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A STUDY OF SELECTED DEMOGRAPHIC FACTORS ASSOCIATED WITH CHANGES IN
AGE STRUCTURE IN THE POPULATION OF SOUTH DAKOTA FROM 1960-1970

BY

ROBERT TODD WAGNER

A thesis submitted
in partial fulfillment of the requirements for the
degree Doctor of Philosophy, Major in
Sociology, South Dakota
State University

1972

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A STUDY OF SELECTED DEMOGRAPHIC FACTORS ASSOCIATED WITH CHANGES IN
AGE STRUCTURE IN THE POPULATION OF SOUTH DAKOTA FROM 1960-1970

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A STUDY OF SELECTED DEMOGRAPHIC FACTORS ASSOCIATED WITH CHANGES IN
AGE STRUCTURE IN THE POPULATION OF SOUTH DAKOTA FROM 1960-1970

Abstract

ROBERT TODD WAGNER

Under the supervision of Dr. Marvin P. Riley

A study of the population profile for South Dakota for 1960 and 1970 was made to determine: (1) the changes that transpired in the composition of the population for the age categories 0-4, 0-14, 15-34, 35-64, 65+ and 75+; (2) the variation in the changes observed in the selected age categories when controlled according to residence, sex and race differentials; and (3) the extent to which changes in the basic demographic components of migration, fertility and mortality are associated with changes in the age interval 0-4.

Each county in South Dakota was employed as the unit of analysis, and census and vital data were aggregated and tabulated. General changes by number and percent in South Dakota's population from 1960 to 1970 by size, urban-rural distribution, expected natural increase and net migration were determined and analysed by state, county and planning district. Similarly, changes in number and rates for vital events reported for South Dakota from 1960 and 1970 were determined and compared.

Changes in the population were determined according to age and such selected differentials as planning district, urban-rural residence, sex and race.

The association between a set of demographic variables and the declines in the number of children under five from 1960 to 1970 for the State was hypothesized and analysed using a step-wise least squares multi-variate linear equation.

The major findings and conclusions were:

1. South Dakota from 1960 to 1970 declined in population, continued previous patterns of rural depopulation, urbanization and net out-migration, experienced increases in nuptuality, and recorded declines in fertility and child mortality. Variations in losses appeared associated with such factors as large urban centers, reservation Indian populations, and adjacency to State private and public colleges and universities.
2. Changes by age categories varied considerably, the largest loss occurring in interval 0-4, the largest gain in the 15-34 young adult group, and other increases occurring in age intervals 65+ and 75+. These gains appeared associated with the advance of cohorts from younger age intervals to these age categories during the decade.
3. Population redistribution from rural to urban centers was experienced in all age categories, the sex ratio declined markedly in the age dependent population, and the number of non-whites in proportion to whites increased in all categories except 75+. Urban communities appeared to have greater ability to attract selectively newcomers and to retain population levels than did rural places and farm areas. Changes in the age-sex composition of the population appeared associated with differential mortality and fertility and with selective migration.

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CHAPTER I

STATEMENT OF THE PROBLEM AND OBJECTIVES OF THE STUDY

Introduction

Census data for the decades 1940-1970 reveal marked population redistribution in the states of the North Central region.¹ Migration appears as both the essential factor in this population redistribution and as a phenomenon that represents more than the movement of people. As a characteristic of industrial nations, internal migration² includes the transplanting of personal attachments, wealth, social values, and ideas regarding local government, community organization, education, religion, means of communication and modes of economic production. Through migration the manpower resources of a nation are reallocated, providing sufficient labor force to meet the expanded and changing demands of a nation.

One aspect of internal migration in the United States is the continuing relocation of persons from rural to urban areas. As part of

¹Includes the states of Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota and Wisconsin (Kentucky's relationship is cooperative).

²Current interest by popular journalism in internal migration is shown by the following recent articles appearing in one of the weekly general news magazines, U.S. News and World Report: "The '70 Census: How Many Americans and Where They Are," September 14, 1970; "Big Shifts in Political Power: Impact of the 1970 Census," September 21, 1970; "What U.S. Will Be Like by 1980: Meaning of Population Shifts," January 11, 1971; "Where Blacks Are Moving -- and Moving Up," March 1, 1971; "New Profile of U.S. -- Latest from Census," March 15, 1971; "Crowded Cities, Empty Land -- and the Nixon Remedy," April 5, 1971.

its study on rural population changes during the 1950-1960 decade, the United States Department of Agriculture³ reported:

In rural United States, there have never before been so many areas declining in population at a time when most urban areas are growing rapidly. Never before have there been such disparities in the age distribution of farm and nonfarm populations as there are now, nor such differences in the directions in which the distributions are changing.

Related to this redistribution are two particular factors of interest. The first, as Beale⁴ has indicated, is the emergence since 1950 of counties in the United States with such distorted age structures that the proportion of fecund women remaining is not sufficient to produce births in excess of the number of deaths occurring in the larger population. The second is the somewhat perplexing observation of Eldridge⁵ that in spite of rural economic progress, rural out-migration is a pervasive demographic process, depopulating the active labor segment.

These factors suggest that although internal migration is selective of all kinds of people, it is more selective of certain classes

³Recent Population Trends in the United States with Emphasis on Rural Areas. Washington, D.C.: United States Department of Agriculture, Agricultural Economic Report No. 23, January, 1963, p. 2.

⁴Calvin L. Beale, "Natural Decrease of Population: The Current and Prospective Status of an Emergent American Phenomenon," Demography, 6:91-99, May, 1969.

⁵Eber Eldridge, Research Needs in Rural Development. A paper submitted to the North Central Extension and Research Community Resource Development Committees, September, 1970, p. 7.

of population than of others. A study by Riley and Pew⁶ reported the selective out-migration of young adults from South Dakota during the 1950 to 1960 decade. A recent report by Riley and Wagner⁷ concluded that the continuing rural depopulation of the past three decades, the slow rate of growth for South Dakota major cities, the apparent declining birth rate during the 1960's and the persistence of net out-migration over the past thirty years have important ramifications for the State's future population structure.

The relative influence of migration, fertility and mortality on population structure, and the relative intensity with which these processes affect the age and sex composition of a rural population such as that located in South Dakota, provide a meaningful arena for demographic study.

Statement of the Problem

Students of population are aware of the tendency for shifts in the direction and intensity of population movement to selectively modify the demographic structure of the communities from which they leave and the communities to which they move. A difficulty rests, however, in

⁶Marvin P. Riley and James E. Pew, The Migration of Young Adults, 1950 to 1960: South Dakota Counties, State Economic Areas and States in the North Central Region. Brookings, S.D.: Agricultural Experiment Station, South Dakota State University, Department of Rural Sociology, Pamphlet No. P122, Nov., 1967.

⁷Marvin P. Riley and Robert T. Wagner, South Dakota Population and Net Migration, 1960-1970. Brookings, S.D.: Agricultural Experiment Station, South Dakota State University, Bulletin No. 580, Feb., 1971.

ascertaining the relationship between the changing demographic composition of a given area and the type of change experienced by the area as part of the component processes of migration, relocation, fertility and mortality. Further, a question arises as to which demographic components are most strongly related to the variability in the distribution of a population by age and sex.

Consequently, this study attempts to investigate the following problem:

"What major changes have transpired from 1960 to 1970 in the age composition of the population of South Dakota when differentiated by residence, sex and race, and to what extent are the changes in the most pronounced age category associated with the changes in selected basic demographic component processes?"

Stated more explicitly, the problem is:

1. What changes in the composition of South Dakota's population for the age categories 0-4, 0-14, 15-34, 35-64, 65 plus and 75 and over have occurred for the years 1960 to 1970?
2. How are these changes by age differentiated when controlled for residence, sex and race?
3. What is the association between the decline in the number of resident children under age five and changes in fertility, mortality and migration processes?

Research related to this question is important in that migration, fertility and mortality patterns concern human resources -- their

distribution, attributes and profiles. As Beegle, Marshall and Rice⁸ concluded regarding the migration component, conceivably out-migration from given counties over long periods of time may bring about unfavorable population compositions of such magnitude as to reduce to a desired but unfeasible dream the possibility of local industrialization and the diffusion of persons from density centers to certain declining areas. Certainly this could be the consequence for a state such as South Dakota where the net out-migration the past thirty years has equalled 266,307 persons.

Further, knowledge of the association between selected demographic variables and the composition of the population in South Dakota may assist in the area planning and programming implemented by various governmental, educational, economic, recreational and religious agencies. The efforts of the State Planning Agency are a case in point. As Kuroda⁹ speculated, "Regional changes in demographic structure . . . surely affects regional development, economically and socially."

Objectives of the Study

The objectives of this study are to determine:

⁸Allan Beegle, Douglas Marshall and Roger Rice, "Selected Factors Related to County Migration Patterns in the North Central States, 1940-1950 and 1950-1960," Quarterly Bulletin, 46, 2:223, Nov., 1963.

⁹Toshio Kuroda, "Internal Migration: An Overview of Problems and Studies," Population and Society, Charles B. Nam, Editor. Boston: Houghton Mifflin Company, 1968, p. 339.

1. The changes that have transpired from 1960 to 1970 in the composition of the population of South Dakota for the age categories 0-4, 0-14, 15-34, 35-64, 65+ and 75+.

2. The variations in the changes observable in the selected age categories when controlled according to residence, sex and race differentials.

3. The extent to which changes in the basic demographic components of migration, fertility and mortality are associated with the changes in age category 0-4 for the State of South Dakota for the years 1960 and 1970.

Organization of the Dissertation

This dissertation is organized as follows:

1. Chapter I consists of introductory material, statement of the problem and objectives of the study.
2. Chapter II reviews selected literature pertinent to the study.
3. Chapter III includes the theoretical framework and research hypotheses.
4. Chapter IV presents the research design and methodology.
5. Chapter V is an analysis of the changes in South Dakota's population by age and selected differentials for the years 1960-1970.
6. Chapter VI is an analysis of the association between selected demographic component processes and the change experienced by a pronounced age category during the decade 1960-1970.

7. Chapter VII includes a summary of the research findings, conclusions, limitations of the study, and suggestions for further research.

CHAPTER II

REVIEW OF LITERATURE

This chapter reviews selected literature related to the present study. It surveys pertinent fertility studies, mortality investigations and literature related to recent rural migration and population change.

Fertility Research

Kiser¹ has described the thirties as one when population research was identified with the social and economic problems of the depression, with studies directed to the demographic aspects of poverty, ill-health, illiteracy in rural areas, economics of declining populations,² differential fertility by socioeconomic status,³ prevalence and effectiveness of contraception,⁴ and the social and psychological factors affecting fertility.

