THE RELATION OF FERTILITY TO SELECTED SOCIO-ECONOMIC FACTORS

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SOCIO-ECONOMIC FACTORS

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CHAPTER I

NATURE OF THE PROBLEM

Introduction

There has long been considerable interest in the fertility patterns of American women. As a result, probably more is known about the fertility and family planning of the American population than about that of any other country in the world.[1] One main area of interest in the fertility patterns of American women has been the relationship between fertility and socio-economic status. Studies of the fertility of socio-economic strata of the American population are abundant in demography and constitute one of the main foundations of the sociologist's interest in the areas of fertility.

Review of Previous Studies

American studies of family planning and fertility are basically of two types. The first type includes special field studies which usually base their findings on data compiled from information collected from individuals. While these special field studies have been unusually

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[1] Ronald Freedman, "American Studies of Family Planning and Fertility: A Review of Major Trends and Issues," Research in Family Planning, Clyde V. Kiser, ed. (Princeton, New Jersey: Princeton University Press, 1962), p. 211.

extensive and intensive in the United States, they still derive much of their meaning from amplifying and interpreting the trends developed from official data which are more massive and regular, if limited in the variables treated.[2]

One of the most famous of the field studies was the study carried out by Whelpton and Kiser called "Social and Psychological Factors Affecting Fertility," better known as the "Indianapolis Study." This study's field work was carried out in 1941, in Indianapolis, Indiana, and involved interviews with 1,444 "relatively fecund" couples. The general aim of the study was to learn something about the social and psychological correlates of family planning and the size of planned families.

Because of the nature of this thesis, the interest in the Indianapolis study concerns the social factors affecting fertility, rather than the psychological ones. One of the main findings of the study, the familiar inverse relationship of fertility to socio-economic status, was rather sharply manifested by the total sample of 1,444 couples.[3] Kiser and Whelpton did find, however, that among those couples practicing contraception well enough to effectively plan and space their children, fertility rates were directly related, instead of inversely related to socio-economic status.[4] This was especially true when

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[2] Ibid., p. 220.

[3] Pascal K. Whelpton and Clyde V. Kiser, eds., Social and Psychological Factors Affecting Fertility, Milbank Memorial Fund (New York, Five volumes published in 1946, 1950, 1952, 1954, and 1958).

[4] Pascal K. Whelpton and Clyde V. Kiser, "Resumé of the Indianapolis Study of Social and Psychological Factors Affecting Fertility," Demographic Analysis, Joseph J. Spengler and Otis Dudley Duncan, eds. (Glencoe, Illinois: The Free Press, 1956), p. 258.

husband's income was used as a measure of socio-economic status. The Indianapolis study could explain only a small portion of the fertility variation of the 1,444 couples, but most of the explanation finally achieved was attributable to socio-economic status.[5]

A more recent study that examined the relationship of socio-economic status and fertility was the "Growth of American Families" study sponsored by the Scripps Foundation and the University of Michigan. Whelpton, Campbell, and Freedman, the principal investigators of this research, conducted two studies: one in 1955, another in 1960. These studies were the first nationwide studies of factors affecting the control of fertility in the United States. The 1955 sample of women consisted of 2,713 white wives, 18-39 years old. The 1960 sample consisted of 2,400 women with the same characteristics as those chosen for the 1955 study. They also studied 300 non-white women, married, aged 18-39 years; and finally, 600 women whose marital status had changed since 1955.

In regard to certain socio-economic factors, the latter study found an important association between women's educational attainment and the ability to control fertility. The authors found that the proportion of wives having more children than they wanted rose from only 10 per cent for the college group to 30 per cent for the grade school group.[6]

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[5]Ronald Freedman, "American Studies of Family Planning and Fertility: A Review of Major Trends and Issues," p. 220.

[6]Pascal K. Whelpton, Arthur A. Campbell, and John E. Patterson, Fertility and Family Planning in the United States (Princeton, New Jersey: Princeton University Press, 1965), p. 100.

