table 1. Student and employment status by age, March 1976

Group	Age in years	NAMOLUK			PENIYESENE		
		No. students	No. employed	No. in cohort	No. students	No. employed	No. in cohort
Younger women	15-19	24	0	26	23	1	28
	20-24	4	3	18	6	6	25
	25-29	1	5	15	0	5	20
	Subtotal	29	8	59	29	12	73
Transitional women	30-34	0	2	13	0	2	8
	35-39	0	2	14	0	5	15
	Subtotal	0	4	27	0	7	23
Older women	Subtotal	0	1*	40	0	0	33
	Totals	29	13	126	29	19	129

* This woman, from the 55-59 year old age cohort, is employed on Guam, having been twice married to foreign nationals.

Table 2. Highest education attained by women by age, March 1976

Group	Age in years	NAMOLUK						PENIYESENE					
		None	Some elementary*	Some H.S./voc.	H.S. grad.	Post-secondary	No. in cohort	None	Some elementary*	Some H.S./voc.	H.S. grad.	Post-secondary	No. in cohort
Younger women	15-19	0	4	20	0	2	26	0	13	15	0	0	28
	20-24	0	7	4	4	3	18	0	12	7	5	1	25
	25-29	0	6	2	2	5	15	1	12	3	2	2	20
	Subtotal	0	17	26	6	10	59	1	37	25	7	3	73
Transitional women	30-34	1	10	1	1	0	13	0	5	2	0	1	8
	35-39	2	10	2	0	0	14	0	13	2	0	0	15
	Subtotal	3	20	3	1	0	27	0	18	4	0	1	23
Older women	40-44	6	5	0	0	0	11	2	4	0	0	0	6
	45-49	4	3	0	0	0	7	0	4	0	0	0	4
	50-54	3	3	0	0	0	6	1	4	0	0	0	5
	55-59	11	0	0	0	0	11	7	5	0	0	0	12
	60-64	4	1	0	0	0	5	6	0	0	0	0	6
	Subtotal	28	12	0	0	0	40	16	17	0	0	0	33
Total		31	49	29	7	10	126	17	72	29	7	4	129

* "Some elementary" means a woman has completed anything from grade 1 to grade 8; some high school means she has completed anything from grade 9 to grade 11; post-secondary means she has completed at least one semester's work at a tertiary institution.

those under age 20 were enrolled in school in March 1976. The similarities between the Namoluk and Peniyesene female populations with respect to both educational status and wage employment are striking when one considers that Namoluk is a rural outer island and Peniyesene is a part of the urban center. Each community had similar numbers of female students. The percentage of Peniyesene women in salaried jobs was only slightly higher than that of Namoluk women despite the easier access Peniyesene women had to such work in the port town.

Table 2 provides information on the amount of formal education Namoluk and Peniyesene women had acquired as of March 1976. Approximately two-thirds of the women had less than a ninth grade education (63 per cent for Namoluk; 69 per cent for Peniyesene). Twenty-eight per cent of the women in each population were high school graduates or had some high school or postprimary vocational training. Only 8 per cent of Namoluk women and approximately 3 per cent of Peniyesene women had attended college.

"Younger women" clearly have taken advantage of their greater access to formal education. For each study population, no woman in the "older" group had more than elementary level schooling and a large proportion had no formal education at all. Less than one-quarter of the women in the "transitional" group had more than an eighth grade education, although most had attended some elementary school. On the other hand, nearly three-fourths of the "younger women" on Namoluk and almost one-half of this group in Peniyesene had progressed beyond the eighth grade, and only one woman in either of these populations under age 30 (who was retarded) had no formal schooling. The number of those who had attended some high school or vocational school at the secondary level increased in each younger age cohort under age 35 in both populations, which is a reflection of the relative recency with which secondary education has become available to women in Truk. The greater number of students attaining secondary education in the Namoluk population is consistent with the greater emphasis placed on maximizing educational achievement in that particular community.

The strong positive relationship between attainment of some secondary education and current employment is shown in Table 3. The χ^2 -value for the relationship is significant beyond the level of $p=0.01$ for the Peniyesene population and beyond the level of $p=0.0005$ for the Namoluk population. A large proportion of the women in each population who had at least entered secondary school were employed at the time of this study (52 per cent of Namoluk women; 40 per cent of Peniyesene women). On the other hand, only 4 per cent of Namoluk women and 14 per cent of Peniyesene women with only elementary education were employed at the time. It should be noted here that most Namoluk women who have not progressed beyond eighth grade remain on the island where wage jobs are few, whereas Peniyesene women often can find unskilled jobs in the nearby town.

