

SEX RATIO AT BIRTH IN RELATION TO FATHER'S OCCUPATION IN THE UNITED STATES: A SIMULATED ANALYSIS

M. E. El-Attar and S. M. El-Hakeem
Mississippi State University

Introduction

The union of the constant female X chromosome with either Y or X chromosome possessed by the male parent, which results in the first case with conception of a male and in the second case with conception of a female has established the belief that the male parent alone determines the sex of offspring (Eastman, 1963; Shettles, 1962). For a while it was believed that the fertilization of the ovum by an X or Y spermatozoon was random, with a 50 percent chance for either. But the excess of male births was noted by John Graunt about the turn of the seventeenth century (Bogue, 1969). Since that time, the topic has continued to attract the curiosity of outstanding investigators of demography as well as scientists in some of the closely related fields.

Statement of the Problem

The balance between male and female births has been shown to be almost stable from one calendar year to another, varying around 105 males to 100 females, with a little increase in births of males in war time compared to peace time (Tarver and Lee, 1968; Winston, 1931; Myers, 1947). Attempts to interpret the familiar occurrence of this ratio by any single factor have not been successful. Theories of divine intervention and natural compensation from the past have been refuted. Analyses of environmental factors and genetic factors have been attempted. The literature is rich in biological and sociological explanations. Biologists are trying to produce the desired sex in laboratory experiments or to detect the sex early in pregnancy (Edwards and Fowler, 1970; Edwards and Gardner, 1968; Rorvik and Shettles, 1971). Other biologists, together with demographers, sociologists, and psychologists, have taken advantage of vital statistics to relate such variables as age of mother, age of father, and birth order to the sex ratio of births. Findings of these studies could be summarized, in general terms, as follows:

1. An inverse relationship was observed between age of mother and sex ratio of births. In later writings the relationship was discovered to be spurious and was inferred differently by different writers (Novitski and Sandler, 1956; Novitski and Kimball, 1958; Myers, 1947; Tarver and Lee, 1968; Rubin, 1967).
2. In most studies an inverse relationship was observed between age of father and sex ratio of births. In some studies the inverse relation was found to be reversed when the father reached 40 years of age (Szilard, 1960; Novitski and Sandler, 1956; Novitski and Kimball, 1958; Novitski, 1953; Rubin, 1967).
3. Data on birth order, contrary to that for age of father, were easily available and were found to have an inverse relationship with sex ratio at birth.

Correctly or not, the relation between mother's age and sex ratio at birth in many instances was reverted to birth order as it is directly correlated with mother's age (Tarver and Lee, 1968; Novitski and Sandler, 1956; Novitski and Kimball, 1958; Myers, 1954; Rubin, 1967).

4. A higher sex ratio at birth is regularly found for whites as compared with blacks, and is often attributed to the greater physical handicap of the socially disadvantaged black mother.

5. The sex ratio at birth rises with social class. This difference is ascribed to social factors rather than to innate differences. Among investigators arriving at these conclusions were Carberg and Lenhossek (cited in Winston, 1931).

6. Studies of data from different countries indicate a higher sex ratio in rural than in urban areas (Winston, 1931).

7. Sex ratio for legitimate births is higher than that for illegitimate births in both European and American data (Winston, 1931).

8. The idea of higher sex ratio in war time compared with peace time was not well established when comparison was made for different countries in different war periods (Panunzio, 1943; Myers, 1947).

Most of these studies were based on small samples, and, accordingly, conclusions were limited in scope. Moreover, since data on occupation of father in relation to the sex of his children have been very limited, there are no firm conclusions. The present study aims at this objective despite a lack of relevant data. In order to reach an approximate conclusion, a simulated analysis was undertaken. Such analysis must be considered as a suitable rather than a refined technique, since simulations are being described as crude structures (Fleisher, 1968). On the other hand, studies of the sex ratio of births are lacking in theory, and where theory is weak, simulations are believed to aid the investigator in the process of theorizing as well as in making "accurate, intelligent observations".

