THE IMPACT OF INDUSTRIALIZATION ON FERTILITY IN THE UNITED STATES

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1967

Submitted to the Faculty of the
Graduate College of the
Oklahoma State University
in partial fulfillment of
the requirements for
the Degree of
MASTER OF SCIENCE
July, 1968

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Thesis Approved:

Thesis Adviser

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ACKNOWLEDGEMENT

The author wishes to express her sincere appreciation to her major advisor, Dr. Gene Acuff, for the guidance, encouragement and valuable criticism during the course of this study and writing of this thesis. Equal gratitude is extended to Dr. Donald Allen, who gave so generously of his time, and whose suggestions and directions were of great value. The author is also appreciative for the personal interest and encouragement of Dr. Carol Pollis.

The Sociology Department of Oklahoma State University has been gracious in providing the facilities used in this study.

In addition, the author would like to thank Mrs. Pat Dunsmore for her help in preparing the data used in the study, and Mrs. Patty Tillerson for accepting the responsibility for typing the manuscript.

Special thanks is given to Dr. Dan Wesley for agreeing to serve on the committee at such a late date.

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CHAPTER I

INTRODUCTION

This study will be concerned with the impact of industrialization on fertility in the United States of America. In this study the author will explore the alternative ways in which census statistics can be used to increase the fund of knowledge about the divergent communities of the United States. The approach is a comparative one based on comparisons of communities of different sizes, types, and occupations. It is dealing with demographic data-characteristics of human populations. The analysis is in terms of concepts and hypotheses drawn from the discipline of demography.

In contemporary mass society, the urbanite and the rural man may have considerable knowledge of each other's life style. However, it is still easy to start a lively conversation on the relative merits of rural environment versus urban amenities. People asign different values to one or another kind of community life. Some communities are regarded as progressive, others are regarded as

tradition - bound. There is a great diversity in the kinds of communities in which men live.

In the social sciences, the researcher approaches such studies by accepting the common - sense observation of intercommunity variation. He seeks to describe these communities systematically and to discern the factors which produce variation.

The guiding assumption of the study is that there are orderly, but complex, processes and relationships which produce diversity in modes of community life. It focuses on an important factor, industrialization, suspected to be of basic importance in shaping the character of communities. The study relates industrialization to a number of qualities differentiating communities. These qualities are concrete, observable, and could be roughly measurable.

For such a comparative analysis, the most reliable data are obtained by the modern census. To facilitate empirical research, and enabling additional analytical tabulations of the characterisitics of the population of the United States, the Bureau of the Census makes available reels of magnetic tape or sets of punch cards containing the separate record of the population characteristics of a one-tenth-of-one-percent sample of the population of the United States. The information contained on the record comprises

substantially a random representation of all the characteristics of the persons enumerated in the 25-percent sample portion of the decenial population census of 1960. This complete record makes it possible for the researcher to prepare tabulations in which the characteristics of any person in a family are associated with the characteristics of the family as a whole, or of the housing unit in which the family lives. The above mentioned tape is used as the main data source for this study.

REVIEW OF LITERATURE

It has become increasingly important to try to understand the variety of factors that influence family growth in the United States. The first nationwide effort in this field was an interview survey conducted in the spring of 1955 under the direction of the Survey Research Center of the University of Michigan and the Scripps Foundation for Research in Population Problems, Miami University, Oxford, Ohio. The findings of this survey are reported by Ronald Freedman, Pascal K. Whelpton, and Arthur A. Campbell.[1] In the summer of 1960, the same organizations sponsored a second survey and the findings were reported by Pascal K. Whelpton, Arthur A. Campbell, and John E. Patterson.[2] One important purpose of the second survey was to see how well the wives interviewed in 1955 had predicted the number of children that women like themselves would have in the 1955-1960 period. The second study was also designed to get more information on certain subjects, such as the couple's ability to have children and their success in using contraception. In addition, the second study provides, for the

first time, some data on the family planning attitudes and practices of non-white couples.

There have been studies of similar or related topics based on more narrowly defined samples and with somewhat different objectives. The first such study was the Indianapolis study[3] of 1941. It was disigned primarily to test specific hypotheses about factors affecting fertility. Some of the factors were socio-economic status and security, personality characteristics, fear of pregnancy, interest in religion, and husband-wife dominance. The purpose[4] of this survey was not so much to describe variations in fertility for different population groups as it was to try to investigate some of the underlying social and psychological determinants of behavior affecting the control of fertility.

The Princeton Study,[5] the field work for which began in 1957, is a direct descendant of the Indianpolis Study. One of the purposes of this study was to investigate the factors determining whether or not the couple would have a third child. The reason for this focus was the fact that much of the higher fertility of the post war period had resulted from the desire for more than two children. The same sample was interviewed again in the 1960[6] to see which couples had had a third child and to explore the factors

influencing their control of fertility. As in the Indianapolis Study, many of the variables examined were psychological in nature, but there was strong emphasis on socio-economic factors.

Several of the Detroit Area Surveys, sponsored by the University of Michigan, have dealt with topics related to fertility. The 1954[7] Detroit Area Survey pioneered questions on the number of children expected. Similar questions were asked in the 1955 and 1958[8] surveys. The aim of these surveys were threefold; to study socio-economic differentials in past fertility, to study expected child-bearing in Detroit area, and to provide information on the reliability and stability of birth expectations. A much more elaborate survey was conducted in early 1962.[9] The major aim of this study was to examine social and economic factors affecting fertility.

Social Research Incorporated conducted two[10,11] surveys under the sponsorship of the Planned Parenthood Federation of America. These were designed to examine psychological and interpersonal factors affecting the use of contraceptives in the United States. These studies were largely exploratory. The interviews have been "open-ended" because the aim of the investigators was not to test hypothesis, but to seek promising leads about the nature of less conscious attitudes affecting the use of contraceptives.

The University of Michigan Population Center has begun adding questions on past and expected childbearing to nation-wide surveys of the Survey Research Center that deal principally with other topics. The investigators hope to use the answers to these questions to develop a time series of birth expectations for the United States that will extend the series begun in the Growth of American Families Studies.

In contrast to the more analytical studies mentioned above, The Growth of American Families Studies seek simply to describe the distribution of certain fertility variables for the United States as a whole, to show how they differ for certain important subgroups of the population, and to trace their change over time.

The "Modernization of Traditional Societies Series," published by the Committee on Economic Growth of the Social Sciences Research Council, have been concerned with both the continuing dynamics of industrialized societies and with the processes of change in areas just beginning modernization. The book "The Impact of Industry,"[12] may be regarded as an introduction to the series. The attention of the book ranges over the characterictics of the modernization which may be political, and social as well as economic, but its central focus is symbolized by its title.

Ogburn and Nimkoff[13] wrote a book in 1955, "Technology and the Changing Family," in which they studied the causes of recent family changes and technology. A single institution, the family, has been chosen and upon it recorded the influences coming from many different inventions and scientific discoveries.

It may be concluded that there is no shortage of literature on the subject under discussion. Various authors have studied the area of fertility, technology and the changing family, etc. However, there is a dearth of research specifying and pin-pointing the impact of industrialization on fertility.

"The Series of Supplement" is the authentic source of current information about the one-in-a thousand sample. It is, also, the source of information about the revisions which take place in the "Description and Technical Documentation."[14] The areas studied are diverse and done by organizations such as the "Department of Defense, Office of the Assistant Secretary of Defense for Manpower," and "The North African Center for Demographic Research and Training," or by private researchers such as the famous demographer Otis Dudly Duncan and Karl Taeuber. These studies cover areas such as Analysis of Industry Groups, Occupations, and educational levels, done by E. Hardin; Estimation of

Determinants of Farm Income, done by A. V. Williams; The Future Economic Circumstances of the Aged, done by J. Schulz; The Internal Variability of Social Classes, done by D. Arnold; The Analysis of American Society Through the Census, done by W. Bash, etc.. All information concerning these studies could be obtained from the Bureau of the Census of the United States.

THE PROBLEM

The Family has been considered the basic institution in most societies, including the United States Society. However, evidence from the past 150 years indicates that the American family has become smaller in size. The decrease in size of families in the United States was one of the most striking changes which have taken place during the last 150 years. In the census records, during these 150 years families have decreased 40 percent in their average size, but the most frequent size of family changed from five persons in 1790 to two persons in 1940.[15] Table I[16] gives some additional details of this decrease in the family size. In spite of the increase in marriages, the size of families continue to decrease.

The family as a social institution is changing, as are other institutions. These changes differ somewhat in countries according to the degree of their industrialization, of their urbanization and their isolation.[17] But whatever these changes may be, they can be better seen after an analysis of the factors that affect the form and functions of the family. These factors could include: the community

TABLE I

PER CENT DISTRIBUTION OF HOUSEHOLDS, BY SIZE IN THE UNITED STATES IN 1790, 1890 AND 1960

Size of Household	1790	1890	1960
1 Person	03.7	03.6	13.1
2 Persons	07.8	13.2	27.8
3 Persons	11.7	16.7	18.9
4 Persons	13.8	16.8	17.6
5 Persons	13.9	15.1	11.5
6 Persons	13.2	11.6	05.7
7 Persons	11.2	08.5	05.4
8 Persons	09.0	05.9	
9 Persons	06.7	03.8	
10 or more Persons	09.1	04.8	
All	100.0	100.0	100.0
Medium Size (in Persons)	05.4	04.5	03.0

Source: Paul C. Glick, American Families, 1957, Table 14, p. 22, for all but 1960. The latter comes from U. S. Bureau of the Census, Current Population Reports, Series P-20, Number 106, January 9, 1961, Table 3, p. 13.

type in which the family exists such as rural-urban; technology which is an indirect factor of great importance affecting the family size by developing and transferring the economic functions of the family to other institutions; and the presence of a cultural lag between the rural and urban families. Some believe that family bonds weaken and the members of the family emerge as individuals with rights as independent persons under the influence of industrial technology.

It is customary to begin a discussion of the demographic situation of developing areas by referring to the "demographic transition" in the West. The broad descriptive generalization states that premodern populations were comparatively stable. High and relatively constant fertility rates were offset by correspondingly mortality rates. With modernization, death rates were reduced; fertility rates were reduced considerably later; and there was a period of rapid transitional growth. The transition is presumably completed when a low and relatively constant rate of mortality is matched by a low and variable rate of fertility.[18]

A set of explanatory principles has been developed for each of the variables and sequences. Two of these explanations are of considerable importance. First, it is argued that mortality rates fell before fertility rates because death is always a negative value, whereas fertility is,

in most societies, a positive value. Second, it is argued that fertility eventually declines. This is attributed to industrialization and urbanization: more precisely, it is attributed to the fact that high fertility is inconsistent with aspirations for mobility within single careers and between generations.[19]

The validity of the transition theory as a historical generalization has been increasingly criticized. Its explanation of declining fertility is particularly important. The "mortality" explanation has been challenged as too generalized. By the same token, the possibility arises that attitudes conducive to fertility reduction may not have to await massive changes in occupation and styles.

The historical fertility differentials in the West will probably be more or less repeated in the developing areas as the practice of limiting the size of one's family becomes somewhat more widespread. Consequently, there will be an inverse relation between fertility and indices of socio-economic status. If history approximately repeats itself further, a narrowing fertility differentials will follow. If and when fertility limitation becomes common, and most childbearing becomes voluntary, a positive relationship between income and family size may appear. Children will

then become something like consumer goods, to be conspicuously displayed.[20]

Another subsidiary part of transition theory that is subject to question is the assumption of the universality of high fertility values. Field studies in other areas have indicated that in terms of "ideal size of family," the resistance to family limitation may have been exaggerated.

"Many sociologists and population students believe that birth rates in countries undergoing urbanization and industrialization will eventually decline as their citizens come to prefer small families for substantially the same reasons that led Westerners to do so."[21] The experience of Japan,[22] the one non-Western country to achieve full economic and demographic modernization, supports this belief.

The urban families of the nations of Western Europe and the United States have common features as well as differences.

Ogburn states in his article[23] that the most important of these common features is the loss of functions to other social institutions. These institutions have developed traditional family functions much further. Thus, production has been transferred to the factory, though consumption remains as an important family function, with men, women, and

children spending much of their time away from home. With the shift of economic functions there have been transferred other functions such as protection, recreation, religious worship, and marriage. Particularly, in cities, have the power and prestige of families as such declined. Power is in government and industry rather than in the family as it is in small communities. The family and household are becoming smaller[24] in size partly because of the diminution of economic production in the household and partly because of the costs of rearing children which must be paid to agencies outside the family. This reduction in size is made possible by discoveries in methods of avoiding conception other than abstinence. This technological development influenced the tendency towards early marriages without having children to support and furnished remunerative employment to young wives outside the home. The authoritarian family with powers of discipline and punishment is declining. Instability of the families in the city is increasing in that there is more permanent separation of mates and more marriages among those who have been previously married. This increase occurs because there are fewer bonds that hold two persons together through life. Family social status and family pride are decreasing, as would be expected where wealth is concentrated in industry and power in government,

and where families are becoming less stable. The ideals, social controls and valuations of the family are changing, too, but much less rapidly; and newer ideals are slow to rise. In an industrial society common habitation of wife and husband together seems to be a goal but in rural society it is not a goal but a means to a goal which is to keep the production of the houshold going without excessive labor turnover and to rear successfully a large family.