Almost every woman in both populations over the age of 30 was or at some time had been married. For this reason the data on marriage and educational attainment shown in Table 4 for the "transitional" and "older" groups have not been separated

Table 3. Employment status by education for women not attending school, March 1976

Education	NAMOLUK			PENIYESENE		
	Employed for wages	Not employed	No. in cohort	Employed for wages	Not employed	No. in cohort
Some high school or more	10	9	19	8	12	20
Some elementary or less	3	75	78	11	69	80
Total	13	84	97	19	81	100

χ^2 for Namoluk = 27.27
df = 1
p < .0005, one-tailed distribution

χ^2 for Peniyesene = 5.56
df = 1
p < .01, one-tailed distribution

into age cohorts. Because very few Peniyesene women and no Namoluk women under age 20 had married, the subtotals for the proportions of "younger women" ever married may be a bit misleading and a better picture of marriage patterns may be had by a closer examination of the 20-29 year olds in this group. In the 20-24 year cohort, marriage was much more common among those with only elementary education than among those who had obtained at least some high school. Among the 25-29 year olds, only those who had graduated from high school had a smaller proportion of married women. When the 20-29 year olds who had attended high school or had graduated are grouped according to whether or not they were enrolled in school in 1976, it is apparent that all those who were attending school were single, while approximately three-fourths of those who had left school were married in each study population. Four of the five women in the 15-19 year cohort who already had left school also were married. The only women who were married while attending school were three of the twenty-three Peniyesene women in the 15-19 year cohort who were enrolled in high school. Two of these were divorced within a year. This suggests that women in these two Trukese communities generally delay marriage until they are out of school. Actually, women in each of the 15-29 year old age cohorts in both populations are less likely to be married if they are at all occupied outside the home, as is indicated in Table 5. The negative relation of current wage employment of nonstudents to the proportion of women ever married is notable only in the Peniyesene 25-29 year old group, however.

Generally, women in these two communities have produced large families, which is in keeping with the very rapid expansion of the population of Truk over the past fifty years (Japan, 1931, 1937; USTTPI, 1973; Marshall, 1975; Nason, 1975). Few married women in either population were childless (6 per cent for Namoluk; 11 per cent for Peniyesene). Among Namoluk women aged 15-64 who had ever given birth, the average number of children borne was 4.7 per woman; the comparable figure for

Table 4. Proportion of women ever married by age and educational attainment, March 1976

Group	Age in years	NAMOLUK					PENIYESENE				
		None	Some elementary	Some H.S./voc.	H.S. grad. or more	Total proportion ever married	None	Some elementary	Some H.S./voc.	H.S. grad. or more	Total proportion ever married
Younger women	15-19	0/0	0/4	0/20	0/2	0/26	0/0	3/13	4/15	0/0	7/28
	20-24	0/0	6/7	1/4	3/7	10/18	0/0	10/12	0/7	4/6	14/25
	25-29	0/0	6/6	2/2	5/7	13/15	0/1	11/12	3/3	2/4	16/20
	Subtotal	0/0	12/17	3/26	8/16	23/59	0/1	24/37	7/25	6/10	37/73
Transitional women	Subtotal	2/3	18/20	3/3	1/1	24/27	0/0	18/18	4/4	1/1	23/23
Older women	Subtotal	27/28	11/12	0/0	0/0	38/40	16/16	17/17	0/0	0/0	33/33
	Total	29/31	41/49	6/29	9/17	85/126	16/17	59/72	11/29	7/11	93/129

Table 5. Proportion of women ever married by current employment or schooling (occupation outside the home) by age, March 1976

Group	Age in years	NAMOLUK			PENIYESENE		
		Occupied outside the home?			Occupied outside the home?		
		Yes	No	Total proportion ever married	Yes	No	Total proportion ever married
Younger women	15-19	0/24 ^a	0/2	0/26	4/24 ^d	3/4	7/28
	20-24	2/7 ^b	8/11	10/18	4/12 ^e	10/13	14/25
	25-29	4/6 ^c	9/9	13/15	2/5	14/15	16/20
	Subtotal	6/37	17/22	23/59	10/41	27/32	37/73
Transitional women	Subtotal	3/4	21/23	24/27	7/7	16/16	23/23
Older women	Subtotal	1/1 ^f	37/39	38/40	0/0	33/33	33/33
	Total	10/42	75/84	85/126	17/48	76/81	93/129

^a Twenty-four were unmarried students.

^b Four were unmarried students.

^c One was an unmarried student.

^d Twenty-three were students, three of whom were married.

^e Six were unmarried students.

^f One woman aged 55-59 married to a foreign national.

Peniyesene was 4.9. The average number of children borne per demonstrably fertile woman in each cohort increased with age of mother for women up to age 50 in both communities. Women terminated their childbearing by their mid-to-late forties.