Whelpton and his associates also found a strong association between the wife's work experience and fertility. The wives who had worked after their marriages had not only had fewer births by 1960 than those who had not worked, but also had had significantly smaller completed families.[5] The factor of the wife's employment history also appeared to be the primary cause of the relatively strong inverse relationship between family income and fertility. The authors observed that "in many cases, a higher family income simply reflected the fact that the wife as well as the husband was gainfully employed, and the wives who work tend to have fewer children than wives who do not work."[8]

The authors of the "Growth of American Families" study also found differences in fertility between urban and rural women, with the rural group expecting and having more children than the urban group. The authors found, however, that these differences were no longer as significant as they once were, primarily because urban women were expecting larger families than in the past.

In another analysis of the data collected by Freedman, Whelpton, and Campbell in 1955, Deborah S. Freedman examined the relationship of fertility and two economic variables--one, the husband's annual income, and the other, the wife's participation in the labor force. This study is of particular interest because of the statistical procedure used. The method of multivariate analysis is similar to the statistical procedure used in the present study. Deborah Freedman

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[7] Ibid., p. 124.

[8] Ibid., p. 106.

found that husband's income was significantly related to fertility, but the relationship was inverse rather than direct; she also found that a long work history for the wife is associated with fewer children.[9]

Another major study which, as one of its objectives, examined the relationship of fertility and socio-economic status was the "Family Growth in Metropolitan America" study, better known as the "Princeton Study." Westoff, Potter, and Sagi, the principal investigators, selected a sample of 1,165 couples living in the largest metropolitan areas in the country.

The Princeton Study found in its particular sample that socio-economic status was less strongly related to fertility than was religion; but, when examining Protestants alone, certain relationships did occur between socio-economic status and fertility.[10]

Among Protestants they found a negative correlation between education and fertility. But in the relationship of fertility planning with the socio-economic factors of income and education, only income seemed to be inversely related to fertility planning; that is, as income for Protestants increases, there seems to be a desire for a smaller family.[11]

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[9]Deborah S. Freedman, "The Relation of Economic Status to Fertility," American Economic Review, vol. 63, No. 3 (June, 1963), pp. 418-419.

[10]Charles F. Westoff, Robert G. Potter, and Phillip Sagi, The Third Child, (Princeton, New Jersey: Princeton University Press, 1963), p. 239.

[11]Ibid., p. 129.

In a 1959 study, David Goldberg also was interested in the relationship of fertility and socio-economic status. He examined data on married couples in the Detroit area that were collected from 1952 to 1958. He found that among all couples included in the sample, there occurred the traditional inverse relationship between socio-economic status and fertility. But among couples who were at least two-generation urbanites, the fertility patterns of different income groups were much the same and, in some cases, there was a reversal of the traditional inverse relationship between income and fertility. Goldberg found that none of the differences in income of the two-generation urbanite couples were statistically significant.[12]

In Goldberg's research only education survives as a status variable capable of differentiating levels of fertility among two-generation urbanites, and even these differences are not always statistically significant. According to Goldberg,

> "Previous studies have consistently shown an inverse relationship between fertility and socio-economic status. These data (the Detroit data) seem to suggest that we have, in effect, been looking at urban-rural differences when we were attempting to examine socio-economic differences."[13]

The second group of studies of family planning and fertility is based upon information derived from official government reports such as the decennial censuses, the interim Current Population Surveys, and birth registration statistics.

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[12]David Goldberg, "Fertility of Two-Generation Urbanites," Population Studies, vol. 12, no. 3, (March, 1959), p. 216.

[13]Ibid., p. 218.

Grabill, Kiser, and Whelpton carried out an extensive study of fertility in the United States using decennial census data, particularly for the years 1910, 1940, and 1950. They also were interested in the relationship between fertility and socio-economic status. Two important criteria of socio-economic status they paid special attention to were place of residence (whether urban or rural) and the educational attainment of women.

Grabill and his associates found the traditional pattern of higher rural fertility than urban fertility, but that these differences had narrowed considerably over the years.[14] They also found that this narrowing was due more to a decline in rural fertility rates than to an increase in urban fertility rates.