Perhaps the rate of change in the family due to industrialization has been overestimated, and the role of transition in producing these conditions has been exaggerated. But the results obtained from this study will broaden our knowledge of this area, and will answer many of these questions we have in mind around the impact of industrialization on the family, hence fertility in the United States.

The study is investigating the impact of industrialization on fertility in the United States. For this purpose, a study sample composed of all the industrial families in the United States is taken from the 1960 Census one-in-a-thousand-sample tape. A control sample composed of all the rural-farm families in the United States is taken from the same tape. The assumptions taken from the discussion above indicate that industrialized area inhabitants: (1) favor small-size families, (2) experience a lower fertility rate,

(3) tend to marry younger, (4) have a higher rate of non-white population, (5) enjoy higher income than the rural-farm population, (6) have achieved a higher educational level than the rural-farm population, (7) are burdened by a higher rate of familial instability and the ratio of child bearing wives is higher.

In this research an attempt will be made to test empirically the above mentioned assumptions by comparing the two communities, the industrial versus the rural-farm, to see to what extent the industrial community is different from the rural-farm. Hence, we will measure the impact of industrialization on the family in general and on fertility in particular.

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[22] Irene B. Taeuber, The Population of Japan (Princeton, N. J., 1958).

[23]W. F. Ogburn, "Why the Family Is Changing", Perspective on the Social Order (New York, 1968), pp. 359-60.

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CHAPTER II

METHODS AND PROCEDURES

This study is based primarily on the statistics in the one-in-a-thousand sample of the 1960 United States Census of Population. The census trichotomy of urban, rural-nonfarm, and rural-farm population is used to designate the rural-urban differences. This study is concerned with the urban and the rural-farm populations. The intermediate rural-nonfarm category is disregarded to sharpen the contrast of the two polar categories.

A brief outline of the development of census data on the family and household characteristics follows.

Comprehensive demographic statistics in the field of the family are of relatively recent origin. In the United States,[1] a few characteristics of households in 1790 were compiled more than one century later for inclusion in an analysis of population changes up to 1900 (United States Bureau of the Census, 1909, Chap. viii). Very limited data on households were compiled from the censuses of 1850 to 1880, but the coverage was not complete for certain

censuses; and for other reasons the quality of these data was unsatisfactory. In 1890 and 1900, household data of a much wider range were compiled, partly for the light they threw on the subject of home ownership. Statistics on the marital status of persons have been published for each census date since 1890. In the 1930 census, the last of the six basic volumes on population was devoted to family statistics. Among the subjects covered were size of family, number of young members of different ages in the family, number of gainful workers in the family, number of lodgers living with the family, tenure and value or rent of home, and several characteristics of the head of the family, such as age, marital status, sex, race, and nativity. Data on these subjects were published for the United States, each state, each large city, and selected data were shown for counties and smaller cities. The fundamental distinction between urban and rural did not become explicit in the procedures of the Bureau of the Census until 1890. The distinction between rural-farm and rural non-farm population was not introduced until 1920.[2] Several tables for 1930, showing detailed cross-classification of family items by marital status and sex of the head-of-household, were compiled but not published except in summary tables included in some of the 1940 family reports. The general design

of the 1930 family tabulations was followed in the 1940 census. In addition, new types of data were compiled on family income and housing characteristics in relation to family composition. Moreover, data on persons classified by relationship to the head of household were compiled for the first time in 1940. Data on selected family items were published for the first time in 1950 for Standard Metropolitan Areas (SMA) and urbanized areas.

The Current Population Surveys are based on scientifically selected samples of households in many areas throughout the United States. The development of census data on the family shows that long-term trends can be traced for only a relatively small number of items but that recent data are available on a wide variety of subjects. These facts, in turn, are related to the recent development of active interest in demographic data in these areas.

In response to strong recommendations by a number of social scientists, the Bureau of the Census developed and made available for public use two samples of the population of the United States, based on the returns of the 1960 Census. One of them is "The-One-in-a-Thousand" sample which we used in this study, and "The-One-in-Ten-Thousand" sample. In order to encourage more wide-spread use of the samples, the Population Council has provided funds to cover,

for nonprofit organizations, their prorated share for producing the master records for the sample. The Bureau of Census also plans to make available a similar set of punch cards relating to a one-hundredth-of-one-percent sample of the population. These samples are available on reels of magnetic tape or sets of punch cards. The names of the respondents and certain of the more detailed items on place of residence and some other characteristics are not revealed. Therefore it has been determined that making records available in this form doesn't violate the provision for confidentiality in the law under which the census was conducted.

In this sample, the tape record contains 120--alphanumeric characters for each person. The record is divided into eight major sections.[3]

1. Area and Unit Identification -- (Items 1-5)
2. Characteristics of the person -- (Items 6-45)
3. Characteristics of the household of which the person is a member -- (Items 46-49)
4. Characteristics of family of which person is a member--(Items 50-61)
5. Characteristics of subfamily (for persons in a subfamily) or characteristics of Family (for persons not in subfamily) -- (Items 62-71)
6. Characteristics of the Associated Person --

(Items 6a, 10a, 14a, 26a, 28a-31a, 37a, 38a, 43a, the associated person is defined in the preface to Part A, Section 5)

7. Characteristics of Mother of Never Married Children Under 18 -- (Items 26b, 28b)
8. Characteristics of Housing Unit in which person lives -- 25 percent sample (Items 72-87); 05 percent sample (Items 88-92); 20 percent sample (Items 93-97)

The magnetic tape record for the head of the household is followed by the records for the other members of the household. Thus, it is possible to prepare tabulations in which the characteristics of any person in a family are associated with characteristics of other members of the family or the family as a whole.

The sample is self-weighting; that is, each person in the 0.1 percent sample is assigned a weight of 1,000 estimates for the universe may be obtained by adding three zeroes to the uninflated counts.

In processing the one-in-a-thousand sample it cannot be assumed that an item relating to a particular group of persons does, in fact, contain codes only for that universe. Thus, information on mother tongue was, by definition, limited to foreign born persons; but the record may contain, by

error, a mother tongue code for natives. Therefore, in tabulating mother tongue, it is necessary to first define the universe by limiting it to foreign born persons.

Where possible, the sample items have been constructed with a code (usually X) to indicate persons excluded from the universe for the item. However, users are likely to be concerned with specially defined universes represented by codes from a combination of two or more items. To prevent confusion arising from failure to select a universe in an identical manner each time it is used, it is recommended by the Bureau of the Census that every computer installation using this sample establish standard universe selection procedures. The list below presents the more commonly used universes for which tabulations are made.[4]

Universe	Definition
Total Population	All records
Persons in household	Item 11, Code 0 to 9 and V
Persons in group quarters	Item 11, Code X
Males	Item 8, Code 0 to 4
Females	Item 8, Code 5 to 9
Population 14 yrs. of age and over	Item 28, not Code X
Urban	Item 3, Code 2 to 9,V and X
Rural	Item 3, Code 0 and 1

Universe	Definition
Rural-nonfarm	Item 3, Code 1
Rural farm	Item 3, Code 0
In urbanized areas	Item 5, Code 4 to 9, V and X
In SMSA'S	Item 4, Code 1 to 9, V
White	Item 14, Code 0 to 1
Non-white	Item 14, Code 2 to 7
Native	Item 15, Code 0 to 3
Foreign born	Item 15, Code 4
Foreign stock	Item 15, Code 1 to 4
5 to 34 enrolled in school	Item 27, Code 0 and 1
Ever married	Item 10, Code 0 to 9
Never married (single), 14 and over	Item 10, Code V
Married spouse present	Item 10, Code 0 and 1
Household heads (all housing units)	Item 11, Code 0
Primary family heads	Item 11, Code 0 with Item 12, Code 0
Primary individuals	Item 12, Code 7
Family heads	Item 12, Code 0, 5 or 6 with Item 13, Code 0 to 6
Family members	Item 12, Code 0 to 6
Primary family members	Item 12, Code 0 to 4
Subfamily members	Item 12, Code 1 to 4
Secondary family members	Item 12, Code 5 and 6

Universe	Definition
Unrelated individuals	Item 12, Code 7, 8, and 9
Secondary individuals in households	Item 12, Code 8
Secondary individuals in groups' quarters	Item 12, Code 9
Inmates	Item 12, Code V
Labor force	Item 28, Code 0 to 4
Civilian labor force	Item 28, Code 0 to 2
Experienced civilian labor force	Item 28, Code 0 to 1 and Item 18, Code 1 with Item 30, Code 0 to 4
Employed	Item 28, Code 0 to 1
Unemployed	Item 28, Code 2
Experienced unemployed	Item 28, Code 2 with Item 30, Code 0 to 4
Armed Forces	Item 28, Code 3 and 4
Net in labor force, 14 and over	Item 28, Code 5
Net in labor force who worked sometimes since 1950 (Labor Reserve)	Item 28, Code 5 with Item 30, Code 0 to 3
Persons with income in 1959	Item 43, Codes other than XXX or XXO
Persons with earnings in 1959	Item 39, Codes other than 0
Owner occupied housing units	Item 11, Code 0 with Item 72, Code 0
Renter occupied housing units	Item 11, Code 0 with Item 72, Code 1 and 2

The Census is defined by Thomlinson[5] as a sort of social photograph of certain conditions of a population at a given moment which are expressible in numbers. The initial frame for the sample under study consists of progressive sampling stages; drawing first areas, then dwelling units, and finally the individuals themselves. Each person enumerated by the 1960 Census was counted as an inhabitant of the area where he lives. Thus, the one-in-a-thousand sample is a multistage area cluster sample of households spread throughout all fifty states, and it is as accurate as the full census since it is a representational sample.

To satisfy the requirements of this study, facts were gathered about all the industrial families presented in the one-in-a-thousand sample. This industrial group totals 38,254 families, of which 34,338 families are white and 3,916 are non-white. This group comprises the study sample. A control sample is taken also which consists of all the rural-farm families presented in the one-in-a-thousand sample. The total number of this rural-farm group is 3,537 families, of which 3,238 families are white and 299 families are colored. In order to facilitate comparisons between the two groups, percentages will be used as a unitary measure. Thus, the relative size of the rural-farm family sample to the industrial family sample is 9.2 percent; the

relative size of the colored family sample in the industrial group is 10 percent of all the families, and 9.2 percent of all the rural-farm family sample. Table II below will show the relative size of the two samples by color.

TABLE II

THE RELATIVE SIZE OF THE INDUSTRIAL AND RURAL-FARMS FAMILY SAMPLES BY COLOR*

Category	No. Families in Category	%
All Families Studied	41,791	100.0
Industrial	38,254	90.8
Rural-Farm	3,537	9.2
All Industrial by Color	38,254	100.0
White	34,338	90.0
Non-white	3,916	10.0
All Rural-farm by Color	3,537	100.0
White	3,238	90.8
Non-white	299	9.2

*These data are selected from the "One-in-a-thousand" sample magnetic tape (Bureau of the Census of the United States, Washington, D. C., 1960).

DEFINITIONS OF AREA UNITS

A general tendency for manufacturing activity to be concentrated toward population nodes has been frequently noted. For example, Florence and Friendson[6] state: "A high density usually points to intensity of production and often to the development of peculiarly 'urban' activities, mainly manufacturing and services."

Duncan and his associates[7] state also: "In the nation as a whole, the proportion of the resident labor force in manufacturing tends to vary directly with the 'urbanization' of the area. For example, in 1950 manufacturing accounted for about 30.7 percent of the resident employment in all urbanized areas; outside urbanized areas the proportions were 27.8 percent in cities of 25,000 or more, 24.4 percent in towns of 2,500 to 25,000, 25.6 percent in villages and other rural non-farm areas, and only 9.4 percent in the rural-farm population. Thus, we suspect that the proportion of the labor force in manufacturing will increase as the degree of urbanization increases."

The comparative study of communities of different sizes is one approach to the urbanization, and hence industrialization. Urbanization has two aspects. The longitudinal aspect which is a process involving an increase over time in the number and size of centers of population concentration the cross-sectional aspect of urbanization refers to variations at one point in time among areas in the degree of population concentration, or to variations by size of community in the frequency of population characteristics. Cross-sectional and longitudinal studies of urbanization should not be regarded as antithetical, but as compensatory approaches. A knowledge of the correlates of urbanization gained through cross-sectional analysis has presumptive value for understanding social changes in an economy undergoing urbanization. For the most part, cross-sectional studies of urbanization have been limited to gross comparisons between urban and rural communities, with the latter often being divided into non-farm and farm components following the introduction of this distinction by the Bureau of the Census in 1920.