Most but not all childbearing occurred within the marital union. Although all of the five never-married Namoluk women over age 30 had borne at least one child, none of the thirty-six unmarried women under age 30 had given birth. Three of the thirty-five unmarried women under age 30 in Peniyesene each had borne a single child.

A comparison between a woman's educational attainment and her marital fertility is presented in Table 6. Educational attainment is grouped in the table according to whether a woman progressed beyond the eighth grade or not for two reasons. First, so few of the younger women had either no formal schooling or had progressed beyond high school that, in order to have representatives in each educational group, the categories "no school" and "elementary education" were combined; likewise, the two educational groups which included women who had at least some secondary education were combined. Second, to graduate from a village elementary school and continue on at a larger school which drew its students from several different communities was a significant step for a young person, the more so

Table 6. Number of children borne by married women by educational level and age of mother, March 1976

Community and age cohort	Number of children borne by married women											
	Some elementary education or less						Some high school education or more					
	0	1-2	3-4	5-6	7+	average/woman ^g	0	1-2	3-4	5-6	7+	average/woman ^g
NAMOLUK												
15-19	0	0	0	0	0	0	0	0	0	0	0	0
20-24	0	3	2	1	0	3.0 (6)	0	4	0	0	0	1.5 (4)
25-29	1	0	2	3	0	3.7 (6)	1	3	2	1	0	2.4 (7)
30-34	1	2	2 ^a	3	2	4.2 (10)	0	1	1	0	0	2.5 (2)
35-39	0	0 ^b	4	2 ^c	4	5.6 (10)	0	1	1	0	0	2.5 (2)
40-44	1	1	3 ^d	1	4	5.6 (10)	0	0	0	0	0	0 (0)
45-49	0	0	2 ^e	0	4	7.3 (6)	0	0	0	0	0	0 (0)
50-54	0	2	0	1	3	5.2 (6)	0	0	0	0	0	0 (0)
55-59	0	4	2	2	3	4.3 (11)	0	0	0	0	0	0 (0)
60-64	1	0	1	1	2	5.8 (5)	0	0	0	0	0	0 (0)
PENIYESENE												
15-19	2	1	0	0	0	0.3 (3)	2	2	0	0	0	0.5 (4)
20-24	0	5	5	0	0	2.2 (10)	1	3 ^f	0	0	0	1.3 (4)
25-29	1	3	4	3	0	3.5 (11)	0	0 ^b	3	2	0	4.0 (5)
30-34	0	0	0	4	1	5.8 (5)	0	0	3	0	0	4.0 (3)
35-39	0	0	3	2	8	7.8 (13)	0	0	0	0	2	8.5 (2)
40-44	1	1	0	0	4	6.8 (6)	0	0	0	0	0	0 (0)
45-49	0	0	0	2	2	8.3 (4)	0	0	0	0	0	0 (0)
50-54	0	2	1	1	1	4.2 (5)	0	0	0	0	0	0 (0)
55-59	3	2	2	0	5	4.8 (12)	0	0	0	0	0	0 (0)
60-64	2	1	1	2	0	2.7 (6)	0	0	0	0	0	0 (0)

^a One unmarried woman with 3 children.

^b One unmarried woman with 1 child.

^c One unmarried woman with 6 children.

^d One unmarried woman with 3 children.

^e One unmarried woman with 4 children.

^f Two unmarried women, each with 1 child.

^g Number in parentheses indicates the number of married women in that age cohort and educational level.

since competitive examinations were required for entrance to secondary schools. Because of the small numbers and unequal distribution of women between the two groups, no statistical comparisons between groups can be made. Since very few women under age 20 had borne children and no woman over age 40 had attended secondary school, the data for women in the cohorts between 20 and 39 years are of greatest interest here.

That attainment of secondary schooling is associated with smaller average family size is tentatively suggested by the figures in Table 6. In the 20-24 year old age cohort in each population, an obvious difference between those with and without

Table 7. Average number of children borne by married women by employment status and age, March 1976^a

Age in years	NAMOLUK				PENIYESENE			
	Employed		Unemployed		Employed		Unemployed	
	No. in cohort	Marital fertility	No. in cohort	Marital fertility	No. in cohort	Marital fertility	No. in cohort	Marital fertility
15-19	0	0	0	0	1	0	6 ^b	0.5
20-24	2	2.0	8	2.5	4 ^c	2.5	10 ^c	1.7
25-29	4	2.3	9	3.3	2 ^c	1.5	14	3.9
30-34	1 ^d	1.0	11	4.2	2	4.0	6	5.5
35-39	2	4.0	10 ^e	5.3	5	4.8	10	9.5

^a In addition, one employed Namoluk woman in the 55-59 age cohort was married and had borne one child. Thus employed marital fertility for that cohort was 1.0 (N=1) and unemployed marital fertility for that cohort was 4.6 (N=10).