In the same study, the number of years of school completed by the wives was related to the number of children ever born and also to the number of children under five years of age in the fertility tabulations for 1950. They found an inverse relationship between educational attainment and fertility, but they also found a substantial narrowing of the fertility differentials by education since 1940. Among some of the urban white women who were in the upper educational classes, there was a direct relation of fertility rates to educational attainment.[15]

In a more recent study using 1960 Decennial Census data, Phillip R. Kunz was able to compile evidence to show that there has been a reversal

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[14]Wilson H. Grabill, Clyde V. Kiser, and Pascal Whelpton, The Fertility of the American Woman (New York: John Wiley and Sons, 1958), p. 83.

[15]Ibid., p. 387.

of the historic inverse relationship between income and fertility. Using a five per cent national sample of urbanized women whose husbands had the same type of social characteristics, but varied in income, he found that not only is the inverse relationship not always present, but also that "women marrying at twenty-two years of age and after show a strong positive relationship between income and fertility."[16]

The Present Study

Past research into the relationship of fertility and socio-economic factors has usually shown that certain socio-economic factors do account for some of the variation that occurs in the fertility patterns of American women. While earlier studies usually confirmed the commonly accepted inverse relationship between fertility and such measures of socio-economic status as education, income, and residence (whether urban or rural), more recent studies have documented a definite contraction of almost all differences in fertility. These studies have also shown that these differentials have not only narrowed but, in some cases, there has been a reversal of the traditional inverse relationship between fertility and certain measures of socio-economic status.

This study will examine the fertility patterns of Oklahoma and Kansas women based upon the aggregate fertility of separate counties and cities within these two states. The information will be compiled from the Decennial Census of 1960. The primary objective of the study

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[16]Phillip R. Kunz, "The Relation of Income to Fertility," Journal of Marriage and the Family, vol. 27, No. 4, (November, 1965), p. 509.

is to determine if, as previous studies have shown, certain socio-economic factors are accounting for a portion of the fertility differences occurring between the counties and the cities. If socio-economic factors are found to be contributing factors of fertility differences, a second objective of the study will be to determine the direction of the relationship between fertility and the socio-economic factors.

The following socio-economic factors are to be examined for their possible relationship to fertility differences among the cities: (1) male income, (2) femal education, and (3) per cent of women in working force. Fertility differences of the counties will be analyzed for their relationship to: (1) male income, (2) female education, (3) male education, (4) per cent of women in working force, and (5) per cent of county population classified urban.

Two other social factors, religion and race, have often been examined for their possible relationship to fertility. But in this particular study they have been omitted because the Kansas and Oklahoma cities and counties selected for this study are predominantly white and Protestant.

Limitations of the Study

Because the study will deal exclusively with data representing aggregates of persons on the county and city level, the finding can only be interpreted as applying to fertility behavior and social characteristics of aggregates of persons and not to individual behavior or characteristics.

Another limitation is that the study does not represent the current fertility patterns of Oklahoma and Kansas women, since the data used for the study came from the 1960 Decennial Census.

CHAPTER II

METHODOLOGY

Selection of Cities and Counties

This study attempted to examine the relationship of certain socio-economic factors to the fertility patterns of Oklahoma and Kansas women. These two states were chosen for the study because both are predominantly white and Protestant. Therefore, the possible relationship between fertility and the social factors of religion and race is minimized.

Two types of populations in the states were selected for analysis. The first type consisted of urban areas of at least 10,000 persons. Cities of this size were chosen because the decennial census, which was the source of information for this study, gave more details concerning the social characteristics of cities of that size than it gave for smaller urban places. In Kansas and Oklahoma all cities whose populations were at least 10,000 according to the 1960 Decennial Census were selected for examination. There were fifty-five cities meeting the above requirement; these can be found in Appendix A.

Since one of the aims of this study was to discover whether or not residence (whether urban or rural) had any effect on fertility, 110 counties in Oklahoma and Kansas were also selected for analysis. Both predominantly urban and predominantly rural counties were included within

this group. The only criterion used in the selection of these counties was that each have at least 68 per cent of its females, 14 years and over, married by 1960. This requirement was set to exclude those counties whose small number of married females could account for low fertility within those counties. A list of the counties selected for analysis appears in Appendix B.