For the purpose of this study a definition of the trichotomy (urban, rural non-farm, and rural farm) will be of value. The definitions of the major concepts used in the 1960 Census of Population will be given below. A few of the

definitions used in 1960 differ from those used in 1950. These changes were made in order to improve the statistics, even though it was recognized that comparability would be affected.

Industrial Families

John Goldthrope[8] defined the "Industrial Society" as, "an open community encouraging occupational geographic, and social mobility. In this sense, industrialism must be flexible and competitive; it is against tradition and status based upon family, class, religion, race or caste."

In the same fashion Wilbert E. Moore[9] defines "Industry" as "the fabrication of raw materials into intermediate components or finished products by primarily mechanical means dependent on inanimate sources of power."

The best source of relatively detailed industry data is the labor force industry tabulations of the Census of Population.

The detailed industrial classification of 150 industries are described in the 1960 Classified index of Occupations and Industries. These 150 industries are divided into 13 groups:[10]

1. Agriculture, Forestry, and Fisheries: 3 categories
2. Mining: 4 categories

3. Construction: One category
4. Manufacturing: 4 main categories, each divided into a number of subcategories.
   A. Durable good: 9 subcategories, each divided into a number of subcategories.
   B. Nonclearable goods: 11 subcategories, each divided into a number of subcategories.
5. Transportation, Communication, and Other Public Utilities: 3 categories, each divided into a number of subcategories.
6. Wholesale and Retail Trade: 2 categories, each divided into a number of subcategories.
7. Finance, Insurance, and Real Estate: 4 categories.
8. Business and Repair Services: 4 categories.
9. Personal Services: 7 categories.
10. Entertainment and Recreation Services: 3 categories.
11. Professional and Related Services: 9 categories.
12. Public Administration: 4 categories.
13. Industry Not Reported.

According to the definition adopted for use in the 1960 Census, the urban population[11] comprises all persons living in (a) places of 2,500 inhabitants or more incorporated as cities, boroughs, villages, and towns; (b) the

densly settled urban fringe, whether incorporated or unincorporated, or urbanized areas; (c) towns in New England and townships, in New Jersey and Pennsylvania which contain no incorporated municipalities as subdivisions and have either 25,000 inhabitants or more or a population of 2,500 to 25,000 and a density of 1,500 persons or more per square mile; (d) counties in the States other than the New England States, New Jersey, and Pennsylvania that have no incorporated municipalities within their boundaries and have a density of 1,500 persons or more per square mile; and (e) unincorporated places of 2,500 inhabitants or more. The population non-classified as urban constitutes the rural population.

Rural-Farm Families

The rural population[12] is subdivided into the rural-farm population, which comprises all rural residents living on farms, and the rural non-farm population; which comprises the remaining rural population.

In the 1960 Census, the farm population consists of persons living in rural territory on places of 10 or more acres from which sales of farm products amounted to $50 or more in 1959 or on places of less than 10 acres from which sales of farm products amounted to $250 or more in 1959.

Other persons in rural territory, including those living on "city lots", were classified as non-farm if their household paid rent for the house but their rent did not include any land used for farming.

The method of determining farms residence in the 1960 Population Census differs from that used in earlier surveys and censuses. For this reason, the numbers of farm households for years since 1960 are not comparable with the numbers published for earlier dates. The number of farm households reported in the March 1960 survey was about one-fifth smaller when the current farm definition was used than when the previous farm definition was used.

Using the above criteria, the total number of the Rural population in the one-in-a-thousand sample is 54,031. This total is divided into Rural-farm Population which comprises only 13,558 and Rural-nonfarm population which is 40,473. The ratio of the farm Population to the total population of the United States is 8.7 percent for 1960.

Because of the frequent use of the following words, "color and race", "household," "family," "head of household, family or subfamily," "size of household, family or subfamily," and "own children and related children," a definition for each will be given in the second part of this chapter.

VARIABLES STUDIED

To study the correlation between industrialization and fertility in the United States, two factors are studied as "independent variables" or determinants of the results. These are (1) the industrial family, and (2) the rural farm family which is used as a "control factor." This dichotomy of industrial and rural-farm is among the basic features of a low-fertile community or a high-fertile community. The plausibility of this assumption could be tested by considering what differences a researcher would expect to find between rapidly growing, large industrial community and a small, stable rural-farm community.

The 1960 United States Census of Population describe Communities of different types in terms of principal items on population composition. These include age, sex, marital status, mobility, education, income, and employment status of the population; family and household characteristics; and the cccupational and industrial composition of the labor force. The analysis of these data in this study proceeds by raising such questions as the following: Do industrial or rural-farm communities have greater

proportions of married persons? Is the rate of mobility higher in industrial families than rural-farm families? Are incomes higher or lower in industrial communities than in those which are rural-farm communities? Is the number of colored families higher in the industrial or rural-farm communities? Is there any difference in the family size between the two communities? In short, the population characteristics are regarded as "dependent variables," and the problem is to find out how the "dependent variables" are related to the "independent variables."

Because the problem of achieving efficient organization is intensified in some direct relationwhip with the scale of organization, the industrial community is apt to have structural complexities not found in the small rural-farm community. These complexities are reflected in the specialization of occupational roles, and adaptations of family and institutional life. The sheer physical contrast between the urbanized area inhabitants and the rural-farm area inhabitants is so striking in some respects. The data establish a number of significant relationships between demographic, economic, and socio-economic characteristics and the type of community. These relationships vary in degree and pattern, and are subject to many qualifications, making allowance for the influence of other variables.

Nevertheless, one may suspect that any investigation of differences in fertility, which overlooks the factor of community type, is apt to neglect an important source of variation.

The 1960 Census of population defines and explains most of the variables studied in the Series P - 20, No. 164.[13] It is thought useful to have some of these definitions in order to avoid any misconception of these variables. The following definitions are coded verbatim from the above mentioned report.

Age. The age classification is based on the age of the person at his last birthday.

Color and Race. The term "color" refers to the division of the population into two groups, white and nonwhite. The nonwhite group includes Negroes, Indians, Japanese, Chinese, in other nonwhite races.

Household. A household consists of all the persons who occupy a housing unit. A house, an apartment or other group of rooms, or a single room, is regarded as a housing unit when it is occupied or intended for occupancy as separate living quarters; that is, when the occupants do not live and eat with any

other persons in the structure and there is either (1) direct access from the outside or through a common hall or (2) a kitchen or cooking equipment for the exclusive use of the occupants. A household includes the related family members and all the unrelated persons, if any, such as lodgers, foster children, wards, or employees who share the housing unit. A person living alone in a housing unit, or a group of unrelated persons sharing a housing unit as partners, is also counted as a household. The court of households excludes group quarters.

Family. The term "family," as used here, refers to a group of two persons or more related by blood, marriage, or adoption and residing together; all such persons are considered as members of one family. A family may comprise persons in a household or group quarters. A lodger and his wife who are not related to the head of household, or a resident employee and his wife living in, are considered as a separate family and not as part of the head's family. Thus, a household may contain more than one

family. However, if the son of the head of the household and the son's wife are members of the household, they are treated as part of the head's family. A household head living alone, or with unrelated persons only, is regarded as a household but not as a family. Thus, some households do not contain a family.

Primary family. Is a family that includes among its members the head of a household.

Secondary family. Is a family that does not include among its members the head of a household.

Subfamily. Is a married couple with or without children, or one parent with one or more own single children under 18 years old, living in a household and related to, but not including, the head of the household of his wife.

Marital Status. The marital status classification identifies five major categories: single, married, widowed, divorced, and separated. These terms refer to the marital status at the time of the enumeration.

Head of household, family, or subfamily. One person in each household, family, or subfamily is designated as the "head." The numbers of heads, therefore, is equal to the number of households, families, or subfamilies. Married women are not classified as heads if their husbands are living with them at the time of the survey.

Size of household, family, or subfamily. The term "size of household" includes all persons occupying a housing unit. "Size of family" includes the head of the family and all other persons in the living quarters who are related to the head of the family by blood, marriage, or adoption.

Own children and related children. "Own" children in a family are sons and daughters, including stepchildren and adopted children, of the family or subfamily head. "Related" children in a family include own children and all other children in the household who are related to the family head by blood, marriage, or adoption. The count of own or related children is limited to single (unmarried) children.

Years of school completed. Data on years of school completed were derived from the combination of answers to two questions, (a) "What is the highest grade of school that he has attended?" and (b) "Did he finish this grade?" The questions on educational attainment applied only to progress in "regular" schools. Such schools include graded public, private, and parochial elementary and high schools, colleges, universities and professional schools, whether day schools or night schools. Thus, "regular" schooling is that which advances a person toward an elementary or high school diploma, or a college, university or professional school degree. Schooling in other than regular schools was counted only if the credits obtained were regarded as transferable to a school in the regular school system.

Family income. Data on income for persons 14 years old and over were collected from all households included in the 1960 Census. The chief income recipient in a family is the family head unless some other family member has more income than the head. If two or more other family members have equal or higher incomes, the first one processed is regarded as the chief income recipient. The total income of a family is

the algebraic sum of the amounts received by all income recipients in the family.

One key word in the study is left without definition, that is, "Fertility." Fertility is "The actual reproduction performance,"[14] commonly measured by the "crude birth rate," the annual number of births per 1000 (or some other standard figure) of the total population.

Considerations of the measurements and the nature of the data collected will be covered in the following part of this chapter.

METHODOLOGY

Sampling has been extended to many aspects of data collection and data processing with great gains in timeliness, economy, and quality. From a substantive standpoint one of the most important uses of sampling in data collection is that related to the Census. In this usage, the number of inquiries in a complete census undertaking is limited, and sampling methods are employed within the framework of the Census for a number of inquiries. The probability theory on which sampling methods are based dates back to the seventeenth century and although Laplace's classic work on probability was written a century and a half ago (Laplace, 1812),[15] the developments in theory and practice which have made the sample survey an exceedingly powerful tool for population study are largely the product of the last two or three decades. It is in the development of "restrictive random designs" as against simple random sampling, and particularly in the emergence of "area probability sampling," that the sample survey has emerged as a major instrumentality for producing population as well as other types of data.[16]

The use of sampling[17] in conjunction with the Census was employed in the United States in 1940 to extend the range of the subjects on which information was obtained for relatively large geographic areas. In 1950, sampling was used in conjunction with the Census to provide information for "small areas" as well as large areas. In 1960, the use of sampling in conjunction with the Census is greatly extended and that only a few basic items are included in the complete canvas.

The justification for the use of sampling methods lies, of course, in its contribution to increased timeliness, decreased costs, and improved quality of the data. The gains in timeliness and costs arise from the great decrease in the number of persons to be enumerated and items to be processed. The gain in quality of data is not so readily apparent. It derives from the feasibility of increasing the expenditures per person enumerated, over that practiced in a complete Census enumeration. In the United States Census, it has become a working rule to include in the Census undertaking only inquiries and procedures which have been subjected to rigorous pretesting. The "pretest" is a device which permits both experimentation and practice to improve the Census results.

The degree of accuracy required in data is relative

and is a function of the use to which the data are put. In this study, population projections were regarded as a form of model-building rather than as predictions or forecasts of events. For dealing with population data, the author depended largely on general statistical descriptive techniques with some ratio and graphic devices. The tables in this study are arranged in accordance with the data available in the "one-in-a-thousand" sample of the Census of the United States. These tables were constructed in a way which will help the author to predict and project the differences between the industrial and the rural-farm families, hence the impact of industry on fertility.

Important characteristics of the family, such as demographic, economic, and socio-economic differences were selected for both independenct variables, industrial and rural-farm. The data taken from the above mentioned sample establish a number of significant relationships between demographic, economic, and socio-economic characteristics, and type of community. These relationships vary in degree and pattern, and are subject to various qualifications, making allowance for the influence of other variables.

One of the most useful procedures in sociology for determining the relationship between variables is the simple comparison of percentages. Once the bases have been

selected and the percentages computed, the association between the variables becomes apparent through testing and inspection, which will show the direction of the relationship whether it be negative or positive. The direction of the association or relationship could be measured by a statistical test which will enable the researcher to study and to describe precisely averages, differences, and relationships. Since we have two independent samples, the Chi-square test was chosen to test the hypotheses that the two samples, industrial rural-farm families, differ in respect to some demographic, economic, and socio-economic characteristics. The level of measurement of these samples differ from table to table. It is nominal for some tables, ordinal, or ratio for others. The Chi-square test is suitable for the analysis of the data used in this study as the expected frequency in any cell is more than 5.