¹Clyde V. Kiser, "Population Research," Review of Sociology: Analysis of a Decade, Joseph B. Gittler, Editor. New York: John Wiley & Sons, Inc., 1957, pp. 58-9.

²Alvin H. Hansen, "Economic Progress and Declining Population Growth," American Economic Review, 29:1-5, 1939.

³Edgar S. Sydensticker and Frank W. Notestein, "Differential Fertility According to Social Class," Journal of the American Statistical Association, 25:9-32, 1930.

⁴Gilbert W. Beebe, Contraception and Fertility in South Appalachia. Baltimore: Williams & Wilkins Company, 1942; and Regine K. Stix and Frank W. Notestein, "Comparative Appraisal of Three Contraceptive Services," Journal of the American Medical Association, 118:283-90, 1942.

The increase in marriage and birth rates in the United States during the Second World War led to Whelpton's⁵ early analysis of natality by parity, and his discovery of the fundamental weakness of the net reproduction rate.

Efforts to improve replacement and fertility measures led Whelpton⁶ to adjust net reproduction rates and to study cohort fertility. Hyrenius⁷ searched for better methods for analyzing reproduction, and Karmel⁸ computed the conditions under which the same true rate of natural increase could be obtained by using both male and female births.

The spectacular increase in the birth rate during the forties led to the expanded study of differential fertility. Studies⁹ indicated that fertility ratios tended to be higher for urban than for rural populations, significantly greater in the Northeast than in the South, and higher for "upper" socio-economic groups than for "lower" groups.

⁵Pascal K. Whelpton, "Effect of Increased Birth Rate on Future Populations," American Journal of Public Health, 35:326-33, 1945.

⁶Pascal K. Whelpton, "Reproduction Rates Adjusted for Age, Parity, Fecundity, and Marriage," Journal of the American Statistical Association, 45:1-16, 1946; _____, Cohort Fertility: Native-White Women in the United States. Princeton: Princeton Univ. Press, 1954.

⁷H. Hyrenius, "Reproduction and Replacement," Population Studies, 4:421-31, 1951.

⁸P. H. Karmel, "The Relations Between Male and Female Reproduction Rates," Population Studies, 1:249-74, 352-87, 1947-48.

⁹Clyde V. Kiser, "Fertility Trends and Differentials in the United States," Journal of the American Statistical Association, 27:25-48, 1952; Charles F. Westoff, "Differential Fertility in the United States, 1900-1952," American Sociological Review, 19:549-61, 1954.

Grabill and Others¹⁰ have suggested that the best known and most soundly documented generalization for the United States is the long-term continued decline of the disparity in the urban-rural differential. Even farm families have become smaller as they have adopted urban levels of living and technology. A study by Rice¹¹ concludes that there has been a gradual diminution of fertility levels for the United States and all its divisions from 1800 to 1960, and that this decline has persisted regardless of the short-lived surge in fertility following World War II. Grabill and Others¹² indicated that of the four relevant causal variables related to the postwar rise in natality, the increase in the number of children per mother was the least significant. The more significant causal factors in the postwar "baby boom" were the fact that there were more women, more women getting married, and more married women having children. Thomlinson¹³ has suggested that the 1960's portray a consistent decline in natality.

¹⁰Wilson H. Grabill, Clyde V. Kiser and Pascal K. Whelpton, The Fertility of American Women. New York: John Wiley and Sons, 1958, p. 378; Wilson H. Grabill, "The Fertility of the Population of the United States," The Population of the United States, Donald J. Bogue, Editor. Glencoe, Ill.: The Free Press of Glencoe, 1959, pp. 288-324.

¹¹Roger Reid Rice, Metropolitan Dominance and the Persistence of Urban-Rural Fertility Differential: A Distributive Approach to the Study of Factors Affecting Urban-Rural Fertility in the United States, 1960. Chicago: Unpublished Doctoral Dissertation, University of Chicago, 1967, pp. 20 f.

¹²Op. cit., p. 3.

¹³Ralph Thomlinson, Population Dynamics. New York: Random House, 1965, p. 166.

Not only has there been a general decline in both rural and urban fertility, but there has been a general convergence in the differential fertility rates. Goldberg¹⁴ reported that this convergence was due in part to the migration to urban centers of farm migrants who bring with them rural values and norms regarding fertility practices and subsequent fertility increase. Freedman and Freedman¹⁵ have examined the same phenomena and noted that one out of every three adults in 1952 living in a non-farm residence previously had a farm background. Rice¹⁶ has stated that this convergence may be due to the fact that the selectivity of migration may operate to attract only migrants already urbanized in value and normative perspective. Related to this same question is the conclusion of Bogue¹⁷ made in 1955 that ". . . the rural population has diminished to a point where it can no longer be the major source of supply for urban growth," suggesting that an indigenous urban population may now be attained.

¹⁴David Goldberg, "The Fertility of Two Generation Urbanites," Population Studies, 12:214-22, March, 1969.

¹⁵Ronald Freedman and Deborah Freedman, "Farm Related Elements in Non-Farm Population," Rural Sociology, 21:50-61, March, 1956; cf., Otis Dudley Duncan, "Farm Background and Differential Fertility," Demography, 11:240-9, 1965.

¹⁶Op. cit., 27 f.

¹⁷Donald J. Bogue, "Urbanism in the United States," American Journal of Sociology, 60:478, Nov., 1955.

The Indianapolis Study,¹⁸ although inadequate methodologically, examined social and psychological factors affecting fertility and found:

1. religion to be related to fertility,
2. "relative sterility" to be related to socioeconomic status,
3. patterns of differential fertility within groups of specific fertility planning status, and
4. economic security to be related to size of planned family.

Research by Stycos¹⁹ reported that urban classes are curtailing fertility in developing countries in a pattern similar to that in modernized nations, and Davis²⁰ studied migration and postponed marriage and concluded that both were functional in reducing fertility.

Hill, Mayone and Stycos²¹ investigated the role of husband-wife communication as it related to the practice of birth control, and Jaffe²² researched the inverse correlation between family size and

¹⁸Clyde V. Kiser and Paschal K. Whelpton, "Resume of the Indianapolis Study of Social and Psychological Factors Affecting Fertility," Population Studies, 7:95-110, 1953.

¹⁹J. Mayone Stycos, "Social Class and Differential Fertility in Peru," Population and Society, Charles B. Nam, Editor. Boston: Houghton Mifflin Company, 1968, pp. 181-4.

²⁰Kingsley Davis, "The Theory of Change and Response in Modern Demographic History," Population Index, 4:345-66, Oct., 1963.

²¹Reuben Hill, Kurt Back, and J. Mayone Stycos, "Intra-Family Communication and Fertility Planning in Puerto Rico," Rural Sociology, 20:258-71, September-December, 1955.

²²Frederick S. Jaffe, "Family Planning and Poverty," Journal of Marriage and the Family, 26:467-50, Nov., 1964.

income and concluded that the gap between family aspirations and fertility performance was due to lack of access to guidance in effective birth control methods.

Mortality Research

Kiser²³ and Kammeyer²⁴ noted the dearth of mortality research since 1945, a factor related to the medical and biological variables associated with death.

However, recent contributions have been made to the study of mortality. Thompson and Lewis²⁵ reviewed the mortality differentials between urban and rural peoples in the United States, noting that urban residents have an advantage in controlling death up to age thirty-five and rural residents after age thirty-five. Studies in differential mortality indicated that marital status, race,²⁶ and socioeconomic position²⁷ are highly related to significant differences in life chances.

²³"Population Research," p. 69.

²⁴Kenneth C. W. Kammeyer, Population Studies: Selected Essays and Research. Chicago: Rand McNally & Company, 1969, p. 261.

²⁵Warren S. Thompson and David T. Lewis, Population Problems. New York: McGraw-Hill Book Co., 1965, p. 364.

²⁶Alfred Yankauer, "The Relationship of Fetal and Infant Mortality to Residential Segregation," American Sociological Review, 15:644-8, Oct., 1950.

²⁷Charles W. Willis and William B. Rothney, "Racial, Ethnic, and Income Factors in the Epidemiology of Neonatal Mortality," American Sociological Review, 27:522-6, Aug., 1962.

Migration

Bogue²⁸ has defined migration as a component of population change occupying a central place in demographic analysis because it is frequently a major symptom of basic social change; profoundly affects areas experiencing it; acts as an element of population adjustment and equilibrium, by siphoning excess population and maintaining social and economic balance between communities; reallocates human resources and maximizes effective use of specialized persons; facilitates cultural diffusion and social integration; and offsets completely or reinforces greatly the population change resulting from natural increase.

Thomas²⁹ theorized in the late 1930's that there were ". . . almost no acceptable generalizations about the strength and direction of selective internal migration . . ." However, she attributed differential selection on the basis of age, sex and occupation to be existent.

A few notable efforts have opened possible lines for research by providing pioneer generalizations about migration streams.

Goodrich³⁰ concluded that areas of low level of living tend to be areas of net out-migration, whereas areas of high levels tend to be areas of net in-migration.

²⁸Donald J. Bogue, "Internal Migration," The Study of Population: An Inventory and Appraisal, Philip M. Hauser and Otis Dudley Duncan, Editors. Chicago: The University of Chicago Press, 1959, 486-8.

²⁹Dorothy Swaine Thomas, Research Memorandum on Migration Differentials. New York: Social Science Research Council, 1938, pp. 123-7.

³⁰Carter Goodrich, Migration and Economic Opportunity. Philadelphia: University of Pennsylvania Press, 1936.

Mangus and McNamara³¹ and Folger³² generalized that rates of migration between two areas tend to be directly proportional to differences in the level of living and inversely proportional to the distance between them, and that the relation between the number of migrants and distance will be different between non-integrated and integrated economic areas.

Bogue and Hagood³³ generalized that the rates of migration between two communities varies with the types of community of origin and destination, the direction of migration, and the age and other characteristics of the migrant.

Bogue, Shryock and Hoermann³⁴ postulated that rates of in-migration and out-migration in any community tend to correlate positively with each other, that a high proportion of all migration streams are flows between communities of the same type, with the rural to urban flow the highest of all types in modern industrialized nations, that migration streams tend to avoid areas of high unemployment, and that

³¹A. R. Mangus and R. L. McNamara, Levels of Living and Population Movements in Rural Areas in Ohio, 1939-40. Wooster, Ohio: Ohio Agricultural Experiment Station, Bulletin 639, [no date].

³²John K. Folger, "Some Aspects of Migration in the Tennessee Valley," American Sociological Review, 18:253-60, 1953.