^b Three of these were currently enrolled in high school (fertility for those *not* in school was 0.3; for those in school was 0.7).

^c Plus one unmarried woman with one child.

^d Plus one unmarried woman with three children.

^e Plus one unmarried woman with six children and one unmarried woman with one child.

secondary education appears in the average number of children borne per woman. Furthermore, only the lesser educated women in this cohort had more than two children. The difference between the two groups of women in average family size continues to hold in later age cohorts for the Namoluk population. When the 25-29 year olds who have had some high school education in each population are divided into those who have and those who have not graduated from high school, graduates are found to have a smaller average marital fertility than nongraduates (1.8 versus 4.0 for Namoluk; 3.0 versus 4.7 for Peniyesene). These differences in marital fertility by educational attainment in the 20-29 year old cohorts in each population parallel the differences in marital status by education for these women. In general, the marital fertility among more educated Peniyesene women was discovered to be higher than among their Namoluk counterparts.

The average marital fertility in each age cohort in each population according to current employment status is presented in Table 7. As might be expected from the close relationship between educational attainment and employment status, marital fertility is generally lower among those currently employed than among those not employed for wages. Again, the numbers are too small to make any formal statistical comparison possible, and the older cohorts are very poorly represented.

Discussion

Many of the age-related activities of Namoluk and Peniyesene women were quite

similar. Many younger women, those born following World War II, had had the opportunity to attend secondary and even postsecondary schools. Almost all women under age 20 were still students. Women in their twenties were either attending school, working for wages, or more rarely, staying at home. Some transitional women, those who were young children during World War II, had occasionally had the opportunity to attend secondary school. At the time of this study, some of these women were employed for wages, but most were taking care of families at home. Older women, those over 40 years of age, had never had the opportunity to progress beyond elementary school and—with one exception—were not working outside the home. Current employment for wages was strongly associated with having attained more than an eighth grade education.

The ages at which women in these two communities began to build their families also were similar. There were very few marriages or children born to women under age 20. However, before reaching age 30, most women had married and borne children within the marital union. Few women over age 30 remained childless, even if not married. Average cumulative family size in these communities was just under five children; average completed family size would, of course, be higher.

The proportion of women who were married in each community was lower among the more highly educated and among those who were either in school or currently employed. The pattern of marriage in each age cohort according to educational attainment indicates that this lower proportion was due to postponement of marriage until the woman had left school.

Marital fertility was lower among younger women who had had more than an eighth grade education. This differential in fertility parallels the differential in marital status by level of educational attainment in each age cohort. The delay in age of marriage might be expected to decrease the number of children borne by married women in a particular cohort, since the number of childbearing years would thereby be reduced; however, shortening of birth intervals could override this effect. In the Peniyesene data, fertility differentials according to educational status are less marked or even reversed after age 25, suggesting a "catching up" effect. This effect, a delay in peak fertility age among those who have postponed the age at which they begin childbearing, has been reported for Egypt (El Attar, 1973) Puerto Rico (Godley, 1967), Pakistan (Stoeckel and Choudhury, 1969), and Britain (Piepmeir and Adkins, 1973).

Decreased fertility among better educated women also may be due to an increase in birth intervals or to a lowering of the age at which the last child is born. Whether or not the completed family size will actually be lower within better educated groups, or the birth intervals will be larger, or the women will complete their families sooner, cannot be assessed until these better educated women complete their families over the next two decades. Studies in other areas of the world indicate that the effect of increased education on family size is mediated mainly by delay in age at marriage or age at first childbirth (Godley, 1967; Janowitz, 1976; Johnson, 1976; Zei and Cavalli-Sforza, 1977), although Godley (1967) also has suggested earlier termination of

childbearing by better educated women.

Marital fertility also was lower among women who were employed in the wage economy at the time of the study. Because of the highly significant association between current employment and educational attainment beyond eighth grade, this effect was confounded with the effect of increased education on marital fertility. Because the numbers of women in each group in this study were so small, it was not possible to factor out the effects of these two variables statistically by holding one or the other constant while the other varied. However, there is evidence in the literature for independent effects of education and employment (e.g., Johnson, 1976; Weller, 1977; Cleland and Rodríguez, 1980).