The one-in-a-thousand and one-in-ten-thousand samples are subsamples of the 25 per cent and 5 per cent samples that were used to provide most of the statistical data in the 1960 Census of Population and Housing. Statistics based on the 25 per cent sample were estimated through the use of a ratio estimation procedure. These ratio estimates reduce the component of sampling error arising from the variation in size of the household and achieve many of the gains of

stratification in the selection of sample, with the strata being the groups for which separate ratio estimates are computed. The net effect is a reduction in the sampling error and bias of most statistics below what would be obtained by weighting the results of the 25 per cent by a uniform factor or four. A by-product of this type of estimation procedure is that estimates for the sample are generally consistant with the complete count with respect to the total population and for the subdivisions used as groups in the estimation procedure.

A detailed analysis of the data relevant to the above mentioned hypothesis and findings will be discussed in Chapter III.

FOOTNOTES

[1]Phillip M. Hauser and Otis Dudley Duncan, The Study of Population (Chicago, Ill., 1959), pp. 577-78.

[2]Bureau of the Census,"1/1000 and 1/10,000", Two National Samples of the Population of the United States: Description and Technical Documentation (Washington, D. C., 1960), pp. 2-3.

[3]Ibid.

[4]Ibid, pp. 79-80.

[5]Ralph Thomlinson, Population Dynamics (New York, 1965), p. 33.

[6]Florence and Friedson, Industrial Location and Natural Resources(Washington, D.C., 1943), p. 63.

[7]Otis Dudley Duncan, W. Richard Scott, Stanley Lieberson, Beverly Duncan, and Hal H. Winsborough, Metropolis and Region (Baltimore, 1960), p. 167.

[8]John H. Goldthrope, "Social Stratification in Industrial Society", Class, Status, and Power (New York, 1966), p. 651.

[9]Wilbert E. Moore, The Impact of Industry (Englewood Cliffs, 1965), p. 4.

[10]Bureau of the Census, "1/1000 and 1/10,000", Two National Samples of the Population of the United States: Description and Technical Documentation (Washington, D. C., 1960), pp. 48-52.

[11]Bureau of the Census, Report PC (1) - 1C (Washington, D. C., 1960), pp. VII-VIII.

[12]Ibid, p. VIII.

[13]Bureau of the Census, Population Characteristics, March 1966, Report P-20, No. 164 (Washington, D. C., 1967) pp. 4-7.

[14]Dennis H. Wrong, Population and Society (New York, 1964), p. 43.

[15]P. S. Laplace, Theories Analytique des Probabilities (Paris, 1812).

[16]Frank Yates, Sampling Methods for Censuses and Surveys (New York, 1949).

[17]Philip Hauser and Otis Dudley Duncan, The Study of Population (Chicago, Ill., 1959), pp. 58-60.

CHAPTER III

COMPARISON BETWEEN INDUSTRIAL AND RURAL FARM FAMILIES - THE DATA AND RESULTS

One of the major purposes of this study is to gather information that will help to improve forecasts of the impact of industrialization on fertility in the United States. Whelpton, Campbell, and Peterson[1] mentioned in their fertility study in the United States that family-size ideals, as well as the actual size of the typical family, vary from time to time in the United States, perhaps in response to changes in economic conditions or perhaps merely in response to changes in the fashion of the times. The study of all the dependent variables and the effect of the independent variables on them will clear up this point to a great extent.

The data related to each of the dependent variables were subjected to a chi-square test. The results of this analysis have been summarized in various tables. According to Siegel[2], the chi-square test is applicable to data in a contingency table only if the expected frequencies are sufficiently large, since $\frac{(Oi-Ei)^2}{Ei}$ has distribution $(C-1)(r-1)$

degrees of freedom. When the observed expected frequencies do not meet these requirements, one may increase their values by combining adjacent classifications and, thereby, reducing the number of cells. This may be properly done only if such combining does not rob the data of their meaning. Many writers suggest that the expected value should be at least equal to five. In order to apply the chi-square test correctly, some adjacent classifications were combined in some tables where zero observed values existed.

In most of the chi-square tests in this study, the computed chi-square values are found to be highly significant (See the table of significance in Appendix A). In most of the tables the probability associated with such values was 0.000. A possible explanation is that the sample size in these cases was very large and might tend to inflate the chi-square values. Consequently, the results of such cases will be interpreted with caution.

AGE AND SEX COMPOSITION

Age Distribution by Sex and Color (of Individuals in Families)

Referring to the age distribution by sex and color for the industrial population (Figure 1), the sex ratio shows a lower ratio of females per 1000 males for both white and non-white groups except for the first age category. In this category (19 years or less), the ratio of females per 1000 males is higher for the white group.

In contrast to the industrial population, the rural-farm sex ratio (Figure 2) shows that there is a higher ratio of females per thousand males for both white and non-white in general. This does not hold for the age groups 30-34 and 35-39 for the white population, and in age groups 20-24 and 30-34 for the non-white population.

The non-white farm population comprised only 9.2 per cent of the total population in contrast to 10.0 percent of the industrial population. This could be explained by the trend of migration from rural areas to industrial areas seeking better jobs and higher incomes. Figures 1 and 2 show that in both groups there is a heavy concentration in

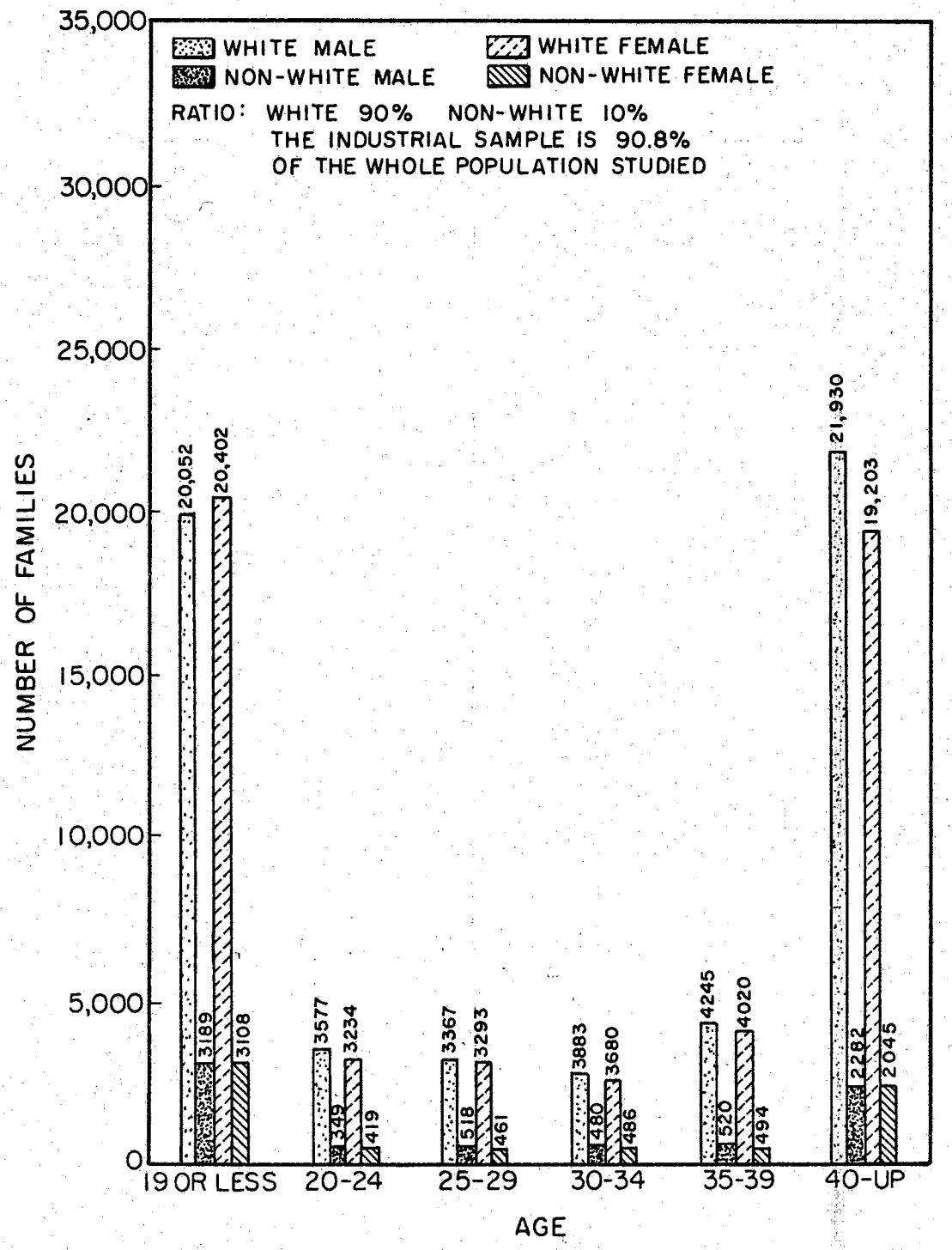

Figure 1. Age Distribution by Sex and Color (Industrial)

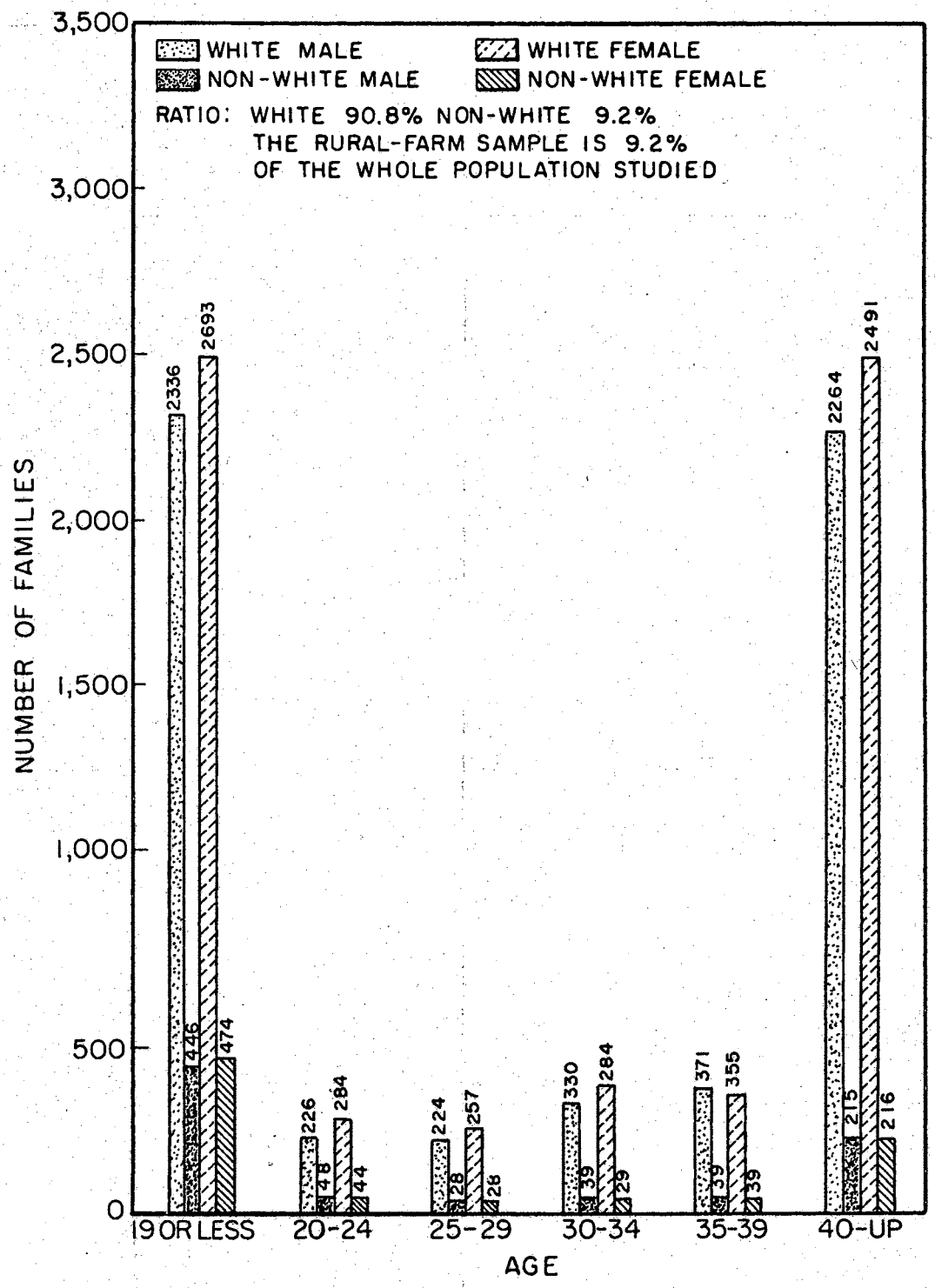

Figure 2. Age Distribution by Sex and Color (Rural - Farm)

the last age group for both white and non-white populations. However, the non-white figures show that the numbers in the last age group, 40 and up, although high compared to the other categories, still it is far less than the white population. This may be explained from the fact that the white population, as compared to the non-white have a higher longevity.