³³Donald J. Bogue and Margaret J. Hagood, "Subregional Migration in the United States, 1935-40," Differential Migration in the Corn and Cotton Belts. Oxford, Ohio: Miami University, 1957, Vol. II.

³⁴Donald J. Bogue, Henry S. Shryock and Siegfried A. Hoermann, "Subregional Migration in the United States, 1935-40," Streams of Migration Between Subregions. Oxford, Ohio: Miami University, 1953, Vol. I.

the size, direction and net effect of migration streams are not invariable, but highly sensitive to social and economic changes occurring in the communities of origin and destination.

Selected studies of migration support the following statements regarding differential migration, although only the first has completely survived the test of time. The six generalizations are:

1. Persons in their late teens, twenties and early thirties are more mobile than younger or older persons.³⁵
2. Most adult migrants move as individuals rather than as members of families.³⁶
3. The rate of migration varies inversely with education and social class attainment, with urban areas selecting the better

³⁵Cf., Otis Dudley Duncan and Albert J. Reiss, Jr., Social Characteristics of Urban and Rural Communities. New York: John Wiley and Sons, Inc., 1950, pp. 83-7; Shryock, op. cit., p. 352; and Dorothy Swaine Thomas, "Age and Economic Differentials in Interstate Migration," Population Index, 4:313-25, Oct., 1958.

³⁶Peter H. Rossi, Why Families Move: A Study in Social Psychology of Urban Residential Mobility. Glencoe, Ill.: The Free Press of Glencoe, 1955.

educated;³⁷ although Burchinal and Bauder³⁸ note that the rural-reared migrant living in an urban place often has a lower social status than the urban native; and Hamilton³⁹ notes that migration of whites from the South was highly selective of elementary educated persons.

4. Persons with professional occupations are the most migratory segments of the population, while laborers, farmers and operatives are below average in mobility.⁴⁰

³⁷Cf., Shryock, op. cit., Ch. 12; C. Horace Hamilton, "The Negro Leaves the South," Demography, 1:273-95, 1964; _____, "Educational Selectivity of Rural-Urban Migration: Preliminary Results of a North Carolina Study," Proceedings: Annual Milbank Memorial Fund Conference: 1957. New York: Milbank Memorial Fund, 1958, Pt. III; _____, "Educational Selectivity of Net Migration from the South," Social Forces, 1:33-42, October, 1959; Everett S. Lee, "Negro Intelligence and Selective Migration: A Philadelphia Test of the Klineberg Hypothesis," Demographic Analysis, Joseph J. Spengler and Otis Dudley Duncan, Editors. Glencoe, Ill.: The Free Press of Glencoe, 1951; Daniel O. Price, "Some Socio-economic Factors in Internal Migration," Social Forces, 29:409-15, 1941; Harry K. Schwarzweller, "Education, Migration and Economic Life Chances of Male Entrants to the Labor Force from a Low-Income Rural Area," Rural Sociology, 29:152-67, June, 1964; Harry K. Schwarzweller and James S. Brown, "Social Class Origin, Rural-Urban Migration, and Economic Life Chances: A Case Study," Rural Sociology, 1:5-19, March, 1967; and Elizabeth M. Suval and C. Horace Hamilton, "Some New Evidence on Educational Selectivity in Migration to and from the South," Social Forces, 4:536-47, May, 1965.

³⁸Lee G. Burchinal and Ward W. Bauder, "Adjustments to the New Industrial Environments," Population Studies: Selected Essay and Research, Kenneth C. W. Kammeyer, Editor. Chicago: Rand McNally & Company, 1969, pp. 211-31.

³⁹"Educational Selectivity of Net Migration from the South," p. 40.

⁴⁰C. T. Philblad and C. L. Gregory, "Occupation and Patterns of Migration," Social Forces, 1:56-64, Oct., 1957.

5. Unemployed persons are more migratory than employed.⁴¹

6. Negro migration, especially from the South to North, is increasing, although still less than for white persons.⁴²

Tarver⁴³ and Taeuber⁴⁴ completed recent studies regarding rural migration and redistribution.

A late study by Tarver⁴⁵ traced the migration history of Georgia since 1870, providing data on the destination of out-migrants, origin of in-migrants, intrastate migration and selectivity.

Beale,⁴⁶ in a general study, suggested that the curious age structure of the farm population is the product of selected out-migration in all regions of the United States.

⁴¹Bogue, "Internal Migration," p. 504.

⁴²Cf., Homer L. Hilt, "Migration Between the South and Other Regions," Social Forces, 1:9-16, October, 1957; Michael J. Greenwood and Patrick J. Gormely, "A Comparison of the Determinants of White and Nonwhite Interstate Migration," Demography, 1:141-55; Bogue, loc. cit.

⁴³James D. Tarver, "Bureau of the Census Data on the Selectivity of Migration from Farms," Rural Sociology, 2:162-3, June, 1957.

⁴⁴Karl E. Taeuber, "The Residential Redistribution of Farm-Born Cohorts," Rural Sociology, 1:20-36, March, 1967.

⁴⁵James D. Tarver, Migration in Georgia. Athens, Ga.: College of Agricultural Experiment Stations, University of Georgia, Res. Report No. 26, May, 1968.

⁴⁶Calvin L. Beale, Current and Foreseeable Trends in Rural Population. Washington: Economic Research Service, United States Department of Agriculture, November, 1962.

In another article, Beale⁴⁷ reported the emergence since 1950 of counties in the United States with distorted age structures due to the inability of the non-out-migrating fecund women to provide sufficient births in excess of the number of deaths occurring in the larger population.

Beale⁴⁸ studied the influence of migration on rural counties and concluded that in the Dakotas, Montana and Minnesota from 1960 to 1966 the reduction in births and the selectivity of out-migration undercut the relatively young population age structure, reduced growth potential, and created a distorted high age structure.

Micklin⁴⁹ attempted to generate the middle-range theory that urbanization is inversely related to fertility, suggesting that as migration continues to urban areas fertility levels for given areas will decline, not only in the urban community but also within the rural countryside.

Shryock and Larmon⁵⁰ utilized the longitudinal cohort approach, concluding that average lifetime migration is not less than 3.15

⁴⁷Beale, "Natural Decrease of Population: The Current and Prospective Status of an Emergent American Phenomenon," pp. 19-99.

⁴⁸Calvin L. Beale, "Demographic and Social Considerations for U.S. Rural Economic Policy," American Journal of Agricultural Economics, 2:410-27, May, 1969.

⁴⁹Michael Micklin, "Urban Life and Differential Fertility: Specification of an Aspect of the Theory of the Demographic Transition," The Sociological Quarterly, 4:480-500, Fall, 1969.

⁵⁰Henry S. Shryock and Elizabeth A. Larmon, "Some Longitudinal Data on Internal Migration," Demography, 2:579-592, 1965.

migratory moves; that urban-rural migration is comparatively minor whereas rural-urban is considerable; that wide variations exist within the population in the number of residences one claimed; and that unemployed men are more likely to migrate than employed men and more likely to find jobs than the non-migrant unemployed. Additionally, they speculate that key events in the life cycle (assuming employment, entering marriage, or retirement, etc.) tend to stimulate migration, providing a typical "quota" of moves for the average person.

Demographic studies related directly to the migration variable for the North Central States for the decades 1940-1950, 1950-1960 and 1960-1970 are few. Jehlik and Wakeley⁵¹ reviewed the population growth of the North Central States from 1850 to 1950, studied the population growth by economic sub-regions from 1940 to 1950, analyzed the births, deaths and natural increase during that decade, determined net change due to migration for the period, examined rural-urban migration in the metropolitan and non-metropolitan areas for those years, investigated the relationship between certain agricultural and industrial factors and net migration, and projected probable future population. The study did not attempt to relate structural demographic variables to patterns of migration rate change.

⁵¹Paul J. Jehlik and Ray E. Wakeley, Population Change and Net Migration in the North Central States, 1940-50. Ames, Iowa: Iowa Agricultural Experiment Station, Iowa State College, 430:486-544, July, 1955.

Wakeley and Jehlik⁵² discussed the organization of the 1940-1950 North Central States migration research project.

Marshall⁵³ authored a report in behalf of the North Central Regional Committee for Research on Population Dynamics and Related Rural Social and Economic Problems in the North Central Region. This publication reviewed the population changes for states in the North Central Region from 1880 to 1950, reporting on population growth and distribution, changes in fertility and mortality, migration, population composition by age, sex and race, occupational, employment, educational and income characteristics, and data pertaining to agriculture. Chapters in the report relate to migration processes within the states, especially the association between migration, fertility and mortality and the changing age and sex composition.

Sjaastad⁵⁴ examined migration and population growth in the Upper Midwest from 1930 to 1960, studying the relationship between migration and its impact on rural depopulation and population composition.

⁵²Ray E. Wakeley and Paul J. Jehlik, "Regional Research in Population Dynamics," Rural Sociology, 18:166-9, June, 1953.

⁵³Douglas G. Marshall, Population Characteristics, Resources, and Prospects in the North Central Region. Madison, Wis.: University of Wisconsin, Res. Bull. No. 209, April, 1959, pp. 1-80.

⁵⁴Larry A. Sjaastad, Migration and Population Growth in the Upper Midwest. Minneapolis: Upper Midwest Research and Development Council and the University of Minnesota, Study Paper No. 4, July, 1962, pp. i-40.

Beegle, Marshall and Rice⁵⁵ studied the migration patterns for the North Central States for the decades 1940-1950 and 1950-1960, describing the migration patterns on regional and state levels, ascertaining the stability and instability of counties in the region with respect to net migration and migration patterns, associating patterns of migration with farm operator family level of living indexes and the percentage of persons employed in manufacturing. No attempt was made to relate structural demographic variables to patterns of migration rate change apart from concluding that it seemed logical that areas experiencing net out-migration would lose those persons in the reproductive age.

Klietsch, et. al.,⁵⁶ prepared a study related to the impact of population change on individuals and institutions, employing selected "ideal type" counties to relate population change and migration to the extent of industrialization and agricultural economic viability. They discussed the implications of these related variables on the psychosocial character of migrants and other members of a population, on the demographic composition of the population and on the socioeconomic vitality of the selected counties.

⁵⁵Op. cit., pp. 206-23.

⁵⁶Ronald G. Klietsch, et. al., Social Response to Population Change and Migration. Ames, Iowa: Agricultural and Home Economics Experiment Station, Iowa State University, Spec. Report No. 40, Sept., 1964, pp. 1-45.

Bowles and Tarver⁵⁷ prepared a summary of net migration by age, sex and color for the North Central States.

Recent studies relative to population change and migration for states in the North Central Region have appeared during the past decade.