Construction of the Theoretical Model

The simulated analysis proposed in this study is based on a theoretical model which constitutes those variables to which the sex ratio of births is thought to be most closely related. According to this model the sex ratio at birth is conceptualized to be a result of one or any combination of two major sets of factors:

Endogenous Biological Factors

Endogenous biological factors in this study refer to innate factors, that is, elements pertaining to heredity and other inborn factors which exist in the parents from birth. These endogenous factors are considered to affect the sex of a child and include: (1) heredity,

(2) age of parents, and (3) child birth order.

Socio-economic and Exogenous Bio-psychic Factors

This set of factors constitutes the three component variables of socioeconomic status, namely occupation, education, and income. Only occupation of father is to be considered in the present analysis. The emergence of father's occupation as a prominent factor in this study stems from the fact that occupation is a factor which determines not only the socioeconomic position of an individual but his bio-psychic nature as well. These consequences characterize occupations "in urbanized societies in general, and in the United States in particular," where "occupations are differentiated on the basis of income, rights and privileges," and as the individuals' "image of himself as the holder of a particular specialized position in the division of labor" (Taylor, 1968; Becker and Carper, 1956). In other words, occupation of father may be assumed to have effects on the social and sexual life of parents so that the ability to conceive a male child or bring it to term is affected. A theoretical schematic model for this conceptualization is illustrated in Figure 1.

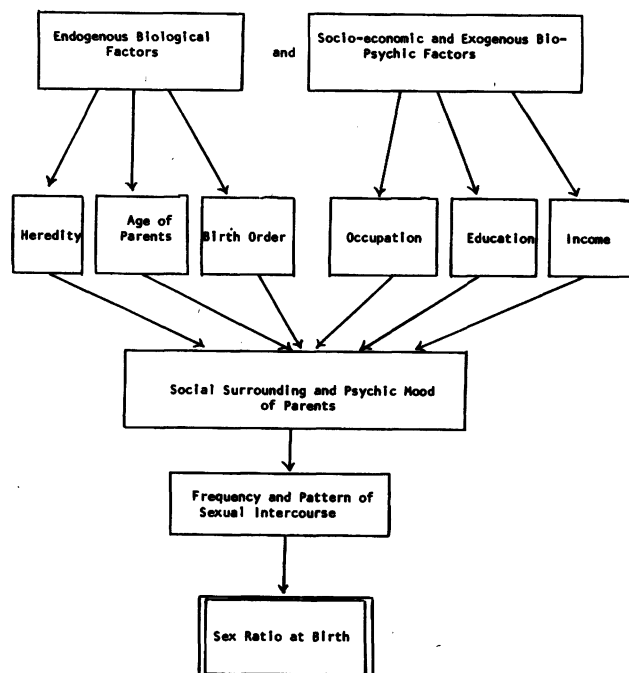


Figure 1-- Schematic Model for the Theoretical Conceptualization of the Relationship Between Sex Ratio at Birth and Selected Factors

The simulated analysis will use the following variables as a basic framework: (1) occupation of father, (2) age of parents, and (3) birth order.

Occupation

"An occupation is the social role(s) that constitutes a major focus in the life of adult members of society and that directly and/or indirectly" generates socioeconomic-and-biopsychic consequences to the performing actors (Hall, 1969).

The biological consequences generated by occupations are termed exogenous biological factors, to distinguish them from the endogenous (innate) biological consequences. Occupation as a concept indicates source of livelihood, career, status, prestige, and image. Obvious major differences exist among occupations. Most important to this study is the fact that some occupations require special mental ability while others stress manual dexterity. Certainly, the conditions of the job have an impact on the responses of the worker to his total life situation. Security and stability characterize more occupational groups; anxiety or insecurity are evident among others. The difficulty of dichotomizing occupational categories into manual and mental, and the absence of another suitable typology, were strong and convincingly good reasons for using the broad categories found in the census and available in the 1/1,000 sample (U.S. Bureau of the Census, 1964). Sketches of the work conditions for each group are given in a recent study by the co-author (El-Hakeem, 1973).