Source and Type of Data

All data concerning the cities and counties of the study were obtained from the United States Bureau of the Census, 1960: Census of Population, Volume I, Characteristics of the Population; Part 38, Oklahoma, and Part 18, Kansas. The data to be compiled were treated as continuous variables.

Research Procedures

The measurement of fertility for each of the 55 cities and 110 counties was the "fertility ratio" which is the number of children under five years of age per one thousand women 15 to 49 years of age.[1] This particular fertility measure was used because it most nearly describes recent fertility in the cities and counties under study. The fertility ratio was the dependent variable.

The following socio-economic factors were selected to be examined as independent variables in association with fertility variations among the 55 cities: (1) median income of males in the city, (2) median

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[1] United States Bureau of the Census, 1960: Census of Population, Volume I, Characteristics of the Population; Part 38, p. 27.

school years completed by females in the city, and (3) per cent in the labor force of married women with husband present.

For the counties the socio-economic factors selected as independent variables were: (1) median income of males in the county, (2) median school years completed by males in the county, (3) median school years completed by females in the county, (4) per cent of married women with husband present in the labor force, and (5) per cent of the county's population classified as urban.[2]

In addition to the above independent variables being examined, the interaction effect of male income and per cent of female employed on fertility was also considered for both the cities and the counties. No other factor interactions were included in this study.

Hypotheses

The following research hypotheses were derived for examination of the fertility differences among the cities:

1. Male income is a factor contributing to fertility differences among the cities.
2. Female education is a factor contributing to fertility differences among the cities.
3. Percentage of married females employed in the working force is a factor contributing to fertility differences among the cities.
4. The two factor interaction of male income and percentage of females working is a factor contributing to fertility differences

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[2] Ibid., p. XVII.

among the cities.

The research hypotheses considered in the examination of the counties are as follows:

1. Male income is a factor contributing to fertility differences among the counties.

2. Male education is a factor contributing to fertility differences among the counties.

3. Female education is a factor contributing to fertility differences among the counties.

4. Percentage of married females employed in the working force is a factor contributing to fertility differences among the counties.

5. Percentage of the county's population classified as urban is a factor contributing to fertility differences among the counties.

6. The interaction of male income and percentage of females working is a factor contributing to fertility differences among the counties.

Statistical Procedures

The following statistical models were used to determine the amount of fertility variation accounted for by the independent variables.

1. Model for Cities:

$$Y_{ijpk} = u + A_i + P_j + R_p + (AR)_{ip} + E_{ipk}$$

where: Y = the fertility ratio

u = the average means

A_i = median male income

P_j = median female education

R_p = per cent of married females in working force

$(AR)_{ip}$ = two factor interaction

and k = 1...55 with subscript k identifying each of the population centers.

The null hypotheses to be tested with this statistical model are as follows:

H_1: $A_i = 0$ (that is, the variation in the fertility ratios accounted for by male income is equal to zero)

H_2: $P_j = 0$

H_3: $R_p = 0$

H_4: $(AR)_{ip} = 0$

2. Model for Counties:

$$Y_{iajpfk} = u + A_i + C_a + P_j + R_p + S_f + (AR)_{ip} + E_{iajpfk}$$

where: Y = the fertility ratio

u = the average means

A_i = median male income

C_a = median male education

P_j = median female education

R_p = per cent of married females in working force

S_f = per cent of county population classified urban

$(AR)_{ip}$ = two factor interaction

and k=1...110 with subscript k identifying each of the counties.

The null hypotheses to be tested with the statistical model for the counties are as follows:

H_1: $A_i = 0$

H_2: $C_a = 0$

H_3: $P_j = 0$

H_4: $R_p = 0$

H_5: $S_f = 0$

H_6: $(AR)_{ip} = 0$

A statistical procedure known as the abbreviated Doolittle method was employed to determine the variation in fertility ratios accounted for by selected factors within the collected data. By using the abbreviated Doolittle procedure, a factorial analysis of variance was derived by the process of stepwise regression.[3] In this process the variation accounted for by each factor in the model was adjusted for the variation effects of the preceeding factors in the model, but not for the following factors. From this analysis of variance, F-values (or variance ratios) were compiled to test the significance of the variation accounted for by each factor.