The Department of Rural Sociology⁵⁸ at the University of Wisconsin investigated population change and net migration, rural and urban change, age structure and migration, the residential distribution of the aged and migration patterns of the elderly for Wisconsin from 1950 to 1960 and from 1960 to 1970.

⁵⁷Gladys K. Bowles and James D. Tarver, Net Migration of the Population, 1950-60, by Age, Sex and Color. Washington, D.C.: Economic Research Service, United States Department of Agriculture, Vol. 1, Pt. 2, May, 1965, pp. i-374.

⁵⁸Cf., Douglas G. Marshall, How Wisconsin's Population is Changing. Madison, Wis.: Department of Rural Sociology, University of Wisconsin, February, 1955; James F. Bang, Population Change and Net Migration, 1950-1960. Madison, Wis.: Department of Rural Sociology, University of Wisconsin, Population Series, No. 1, Fall, 1960; Glenn V. Fuguitt, Rural and Urban Population Change in Wisconsin, 1950-1960. Madison, Wis.: Department of Rural Sociology, University of Wisconsin, Population Series, No. 2, March, 1961, pp. i-81; _____, Population Change Patterns of Wisconsin Counties, 1950-1960. Madison, Wis.: Department of Rural Sociology, University of Wisconsin, Population Note No. 1, September 1961, pp. 1-9; _____, The Changing Age Structure of Wisconsin's Population. Madison, Wis.: Department of Rural Sociology, University of Wisconsin, Population Series, No. 3, April, 1962, pp. i-68; T. Lynn Smith and Douglas G. Marshall, Our Aging Population, The United States and Wisconsin. Madison, Wis.: Department of Rural Sociology, University of Wisconsin, Population Series, No. 5, April, 1963, pp. i-41. Hazel H. Reinhardt and Douglas G. Marshall, Population Changes, 1950, 1960, 1970. Madison, Wis.: Applied Population Laboratory, Department of Rural Sociology, College of Agricultural and Life Sciences, The University of Wisconsin, Population Series 70, No. 2, April, 1971, pp. i-69.

Among other non-demographic variables, Photiadis⁵⁹ in a related study of migration in Minnesota from 1950 to 1960 found a relationship between the degree of migration and the residency distribution of the population.

Voelker and Ostenson⁶⁰ reported population changes in North Dakota from 1880 to 1960, including data on interstate and intra-county migration, age and sex differentials in migration and the relationship between migration and population changes of counties.

Flora, Rusholt and Curtis⁶¹ in a descriptive study, summarized migration patterns in Kansas from 1960 to 1970, suggesting possible associations between migration experiences and economic and employment factors. Tait and Johnson⁶² reported on 1960 to 1970 Iowa population trends.

Recent studies relative to migration in South Dakota have been completed.

⁵⁹John D. Photiadis, "Corollaries of Migration," The Sociological Quarterly, 4:339-48, Autumn, 1965.

⁶⁰Stanley W. Voelker and Thomas K. Ostenson, North Dakota's Human Resources: A Study of Population Change in a Great Plains Environment. Fargo, N.D.: Department of Agricultural Economics, Agricultural Experiment Station, North Dakota State University, Bulletin No. 476, May, 1968, pp. 1-54.

⁶¹Cornelia Flora, Kirsten Rusholt and William Curtis, Migration in Kansas: Out-migration and Population Trends. Manhattan, Ka.: Population Research Laboratory, Agricultural Experiment Station, Kansas State University, April, 1971, pp. 1-9.

⁶²John L. Tait and Arthur N. Johnson, Iowa Population Trends. Ames, Iowa: Iowa State University of Sciences and Technology, Cooperative Extension Service, Pm-517, Sept., 1971, pp. 1-29.

Riley and Biggar⁶³ reviewed State and county population changes and net-migration for 1950 to 1960.

Riley⁶⁴ prepared a fact book, ranking counties according to measures of total population, net migration, land areas and population densities, age, age groups, dependency ratios, vital statistics and fertility ratios, marital and household characteristics, median education, incomes, volume of labor force, racial distribution and selected agricultural factors.

Riley and Johnson⁶⁵ reported the decline in the number of South Dakota young men engaged in farming from 1954 to 1964, together with the decline in young farm families. They conjectured that both decreases were symptomatic of selective out-migration.

Studies of the selectivity of migration as it affected young adults in South Dakota from 1950 to 1960 were completed by Riley and

⁶³Marvin P. Riley and Jeanne Biggar, South Dakota Population, 1950-1960. Brookings, S.D.: Department of Rural Sociology, Agricultural Experiment Station, South Dakota State College of Agricultural and Mechanic Arts, Pamphlet No. 121, Oct., 1960, pp. 1-40.

⁶⁴Marvin P. Riley, South Dakota Population and Farm Census Facts. Brookings, S.D.: Rural Sociology Department, Division of Agriculture, South Dakota State College, Circular No. 151, Jan., 1962, pp. i-45.

⁶⁵Marvin P. Riley and Darryll R. Johnson, Farm Facts. Brookings, S.D.: Cooperative Extension Service, U.S. Department of Agriculture, FS 374, Oct., 1967, pp. 1-3.

Pew,⁶⁶ and by Pew,⁶⁷ the latter using net migration as the dependent variable and multiple linear regression analysis as a statistical test, a practice uncommon to demographic research.

Hogan⁶⁸ surveyed 2,490 students selected randomly to determine reasons for out-migration from South Dakota, the destination of out-migrants, and the reasons given by those remaining in the State. He concluded that out-migration from the State was consequential and that rural development, improved natural and economic resources, increased employment and a positive attitudinal orientation was mandatory.

Studies by Field and Dimit⁶⁹ examined factors associated with the growth and decline of incorporated places in South Dakota, reporting factors influencing small town change, determinants of community

⁶⁶Marvin P. Riley and James E. Pew, The Migration of Young Adults, 1950 to 1960: South Dakota Counties, State Economic Areas and States in the North Central Region. Brookings, S.D.: Department of Rural Sociology, Agricultural Experiment Station, South Dakota State University, Pamphlet No. P122, Nov., 1967, pp. 1-31.

⁶⁷James E. Pew, Selected Factors Associated with the Net Out-migration of Young Adults from South Dakota Counties and State Economic Areas, 1950-1960. Unpublished Master's Thesis, Brookings, S.D.: South Dakota State University, 1968, pp. 1-98.

⁶⁸Edward Patrick Hogan, The Dilemma of South Dakota Youth. Brookings, S.D.: Cooperative Extension Service, U. S. Department of Agriculture, South Dakota State University, FS 494, March, 1970, pp. 1-6.

⁶⁹Donald R. Field and Robert M. Dimit, Population Change in South Dakota Small Towns and Cities, 1949-60. Brookings, S.D.: Rural Sociology Department, Agricultural Experiment Station, South Dakota State University, Bulletin No. 571, March, 1970, pp. 1-26. _____, Population Change in Incorporated Places in South Dakota, 1940-60. Brookings, S.D.: Cooperative Extension Service, U. S. Department of Agriculture, South Dakota State University, Extension Circular No. 682, April, 1970, pp. 1-7.

growth and decline and data related to population change from 1940 to 1960 for incorporated communities.

Heil⁷⁰ investigated the relationship between types of migration patterns for South Dakota counties and certain selected demographic and socio-economic variables.

Riley and Wagner⁷¹ prepared descriptive studies of population change and net migration for the State of South Dakota, tentative Planning Districts and counties from 1960 to 1970, and suggested the possible association of such processes to economic and education factors.

Population Change

This section will focus on that aspect of population change that relates primarily to population composition.

Composition refers to the distribution within a population of various internal differentials or traits. Two elements readily observable as constituent parts of any human population are age and sex, both being the products of birth, death and migration processes

⁷⁰Gerald P. Heil, Population Changes Associated With Net Out-Migration from South Dakota Counties, 1950-1960. Brookings, S.D.: Unpublished Master's Thesis, South Dakota State University, 1971.

⁷¹Marvin P. Riley and Robert T. Wagner, South Dakota Population and Net Migration, 1960-1970. Brookings, S.D.: Agricultural Experiment Station, South Dakota State University, Bulletin No. 580, February, 1971, pp. 1-34. _____, Reference Tables: Population Change of Counties and Incorporated Places in South Dakota, 1950-1970. Brookings, S.D.: Rural Sociology Department, Agricultural Experiment Station, South Dakota State University, Bulletin 586, 1970 Population Series, Report No. 2, July, 1971, pp. 3-51.

operating over time. Hawley⁷² wrote that these two traits are the pivotal characteristics in the analysis of composition in that all others are contingent upon them, and Bogue⁷³ stated that they were intimately related to population change.

Bogue⁷⁴ offered the following generalizations regarding the relationship of the basic demographic components to population composition:

1. Whenever birthrates fall, in comparison with previous levels, children constitute a smaller proportion of the total population than formerly; whereas the sudden rise in birthrates has the opposite effect.

2. A sudden decline in the death rate at any age tends to pass on to the higher age classes a larger proportion of the individuals who have already been born, increasing the proportion of the population at older ages; whereas an increase in the death rate has the reverse effect.

3. If death rates are high at the ages of infancy and early childhood, only a small percentage of the population is able to survive to reproduce. Lowering of the death rates at the younger ages has the

⁷²Amos H. Hawley, "Population Composition," The Study of Population: An Inventory and Appraisal, Philip M. Hauser and Otis Dudley Duncan, Editors. Chicago: The University of Chicago Press, 1959, pp. 361-81, esp. 370.

⁷³Bogue, Principles of Demography. New York: John Wiley and Sons, Inc., 1969, p. 147.

⁷⁴Ibid., pp. 153-4, 167.

effect of increasing survivorship to the reproductive ages, creating an indirect increment to lower age levels.

4. Migration streams tend to broaden the proportion of young adults in a given population if inward, to narrow it if outward.

5. Migration tends to alter the sex balance of a population, with women migrating from rural areas more readily and at an earlier age than males.

The study by Marshall⁷⁵ reported the increase in the number of persons in the older age group in the North Central Region in 1950 compared to 1920, and further showed a higher number of females in the urban centers. Stockwell and Goldsmith⁷⁶ used population pyramids to graphically demonstrate the effect of changing fertility and migration patterns on the population composition of the Northeast Region from 1940 to 1960.

Summary of Literature Review

This section of Chapter II will outline the pertinent conclusions drawn from the review of literature relating to fertility, mortality, theory, migration and rural population change.

⁷⁵Population Characteristics, Resources, and Prospects in the North Central Region, pp. 24-6.