Age

In most societies, age connotes biological and social elements. In the present analysis, the concept of "age" refers to the "biologic age", that is, "the person's relative functioning capacity as determined by the sum of genetic and environmental factors" (Petersen, 1969). The lack of accurate data on age of father has led to surveys with small samples and doubtful conclusions. However, the literature on age of father and sex ratio at birth is laden with conclusions which document inverse relation between age of father and that ratio. Regarding age of mother, no significant relation between sex ratio and mother's age was found. However, ages of both the father and mother are used as control variables in this study.

Birth Order

Birth order refers to "birth rank", that is, "higher order births or subsequent births are births occurring after the last specified order" (United Nations, 1958). In this study, only births of the current marriage are considered and used as a control variable.

The Hypotheses

It is observable in the American society that the father bound up in his job, anxious for success, and striving for prestige can be expected to have a lower frequency of intercourse than his fellow man, who is equal to him in every respect except that he has a manual job, and may be likely to spend more time with his family relaxing and seeking excitement and enjoyment far away from

his work. Even if the intellectual, ambitious father happens to have frequent sexual relations with his wife, one or both may be more likely to be under mental anxiety and stress, which affect their biophysical conditions and consequently may affect the sex ratio at birth.

In view of the above conceptualization as verbally stated and schematically outlined, the following hypotheses can be inferred.

Father's occupation has an effect on the sex of his child as follows: (a) husbands engaged in occupations which are characterized with extra job expectations tend to have low proportions of male offspring, (b) husbands engaged in routine work occupations tend to have high proportions of male offspring.

Source of Data, Universe of Analysis and Simulation

Given below are descriptions of source of data, universe of analysis, and the simulation process.

Source of Data

The source of data for this study is the 1/1,000 sample from the 1960 population census of the United States (U.S. Bureau of the Census, 1964). This sample was selected from a source file of the records of another sample (five percent) of population of the United States. The records in the source file were grouped by households in such a manner that a record for household head was followed by the records of all other members of the head's household. The sample includes 179,562 cases (individuals) grouped in households, including primary families, subfamilies, secondary families, and other (secondary individuals, non-inmates in group quarters, and inmates).

Universe of Analysis

The families selected for this study were limited to white families with children under 5 years of age living in urban areas, and who should satisfy the following criteria: (1) the father was married once; (2) the mother was married once; (3) both the father and mother were living and were counted in the sample; (4) the father was the chief income recipient and the head of the family; (5) the father had an occupation and an income; (6) the children represented in the family and counted at the time of the survey were equal to the number of children ever born by the mother.

The Simulation Process

Simulation is generally understood by people to be an "attempted replication of reality" (Goroff, 1973). It is a technique which enables the simulator to investigate some hypothesized relationship

about phenomena abstracted from reality. "Simulation in research provides a controlled environment in which most parameters affecting the system may be examined and quantified (McCluskey, 1973). In the study of complex phenomena such as this one, where adequate data are not available, simulation as a tool permits one to explore the phenomenon and to specify the limitations of the existing data through the "imitation of a real process". (Dutton and Briggs, 1971; Sheps, 1971).

The simulation process in the present study has started out with two steps that constituted the organization of the data. The first step involves selection of the desired data from an initial population of households, stored on five magnetic tapes. From these five tapes, a seven-track magnetic tape was built on Univac 1106. The tape includes all children in the 1/1,000 sample who belong to parents where marriage to each other is for the first time, with no infant mortality, with father having an occupation and being chief income recipient. Children selected according to the above criteria included 33,081 children belonging to 13,533 families.

The tape is built in such a manner that each child has one record containing the following information as provided in the 1/1,000 documentation (U. S. Bureau of the Census, 1964): Household number, family number, size of place of residence, father's year of marriage, mother's year of marriage, father's marital status, mother's marital status, father's age, mother's age, father's race, mother's race, father's education, father's occupation, father's income, child's quarter of birth, child's sex, child's age, children ever born by the mother of the child, and child's birth order, which is arranged according to each child's age together with his siblings.