It was also found that there is a very high significance in testing the independence of age and color for both rural and industrial males and females. Color and age do not appear to be related except the problem of relationship in the older age category.

Child Bearing Wives by Age and Color

In testing the hypothesis of independence of color and the age of child bearing wives, the probability associated with the computed chi-square in case of the rural-farm population is 0.984. In contrast, this probability is close to zero in the case of the industrial population. This indicates that color and the age of child bearing wives are independent in the case of the rural-farm population, whereas the same factors are dependent in the industrial population. In other words, in the case of the rural-farm population, the frequencies with which the white group is

distributed on the different age groups are almost the same as those for the non-white group. However, in the case of the industrial population such frequencies are not the same for both white and non-white groups. Also, the highest deviation of the observed frequencies from the expected frequencies in the industrial population is found in the age group 40 and up. For the white group, the observed frequency is 115.66 greater than the expected 10392.34, and for the non-white group the observed frequency is less than the expected by that amount of deviation. The smallest deviation between the observed and the expected frequencies is found in the age group 15-19. This deviation is -6.04 for the white group, and 6.04 for the non-white group. Table III shows that the observed frequencies with which the white group is distributed on the different age groups are less than the expected for the first four age groups 15-19, 20-24, 25-29, 30-34. The observed frequencies of the last two age groups 35-39, 40-up are greater than the expected. For the non-white group the above findings are true in the opposite direction. This is due to the fact that a higher rate of death takes place among the non-white wives before they can reach the last two age categories.

TABLE III

OBSERVED AND EXPECTED FREQUENCIES OF CHILD-BEARING WIVES IN DIFFERENT AGE GROUPS FOR WHITE AND NON-WHITE, AND INDUSTRIAL AND RURAL FARM POPULATIONS

Age Group			15-19	20-24	25-29	30-34	35-39	40-Up
Industrial	White	Obs.	272.00	1781.00	2546.00	3205.00	3500.00	10508.00
		Exp.	278.04	1817.22	2585.45	3262.50	3476.45	10392.34
	Non-white	Obs.	36.00	232.00	318.00	409.00	351.00	1004.00
		Exp.	29.96	195.78	278.55	351.50	374.55	1119.66
Rural-Farm	White	Obs.	27.00	124.00	167.00	279.00	329.00	1070.00
		Exp.	27.39	126.01	167.09	280.32	327.80	1067.39
	Non-white	Obs.	3.00	14.00	16.00	28.00	30.00	99.00
		Exp.	2.61	11.99	15.91	26.68	31.20	101.61

Taking into consideration the ratio of the industrial to the rural-farm population, it can be seen from figure 3 that the white group in both populations, industrial and rural-farm, for the first age group 15-19 is the same. It can be observed, also that for the following four age groups 20-24, 25-29, 30-34, 35-39 the ratio of child bearing wives is higher in the industrial population than the rural-farm for both the white and the non-white. As for the last age group, 40-up, the ratio of the white child-bearing wives in the industrial population is less than the ratio of white child-bearing wives in the same age group in the rural-farm population. But it has, almost, equal ratios for the non-white groups.

The findings support the assumption that the industrial population has a higher rate of child-bearing wives than the rural-farm population for both groups, white and non-white.

Rate of Mobility from County of Residence by Color

By comparing the industial and the rural-farm populations, it can be seen that the ratio of mobility between the industrial populations, white and non-white, is far higher than the rate of mobility between the rural-farm population. Figure 4 shows the difference between the two populations.

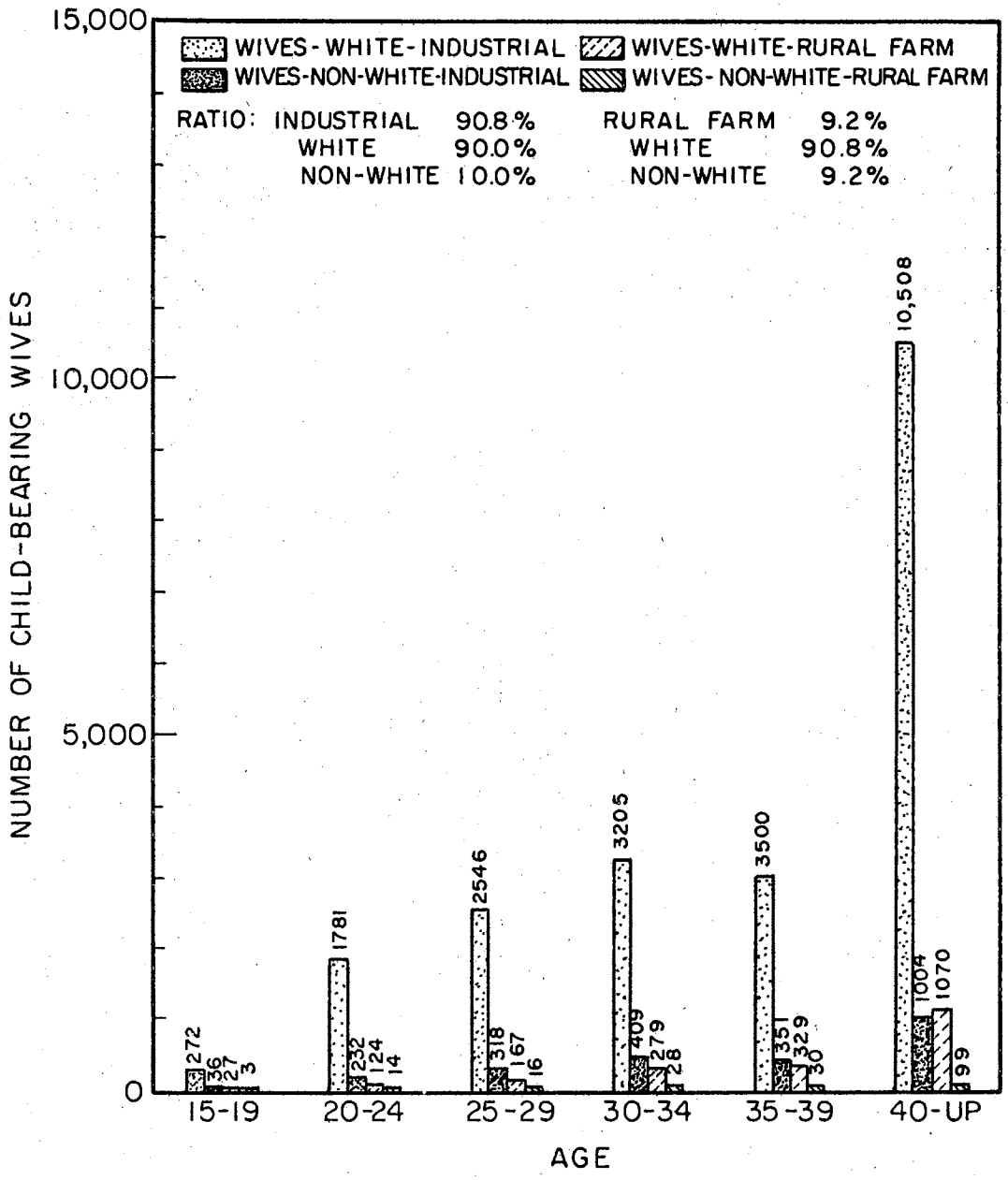

Figure 3. Child-Bearing Wives by Color (Industrial and Rural-Farm)

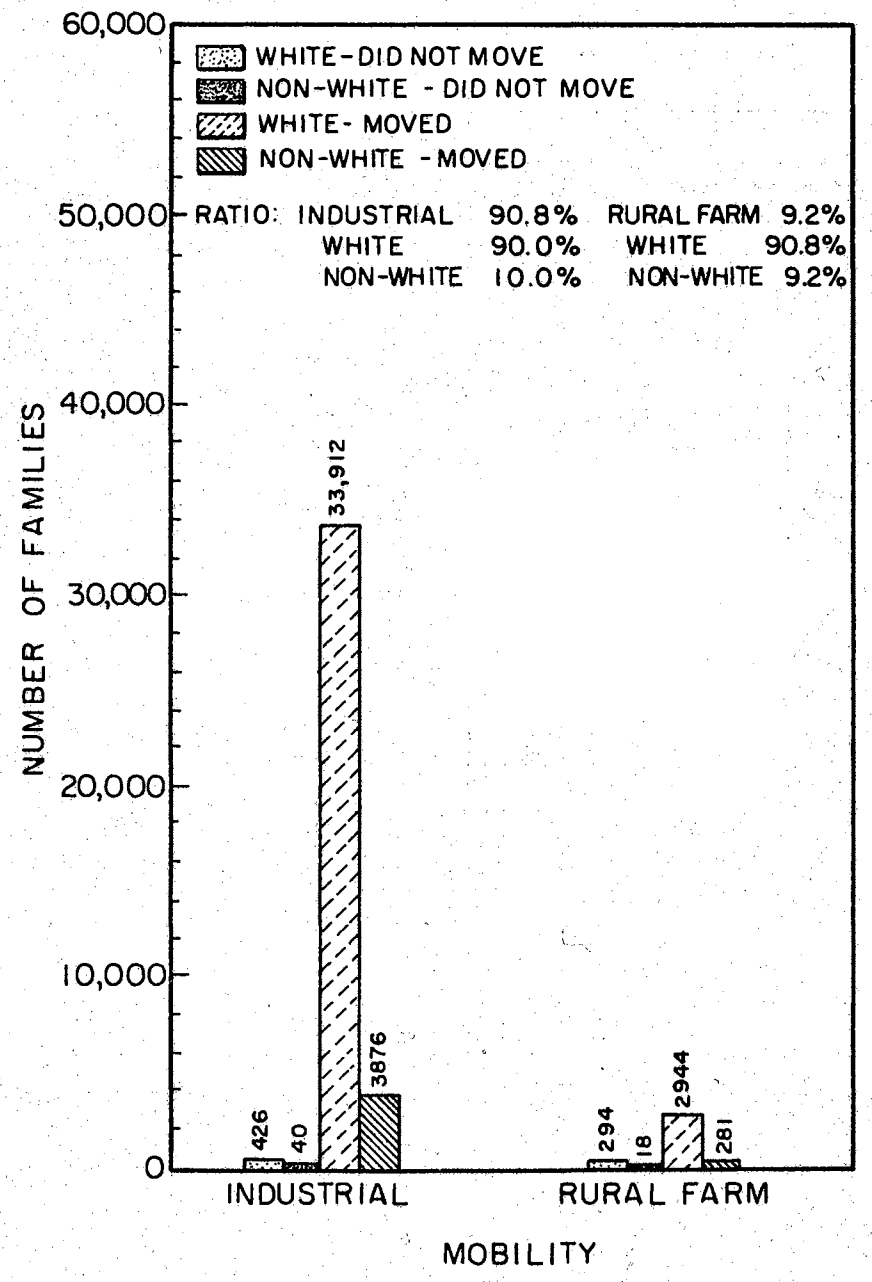

Figure 4. Rate of Mobility (Industrial and Rural - Farm)

As far as the percentages of those moved in comparison to those who did not move, it is as follows:

Industrial	% Did not Move	%Moved	Rural-farm	% Did not Move	%Moved
White	1.24	98.76	White	9.08	90.92
Non-white	1.02	98.98	Non-white	6.02	93.98
Overall Mobility	1.22	98.78	Overall Mobility	8.82	91.18

By examining the different percentages it is concluded that, although both populations are mobile, the Industrial population rate of mobility is higher than the rural-farm rate of mobility for whites and non-whites and for the overall rate of mobility.

For testing the independence of the mobility rate and color, the probability associated with the computed chi-square is 0.267 in the case of the industrial population and 0.089 for the rural-farm population. This indicates more independence of the rate of mobility and color for the industrial population than in the rural-farm population.

MARITAL STATUS AND FAMILY CHARACTERISTICS

Age at Marriage by Sex and Color

A comparison between the white males in the two groups, industrial and rural-farm, revealed that less white industrial males than white rural-farm males marry during the age period 15-19. However, the trend is reversed when we study the number of marriages which take place during the rest of the age periods -- 20-24, 25-29, 30-34, 35-39, 40-Up. During all these latter four age periods, more white industrial males than white rural-farm males get married. It can be noted from Figure 5 that about 75% of all the marriages which take place during all the periods for the white male of both groups, happen during the first two marriage age periods (15-19, 20-24).

The non-white industrial males have a higher rate of marriage during the different marriage age periods than the rural-farm non-white males. As it was mentioned above concerning the age periods during which a high rate of marriage takes place, the same holds for the non-white males.

As far as the white females are concerned the data show that the rate of marriage among the white industrial females during the first four marriage age periods is less than the rate of marriage between the same age groups--15-19, 20-24, 25-29, 30-35-- among the rural-farm white females. Also, the highest rate of marriage for white industrial females takes place during the second marriage age period, 20-24, and the second highest for both groups takes place during the third marriage age period, 25-29. A higher rate of marriage among the industrial white females than the rural-farm white females takes place during the last two marriage age periods -- 35-39, 40-Up. This indicates that more white industrial females marry at older ages than the white rural-farm females.