⁷⁶Edward G. Stockwell and Harold F. Goldsmith, Age-Sex Composition of the Northeast Region: 1950 to 1960. Storrs, Conn.: Agricultural Experiment Station, The University of Connecticut, Bulletin No. 396, December, 1966, pp. 4-78, esp. 10-36; cf., Leonard M. Sizer, Population Change in West Virginia with Emphasis, 1940-1960. Morgantown, W. Va.: Agricultural Experiment Station, West Virginia University, Bulletin No. 563, May, 1968, pp. 11-13; James D. Tarver, et. al., Population Trends of Georgia Towns and Cities. Athens, Ga.: College of Agricultural Experiments Stations, University of Georgia, Research Report 43, March, 1969, pp. 22-33.

Fertility. Generally studies suggest that fertility is lower for urban areas than for rural,⁷⁷ that there has been a general decline in both rural and urban fertility rates over time in the United States,⁷⁸ and that this trend was not countered by the post-war rise in the number of births.⁷⁹ As part of this general fertility decline is the apparent convergence of rural-urban differentials,⁸⁰ held by some to be the function of metropolitan dominance,⁸¹ rural migration to the city,⁸² or to the selective redeployment of rural persons already "urbanized" to urban communities.⁸³

Fertility has been found inversely related to social class,⁸⁴ and associated with economic security and religion.⁸⁵ Some studies conclude that fertility is influenced by migration and postponed marriage,⁸⁶ and others indicate fertility to be reduced by increased communication patterns between husband and wife, larger income, and access

⁷⁷Kiser, "Fertility Trends and Differentials in the United States;" Westoff, op. cit.

⁷⁸Grabill, Kiser and Whelpton, op. cit.; Grabill, op. cit.

⁷⁹Grabill, Kiser and Whelpton, op. cit.

⁸⁰Rice, op. cit.; Micklin, op. cit.

⁸¹Rice, op. cit.

⁸²Goldberg, op. cit.

⁸³Freedman and Freedman, op. cit.; Duncan, op. cit.

⁸⁴Kiser and Whelpton, op. cit.; Stycos, op. cit.

⁸⁵Kiser and Whelpton, op. cit.

⁸⁶Davis and Blake, op. cit.

to contraceptive guidance, all features presumed associated with urbanizing cultures.⁸⁷

Mortality. Generally, studies support the decline of mortality in urbanizing areas for those under age thirty-five years and in rural areas for those over thirty-five years.⁸⁸

Theory. Transition theory suggests the correlary generalization that fertility rates decline in areas of rural depopulation, occurring as a result of the relocation of manpower from agricultural to more industrialized pursuits. Demographic regulation theory suggests the lowering of fertility is a pattern of responsive adjustment to changing values such as may be experienced in a rural-urban society undergoing readjustments.⁸⁹

Migration. Migration has been viewed as the relocation of human resources to create new equilibriums,⁹⁰ selective by sex and occupation,⁹¹ and occurring from areas of low prosperity to those of higher

⁸⁷Hill, Back and Stycos, op. cit.; Jaffe, op. cit.

⁸⁸Thompson and Lewis, op. cit.

⁸⁹Bogue, Principles of Demography.

⁹⁰Bogue, "Internal Migration."

⁹¹Thomas, Research Memorandum on Migration Differentials.

capita wealth,⁹² of unemployment to employment, and of low mobility to higher accessibility.⁹³ Studies further show that migrants tend to be young persons age 15 to 34,⁹⁴ individuals rather than family units,⁹⁵ selective by social class and education⁹⁶ (variables inversely related to fertility), professional occupations,⁹⁷ and unemployment.⁹⁸ Some studies report, however, that migrants from rural areas and negroes from the South are those attaining only elementary education.⁹⁹

One of the consequences of this selective migration is the curious reconstruction of the age composition of farm population,¹⁰⁰ distortion

⁹²Mangus and McNamara, op. cit.; Folger, op. cit.; Stouffer, op. cit.

⁹³Bogue, Shryock and Hoermann, op. cit.; Bogue, "Internal Migration."

⁹⁴Duncan and Reiss, op. cit.; Shryock, Population Mobility Within the United States; Thomas, "Age and Economic Differentials in Interstate Migration."

⁹⁵Rossi, op. cit.

⁹⁶Shryock, Population Mobility Within the United States; Hamilton, "Educational Selectivity of Rural-Urban Migration: Preliminary Results of a North Carolina Study;" Price, "Some Socio-Economic Factors in Internal Migration;" Schwarzweller, op. cit.; Schwarzweller and Brown, op. cit.; Suval and Hamilton, op. cit.

⁹⁷Philblad and Gregory, op. cit.

⁹⁸Bogue, "Internal Migration;" Shryock and Larmon, op. cit.

⁹⁹Burchinal and Bauder, op. cit.; Hamilton, "Education Selectivity of Net Migration from the South;" Lee, "Negro Intelligence and Selective Migration: A Philadelphia Test of the Klineberg Hypothesis;" Hilt, op. cit.; Greenwood and Gormely, op. cit.

¹⁰⁰Beale, Current and Foreseeable Trends in Rural Population; Tarver, "Bureau of the Census Data on the Selectivity of Migration from Farms."

of composition balance by sex for the fecund ages,¹⁰¹ loss of sufficient births to maintain natural increase, and the reduction of the child population from 1960 to 1966.¹⁰²

Findings from studies of the North Central States for the decade 1940 to 1960 have a direct bearing on the present study. They indicate that migration appears related to fertility, mortality and changing age and sex composition,¹⁰³ rural depopulation,¹⁰⁴ loss of reproductive persons and young adults,¹⁰⁵ the decline of young farm operators and families,¹⁰⁶ and the decline of rural population.¹⁰⁷

Population Change. The constituent age and sex segments of a human population are pivotal factors associated with changes in population composition and are the products of birth, death and migration

¹⁰¹Beale, "Natural Decrease of Population: The Current and Prospective Status of an Emergent American Phenomenon."

¹⁰²Beale, "Demographic and Social Considerations for U.S. Rural Economic Policy."

¹⁰³Marshall, Population Characteristics, Resources, and Prospects in the North Central Region.

¹⁰⁴Wakeley and Jehlik, op. cit.

¹⁰⁵Bowles and Tarver, Net Migration of the Population, 1950-60, by Age, Sex and Color; Riley and Pew, op. cit.; Heil, op. cit.

¹⁰⁶Riley and Pew, op. cit.

¹⁰⁷Hogan, op. cit.

processes. Variations in the magnitude of these processes are associated with changes in the population composition by age and sex for a given area,¹⁰⁸ a phenomenon reported for the North Central States since 1940.¹⁰⁹

¹⁰⁸Hawley, op. cit.; Bogue, Principles of Demography; Marshall, Population Characteristics, Resources, and Prospects in the North Central Region.

¹⁰⁹Stockwell and Goldsmith, op. cit.

CHAPTER III

THEORETICAL FRAMEWORK

Theoretical development leads to the accumulation of a systematic body of knowledge through the construction of conceptual frameworks and the formulation of interrelated propositions which serve as hypotheses which can be tested at the lowest level by amassing data. Demographers have largely occupied themselves with improving methods of collecting, analysing and summarizing data, resulting in certain deficiencies in the development of theory and high level generalizations.

Representative important generalizations in demography are demographic transition, demographic regulation, the selectivity of migration, differential fertility and the priority of cultural factors on component demographic processes. It is not enough to establish empirical relationships between phenomena; rather, social theorists¹ suggest that adequate theory must specify the set of conditions under which the uniformity of observed relationships are predicted and controlled. To

¹Cf., Hans L. Zetterberg, On Theory and Verification in Sociology. New York: The Tressler Press, 1954, pp. 18f.; David Willer, Scientific Sociology: Theory and Method. Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1967, pp. 1-126; Walter L. Wallace, Sociological Theory. Chicago: Aldine Publishing Company, 1969, pp. vii-59; George Caspar Homans, "Contemporary Theory in Sociology," Handbook of Modern Sociology, Robert E. L. Faris, Editor. New York: Rand McNally & Company, 1964, pp. 951-9; Arthur L. Stinchcombe, Constructing Social Theories. New York: Harcourt, Brace & World, Inc., 1968, pp. 3-293; Sanford Labovitz and Robert Hagedoen, Introduction to Social Research. New York: McGraw-Hill Book Company, 1971, pp. 13-27; Robert K. Merton, Social Theory and Social Structure. New York: The Free Press, 1968, pp. 1-174; Fred L. Kerlinger, Foundations of Behavioral Research. New York: Holt, Rinehart and Winston, Inc., 1964, pp. 3-17.

date, demography has been lacking in theoretical explanation, and a number of writers, particularly Hauser,² Vance,³ Moore⁴ and Hawthorne,⁵ have lamented this situation.

Whereas demographers have framed such theories as the Malthusian, optimum population, demographic transition and demographic regulation, a study of the history of demography and a review of literature shows that theories related to migration, population change and composition have been of lower abstraction and more in the nature of empirical generalizations, devoid of universal application.

Stinchcombe⁶ suggested a conceptual framework which he labeled "demographic causal theory," wherein the causal force is assumed to be proportional to the number of people possessing a certain attribute. Employing his framework, the following model relative to changes in population distribution in South Dakota from 1960 to 1970 is derived in Table 1.

²Philip M. Hauser, "Present Status and Prospects of Research in Population," American Sociological Review, 13:371-82, Aug., 1948.

³Rupert B. Vance, "Is Theory for Demographers?" Social Forces, 31:9-13, 1952.

⁴Wilbert E. Moore, "Sociology and Demography," The Study of Population, Philip M. Hauser and Otis Dudley Duncan, Editors. Chicago: University of Chicago Press, 1959, pp. 832-51.

⁵George Hawthorne, "Explaining Human Fertility," Sociology, 2:65-78, Jan., 1968.

⁶Op. cit., pp. 60-2.

TABLE 1
ILLUSTRATIONS OF DEMOGRAPHIC EXPLANATIONS

To explain	Kinds of people whose number must be specified	Proportionality factors
Number of births	Women of reproductive age	Age-specific birth rates
Number of deaths	Persons in cohorts exposed to death	Age-sex-specific death rates
Net number of migrants	Persons in cohorts exposed to migration	Net age-sex-specific migration rates
Changes in Population distribution	Persons born, dying, migrating, by age, sex and race.	Net reproductive change, net migration

This model of demographic explanations attempts to symbolize the causal forces which may be presumed to operate in generating population change.

The left-hand column refers to the demographic events that may engender the need for further explanations. These events are the incidence of births, deaths and migrants; events through which persons are presumed to be added to or subtracted from a specific population.