The influence of a woman's employment on her fertility has been under worldwide investigation for many years. The effect of employment on fertility appears to vary with the nature and status of the job and with place of residence. In a review of the literature, Piepmeier and Adkins (1973) reported that lower fertility was associated with employment only for urban or upperclass women in developed nations where the role of worker was incompatible with raising small children. For other women, who had no choice but to work, there was no association. In an interim report on the World Fertility Survey, Cleland and Rodríguez (1980) indicated that nonagricultural wage work had the strongest negative effect on fertility. The effect of family or farm work was variable. Gendell, et al. (1970) have proposed that there is a selection of subfecund women into the labor force for certain types of employment, e.g., live-in domestic servants. Cleland and Rodríguez (1980), however, still found a negative relationship between employment and fertility even after controlling for effects of subfecundity, urban residence, level of education, and husband's socioeconomic status. Among Mexican-American women in the southwestern United States, the effect of wage employment was to decrease fertility in older age cohorts regardless of educational background (Johnson, 1976). This suggested that wage earning women curtailed their childbearing at an earlier age. The decreased fertility found among employed women in the Trukese communities in all age cohorts may have been due to the combined negative effects of education (on early fertility) and employment (on late fertility).

Increased education of women may influence fertility in a number of ways in Truk as in many other parts of the world. By keeping women out of the pool of marriageable candidates for a longer period, by giving them skills they need to support themselves rather than being dependent on a man, and by acquainting them with a wider variety of men, education may delay the age or decrease the frequency of marriage (Piepmeier and Adkins, 1973; Janowitz, 1976; Fernando, 1977; Ratcliffe, 1978). Generally, a more educated woman will marry a more highly educated husband and will also, on her own, have greater social mobility. Having a more educated husband and being in a higher socioeconomic class also have been associated with lower fertility, and offer a woman a less traditional social support system (Piepmeier and Adkins, 1973; Ratcliffe, 1978). A more highly educated woman has greater opportunities to obtain wage employment, especially in higher

salaried, higher status jobs (Rosen and Simmons, 1971; Peipmeier and Adkins, 1973; Janowitz, 1976; Fernando, 1977). This, in turn, gives her an increased value in her family. Her increased value, coupled with a less traditional husband and less traditional model peers, allows a woman a greater voice in family decision-making, e.g., concerning allocation of resources and child spacing (Rosen and Simmons, 1971). With increased education also comes an increased awareness of the potential for departures from the traditional in her own role (Janowitz, 1976; Zei and Cavalli-Sforza, 1977), an awareness which is more likely to be supported by a less traditional husband and peer group. A more educated person also tends to place a higher value on education. Thus, the more educated woman is more likely to encourage her children to continue their schooling rather than to contribute to family subsistence or income while they are young. This, in turn, makes each child more expensive to raise and dampens the motivation to generate one's own supply of child labor (Zei and Cavalli-Sforza, 1977). School curricula also provide a fair amount of information on health care and bodily function. An increased knowledge of nutrition, hygiene, and sanitation obtained in school, coupled with the personal affluence necessary to put the knowledge into practice, has been associated with a decline in infant mortality (Khalifa, 1976; Zei and Cavalli-Sforza, 1977; Ratcliffe, 1978; McDermott, 1980), which has been shown to be strongly related to decreased fertility in a population (Janowitz, 1971; Ekanem, 1972; Glassman and Ross, 1978). A knowledge of human reproductive function will increase a couple's understanding of how to use contraceptive technology correctly. A number of knowledge—attitude—practice (KAP) surveys have found knowledge, as well as use, of contraceptive devices to be directly related to level of education (Knodel and Pitaktepsombati, 1973; Khalifa, 1976).

The effects of employment in the wage economy on fertility also may be mediated in a number of ways. Age at first marriage is raised and frequency of marriage is decreased among working women (Weller, 1977) for many of the same reasons as among more educated women. Through increased interests outside the home and a more diverse group of social contacts, a woman (single or married) may become increasingly aware of alternatives to motherhood (Groat, et al., 1976; Weller, 1977). By bringing home a paycheck, a woman increases her direct contribution to family income (Janowitz, 1976; Weller, 1977). This may not only increase her status and decision-making power within the family, as was mentioned above, but it also alters family spending patterns so that the woman's contribution to family income becomes needed and she continues to work outside the home. Increased duration of employment has been found to be related to decreased fertility (Groat et al., 1976). Caring for children is definitely incompatible with the inflexible hours which must be spent away from home to meet the demands of most jobs (Weller, 1977), and paying for childcare makes each child more expensive to raise.

Most wage jobs are available only in urban areas. In the urban situation, children are more expensive to raise because of the need to buy food and more elaborate clothes and to pay school fees. There is also less need for children's labor in

a nonagricultural setting, and children may be forbidden by law to work for wages. In addition, the increased opportunities available in a city produce a future orientation and a tendency to plan one's life. One no longer needs to accept fate passively (Rosen and Simmons, 1971).