Because the stepwise regression process did not treat all factors equally, another statistical process was employed, again using the abbreviated Doolittle procedure. From the X'X inverse matrix of the Doolittle process, which appears in the computer output, regression coefficients were computed for each of the factors of the two statistical models.[4] In this process, the regression coefficients computed showed the variation effect of each factor, after adjusting for the

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[3]This statistical analysis was conducted at the Oklahoma State University Computer Center using a modified Doolittle Program written by Robert Walls.

[4]Robert Steel and James Torrie, Principles and Procedures of Statistics, 2nd ed., (New York: McGraw-Hill Book Co., 1960), pp. 280-301.

effects of all other factors in the model. To test the significance of the regression coefficients, "t" values were computed. These calculated "t" values showed not only the strength of the relationship between the independent variables (socio-economic factors) and the dependent variable (fertility ratios), but also the direction of the relationship.

CHAPTER III

FINDINGS

Results from City Data

A factorial analysis of variance (which is derived by means of stepwise regression) is used to test the statistical significance of the association between the independent variables and the fertility ratios of the cities included in the study. F tests indicate that male income and the two-factor interaction of male income with percentage of married females are both significantly related to the fertility variation. No significant association is found between the fertility variation and the factors of female education or percentage of married females employed. (See Table I.)

Values of "t" are also calculated from the regression coefficients of the socio-economic factors under examination. Calculated "t" values indicate that percentage of married females employed, the two-factor interaction of male income with percentage of married females employed, and male income alone are all statistically significant in their association with fertility differentials among the 55 cities. (See Table II.) Percentage of married women in the working force is the factor with the strongest relationship to the fertility variation ("t" value, -3.32); while female educational attainment is the factor with the weakest relationship to the variation ("t" value, 1.87).

TABLE I

ANALYSIS OF VARIANCE OF THE FERTILITY RATIOS, 55 CITIES, 1960

Sources of Variation	Degrees of Freedom	Sums of Squares	Mean Squares	Calculated Variance Ratio, F
Total (Corrected for mean sum of squares)	54	314,400		
Male Income $R(A_i)$	1	62,639	62,639	15.87**
Female Education $R(P_j/A_i)$	1	10,623	10,623	2.69
Per Cent Female Employed $R(R_p/A_i, P_j)$	1	7,637	7,637	1.93
Interaction $R(AR/A_i, P_j, R_p)$	1	36,090	36,090	9.14**
Error	50	197,411	3,948	

**Double asterisks indicate significance at the one per cent level.

TABLE II

REGRESSION COEFFICIENTS AND CALCULATED "t" VALUES
FOR 55 CITIES, 1960

Sources of Variation	Regression Coefficients	Calculated "t" Values
Male Income $/\bar{A}_i$ (adjusted)$\bar{/}$	- .101	-2.45*
Female Education $/\bar{P}_j$ (adjusted)$\bar{/}$	2.220	1.87
Per Cent Female Employed $/\bar{R}_p$ (adjusted)$\bar{/}$	-18.400	-3.32**
Interaction $/\bar{A}R$ (adjusted)$\bar{/}$	.0038	3.06**

* **Single and double asterisks indicate significance for a two-tail test at the five and one per cent levels, respectively.

Signs of the calculated "t" values also indicate that two factors, percentage of married females employed and male income, are both inversely related to fertility; that is, as they increase, fertility decreases. The "t" value for the factor, female educational attainment, while not statistically significant, does indicate a direct relationship between education and fertility for urban females. (See Table II.)

Since the F-values in Table I are not adjusted for the effects of all other factors, and the "t" values in Table II are, the latter values are used to test the hypotheses stated in Chapter II.

1. Hypothesis

   Male income is a factor contributing to fertility differences among the cities.

   Results

   Probability of less than .05 determined by "t" test indicates rejection of the null hypothesis. The

research hypothesis is accepted.

2. Hypothesis

Female education is a factor contributing to fertility differences among the cities.

Results

Probability of more than .05 determined by "t" test indicates failure to reject the null hypothesis. The research hypothesis is therefore rejected.

3. Hypothesis

Percentage of married females employed in the working force is a factor contributing to fertility differences among the cities.