The computer program written for processing all operations in this step is available from the authors on request. The logical objectives of the program are: (1) To check on every record of the total sample; (2) When the computer read a record of a head of family or wife of a head, eligibility for the above criteria was tested, data were stored, and a search was then started for the partner in order to test eligibility and to store data required about him or her; (3) When the computer detected any ineligible record in item "b", it was required to drop all of the records for the family, to cancel any stored data, and to start search for the next family; (4) Since some of the children were not arranged on the original tapes according to age, records were checked and reorganization of children by age was made on the new tape; (5) For every family selected, the number of children counted was checked against the number of children ever born to the mother. Whenever these two items were not equal, the family was dropped from the analysis.

From the major information provided above, eleven variables were taken to form a basis to the second step. The eleven variables: type of residence, mother's age, mother's race, father's age,

father's race, father's education, father's occupation, father's income, sex of child, age of child, and birth order of each child.

In the second step the simulation task is to specify the type and characteristics of children to be chosen for the analysis. To enhance reliability of the data, it was proposed to limit the sample to white children under five years of age in 1960, who were residing in urban areas. The sample includes 7,062 children (21.3 percent of the sample selected in the first step) belonging to 4,463 families (33 percent). Before the tabulations were done, both age of mother and age of father were computed as of the time of the child's birth by subtracting the child's age in 1960 from the mother's and father's age in the same year. The data on number of families and children and proportions that are males cross-classified by occupation and age of father, age of mother, and/or birth order are given in Tables 1, 2, 3, and 4. Commentary on these tables is given in analysis of findings below.

TABLE 1. NUMBER OF SELECTED FAMILIES AND CHILDREN UNDER 5 YEARS OF AGE AND THE PROPORTION OF MALE CHILDREN BY OCCUPATION OF FATHER IN URBAN AREAS OF THE UNITED STATES, 1960^a

Occupation of Father	Families		Children		Male Proportion
	Number	Percent	Number	Percent	
Professional, technical & kindred workers	708	15.86	1,113	15.76	.4978
Farmers & Farm Managers	132	2.96	213	3.02	.5070
Managers, Officials, and Proprietors, except farm	509	11.40	769	10.89	.5137
Clerical & kindred workers	318	7.13	506	7.17	.4881
Sales workers	365	7.73	532	7.53	.4944
Craftsmen, Foremen, & kindred workers	1,109	24.85	1,728	24.47	.5098
Operatives & kindred workers	938	21.02	1,511	21.40	.5175
Service workers, except private household	160	3.58	261	3.70	.4943
Laborers, including farm	244	5.47	429	6.07	.5128
Total	4,463	100.00	7,062	100.01	.5068

TABLE 2. NUMBER OF CHILDREN UNDER 5 YEARS OF AGE AND PROPORTION OF MALES AMONG THEM BY OCCUPATION AND AGE OF FATHER IN URBAN AREAS OF THE UNITED STATES, 1960^a

Occupation of Father	Age of Father							
	20 or less		21-30		31-40		41 & Over	
	No.	H.P. ^b	No.	H.P.	No.	H.P.	No.	H.P.
Professional wkrs.	11	.5455	561	.5116	485	.4907	56	.4107
Farmers & farm mgrs.	8	.7500	100	.5300	85	.4824	20	.4000
Managers, etc.	10	.6000	362	.5028	337	.5134	60	.5667
Clerical wkrs.	14	.2857	317	.4700	153	.5556	22	.4091
Sales wkrs.	19	.5789	308	.5065	182	.4615	23	.5217
Craftsmen, etc.	57	.5614	975	.5046	613	.5057	83	.5663
Operatives, etc.	105	.5429	878	.5159	453	.4989	75	.6133
Service wkrs., except prt. household	9	.3333	158	.4657	83	.5663	11	.6364
Laborers, including farm	26	.5385	247	.5182	133	.4962	23	.5217
Total	259	.5367	3,906	.5049	2,524	.5032	373	.5308

TABLE 3. NUMBER OF CHILDREN UNDER 5 YEARS OF AGE AND PROPORTION OF MALES AMONG THEM BY OCCUPATION OF FATHER AND AGE OF MOTHER IN URBAN AREAS OF THE UNITED STATES, 1960^a