In the study reported here, cumulative family size was used as a measure of fertility. It included all children ever born to a woman in the study populations before March 1976, and thus is dependent on past decisions and achievements.

Since marital fertility is reported here, it would have been important to standardize the data according to duration of marriage. However, the exact beginning dates for marriages in Truk are often fuzzy—although everyone is quite clear about who is currently or has at some time been married. Data were standardized into age cohorts for several reasons. Birthdates were generally well-established through island records and well-remembered through the emphasis placed on them by the church missions and foreign administrations over the past eighty years. As age increased, the opportunity to bear children obviously increased. Finally, the older a woman was, the less opportunity she had had for secondary education.

In using ever-married instead of currently-married status, this study has provided a measure of those who have at some time entered into a socially recognized union in the two communities, whether or not that union was officially recognized by church or state. No attempt was made to separate out those who were later divorced or widowed. Since ever-married status was used to determine marital fertility (children ever born to women ever married), a few children born out of wedlock before, during, or after a marriage may have been included in the measure. Not all of these cases could be identified reliably, so they were not separated out. While marital fertility was used for the sake of comparability with other studies, notes have been included with Tables 6 and 7 indicating the number of children born to never-married women to provide estimates of total fertility. Including children of never-married women did not change the relationships reported here.

The measure of educational attainment depends on past accomplishments, just as does cumulative family size. Breakpoints in the continuum of amount of formal schooling were arbitrarily set for purposes of analysis. These breakpoints were set at times when a woman was most likely to drop out of the educational system, either because successful completion of an examination was required to continue or because continuation would mean moving further from home. The collapsing of two or more smaller educational categories into a single one in some of the tables was necessary because of the small numbers in each group. Other studies have reported similar effects of education on fertility occurring at similar breakpoints, generally at the termination of primary and of secondary school (Husain, 1970 for India; El Attar, 1973 for Egypt; Piepmeier and Adkins, 1973; Fernando, 1977 for Sri Lanka; Rizk, 1977 for Jordan). Fernando (1977) reported an additional breakpoint at the end of the first two years of secondary schooling. Janowitz (1976) found breakpoints in the effect for women in the U.S.A. at graduation from secondary school and from

college. In Thailand, the breakpoint occurred at the end of the four years of compulsory education (Knodel and Pitaketsombati, 1973). These breakpoints generally are times of progressing beyond what is legally required and/or convenient for the family. These also are times of transition in exposure to increasingly heterogeneous peers and subject matter of instruction.

The measure of current employment is not dependent on past activities and does not reflect the number of women who have ever worked. Nor does it take into account the continuity or duration of employment, which have been shown in the U.S.A. to be important to family planning decisions (Groat et al., 1976). For younger women in the two Trukese communities, the measure of who is working probably reflected who has been working during the postschool, early family-building years. For older women, the measure also picked up women who started work later in life, perhaps after their families were well-started, but missed those women who worked during their early childbearing years and have now retired. However, such cases were extremely rare. Both of these groups are likely to be important, since wage work has been associated with the age at marriage (Weller, 1977)—and early childbearing, as well as with the age at completion of childbearing (Johnson, 1976). Before any causal relationships between employment and cumulative family size can be postulated, data relating the timing of past employment and childbearing episodes must be obtained. However, current employment is a commonly reported variable, and an inverse relationship between current employment and various measures of fertility has been found in Guatemala (Gendell et al., 1970) and the U.S.A. (Johnson, 1976; Weller, 1977), just as was described here for Truk.

The orderly differentials in marital fertility by education or by current employment found for Namoluk women were not quite so clearcut for Peniyese women. Peniyese youth were under much less pressure to achieve in the academic setting than were their Namoluk counterparts, perhaps because they had not had the long close contact with a community school of their own. Far fewer Peniyese youth than Namoluk youth had graduated from high school or attended postsecondary schools. Success or failure in school was not so great a concern to members of the Peniyese community and nonschool activities often took up a greater proportion of a young person's time. Peniyese women attended secondary school or worked in town, which was less than a 5 mile walk or taxi ride from their homes. They were able to return to their extended families after school or work each evening. Relatives were readily available for assistance. Therefore, there were fewer conflicts between having young children and being able to attend school or hold a job. Experienced and trusted childcare was readily available for Peniyese women without the need for extended separation from their children.