Results

Probability of less than .05 determined by "t" test indicates rejection of null hypothesis. The research hypothesis is accepted.

4. Hypothesis

The two-factor interaction of male income and percentage of married females employed is a factor contributing to fertility differences among the cities.

Results

Probability of less than .05 determined by "t" test indicates rejection of the null hypothesis. The research hypothesis is accepted.

Results from County Data

The county data are also treated by a factorial analysis of variance to test the significance of the relationship between the fertility ratios and the independent variables. The calculated variance ratios (F values) indicate that there is a significant relationship between the fertility variation and the factors, male income, male educational attainment, and female educational attainment. (See Table III.) Table III indicates that male income has the strongest association with the fertility variation, but this may be a result of its being treated first in the stepwise regression process. F tests show that no significant relationship is found between the fertility variation and percentage of married females employed, percentage of county urban, or the two-factor interaction. (See Table III.)

When "t" tests are made by means of regression coefficients, only the factor of female education is significantly related to the fertility variation among the 110 counties. Neither male income nor male education is found to be significantly related to the fertility variation when adjustments have been made for all other factors associated with the variation. (See Table IV.)

The direction of the relationship between the significant factor of female education and fertility is positive, as is the relationship between male income and male education. But the calculated "t" values indicate an inverse relationship between fertility and the two independent variables: percentage of married females employed, and percentage of county urban.

TABLE III

ANALYSIS OF VARIANCE OF THE FERTILITY RATIOS, 110 COUNTIES, 1960

Sources of Variation	Degrees of Freedom	Sums of Squares	Mean Squares	Calculated Variance Ratio, F
Total (Corrected for mean sum of squares)	109	574,583		
Male Income $R(A_i)$	1	85,528	85,528	20.86**
Male Education $R(C_a/A_i)$	1	24,162	24,162	5.89*
Female Education $R(P_j/A_i, C_a)$	1	37,953	37,953	9.26*
Per Cent Female Employed $R(R_p/A_i, C_a, P_j)$	1	4,247	4,247	1.04
Per Cent County Urban $R(S_f/A_i, C_a, P_j, R_p)$	1	145	145	.0353
Interaction $R(AR/A_i, C_a, P_j, R_p, S_f)$	1	157	157	.0382
Error	103	422,391	4,100	

* **Single and double asterisks indicate significance at the five and one per cent levels, respectively.

TABLE IV

REGRESSION COEFFICIENTS AND CALCULATED "t" VALUES
FOR 110 COUNTIES, 1960

Sources of Variation	Regression Coefficients	Calculated "t" Values
Male Income $/\overline{A_i}$ (adjusted)$\overline{/}$	.024	.405
Male Education $/\overline{C_a}$ (adjusted)$\overline{/}$	.213	.225
Female Education $/\overline{P_j}$ (adjusted)$\overline{/}$	2.727	2.670**
Per Cent Female Employed $/\overline{R_p}$ (adjusted)$\overline{/}$	- .086	- .011
Per Cent of County Urban $/\overline{S_f}$ (adjusted)$\overline{/}$	- .039	- .154
Interaction $/\overline{AR}$ (adjusted)$\overline{/}$	- .0004	- .193

**Double asterisks indicate significance for a two-tail test at the one per cent level.

Again "t" values are used to test the hypotheses postulated concerning fertility differences of the counties.

1. Hypothesis

   Male income is a factor contributing to fertility differences among the counties.

   Results

   Probability of more than .05 determined by "t" test indicates failure to reject the null hypothesis. The research hypothesis is therefore rejected.

2. Hypothesis

   Male education is a factor contributing to fertility

differences among the counties.

Results

Probability of more than .05 determined by "t" test indicates failure to reject the null hypothesis. The research hypothesis is therefore rejected.

3. Hypothesis

Female education is a factor contributing to fertility differences among the counties.

Results

Probability of less than .05 determined by "t" test indicates rejection of null hypothesis. The research hypothesis is accepted.

4. Hypothesis

Percentage of married females employed in the working force is a factor contributing to fertility differences among the counties.

Results

Probability of more than .05 determined by "t" test indicates failure to reject the null hypothesis. The research hypothesis is therefore rejected.