The middle column specifies those segments of the population possessing the highest probability of experiencing the associated demographic events. Illustrations of this type of specification would be females age 15-44, who are a more refined aggregate of the population exposed to possible birth events than the total population; infants

under one year of age, who are similarly a more refined specification than the larger population when examining mortality events; and young rural adults, a more specific category when examining migration. It is these specific categories which should be examined, for instance, when analyzing population change in the 0-4 age interval.

The right-hand column suggests that the "causal" force presumed related to the demographic events requiring explanation is the proportion of relevant specified persons participating in the event.

This model suggests that any demographic analysis is enhanced in precision when refined as much as feasible in the specification of demographic categories of people.

Ford and De Jong⁷ proposed a conceptual scheme based on an analytical systems model, which relates a set of elements to each other in some specified manner. This model focuses on both the structural traits and the composition and change processes of a demographic system.

The conceptualization of this system is presented in Table 2.

⁷Thomas R. Ford and Gordon F. De Jong, Social Demography. Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1970, p. 3-14.

TABLE 2

TRAITS AND PROCESSES OF A DEMOGRAPHIC SYSTEM

Element trait	Element process	System trait	System process
Membership	Birth, death, and migration	Size	Growth: gains through natality and in-migration minus loss through mortality and out- migration
Age	Aging	Age com- position	Recomposition by Age
Sex and Race	--	Sex and Race composition	Restructuring by Sex and Race
Residence	Internal migration	Residential distribution	Redistribution by residence

This model of the demographic system attempts to symbolize the relationship between individual vital events and adjustments in the larger demographic system. The left-hand column lists the element traits and the second column the processes through which these traits are modified. For each individual membership in a demographic system is dependent upon such additive or separative vital events as birth and in-migration or death and out-migration. Age is an aspect of the aging process, sex and race are not processional but ascribed constants, and residence for the individual is related to relocation and migration.

On the macro-level, the demographic system is isomorphic with the changes in the element level. Columns 3 and 4 show population size to be a function of gains through natality and in-migration or losses

through mortality and out-migration. The age composition is considered affected by cohort process of age interval replacement and recomposition, a system process related to the advancing of aging cohorts. Sex and race composition is the function of restructuring by sex and race due to differential fertility and mortality. Within the system redistribution and relocation of persons according to residence is a process which alters the residential configuration of a given population.

The value of this model is the multivariate profile it provides for the analysis of changes in population composition.

The literature reviewed as background for this study supports the contention that rural depopulation and urbanization profoundly affect areas experiencing such processes, siphoning excess population, re-allocating human resources and offsetting completely population gains resulting from natural increase.

The conceptual models, together with the generalization derivable from literature, generate the following theoretical propositions and associated research hypotheses:

For areas undergoing rural depopulation and urbanization, the following demographic propositions seem applicable:

1. Due to the selective nature of depopulation and urbanization, the numbers in the various segments of the population will be affected differentially.

2. Differential rates of change for the various segments of the population will result in changes in the composition of the population by age and sex.

3. Changes in the age and sex structure of a population are a function of adjustments in the processes of migration, fertility and mortality.

4. Adjustments in the processes of migration, fertility and mortality, generated by migration and urban relocation, result in the decline in the number of fecund females, the frequency of births and the incidence of infant mortality.

5. Declines in the number of fecund females, the frequency of birth events and the incidence of infant mortality are associated with changes in the relative number of young children (defined as under the age of five) in a given population.

6. South Dakota is a State experiencing rural depopulation and urbanization.

Therefore:

Hypothesis 1. The greater the decline in the number of births from 1960 to 1970, the greater the decline in the number of young children.

Hypothesis 2. The greater the increase in the number of child deaths from 1960 to 1970, the greater the decline in the number of young children.

Hypothesis 3. The greater the decline in the number of fecund females age 15-34 from 1960 to 1970, the greater the decline in the number of young children.

Hypothesis 4. The greater the decline in the number of young females age 15-34 from 1960 to 1970, the greater the decline in the number of young children.

Hypothesis 5. The greater the increase in the net number of out-migrants from 1960 to 1970, the greater the decline in the number of young children.

Hypothesis 6. The greater the decline in the number of rural residents living on farms and hamlets under 1,000 inhabitants from 1960 to 1970, the greater the decline in the number of young children.

Hypothesis 7. The greater the decline in the number of white females age 15-34 from 1960 to 1970, the greater the decline in the number of young children.

Hypothesis 8. The greater the decline in the number of non-white females age 15-34 from 1960 to 1970, the greater the decline in the number of young children.

Hypothesis 9. The greater the size of the largest incorporated place in the county in 1970, the greater the decline in the number of young children.

CHAPTER IV

METHODOLOGY

Unit of Analysis

Ideally, the investigation of population changes in South Dakota from 1960 to 1970 would employ the individual as the unit of analysis; however, since census data are not given in this form, the county was used as the smallest unit of analysis in this study. County units were aggregated into State planning districts for some stages of analysis. Census data were presumed to represent the entire population of inquiry and to contain negligible error. The same assumptions were made regarding vital statistics data.

General Procedures

General changes by number and percent in South Dakota's population from 1960 to 1970 by size, rural-urban distribution, expected natural increase and net migration were determined and analyzed by state, county and planning district. Migration was calculated by following the residual method, $M = P_{70} \pm (P_{60} + B - D)$, where M equals the net plus or minus number of migrants, P_{70} the actual population for the area on April 1, 1970, P_{60} the actual population for the area on April 1, 1960, and B and D represent, respectively, the total number of recorded resident live births and deaths reported for the area from April 1, 1960, through March 31, 1970. All percent change was calculated using 1960 population data as the denominator.

Changes in the number and rates for vital events reported in South Dakota from 1960 to 1970 were analyzed and compared. Fertility measures employed were the number change and the crude birth rate. The formula used for the crude birth rate was $CBR = B/P \times k$, where B is the total number of reported resident live births occurring in the given area for a given year, P is the total number of persons residing in the area on April 1 of the given year, and k is 1,000. Mortality measures used were the crude death rate, infant mortality rate and the young child specific death rate. The formulas employed were: $CDR = D/P \times k$, where D is the number of reported resident deaths occurring in the given area for a given year, P is the total number of persons residing in the area on April 1 of the given year, and k is 1,000; $IMR = D_{0-1}/B \times k$, where D_{0-1} equals all recorded resident deaths of children under one year of age for a given area for a given year, B is the number of recorded live births for the given area and given year, and k is 1,000; $ASDR_{0-4} = D_i/P_i \times k$, where D_i equals the total number of recorded resident deaths in the age interval 0-4 for a given area and a given year, P_i the total population in age interval 0-4 for the given area on April 1 of the year, and k is equal to 1,000. Changes in nuptiality were examined for possible increases or decreases in frequency. Due to the number of nonresident marriages, marital rates were not calculated.

The analysis of such changes suggested the value of inquiry into possible changes in the age composition of the population of South Dakota for 1960 compared to 1970. Examination of the changes in the

population was made by age and according to such selected differentials as planning districts, urban-rural residence, sex and race. The age categories utilized were 0-14, sub-set 0-4, 15-34, 35-64, 65 plus and sub-set 75 plus. A tabulation of the numerical, percent and proportion changes for the two censal years by selected age categories and differentials was made and the measures used for analysis.

The magnitude of decline in the number of persons in age category 0-4 for 1960 compared to age category 0-4 in 1970, together with the fact that this age interval was an emergent cohort for each censal year, raised questions regarding the association of certain demographic variables with the perceived change in the young child category. To test possible associations certain variables were selected and conjectural relationships hypothesized in null form.

Dependent Variable

The dependent variable was the absolute plus or minus change in the number of young children age 0-4 for 1960 and 1970 for each county in the State.

Independent Variables

The independent variables were:

1. The absolute plus or minus change in the number of recorded live resident births for 1960 and 1970 for each county in the State (X_1).
2. The absolute plus or minus change in the number of recorded resident child specific deaths for the age interval 0-4 for 1960 and 1970 for each county in the State (X_2).

3. The absolute plus or minus change in the number of fecund females age 15-44 for 1960 and 1970 for each county in the State (X_3).

4. The absolute plus or minus change in the number of young females age 15-34 for 1960 and 1970 for each county in the State (X_4).

5. The absolute plus or minus change in the number of migrants for 1960 and 1970 for each county in the State (X_5).

6. The absolute plus or minus change in the number of rural persons living in rural farm areas and towns of less than 1,000 inhabitants in 1960 and 1970 for each county in the State (X_6).

7. The absolute plus or minus change in the number of young white females age 15-34 for 1960 and 1970 for each county in the State (X_7).

8. The absolute plus or minus change in the number of young non-white females age 15-34 for 1960 and 1970 for each county in the State (X_8).

9. The absolute number size of the largest incorporated place in each county for 1970 (X_9).

Definitions

All terms requiring definition are defined in the manuscript at the place of occurrence.

Mode of Analysis

The statistical analysis used was a step-wise least squares multivariate linear regression. This means of analysis was designed to account for the variability of the dependent variable as it might be

associated with variability of the independent variables. This program permitted the researcher to test for multiple effects by assessing the relative importance of each of the independent variables as they were added or deleted, allowing some measure of the extent to which each of the independent variables contributed to the explained variation in the dependent variable when a given level of significance was specified.

The formula for the regression equation assumed the form

$$Y = a + b_1X_1 + b_2X_2 + \dots + b_kX_k.$$

The specified level of significance was .05.

CHAPTER V

ANALYSIS OF CHANGES IN SOUTH DAKOTA POPULATION, 1960-1970

Having developed a theoretical framework and a set of hypotheses generated from existing knowledge, together with a methodology for analysing population changes in South Dakota for 1960 to 1970, this chapter focuses on changes in South Dakota's population for the past decade. It consists of two sections:

1. A summary of the general changes in population size, spatial distribution, net-migration, fertility and mortality.
2. An analysis of the changes in the composition of the population of South Dakota by age, planning district, urban-rural residence, sex and race. The analysis of the changes in the composition of the population of South Dakota by age and selected differentials is related to Objectives One and Two stated in Chapter I.

I. GENERAL DEMOGRAPHIC CHANGES

Population Change

South Dakota's population as of April 1, 1970, was 665,507¹ a decrease of 15,007, or -2.2 percent, from the 680,514 inhabitants of

¹U.S. Bureau of Census, "Final Population Counts," 1970 Census of Population. Washington, D.C.: U.S. Department of Commerce, November, 1970, PC (VI)-43, p. 1. This report under-reports the 1970 population for South Dakota and for Hamlin and Meade counties by 750, 348 and 402 respectively. All 1970 South Dakota census data reported in this study are taken from the above cited source without corrections made for under-reporting. When taken from Riley and Wagner, South Dakota Population and Net Migration, 1960-1970, figures and percentages have been readjusted to 665,507 to be consistent with final census figures.

the State in 1960. Compared with its six neighboring states, South Dakota's population decline of -2.2 percent for the decade 1960-1970 ranks sixth in the rate of growth for the seven states over the decade and much below the nation (Table 3).