In order to attend secondary school or to work for wages, in most cases Namoluk women, unlike Peniyese women, had to leave their close female relatives on whom they would be most likely to rely for childcare. Most women's mothers, grandmothers and older 'sisters' remained on the atoll which was 120 miles distant over open ocean from the port town where the high schools and most jobs are

located. If they left their children behind with these relatives, as some did, they were separated from them for many months at a time. Not only might their relatives living in town be too busy caring for their own children to regularly look after the child of a more distant kinswoman, but few Namoluk persons had access to land on Truk. This meant that Namoluk persons resident in the port town had no subsistence gardens or reefs on which to draw for food and must rely solely on wage income for food and other family expenses. Under these circumstances caring for someone else's child could become quite burdensome and Trukese do not pay one another for childcare. Thus it was not surprising that young Namoluk women postponed childbearing until they were married and had a greater pool of kin around for assistance, or until they had returned to their close relatives on Namoluk. However, they were frequently and strongly urged to attend high school in town and to perform well there since a good education makes a woman a better "catch" on the marriage market in contemporary Truk (Marshall, 1979b). The cash which they remitted to their kin back home from salaried jobs in town also was greatly appreciated. These differences between certain social and cultural features of the two study populations may in part explain the differences between the two communities in the strengths of the relationships between education and employment on the one hand and fertility on the other.

Conclusions

Elsewhere in the world, increased education for women has been associated with a lowered birth rate and the data from Namoluk and Peniyesene suggest the beginnings of such a trend in Truk. At this time it cannot be determined whether increased educational opportunities in Truk have caused a drop in fertility or whether other factors bringing about the increased opportunities for women also have led to the decline in fertility. Nor is it possible at this time to specify the impact of female participation in wage labor either on fertility or on the relationship between education and fertility. In order to document a trend toward lower fertility among more highly educated women in Truk, to indicate any causality in this relationship, and to factor out other important influences, such as changing employment and residence patterns or alterations in available, acceptable family planning methods, a large scale—preferably longitudinal—study is called for.

In our opinion, the mechanisms of the associations among education, employment and fertility in all of Micronesia should be explored further to guide policy making in this era of tighter budgets and of predictions of population outgrowing available resources. For example, should resources be allocated to continue to support women pursuing education away from home in secondary and postsecondary schools, thereby delaying age at marriage? Or should they be allocated to increase employment opportunities for women, thereby competing with childcare responsibilities? Or should they be allocated to alter local school curricula to emphasize concepts of expanded women's roles, thereby making alternatives to motherhood more attractive? Or should they be allocated to make family planning

methods more available and acceptable to both women and men? What would be the effects of these changes on variables other than fertility? Further research is necessary before informed decisions on these topics can be made. Hopefully, the preliminary findings and discussion presented here will stimulate such research.

ACKNOWLEDGEMENTS

This paper is based on research conducted for seven months during 1976 on Moen, Truk, with a Faculty Research Assignment from the University of Iowa and a grant from the American Philosophical Society (Johnson Fund). Prior fieldwork was carried out by the authors on Namoluk Atoll for eighteen months between 1969 and 1971 with the support of the National Institute of Mental Health (MH 11871-01 and MH 42666-01) and the Department of Anthropology, University of Washington. An earlier version of this paper was read at the 8th Annual Meeting of the Association for Social Anthropology in Oceania in 1979 in Clearwater, Florida.

References Cited

- Ballendorf, D. A. 1977. Education in Micronesia: Is there a brain drain coming? *Micronesian Perspective. A Contemporary Review* 1(1): 4-8.
- Cleland, J. G., and G. Rodríguez. 1980. How women's work and education affects family size. *People [International Planned Parenthood Federation]* 7(4): 17-18.
- Cocharane, S. H. 1979. *Fertility and Education—What Do We Really Know?* Johns Hopkins University Press, Baltimore.
- Dow, T. E., Jr. 1971. Fertility and family planning in Sierra Leone. *Studies in Family Planning* 2(8): 153-165.
- Ekanem, I.I. 1972. A further note on the relation between economic development and fertility. *Demography* 9(3): 383-398.
- El Attar, M. E. 1973. Differential fertility in the Arab Republic of Egypt. *Social Biology* 20(3): 323-334.
- Fernando, D. F. S. 1977. Female educational attainment and fertility. *Journal of Biosocial Science* 9(3): 339-351.
- Fischer, J. L. 1961. The Japanese schools for the natives of Truk, Caroline Islands. *Human Organization* 20(2): 83-88.
- Gendell, M., M. N. Maraviglia and P. C. Kreitner. 1970. Fertility and economic activity of women in Guatemala City, 1964. *Demography* 7(3): 273-286.
- Glassman, M. B., and J. A. Ross. 1978. Two determinants of fertility decline: A test of competing models. *Studies in Family Planning* 9(7): 193-197.
- Godley, F. H. 1967. Fertility and educational attainment, Puerto Rico, 1962. *Vital Health Statistics, Series 21*(12): 1-20.
- Groat, H. T., R. L. Workman and A. G. Neal. 1976. Labor force participation and family formation: A study of working women. *Demography* 13(1): 115-125.
- Hezel, F. X. 1979. The education explosion in Truk. *Pacific Studies* 2(2): 167-185.
- Husain, I. Z. 1970. Educational status and differential fertility in India. *Social Biology* 17(2): 132-139.
- Janowitz, B. S. 1971. An empirical study of the effects of socioeconomic development on fertility rates. *Demography* 8(3): 319-330.
- . 1976. An analysis of the impact of education on family size. *Demography* 13(2): 189-198.
- Japan, Nanyō-chō (South Seas Bureau). 1931. *Nanyō Gunto Tōsei Chōsa-sho, Showa 5 nen.* [A summary of conditions in the Japanese mandated territories, 1930]. 4 vols. Nanyō-chō, Palau.