The rate of marriage during the first two marriage age periods -- 15-19, 20-24 -- among the non-white industrial females is lower than the non-white rural-farm females. There is a high concentration of marriages during the second age category followed by the first age category. A higher rate of non-white industrial females marry during the last four marriage age periods -- 25-29, 30-34, 35-39, 40-Up -- than the non-white rural-farm females (Figures 5 and 6).

The findings do not support the assumption that the industrial population tend to marry younger. It was found

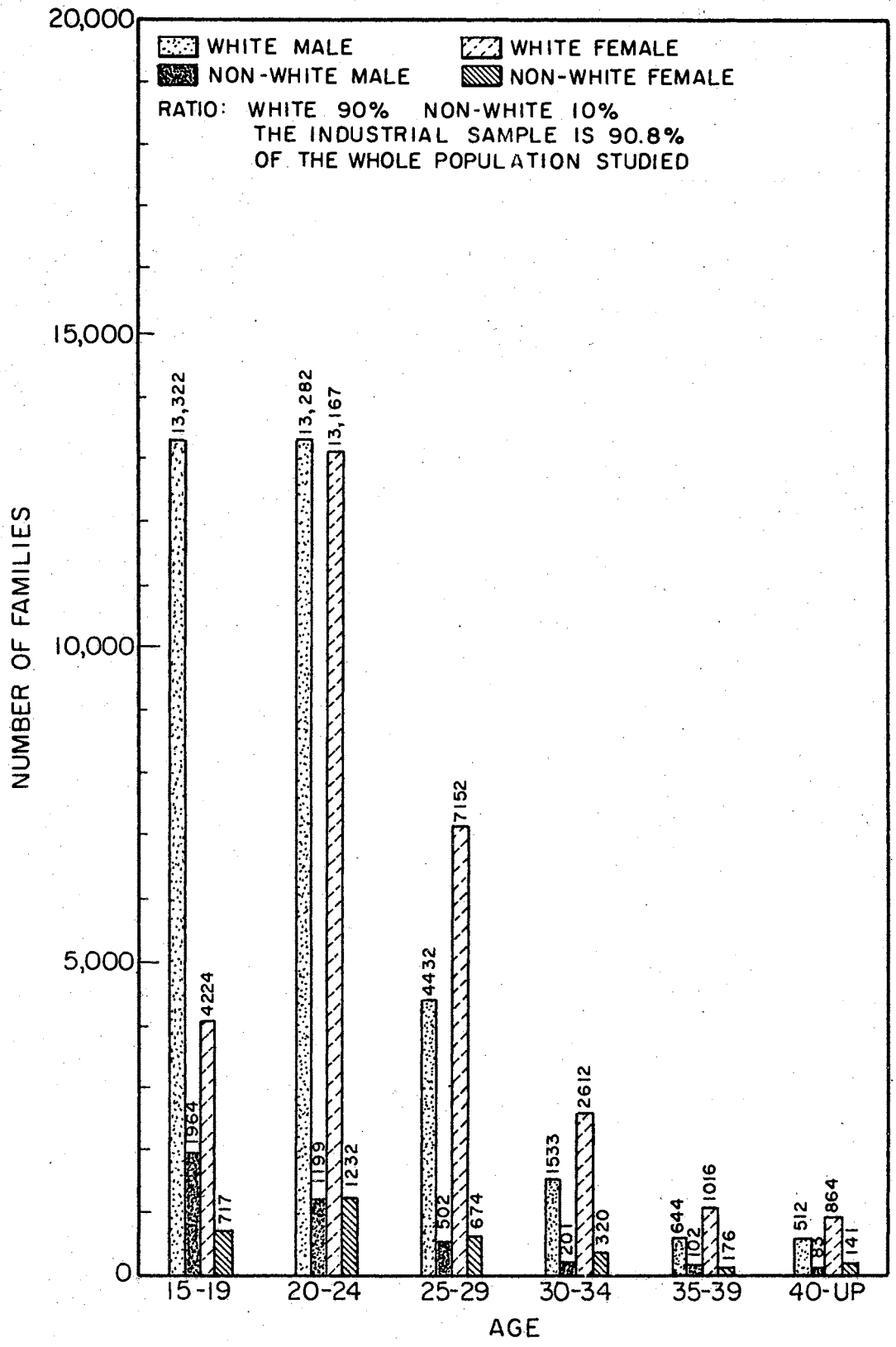

Figure 5. Age at Marriage by Sex and Color (Industrial)

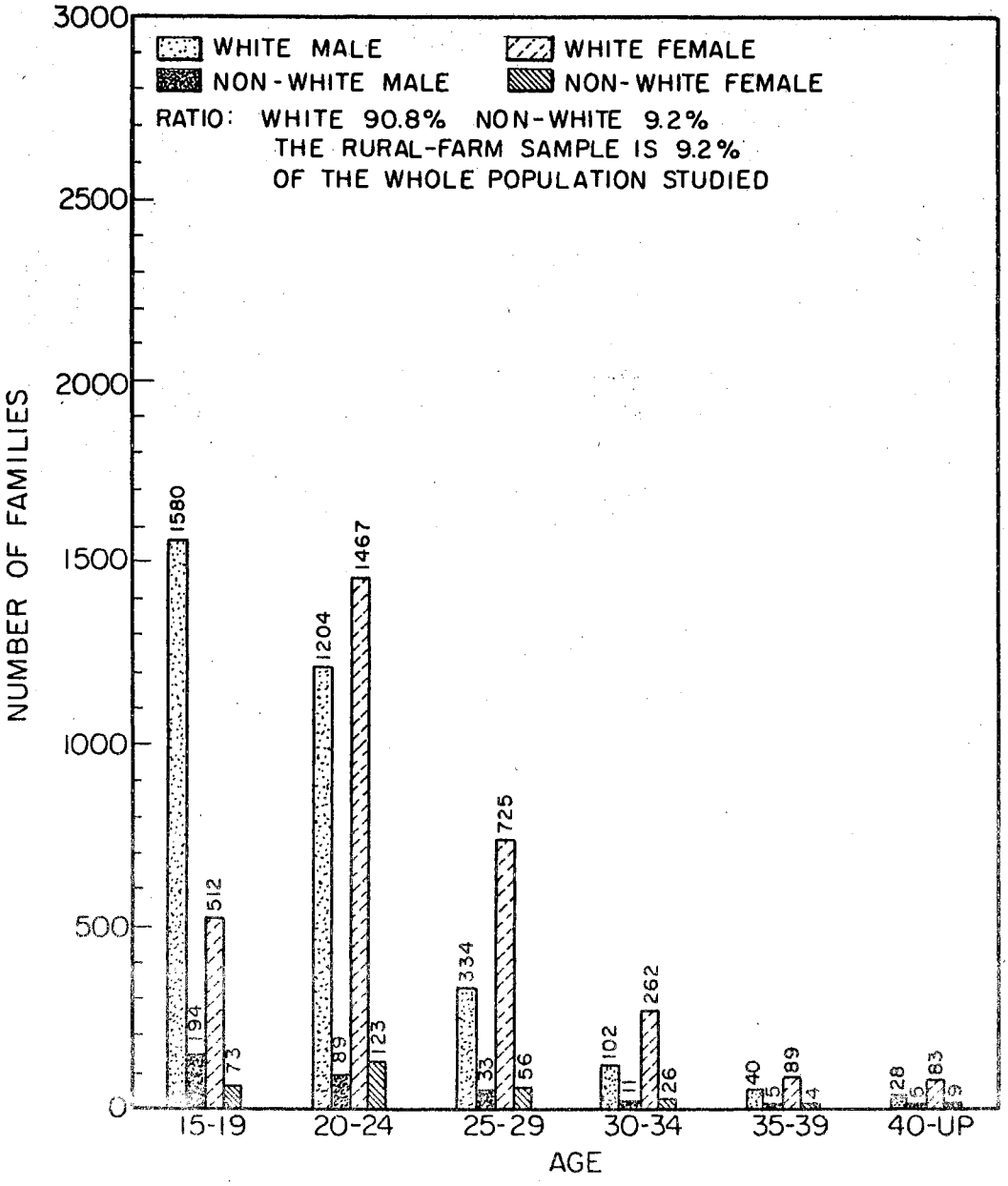

Figure 6. Age at Marriage by Sex and Color (Rural-Farm)

that all the components of the industrial population (male and female, white and non-white) have a lower rate of marriage than the same rural-farm population components during the early marriage age periods.

The probability associated with the chi-square for testing the independence of the age at marriage and color is zero for the industrial population, both male and female. This probability is 0.006 for rural-farm males and 0.005 for rural-farm females. This leads to the rejection of the independence hypothesis in both groups -- industrial and rural-farm, male and female. This shows a very high dependence between color and age at marriage. This result seems to be logical and agrees with the findings above, since the white and the non-white families present two different subcultures.

Marital Status by Sex and Color

The information revealed by the data about the marital status of both samples show that the industrial population -- male and female, white and non-white -- have a lower rate of single persons than the rural-farm population. Among the industrial males and females, the number of married persons is less than the rural-farm white males and females.

This does not hold good for the industrial non-white males and females who have a higher rate of married persons than the rural-farm non-white males and females.

The industrial population, both white and non-white males, have a higher rate of widowed persons among them than the rural-farm population males. As for the industrial female population, white and non-white, the trend is reversed and a smaller rate of widowed females exist in the industrial population than the rural-farm population.

The divorced and separated groups have a very high rate among the industrial population, white and non-white, male and female. This result agrees with the assumption that the industrial area inhabitants are burdened with familial instability. The instability notion is proved true by the very high rate of divorced and separated persons among the industrial population. Figures 7 and 8 give the observed frequencies for each category and for both the industrial and the rural-farm population.

The chi-square test shows a high degree of dependence of color and marital status for industrial and rural-farm, males and females. This indicates that the frequencies with which the white group in the different classifications is distributed on the different categories are not the same

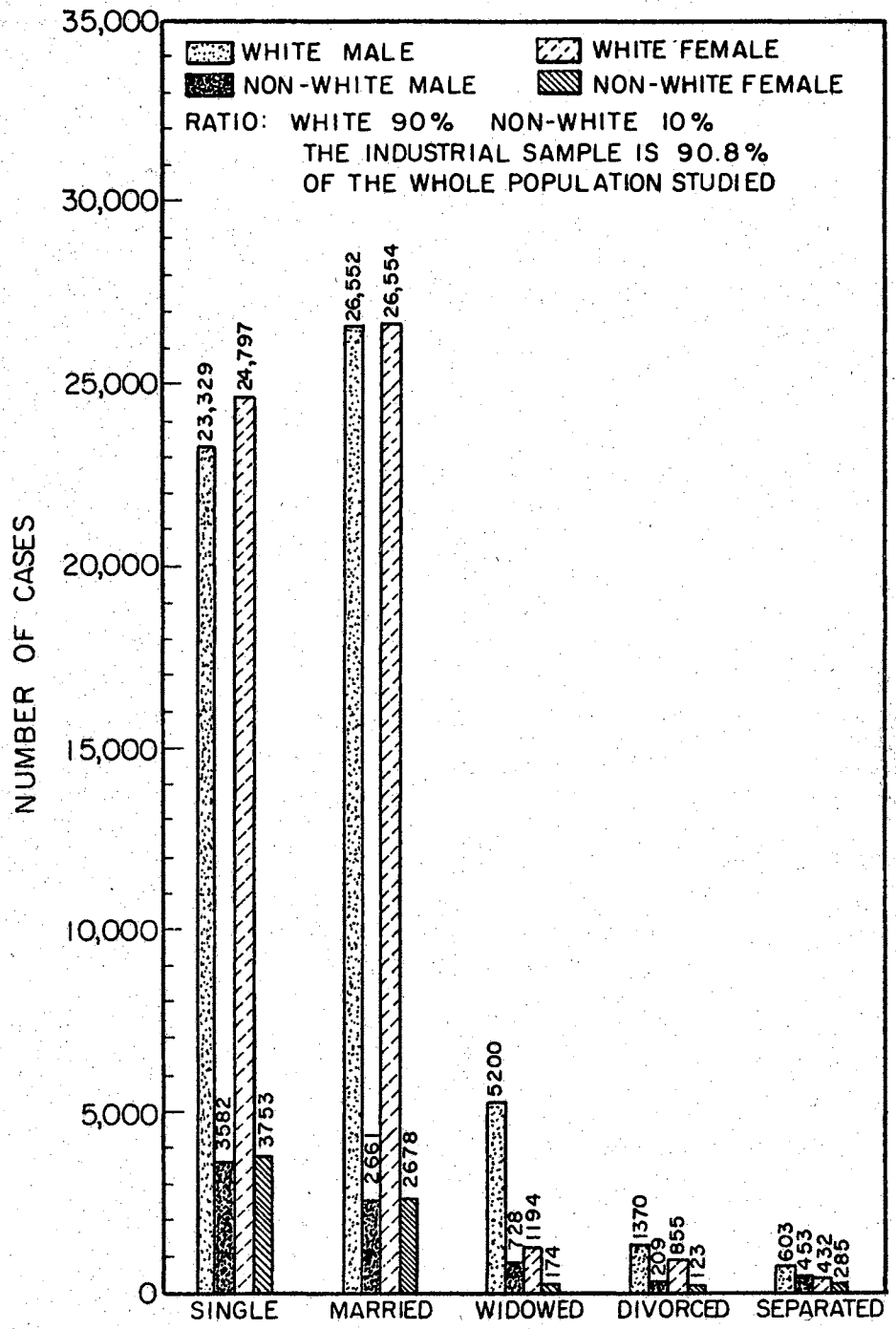

Figure 7. Marital Status by Sex and Color (Industrial)