Occupation of Father	Age of Mother							
	20 or less		21-30		31-40		41 & Over	
	No.	H.P. ^b	No.	H.P.	No.	H.P.	No.	H.P.
Professional wkrs.	58	.5000	727	.5021	318	.4937	10	.3000
Farmers & farm mgrs.	23	.6087	127	.4803	60	.5167	3	.6667
Managers, etc.	45	.4667	454	.5022	252	.5317	18	.6667
Clerical wkrs.	61	.4690	326	.4847	112	.5268	7	.2857
Sales wkrs.	47	.4894	352	.4943	130	.4923	3	.6667
Craftsmen, etc.	220	.5345	1,049	.4881	446	.5471	13	.2308
Operatives, etc.	273	.5092	894	.5212	323	.5139	21	.5238
Service wkrs., except prt. household	37	.4324	174	.4713	46	.6522	4	.2500
Laborers, including farm	82	.5122	256	.5273	85	.4706	6	.5000
Total	846	.5130	4,359	.5003	1,772	.5227	85	.4688

TABLE 4. NUMBER OF CHILDREN UNDER 5 YEARS OF AGE AND PROPORTION OF MALES AMONG THEM BY OCCUPATION OF FATHER AND BIRTH ORDER IN URBAN AREAS OF THE UNITED STATES, 1960^a

Occupation of Father	Birth Order									
	1		2		3		4		5	
	No.	H.P. ^b	No.	H.P.	No.	H.P.	No.	H.P.	No.	H.P.
Professional wkrs.	209	.5017	376	.5266	257	.4630	122	.5082	39	.4103
Farmers & farm mgrs.	35	.4857	61	.5738	56	.4821	28	.3929	16	.7500
Managers, etc.	137	.4818	268	.5299	213	.5023	85	.6000	38	.5526
Clerical wkrs.	144	.4792	184	.4837	115	.4261	41	.6098	19	.6842
Sales wkrs.	115	.5043	192	.4688	115	.5304	67	.5373	25	.4000
Craftsmen, etc.	371	.5067	553	.5280	427	.4988	224	.5045	83	.4819
Operatives, etc.	370	.5324	486	.4897	325	.5292	177	.5311	82	.5488
Service wkrs., except prt. household	49	.4898	86	.4651	70	.5857	29	.5172	19	.3158
Laborers, including farm	99	.5252	131	.5115	87	.5402	45	.4444	28	.6429
Total	1,609	.5071	2,337	.5096	1,665	.5021	818	.5220	349	.5186

Analysis of Findings

The findings of the study and tests of the hypotheses are given in two parts: The first is a descriptive interpretation of the data; the second is statistical analysis couched in a correlation method.

I. Descriptive Interpretation

Tables 1, 2, 3 and 4 are the main data source for this part of the analysis. The tables give the proportion of male children cross-classified by occupation and age of father, age of mother, and birth order.

Male Proportion and Occupation of Father. -- Table 1 gives the number of selected families and children under 5 years of age and the proportion of male children by occupation of fathers in urban areas of the United States in 1960. The two major occupational groups of farm laborers and laborers are lumped together. The proportion of male children is .507, that is, for every 1,000 children there are 507 males and 493 females. The comparative standing of the proportion of male children in an occupation, compared with the male proportion of children for all occupations, is of assistance in evaluating the level of differentiation among the different occupations of fathers as regards the male proportion of their children. Table 1 shows that among non-manual workers, clerical workers have the lowest male proportion among their children, followed by sales workers and professional, technical and kindred workers. Managers, officials and proprietors are the only non-manual group in which fathers have more boys than girls among their children. Fathers occupied in service occupations are the only group among the manual workers who have low proportion of male children.

Proportion of Males by Age and Occupation of Fathers. -- Table 2 provides the number of children under 5 years of age and the proportion of males among them by occupation of fathers in urban areas of the United States in 1960. The proportion of male children for the total of each age group shows a gradient from the high of .5032 for fathers who are 31 to 40 years of age to .5367 for fathers who are 20 years old or less.