5. Hypothesis

Percentage of the county's population classified as urban is a factor contributing to fertility differences among the counties.

Results

Probability of more than .05 determined by "t" test indicates failure to reject the null hypothesis. The research hypothesis is therefore rejected.

6. Hypothesis

The two factor interaction of male income and percentage of married females employed is a factor contributing to fertility differences among the cities.

Results

Probability of more than .05 determined by "t" test indicates failure to reject the null hypothesis. The research hypothesis is therefore rejected.

CHAPTER IV

SUMMARY AND CONCLUSIONS

This study is concerned with the possible relationship between certain socio-economic factors and fertility patterns of Oklahoma and Kansas women. The study examines fertility ratios of women residing in cities of at least 10,000 population and also the ratios of women on the county level. The fertility ratios, which are taken from the 1960 Decennial Census, are statistically examined for their relationships with selected socio-economic characteristics of the Oklahoma and Kansas cities and counties selected for the study.

The socio-economic factors are tested by means of F and "t" tests to see if they are significantly associated with the variation in the fertility ratios. While no direction of relationship is postulated, the "t" values calculated do show the direction of relationship between fertility and the selected socio-economic factors.

On the city level, the socio-economic factors of male income, percentage of married females employed, and the two-factor interaction of these two are found to be statistically significant in explaining part of the fertility variation among the cities.

The "t" tests indicate that married women's participation in the labor force is the factor that is responsible for the greatest amount

of variation in fertility among urban females. Furthermore, the tests show that the relationship between the two is inverse. This finding seems to confirm what other studies have found. Even in the early Indianapolis study, "the wife's work history was one of the few variables fairly strongly correlated with planning status and fertility even when socio-economic status was controlled."[1] The present study also finds that the two-factor interaction of female working status with male income is significantly related to fertility variation. This seems plausible. For if a husband's income is low, a wife may work to supplement this income; and in order to keep working, she must take effective steps to prevent pregnancy.

Analysis of the data for 110 counties indicates that only one socio-economic factor, female education, is significantly related to the fertility variation among the counties. One interesting aspect of this finding is the direct relationship shown, which is contrary to the often accepted inverse relationship between education and fertility. Even the statistical association between female education and fertility for the urban women, while it is not significant, indicates a positive rather than a negative association. Grabill, Kiser, and Whelpton did find a slight inverse relationship between educational attainment and fertility based on 1950 census data, but

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[1]Ronald Freedman, "American Studies of Family Planning and Fertility: A Review of Major Trends and Issues," Research in Family Planning, Clyde V. Kiser, ed. (Princeton, New Jersey: Princeton University Press, 1962), p. 223.

that inverse relationship was not nearly as strong as it was in 1940.[2] This study's findings, based on 1960 census data, seem to indicate that since 1950, the inverse relationship may not only have narrowed, but may have reversed.

One surprising finding of the present study is the failure of the factor of residence (percentage of county urban) to account for a significant amount of variation among the counties. While previous studies have pointed out a narrowing of urban and rural fertility differences, the present author did fully expect to find these differences to be significant. Although the residence factor is not found to be significant, the sign of the tabulated "t" value for that factor does indicate that the traditional pattern of higher rural fertility is confirmed.

This study has been modestly successful in explaining a portion of the fertility variation of selected aggregates of women by means of socio-economic factors. It has also confirmed in part at least, changes in the traditional inverse relationship between fertility and socio-economic status.

The present study, like previous ones, has been able to account for only a very small portion of the fertility variation occurring among American women. Even the superb field studies, such as the Princeton and Michigan studies, have not been conspicuously successful in accounting for fertility differences. But the fact remains that socio-economic status does have some impact upon fertility, however slight.

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[2] Wilson H. Grabill, Clyde V. Kiser, and Pascal Whelpton, The ·tility of the American Woman (New York: John Wiley and Sons, 1958), 7.

Future studies should attempt, therefore, to spell out the conditions underlying socio-economic status which presumably produce the relationship between fertility and status.[3]

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[3]David Goldberg, "Fertility of Two-Generation Urbanites," Population Studies, vol. 12, no. 3, (March, 1959), p. 214.