TABLE 3

POPULATION AND POPULATION CHANGE FOR SOUTH DAKOTA,
ADJACENT STATES AND THE UNITED STATES, 1960-1970^a

Political Division	1960	1970	Percent Change
Minnesota	3,413,864	3,805,069	11.5
Nebraska	1,411,330	1,483,791	5.1
Montana	674,767	694,409	2.9
Iowa	2,757,537	2,825,041	2.4
Wyoming	330,066	332,416	0.7
South Dakota	680,514	665,507	-2.2
North Dakota	632,446	617,761	-2.3
Total United States	179,323,000	203,184,772	13.3

^aRiley and Wagner, South Dakota Population and Net Migration, 1960-1970, p. 1.

South Dakota's population history reveals that a decrease of -2.2 percent for the 1960-70 decade reverses the small increases of 1.5 percent and 4.3 percent experienced in the 1940-50 and 1950-60 periods (Table 4). Neither of these two decades, however, had a population increase as large as in the years prior to 1930. In fact, South Dakota had a sizeable population increase every decade from 1870 to the drought and depression years of the 1930's (Table 4), with the most rapid growth occurring during the 1870 to 1890 settlement years of Dakota Territory.

TABLE 4

TOTAL POPULATION OF SOUTH DAKOTA, URBAN AND RURAL, PERCENT
INCREASE OR DECREASE BY DECADE, 1880-1970^a

Census Year	Population of South Dakota			Percent Increase or Decrease Over Preceding Census		
	The State	Urban	Rural	The State	Urban	Rural
1880	98,268	7,208	91,060	734.5	--	673.5
1890	348,600	28,555	320,045	254.7	296.2	251.5
1900	401,570	40,936	360,634	15.2	43.4	12.7
1910	583,888	76,469	507,419	45.5	86.8	40.7
1920	636,547	101,872	534,675	9.0	33.2	5.4
1930	692,849	130,907	561,942	8.8	28.5	5.1
1940	642,961	158,087	484,874	-7.2	20.5	-13.7
1950	652,740	216,710	436,030	1.5	37.1	-10.1
1960	680,514	267,180	413,334	4.3	23.3	-5.2
1970	665,507	296,628	369,629	-2.2	11.0	-10.8

^aRiley and Wagner, South Dakota Population and Net Migration, 1960-1970, p. 3.

Although drought discouraged settlement and encouraged many to move after 1890, there was further growth after 1900, generated by the homesteading of western South Dakota, the coming of railroads and the establishment of trade centers. These factors gave South Dakota in 1930 its largest population ever--692,849 persons.

The only previous decline in South Dakota's population occurred between 1930 and 1940. The State lost 49,888 persons when drought and unemployment forced many midwesterners to seek better employment opportunities elsewhere. From 1940 to 1960 South Dakota experienced small increases in population.

However, these gains of 9,779 from 1940 to 1950 and 27,774 from 1950 to 1960 did not compensate for the persons who left the State during the depression decade.

Urban-Rural Population

A trend within the State is the continued shift of population from rural areas to urban centers (Table 5). The 11.0 percent increase in the proportion of the population urban² (that is, of all incorporated places having 2,500 inhabitants or more) from 1960 to 1970 was the smallest shift for that segment of the State's population for any decade. The urban population in 1970 accounts for 44.6 percent of the State's total (Table 5).

²A note on urban population: one should be aware that an addition of only one inhabitant to a population of 2,499 makes that population urban by U.S. Census definition; obviously great caution should be exercised in making any deductions as to the "urbanization" of a state or of a county on the basis of such small "urban" centers.

TABLE 5

SOUTH DAKOTA'S URBAN AND RURAL POPULATION AS A
PERCENT OF TOTAL STATE POPULATION, 1880-1970^a

Census Year	Percent Urban	Percent Rural
1880	7.3	92.7
1890	8.2	91.8
1900	10.2	89.8
1910	13.1	86.9
1920	16.0	84.0
1930	18.9	81.1
1940	24.6	75.4
1950	33.2	66.8
1960	39.1	60.9
1970	44.5	55.5

^aRiley and Wagner, South Dakota Population and Net Migration, 1960-1970, p. 5.

Analysis of the 1960-1970 changes in urban population for South Dakota shows the greatest percent increase (14.6 percent) to have occurred in urban places of 2,500 to 10,000 population, followed by a gain of 12.9 percent for the Sioux Falls urbanized area and a growth of 8.0 percent for urban places of 10,000 to 50,000 (Table 6).

On the other hand, South Dakota's rural population (places less than 2,500 persons and inhabitants residing in the open country) declined from 413,334 in 1960 to 369,629 in 1970, a loss of -10.8 percent. This loss was more than double the rate for the 1950-60 decade (-5.2 percent) (Table 4). Although the majority of the State's population (55.4 percent) still resides in rural areas, the proportion rural has been declining since 1900, and the number of inhabitants in rural areas

has declined steadily since the peak year of 1930 when nearly 561,942 people lived in areas classified as rural (Table 4).

TABLE 6

TOTAL POPULATION OF SOUTH DAKOTA CLASSIFIED BY RESIDENCE,
1960 AND 1970, AND PERCENT CHANGE^a

Residence	1960 Population	1970 Population	Change in Number, 1960-1970	Change in Percent, 1960-1970
The State	680,514	665,507	-15,007	-2.2
Total Urban	267,180	296,628	29,448	11.0
Urbanized Area	67,318	76,006	8,688	12.9
Urban Places 10,000 to 49,999	126,930	137,060	10,130	8.0
Urban Places 2,500 to 9,999	79,932	83,562	10,630	14.6
Total Rural	413,334	368,879	-44,455	-10.8
Rural Places 1,000 to 2,499	56,641	53,156	-485	-.9
Other Rural	359,693	315,723	-43,970	-12.2

^aBureau of the Census, "Table 16.--Age by Color and Sex, for the State, by Size of Place, 1960, and Urban and Rural Residence, 1950--Con.," U.S. Census of Population: 1960, General Population Characteristics, South Dakota. Washington, D.C.: U.S. Government Printing Office, Final Report PC(1)-43B, 1960, pp. 43:31-35; _____, "Age by Race and Sex: 1970," Census of Population: 1970. General Population Characteristics, South Dakota. Washington, D.C.: U.S. Government Printing Office, Final Report PC(1)-B43, August, 1971, pp. 43:49-53.

4. Seven demographic variables were found to contribute significantly to the explanation of the variation observed in the number of children under five for South Dakota from 1960 to 1970. Changes in the number of children under five were found to be principally a function of changing fertility patterns on the part of the fecund population, particularly white resident females age 15-34.

The bulk (98.9 percent) of this rural decline of 44,455 persons represents losses from that portion of the State's population classified as "other rural" and living on farms or in communities of less than 1,000 persons. During the decade 1960-1970 this portion of South Dakota's population declined 43,970, or -12.2 percent (Table 6).

South Dakota Counties

South Dakota had 22 counties with population increases in the 1950-60 decade. However, in the 1960-70 decade only 14 counties had increases (Appendix I). Five Indian Reservation counties experienced increases in population: Todd, 41.7 percent; Shannon, 36.6 percent; Washabaugh, 33.3 percent; Buffalo, 12.4 percent; and Bennett with 1.1 percent. The two counties with state universities also experienced sizeable gains, chiefly from increases in student populations which are counted as part of the communities where they attend college. Clay County's population increased by 19.5 percent and Brookings County by 10.5 percent. Lawrence with a State college gained 2.2 percent. The three counties with the largest cities showed varied gains: Pennington, 2.0 percent; Brown, 8.3 percent; and Minnehaha, 10.0 percent. The remaining counties showing a population gain were Davison, 3.8 percent, Meade, 38.0 percent and Yankton, 8.5 percent.

The number of counties with population losses increased from 45 in the 1950-60 period to 53 for the decade 1960-70 (Appendix I), the rate of loss ranging from a -1.7 percent for Dewey-Armstrong to a -39.9 percent loss for Stanley County. The counties suffering losses in excess of 20 percent of their 1960 population were Clark, Fall River, Harding,

Jackson, Perkins, Sanborn and Stanley. Experiencing a comparatively low rate of loss (less than 5 percent of their 1960 population) were the counties of Beadle, Custer, Dewey-Armstrong, Hyde, Lake, Lincoln and Walworth.