Because of the differences in occupational tasks, even in the same occupation, and of differential

effects of stressful norms (norms emphasizing competition and achievement of success) on different individuals (see Brown, 1954 who indicated that some individuals are temperamentally more liable to stress than others) a sharper gradient among the occupation groups with regard to male proportion among children under 5 years of age is evident. These results are in accord with the conceptual framework formulated above for this study, provide support for it, and demonstrate its relevance to this research.

Proportion of Males by Age of Mother and Occupation of Father. Table 3 gives the number of children under 5 years of age and the proportion of males among them classified by age of mothers and occupation of father in urban areas of the United States in 1960. The proportion of male children for the total of each age group shows a gradient ranging from the low .4588 for mothers who are 41 years old and over to the high .5220 for mothers who are 31 to 40 years of age. Comparing the proportion of male children by age of mother with that by age of father, one finds that in both cases an inverse relationship exists between male proportion and age (except in the age group 31 to 40 for mothers and 41 and over for fathers). The age group 31 to 40 is the age at which females married to men engaged in different occupations achieve the highest male proportion (.5222) among their children, whereas a direct relationships between the proportion of male children and age of father is revealed by the age group 41 and over. Generally stated, the proportion of male children at age 41 and over is inversely related to age in the case of mothers and directly related in the case of fathers.

With regard to the male proportion in the individual occupational categories by age of mother, it is worthy to indicate that the generated pattern does not follow that of the total. Hence, it could be said that father's occupation might be a basic factor in producing such differentiated pattern in the proportion of male children among the different occupations.

Male Proportion by Parity and Father's Occupation. -- This section is concerned with the differences in the proportion of male children as associated with occupation of fathers and birth orders. Table 4 gives the number of children under five years of age and the proportion of males among them cross-classified by occupation of father and birth order in urban areas of the United States in 1960. The table shows that the proportion of male children according to birth order (except the third and sixth and above orders), when occupation effect is randomized, exceeds the proportion of male for all occupations (.5068 taken as an average). The fourth order is the modal value for the parity distribution of male proportions. Moreover, the inverse relation between the proportion of male children and birth order, as claimed by the literature, does not hold here, as male proportion is higher in the second order than in the first and third order, and the fourth order is higher than any order in the analysis. The antithesis of an inverse association is supported also by the male proportion in the fifth order which is higher than the

first, second, and third orders. This disagreement with the literature is in accord with the conceptual framework of this study which proposes the proportion of male children to be the product of a combination of biological and social factors.

Regarding the profile of the proportion of male children by parity and father's occupation, the data in Table 4 reveal that the above pattern still holds for the occupational categories. However, the influence of occupation of fathers is noticeable in the differentiated magnitudes of the proportions of male children within each birth order.

II. Statistical Analysis

In preparation for a statistical analysis, the data were simulated in a factorial design as illustrated by Table 5. A five-dimension array was prepared

TABLE 5. ILLUSTRATION OF COMPUTER SIMULATED DATA WHERE PROPORTION OF MALE CHILDREN UNDER 5 YEARS OF AGE IS A CRITERION VARIABLE, AND AGE OF MOTHER, AGE OF FATHER, AND BIRTH ORDER ARE PREDICTORS

Occupation of Father	Simulated Sample Size	Age of Mother	Age of Father	Education of Father	Income of Father	Birth Order	Number of Sons	Number of Daughters	Male Proportion
Professional wkrs.	355								
Farmers and farm mgrs.	158								
Managers, etc.	341								
Clerical wkrs.	208								
Sales wkrs.	265								
Craftsmen, etc.	495								
Operatives, etc.	484								
Service wkrs. except pvt. househd.	168								
Farm laborers	61								
Laborers	220								

containing proportion of male children under five years of age as a criterion variable and five predictors, namely, mother's age, father's age, father's education, father's income, and birth order. It is worthy at this point to remember that occupation of father was used as a replicated variable. The proportion of male children belonging to one combination of independent variables was considered as one observation. Grouping the data in this way resulted in 2,755 observations, distributed as follows: professional, technical and related workers, 355; farmers and farm managers, 158; managers, officials and proprietors, 341; clerical and kindred workers, 495; operatives and kindred workers, 484; service workers, 168; farm laborers, 61; laborers, except farm and mine, 220.