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APPENDIX A

CITIES INCLUDED IN STUDY

Oklahoma Cities

	FR	MI	Ed F	Per Cent F W/F
Ada	395	3,138	10.6	37
Altus	685	3,040	12.1	28
Ardmore	478	3,297	11.5	38
Bartlesville	499	5,386	12.3	35
Bethany	486	4,208	12.1	45
Chickasha	442	3,132	10.6	34
Del City	521	4,922	12.0	40
Duncan	428	4,670	11.8	36
Durant	367	2,357	10.5	40
El Reno	468	3,638	10.2	33
Enid	481	3,826	11.8	37
Lawton	602	3,654	12.0	31
McAlester	396	2,456	10.4	41
Miami	381	3,899	11.4	28
Midwest City	524	4,901	12.2	36
Muskogee	434	3,216	11.1	39
Norman	370	2,156	12.2	38
Oklahoma City	478	4,243	12.0	42
Okmulgee	495	3,115	10.4	30
Ponca City	448	5,051	12.1	33
Sapulpa	458	3,582	10.1	39
Seminole	446	3,640	9.6	30
Shawnee	396	3,274	10.5	38
Stillwater	372	1,725	12.6	36
The Village	588	6,806	12.8	29
Tulsa	447	4,850	12.2	41

APPENDIX A (Continued)

Kansas Cities

	FR	MI	Ed F	Per Cent F W/F
Arkansas City	484	4,184	11.0	29
Atchinson	556	3,971	11.3	30
Chanute	511	3,747	10.9	33
Coffeville	443	4,101	10.9	27
Dodge City	503	4,321	12.1	32
El Dorado	483	4,682	11.8	26
Emporia	378	3,127	12.2	33
Garden City	603	3,947	12.1	36
Great Bend	537	4,999	12.2	34
Hays	529	3,797	12.1	36
Hutchinson	517	4,200	12.0	33
Independence	460	3,752	11.5	33
Junction City	617	3323	12.0	28
Kansas City	510	4,341	10.1	36
Lawrence	394	2,493	12.4	38
Leavenworth	510	4,076	11.0	37
Liberal	611	4.998	12.2	33
Manhattan	483	2,698	12.5	32
Newton	491	4,331	12.0	30
Olathe	518	4,632	12.1	37
Ottawe	441	3,230	10.8	29
Overland Park	558	6,698	12.6	34
Parsons	403	3.113	10.9	33
Pittsburg	369	3,120	11.1	25
Fairie Village	497	8,188	13.0	23
Salina	617	4,252	12.2	31
Topeka	528	4,521	12.2	35
Wichita	515	4,806	12.1	34
Winfield	378	3,437	11.9	42

APPENDIX B

COUNTIES INCLUDED IN STUDY

Oklahoma Counties

Alfalfa
Beaver
Beckham
Caddo
Canadian
Cimmaron
Comanche
Cotton
Creek
Custer
Delaware
Dewey
Ellis
Garvin
Grant
Harmon
Harper
Jackson
Kay
Kingfisher
Lincoln
Love
McClain
Major
Mayes
Noble
Nowata
Oklahoma
Osage
Roger Mills
Rogers
Seminole
Stephens
Texas
Tulsa
Washington
Washita

Kansas Counties

Anderson
Barber
Barton
Butler
Chase
Chautaque
Cheyenne
Clark
Coffey
Comanche
Decatur
Dickinson
Donphen
Elk
Finney
Geary
Gove
Graham
Grant
Gray
Greeley
Greenwood
Hamilton
Harper
Haskell
Hodgeman
Jackson
Jefferson
Jewell
Johnson
Kearny
Kingman
Kiowa
Lane
Linn
Logan
Meade
Morris
Morton
Neosho
Ness
Norton
Osage
Ottawa
Phillips
Pottawatomie
Pratt
Rawlins
Reno
Republic
Rice
Rooks
Rush
Russell
Salina
Scott
Sedgwick
Seward
Sheridan
Sherman
Smith
Stafford
Stanton
Stevens
Sumner
Thomas
Trego
Wabaunsee
Wallace
Wichita
Wilson
Woodson
Wyandotte

VITA

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