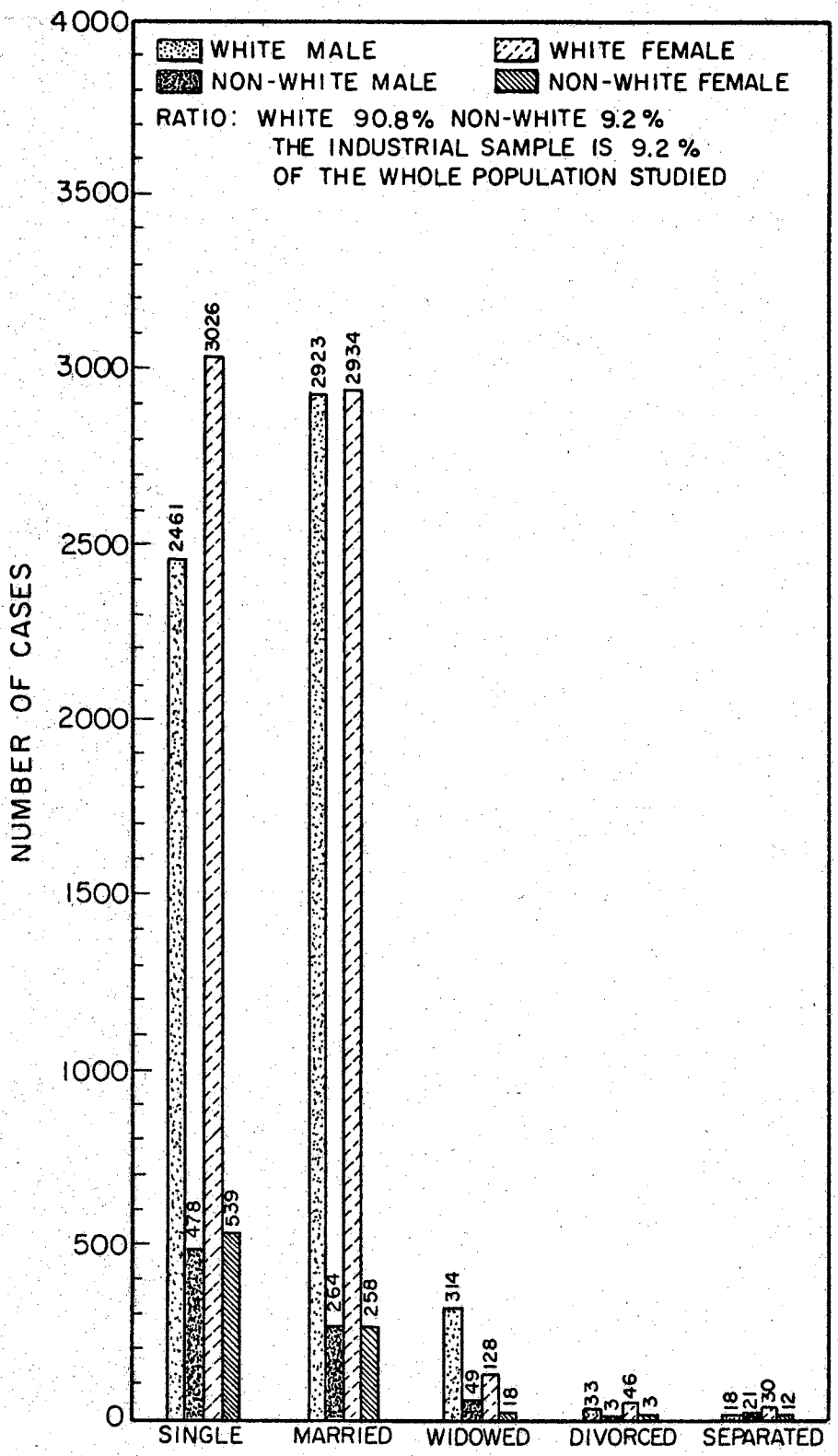

Figure 8. Marital Status by Sex and Color (Rural-Farm)

as those of the non-white group. This shows that the marital status depends to a great extent on color.

Family Characteristics

Family Size by Color, Number of Children in the Family: The ratio of the industrial white and non-white families is almost three times as big as the rural-farm white and non-white families who have one child only. As for the families with two children, the rates are a little higher for the white industrial families than the rural-farm white families, but they are twice as big for the non-white group. The same results hold good for the families with three and four children. As for families with five children, the rate among the industrial white population is lower than the rate among the rural-farm population. This result does not apply to the non-white industrial families with five children since their rate is higher than the non-white families in the rural-farm population.

As for the last two categories, six and over-six children, they are more frequent in the rural-farm population than the industrial population for the white and the non-white groups. The rate is very much higher among the rural-farm families.

These results, which are presented in Figure 9, support the assumption that industrialized area inhabitants favor small size families. They also indicate that the size of the family and the color are very highly dependent on each other since the probability associated with the computed chi-square is zero for both, the industrial and the rural-farm groups.

Number of Children in the Family by Age and Color: The rate of white industrial families who have no children is slightly lower than the white rural-farm families. But the result is reversed when we examine the non-white industrial families who have a higher rate than the rural-farm families. One-fourth of the industrial families have only one child, in the age group 12-17 years. The second high concentration is in the age group 6-11 years, and the least high concentration is in the five year age group. The same is true for the rural-farm group. The rate of the industrial white families with one child under 3 years, and 3 to 5 years is higher than the same rate between the rural-farm white families. As for the rest of the age groups; 5 years, 6 to 11, 12 to 17, 18 to 24, the rate is lower than the rural-farm white families. The same is true, as far as the rates are concerned, for the families with two children. As far as the

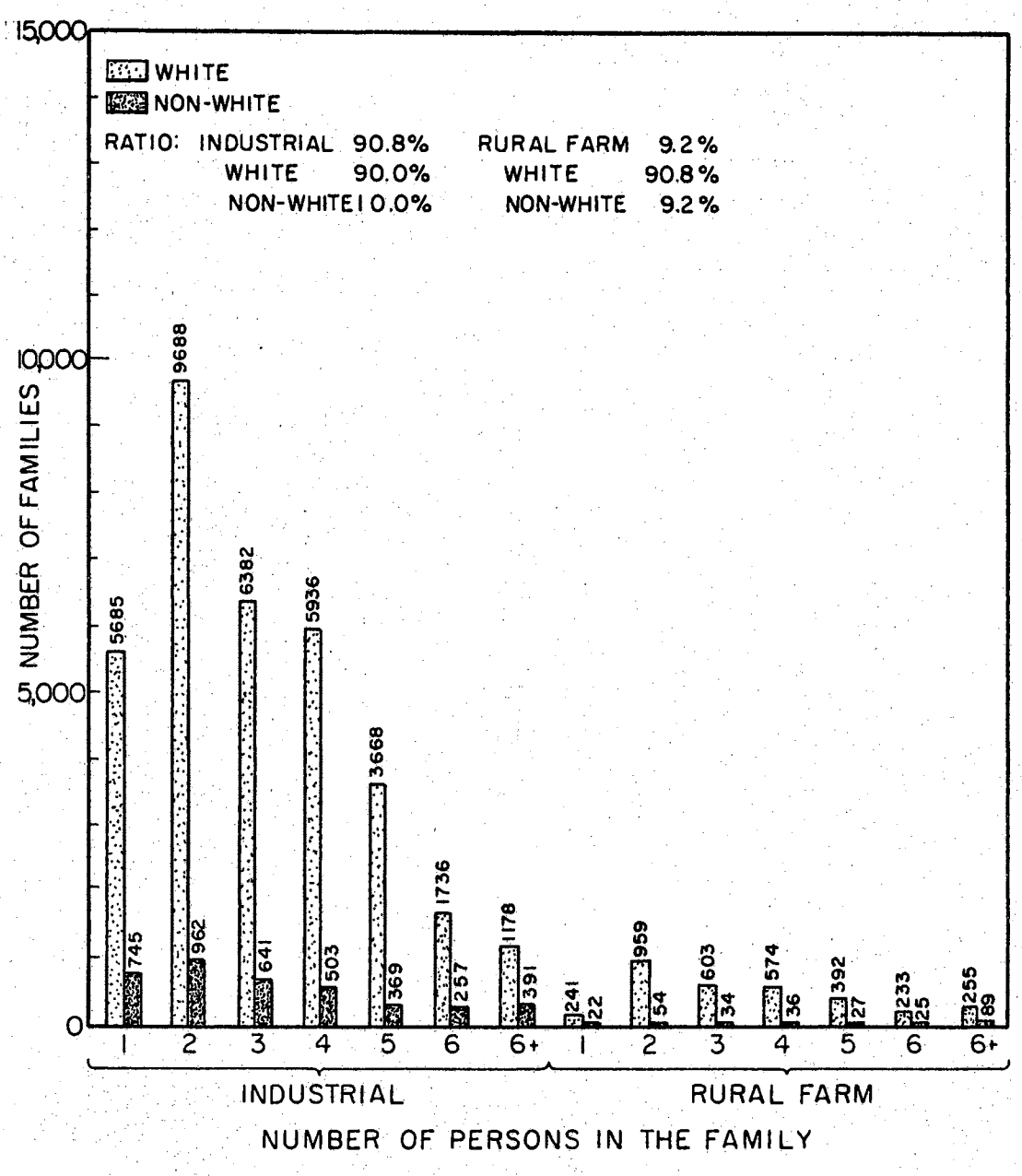

Figure 9. Family Size by Color (Industrial and Rural - Farm)

families with four children or more in the white industrial population are concerned, it could be said that they are hardly presented in the industrial population but they have higher rates among the rural-farm population.

The non-white population has similar results except for the families with two children. The industrial non-white families in this group have a lower rate than the rural-farm families. Table IV gives additional information about the observed frequencies in each age group.

The results obtained from the above discussion supports the assumption that industrial area inhabitants favor a smaller size than the rural-farm area inhabitants.

The chi-square test shows that the number of children in the family and their ages are highly dependent for all the population studied. In other words, there exists a close relationship between the number of children in the family and their age. The more children the family has, the higher is their distribution on the differenct age categories.

Income of the Family Head by Color: By studying the data about the income of the head of the family for the white, industrial and rural-farm families, it has been noticed that most of the rural-farm heads of families'

TABLE IV

NUMBER OF CHILDREN IN THE FAMILY BY AGE AND COLOR

POP.	AGE	COLOR	NO. OF CHILDREN						
			None	One	Two	Three	Four	Five	More
INDUSTRIAL FAMILIES Ratio: 90.8%	None	White	10280	0	0	0	0	0	0
		Non-Wh.	1190	0	0	0	0	0	0
	Under 3 yrs.	White	0	4398	1133	95	5	0	0
		Non-Wh.	0	472	203	34	2	0	0
	3-5 Yrs.	White	0	3684	389	5	1	0	0
		Non-Wh.	0	427	97	6	1	0	0
	5 Yrs.	White	0	2158	44	0	0	0	0
		Non-Wh.	0	323	10	0	0	0	0
	6-11 Yrs.	White	0	4963	2429	604	120	19	1
		Non-Wh.	0	502	255	140	42	7	3
	12-17 Yrs.	White	0	5074	1866	313	46	3	0
		Non-Wh.	0	471	237	83	15	4	0
	18-24 Yrs.	White	0	2453	1174	149	0	0	0
		Non-Wh.	0	281	104	28	0	0	0
RURAL-FARM FAMILIES Ratio: 9.2%	None	White	1097	0	0	0	0	0	0
		Non-Wh.	91	0	0	0	0	0	0
	Under 3 Yrs.	White	0	357	89	14	0	0	0
		Non-Wh.	0	46	25	2	0	0	0
	3-5 Yrs.	White	0	335	32	1	0	0	0
		Non-Wh.	0	40	15	1	0	0	0
	5 Yrs.	White	0	232	4	0	0	0	0
		Non-Wh.	0	37	2	0	0	0	0

TABLE IV (Continued)

POP.	AGE	COLOR	NO. OF CHILDREN						
			None	One	Two	Three	Four	Five	More
RURAL-FARM FAMILIES Ratio: 9.2%	6-11 Yrs.	White	0	500	327	94	26	5	1
		Non-Wh.	0	38	40	31	11	1	0
	12-17 Yrs.	White	0	592	290	86	15	1	0
		Non-Wh.	0	41	33	33	7	1	0
	18-24 Yrs.	White	0	361	170	21	0	0	0
		Non Wh.	0	52	15	6	0	0	0

Ratio: Industrial White - 90.0%
Non-white - 10.0%

Rural-Farm White - 90.8%
Non-White - 9.2%

incomes are concentrated in the first four income categories, less than $1,000, $1000-1999, $2000-2999, $3000-3999 with the highest rate of concentration in the second income category, $1000-1999. In contrast to these results, the industrial white heads of families' incomes are concentrated in the middle four income categories, $5000 - $5999, $6000-6999, $7000-7999, with the highest rate of representation in the $8000-9999 category. It has been noticed also that both groups, the industrial and the rural-farm white heads of families, are almost equally presented in the fifth income category, $4000-4999. The rate of rural-farm white heads of families in the last and highest three income categories, $10,000 - 14,999, $15,000-24,999, and $25,000 or more, is less than half the rate of the white industrial heads of families in the same income category.