The relation between the male proportion and three of the five independent variables, namely, age of mother, age of father, and birth order is assumed to be a functional linear relationship.

The relationships between proportion of male children under 5 years of age and the three selected independent variables in each major occupation group are given in Table 6. Differentiation between occupations is reflected in the magnitude and signs of the coefficients of simple and partial correlations. And although the association is not significant in most occupations the hypothesis that father's occupa-

TABLE 6. SIMPLE AND PARTIAL CORRELATION COEFFICIENTS BETWEEN PROPORTION OF WHITE MALE CHILDREN UNDER 5 YEARS OF AGE AND AGE OF MOTHER, AGE OF FATHER, AND PARITY FOR EACH OCCUPATION GROUP IN URBAN AREAS OF THE UNITED STATES, 1960

Occupation of Father	Correlation Coefficients					
	Age of Mother		Age of Father		Birth Order	
	Simple	Partial	Simple	Partial	Simple	Partial
Professionals, etc.	-.081*	-.068	-.043	.077	-.027	.007
Farmers and farm mgrs.	-.031	.073	-.126*	-.148**	-.019	.025
Managers, etc.	.040	.041	.027	.012	-.029	-.050
Clerical wkrs.	.011	-.004	.006	-.014	.067	.070
Sales wkrs.	-.060	.070	-.003	-.056	.042	.015
Craftsmen, etc.	-.028	-.029	-.009	.010	-.007	.003
Operatives, etc.	.037	-.007	.066*	.052	.034	.014
Service wkrs., except pvt. houshd.	.112*	.075	.160+	.137**	-.077	-.145**
Farm laborers	-.089	-.051	-.080	-.034	-.050	.010
Laborers	-.002	.000	.001	.008	-.021	-.023
Total	-.027*	.012	-.052*	-.041+	-.038+	-.023*

*Significant at 25 percent level.

**Significant at 10 percent level.

+Significant at 5 percent level.

*Significant at 1 percent level.

tion has a different influence on the proportion of male children among his offsprings is partially confirmed. For example, the signs of the partial correlation coefficients (which provide the direction of the relationship) are in opposition to each other in most of the occupational groups. This indicates that, with other things being equal, the influence of a given occupation--for example, professional, technical and kindred workers--on the sex of the child when the age of mother is considered will be different from that of a certain other occupation--for example, service workers. Confirmation of this finding is readily conspicuous from the difference in magnitudes and signs of the simple and partial correlation coefficients obtained from the total and those obtained from the individual occupations.

Summary and Conclusion

In this paper, a theoretical model which embraced those variables to which the sex ratio at birth might be most closely related was developed, and relationships were examined between proportion of male children and the stated variables. Because of the belief that the 1/1,000 sample might be an unreliable source of data for the presett study, a simulated analysis was used. Both the descriptive and statistical analyses partially supported the stated hypotheses.

Among the most severe drawbacks of census data used in this study were the following: (1) Occupation of the father pertained to census time rather than the time of conception; (2) The data did not indicate whether the father and mother were working at time of conception, and if they were, what the occupational group was for each of them; (3) Occupation as given in the census group is a nominal variable and it is deemed necessary to develop an occupational score according to which

occupations can be differentiated, stratified, or ranked with regard to the stress they exert on their incumbents.

More clear-cut findings of the influences of father's occupation on the sex of his children at birth at various ages of both parents as well as parity, would be made possible with the aid of more adequate data. Such data can be established by means of a special survey or, for a lower quality of data, from a special tabulation of vital statistics records.

More adequate data may enable us to construct a general statement according to which the probability of giving birth to a male can be determined by age of father, age of mother, parity, and socioeconomic status of the father.

Acknowledgements

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Footnotes

^aSource: Compiled and computed from U.S. Bureau. U.S. Census of Population: 1960. 1/1,000, 1/10,000, Two National Samples of the Population of the United States. Washington, D. C., 1964.

^bM.P. stands for male proportion.

^cVariables included in the simulation process for the purpose of formulating analytical observations but their influence on the dependent variable was not considered in the present analysis.

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