- . 1937. *Nanyō Gunto Tōsei Chōsa-sho*, Showa 10 nen. [A summary of conditions in the Japanese mandated territories, 1935]. 2 vols. Nanyō-chō, Tokyo.
- Johnson, C. A. 1976. Mexican-American women in the labor force and lowered fertility. *American Journal of Public Health* 66(12): 1186–1188.
- Khalifa, A. M. 1976. The influence of wife's education on fertility in rural Egypt. *Journal of Biosocial Science* 8(1): 53–60.
- Kiser, C. V. 1971. Educational differentials in fertility in relation to the demographic transition. Pages 1926–1935. In *International Population Conference, London, 1969*. Volume 3. International Union for the Scientific Study of Population, Liege.
- Knodel, J., and P. Pitaktpsombati. 1973. Thailand: Fertility and family planning among rural and urban women. *Studies in Family Planning* 4(9): 229–255.
- Larson, R. B. 1979. *Between two cultures: Trukese college students in the United States*. Univ. Iowa, M.A. Thesis.
- Macisco, J. J., Jr., L. F. Bouvier and M. J. Renzi. 1969. Migration status, education and fertility in Puerto Rico, 1960. *Milbank Memorial Foundation Quarterly* 47(2): 167–187.
- McDermott, W. 1980. Pharmaceuticals: Their role in developing societies. *Science* 209: 240–245.
- Marshall, M. 1975. Changing patterns of marriage and migration on Namoluk Atoll. Pages 160–211. In Vern Carroll (ed.), *Pacific Atoll Populations*. ASAO Monograph No. 3. University Press, Hawaii, Honolulu.
- . 1979a. Education and depopulation on a Micronesian atoll. *Micronesica* 15(1–2): 1–11.
- . 1979b. *Weekend Warriors: Alcohol in a Micronesian Culture*. World Ethnology Series. Mayfield Publishing Co., Palo Alto.
- Nason, J. D. 1975. The strength of the land: Community perception of population on Etal Atoll. Pages 117–159. In Vern Carroll (ed.), *Pacific Atoll Populations*. ASAO Monograph No. 3. University Press, Hawaii, Honolulu.
- Nevin, D. 1977. *The American Touch in Micronesia*. W. W. Norton & Co., New York.
- Piepmeyer, K. B., and T. S. Adkins. 1973. The status of women and fertility. *Journal of Biosocial Science* 5(4): 507–520.
- Ramarui, D. 1976. Education in Micronesia: Its past, present and future. *Micronesian Reporter* 24(1): 9–20.
- Ratcliffe, J. 1978. Social justice and the demographic transition: Lessons from India's Kerala state. *International Journal of Health Services* 8 (1): 123–144.
- Rizk, H. 1977. Trends in fertility and family planning in Jordan. *Studies in Family Planning* 8(4): 91–99.
- Rosen, B. C., and A. B. Simmons. 1971. Industrialization, family and fertility: A structural-psychological analysis of the Brazilian case. *Demography* 8(1): 49–69.
- Simon, J. L. 1975. Puzzles and further explorations in the interrelationships of successive births with husband's income, spouse's education and race. *Demography* 12(2): 259–274.
- Stoekel, J., and M. A. Choudhury. 1969. Differential fertility in a rural area of East Pakistan. *Milbank Memorial Fund Quarterly* 47(2): 189–198.
- United States Trust Territory of the Pacific Islands (USTTPI). 1973. *1973 Population of the Trust Territory of the Pacific Islands*. Office of the High Commissioner, Saipan.
- Weller, R. H. 1977. Wife's employment and cumulative family size in the United States, 1970 and 1960. *Demography* 14(1): 43–65.
- Zeig, G., and L. L. Cavalli-Sforza. 1977. Education and birth control. *Genus [Roma]* 33(1–2): 15–42.