As far as the non-white rural-farm heads of families are concerned, they are highly presented in the first two categories, less than $1000, $1000-1999. In addition to that, they are not presented in the last highest four income categories, and hardly presented in the middle categories. On comparing them with the non-white industrial families, a big difference is noticed between the two in terms of the rate of representation in the high income categories. Although the non-white industrial

families are over represented in the low income categories, they are also, presented in the highest three income categories. Table V shows the difference between the different groups, since it shows the actual observed frequencies for both groups, industrial and rural-farm, white and non-white.

These findings support the assumption that the industrial area inhabitants have a higher income than the rural-farm inhabitants for both white and non-white. This result is revealed by the chi-square test which shows very high dependence between color and the income of the head of the family.

Education of Family Head by Color: The data for both groups indicate that, almost no head of a family is now enrolled in 1st grade. As for the white-rural-farm heads of families, they are over presented in the following categories: 1st-4th grade, 5th-6th grade, 7th grade, 8th grade with the highest rate of concentration in the 8th grade. The highest rate of concentration for the white industrial heads of families is in the 4 years of high school. However, their rate of presentation in the last three categories is twice as high for the 1-3 years of college category, three times as high for the 4 years college category, and four times as high for the 5 or more years college category.

TABLE V

INCOME OF THE FAMILY HEAD BY COLOR

INCOME IN DOLLARS	INDUSTRIAL 90.8%		RURAL-FARM 9.2%	
	White 90.0%	Non-White 10.0%	White 90.8%	Non-White 9.2%
Less than $1,000	2383	604	463	133
$1000-$1999	2465	607	526	091
$2000-$2999	2470	624	468	027
$3000-$3999	2905	510	418	018
$4000-$4999	3400	469	333	012
$5000-$5999	4120	362	296	005
$6000-$6999	3692	223	209	006
$7000-$7999	3102	156	130	005
$8000-$9999	4125	203	175	001
$10,000-$14,999	3904	126	142	001
$15,000-$24,999	1265	026	052	000
$25,000 or more	0507	006	026	000

The non-white rural-farm heads of families are highly presented in the 1st-4th grade category, and are hardly presented in the categories which follow 4 years high school category. As for the non-white industrial heads of families, they are highly presented in the 1st-4th grade category, followed by the 1 or 2 years high school category. Also, they are presented in the last two categories, 4 years college, 5 or more years college, although their rate of presentation in these categories is lower than the rate of presentation of the white industrial heads of families.

The assumption that the industrial area inhabitants have a higher level of education is supported by the results obtained from this investigation (Table VI).

A very high degree of dependence between color and the level of the education of the head of the family, is shown by the chi-square test for both the industrial and the rural-farm area inhabitants. In other words, this result seems to be logical and it supports the assumption that a close relationship exists between color and level of education.

A description of fertility requires a further analysis of some of the previously discussed ratios. For this purpose, the author had chosen the effective fertility

TABLE VI

EDUCATION OF THE FAMILY HEAD BY COLOR

HIGHEST GRADE IN SCHOOL COMPLETED	INDUSTRIAL 90.8%		RURAL-FARM 9.2%	
	White 90.0%	Non-White 10.0%	White 90.8%	Non-White 9.2%
None, Never Enrolled in School	0598	163	049	028
Now Enrolled in 1st Grade	0001	000	000	000
1st - 4th Grade	1390	616	258	128
5th - 6th Grade	2015	554	277	061
7th Grade	1942	338	317	029
8th Grade	5610	521	921	021
1 or 2 Years High School	4811	578	371	011
3 Yrs. High Sch.	2047	244	141	005
4 Yrs. High Sch.	8118	567	642	015
1-3 Yrs. College	3785	196	158	000
4 Yrs. College	2253	071	067	000
5 or More Yrs. College	1768	068	037	001

ratio, or the child-woman ratio. According to Thomlinson,[3] "This measure is less affected by minor annual fluctuations than are ordinary birth rates because it describes fertility over a five-year rather than one-year period." The effective fertility ratio equals the number of children under five years of age divided by the number of women in the child-bearing ages (ordinarily 15-44 or 15-49 and in this study 15-40).

The data used in this analysis is taken from Table IV, number of children in the family by age and color, and figure 3, ratio of child-bearing wives by color. The effective fertility ratio for the different groups is as follows:

A. Industrial Population: 453 children per 1000 women in the child-bearing ages.

   1. White: 414/1000

   2. Non-white: 528/1000

B. Rural-farm Population: 502 children per 1000 women in the child-bearing ages

   1. White: 445/1000

   2. Non-white: 679/1000

By examining the results obtained from the effective fertility ratio for the different groups studied, it is a fact that there is a great difference between the

industrial and the rural-farm inhabitants. This difference exists, also, for the white groups in both populations if they were taken alone, and the non-white groups as well. This difference resulted from the impact of industrialization on fertility.

FOOTNOTES

[1]Philip Hauser and Otis Dudley Duncan, The Study of Population (Chicago, Ill., 1959), pp. 58-60.

[2]Whelpton, Campbell, and Patterson, Fertility and Family Planning in the United States (Princeton, N.J., 1965), p. 34.

[3]Ralph Thomlinson, Population Dynamics, (New York , 1965), p. 160.

CHAPTER IV

SUMMARY AND CONCLUSION

The study is investigating the impact of industrialization on fertility in the United States. For this purpose a study sample, composed of all the industrial families in the United States, and a control sample, composed of all the rural-farm families in the United States, was taken from the 1960 Census one-in-a-thousand sample tape.

The assumptions of the study indicate that industrialized area inhabitants favor small size families, experience a lower fertility rate, tend to marry younger, have a higher rate of non-white population, enjoy a higher income than the rural-farm population, have achieved a higher education level than the rural-farm population, are burdened by a higher rate of familial instability, and the ratio of child-bearing wives is higher.

The above mentioned assumptions were tested empirically, through comparing the two communities, the industrial versus the rural-farm, to see to what extent the industrial community is different from the rural-farm community. Hence, it

was possible to measure the impact of industrialization on the family in general and on fertility in particular.

The study is based, primarily, on the statistics in the one-in-a-thousand sample of the 1960 United States Census of Population. It contains 120 alphanumeric characters for each person and the record is divided into 8 major sections. The sample is self-weighting. It is a multi-stage area cluster sample of households, and as accurate as the full census since it is a representational sample.

For the purpose of the study, a definition of the major concepts used was given in Chapter II. The definitions are taken from the 1960 Census which differs in some respect from the 1950 Census definition.

An industrial classification of 150 industries was discussed above. It is described in the 1960 classified index of occupations and industries. These 150 industries are divided into 13 groups.

Two independent variables were studied. The industrial family, and the rural-farm family.

The dependent variables studied were age, sex, marital status, mobility, education, income, family, and household characteristics. In other words, the population characteristics were regarded as dependent

variables, "and the findings of the study show how the dependent variables are related to the independent variables."

The degree of accuracy required in the data is relative and is a function of the use to which the data are put. In dealing with the population data, the author depended largely on general statistical descriptive techniques with some ratio and graphic devices. The data established a number of significant relationships between the demographic, economic, and socio-economic characteristics, and type of community. These relationships vary in degree and pattern. The chi-square test was used to test the degree of independence between the variables. In some tables, percentages were computed for simplification.

According to the results of the study, there exists marked differences between the industrial area inhabitants and the rural-farm area inhabitants.

Industrial area inhabitants were found to have a lower ratio of females per 1000 males (both white and non-white) than the rural-farm area inhabitants who have a higher ratio of males per 1000 females in general.

The sex ratio is typically different between the different parts of a country. Urban sex ratios are generally lower than rural ones. In the United States in

1960[1], the Urban sex ratio was 94.0, the rural non-farm was 103.3, and the rural-farm was 107.2.

The assumption that the industrial population has a higher rate of child-bearing wives for both groups, white and non-white, was supported by the findings of the research.

As for the rate of mobility from the county of residence by color, it is concluded that although both populations, industrial and rural-farm, are mobile. The industrial rate of mobility is higher than the rural-farm rate of mobility for whites and non-whites. These findings support the assumption that industrial area inhabitants are more mobile than the rural-farm area inhabitants.

The findings did not support the assumption that the industrial population tend to marry younger. The findings indicate that all the components of the industrial population (male and female, white and non-white) have a lower rate of marriage than the rural-farm population components during the early age periods.

The instability assumption about the industrial population is supported by the very high rate of divorced and separated persons among the industrial population. The results showed also that the marital status depends to a great extent on color.

The assumption that industrialized area inhabitants favor small size families was found to be true. It was proved also, that the size of the family and the color are very highly dependent on each other.

The results obtained from the study supports the assumption that industrial area inhabitants favor a smaller family size than the rural-farm area inhabitants.

Industrial area inhabitants enjoy a favored socio-economic position when compared with the rural-farm area inhabitants on income and educational levels.

The effective fertility ratio revealed the fact that there is a great difference between the industrial and the rural-farm area inhabitants. This difference holds true for the white groups in both populations if they were taken alone, and the non-white groups as well.

It might be concluded that a reduction in fertility took place as a result of industrialization and modernization. Economic changes encouraged lowering the birth rate among the industrial area inhabitants. People became aware of the financial liability of too many children in a competitive, individualistic, nonagricultural society. Children are no longer "production durables," they are now "consumer durables," and cost money to bring into the world and rear. As a result, mores regarding child

bearing were changed, or violated privately where a change is not possible.

Data compared from the two populations discussed in this study tend to support the transitional theory in demography as far as the first step toward industrialization and urbanization is concerned. It can be concluded that industrialization has a great impact on lowering the fertility among the industrial area inhabitants.

This study was limited in its scope to the material available in the Census records. Some of the information needed was difficult to obtain from the Census one-in-a-thousand sample tape. However, the study covered a wide range of information which can be used as starting points by other researchers in the field.

FOOTNOTES

[1]Bureau of the Census, Census of Population: 1960, U. S. Summary, V. 1, Table 65, p. 199.

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APPENDIX A

TABLE OF SIGNIFICANCE

Social Characteristic	Industrial Population			Rural-Farm Population		
	X^2	df	P	X^2	df	P
Age distribution by sex and color						
A. Male	239.938	5	0.000	76.863	5	0.000
B. Female	145.180	5	0.000	92.381	5	0.000
Ratio of Child-Bearing Wives by Color	40.254	5	0.000	00.627	5	N.S.
Rate of Mobility by Color	1.226	1	N.S.	2.816	1	N.S.
Age at Marriage by Color:						
A. Male	178.580	5	0.000	16.166	5	0.006
B. Female	210.668	5	0.000	17.305	5	0.004
Marital Status by Color:						
A. Male	1247.950	4	0.000	152.565	4	0.000
B. Female	796.747	4	0.000	92.539	4	0.000
Family size by Color	561.384	6	0.000	192.961	6	0.000

TABLE OF SIGNIFICANCE (Continued)

Social Characteristic	Industrial Population X^2	df	P	Rural-Farm Population X^2	df	P
No. of Children in Family by Age:						
A. White	2381.961	9	0.000	641.403	8	0.000
B. Non-Wh.	361.840	9	0.000	103.134	8	0.000
Family Income by Color	1779.613	11	0.000	324.232	9	0.000
Education of Family Heads	2137.609	10	0.000	145.282	8	0.000

N.S.: Not significant at the 0.05 level.

P: Probability associated with calculated X^2 under H_o.

df: Degrees of freedom.

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