Planning Districts

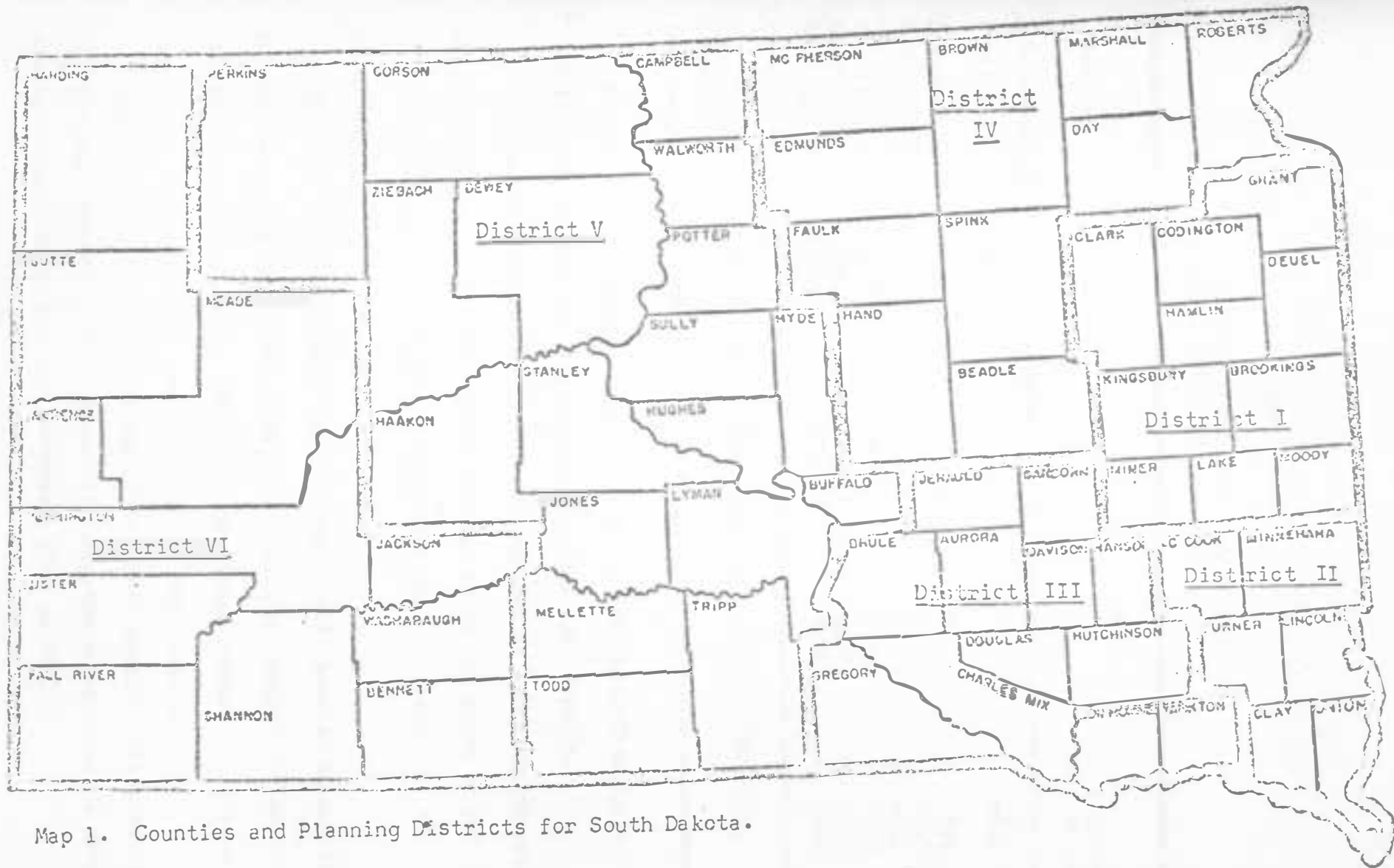
For purposes of analysis the State has been divided into six Planning and Development Districts³ as designated by the South Dakota Planning Agency. These "planning districts," designed on a multi-county basis, have been delineated on the basis of newspaper circulation, points of minimum traffic volumes, regional trade areas and State Economic Areas (see Map 1 for counties included in each District and Appendix I for appropriate County data).

Examination of South Dakota's population changes during the past decade on the basis of the planning districts reveals an interesting pattern (Table 7).

Only Districts II and VI gained population, repeating with less intensity the growth pattern experienced during the 1950 to 1960 decade. These districts include Pennington, Clay and Minnehaha Counties with Rapid City, Vermillion and Sioux Falls as their respective county seats and locations for colleges and universities.

District VI also had gains in Lawrence County, the site of one State college, and in Shannon and Washabaugh Counties, both being contiguous with the Pine Ridge Indian Reservation.

³South Dakota Planning and Development Districts. Pierre, South Dakota: South Dakota State Planning Agency, [no date].



Map 1. Counties and Planning Districts for South Dakota.

TABLE 7

SOUTH DAKOTA POPULATION GAINS AND LOSSES FOR
PLANNING DISTRICTS, 1960-1970^a

Planning District	Final Census 1960	Final Census 1970	Gain or Loss	Percentage Gain or Loss
State Total	680,514	665,507	-15,007	-2.2
District I	105,597	97,865	-7,732	-7.9
District II	139,380	146,654	7,274	5.2
District III	103,184	97,428	-5,756	-5.6
District IV	120,872	115,094	-5,778	-4.8
District V	85,530	78,957	-6,573	-7.7
District VI	125,951	129,509	3,558	2.8

^aRiley and Wagner, South Dakota Population and Net Migration, 1960-1970, p. 18.

District I lost approximately four times the population during the 1960-1970 decade that was lost during the previous 10 years.

All counties but one in Districts I through IV experiencing population gains contained urban places with at least one State or private college or university. Beadle County, with Huron College, was the exception.

District V showed population declines in all counties except Todd, the boundaries of that county contiguous with the Rosebud Indian Reservation. Stanley and Hughes Counties experienced substantial losses, apparently related to the completion of the Oahe Reservoir.

Counties and districts having within their boundaries expanding colleges and universities or federally supported establishments demonstrated population growth for the decade 1960 to 1970.

The State's Natural Population Growth

South Dakota's population increase due to vital birth and death events for the 1960-70 period has been determined by finding the total natural increase for these years, or the total number of deaths for the ten-year period subtracted from the total number of births. By this procedure the natural population growth for the decade for the counties, planning districts, and the State's total population has been estimated (Appendix II).

Applying the above procedure indicates that the total number of births for the State from April 1, 1960, to April 1, 1970, was 143,495 (Appendix II), a decline of 38,426 (-21.1 percent) from the previous decade. The loss from deaths during this same period was 65,192, an increase of 5,007 (8.3 percent) from the previous decade. Thus the natural population increase for the State for the decade was 78,303, a decline of 43,433 (-35.7 percent) from the period 1950 to 1960. If South Dakota had not gained or lost any population through migration, the increase in population for the State would have been 78,303 rather than the actual decrease of 15,007.

The State's planning districts reveal striking differences between their natural and actual population increases (Table 8). Between 1960 and 1970 District II had a natural increase of 16,440 but actually gained only 7,274, District VI had a natural increase of 22,319 but actually gained only 3,558, and Districts I, III, IV and V showed losses ranging from 5,756 to 5,532, in spite of natural increases for the decade.

TABLE 8

SOUTH DAKOTA'S PLANNING DISTRICTS: NATURAL
AND ACTUAL POPULATION INCREASE, 1960-1970^a

Planning District	1960 Population	Natural Increase 1960-1970	Actual Gain or Loss 1960-1970
STATE TOTAL	680,514	78,303	-15,007
District I	105,597	7,447	-7,732
District II	139,380	16,440	7,274
District III	103,184	8,768	-5,756
District IV	120,872	10,894	-5,778
District V	85,530	12,435	-6,573
District VI	125,951	22,319	3,588

^aRiley and Wagner, South Dakota Population Change and Net Migration, 1960-1970, p. 22.

Net Migration

The estimation of the total population due to natural increase in 1970 for the State and its major subdivisions constitute important steps in determining the extent of "net migration." For this study estimates of net migration were determined by subtracting the actual 1970 population from the natural 1970 population, the difference plus or minus between the two numbers being the actual amount of net in-migration or out-migration. When so calculated net migration is expressed as a percent of the area's 1960 population.

South Dakota lost 93,310, or -13.7 percent of its 1960 population, through net out-migration for the 1960-70 period (Table 9), slightly

less than during the decade 1950 to 1960 when net migration involved an estimated net movement of 93,962 (-14.4 percent) persons out of the State.

TABLE 9

SOUTH DAKOTA'S PLANNING DISTRICTS: POTENTIAL 1970 POPULATION, ACTUAL 1970 POPULATION, NUMBER AND PERCENT NET MIGRATION^a

Planning District	1970 Actual Population	1970 Potential Population	Net Change Through Migration	
			Number	Percent of 1960 Population
STATE TOTAL	665,507	758,817	-93,310	-13.7
District I	97,865	113,044	-15,179	-14.4
District II	146,654	155,820	-9,166	-6.6
District III	97,428	111,952	-14,524	-14.1
District IV	115,094	131,766	-16,672	-13.8
District V	78,957	97,965	-19,008	-22.2
District VI	129,509	148,270	-18,761	-14.9

^aRiley and Wagner, South Dakota Population Change and Net Migration, 1960-1970, p. 24.

Although 14 counties showed actual population increases for the 1950 to 1960 decade, only four counties experienced an increase greater than their expected increase: Meade (23.9 percent), Todd (14.6 percent), Washabaugh (7.7 percent) and Clay (7.3 percent) (Appendix II).

The remaining 63 counties all showed a net loss through out-migration for the 10-year period: nearly one-half (48 percent) had a net out-migration greater than -20 percent of their 1960 populations; eleven counties -25 percent to -35 percent, and Stanley -54.6 percent.

Not one of the State's planning districts showed net in-migration for the decade (Table 9).

Fertility

There were 17,594 resident live births recorded for South Dakota in 1960, the highest for the 1960-70 decade. The crude birth rate for 1960 was 25.8 births per 1,000 total population (Table 10). The number

TABLE 10

ESTIMATED ANNUAL CRUDE BIRTH RATES FOR SOUTH DAKOTA, 1960-1970^a

Year ^b	Estimated Population	Recorded Live Births	Crude Birth Rate
1960	683,000	17,594	25.8
1961	693,000	17,551	25.3
1962	705,000	17,158	24.9
1963	708,000	16,711	23.6
1964	701,000	15,627	22.3
1965	692,000	13,692	19.8
1966	683,000	12,534	18.4
1967	671,000	11,424	17.3
1968	669,000	11,408	17.1
1969	668,000	11,441	17.1
1970	666,000	11,717	17.6

^aBureau of the Census, "Preliminary Intercensal Estimates of States and Components of Population Change, 1960 to 1970," Current Population Reports: Population Estimates and Projections. Washington, D.C.: Bureau of the Census, U.S. Department of Commerce, Series P-25 No. 460, July 7, 1971, p. 8; South Dakota Department of Health, South Dakota Public Health Statistics, Annual Statistical Report, 1970. Pierre, S.D.: South Dakota Department of Health, Division of Public Health Statistics, 1970, p. 8.

^bFor years 1960 through 1969, assumed to be mid-year population as of July 1. For 1970, enumerated as of April 1, 1970. Population given in thousands.

of recorded live births and the crude birth rate declined continually from 1960 through 1968, when 11,408 recorded live births represented both the lowest number of births and the lowest crude birth rate (17.1) since 1907. A slight increase in fertility was experienced in 1970 when the number of births was reported at 11,717 and the crude birth rate advanced to 17.6. Of special interest was the relative stability of fertility events and rates from 1966 through 1970, the five reproductive years from which presumably were generated a large portion of the children reported as age 0-4 in the 1970 census. This compares similarly with the relative stability of fertility events and rates, but at a considerably higher level, for the years 1956 to 1960 when the mean number of annual births and the mean annual crude birth rate were 17,710 and 26.2.

Mortality

There were 6,547 resident deaths recorded in 1970, the State reporting a crude death rate of 9.8 for that year (Table 11). The annual mean death rate for South Dakota for the years 1960 through 1970 was 9.5 deaths per 1,000 population. Examination of mortality figures for South Dakota for the decade reveals but minor fluctuation in both the incidence and rates for death.

The South Dakota Division of Public Health Statistics⁴ reported a decline in infant mortality during the decade (Table 12). Deaths of

⁴Op. cit., p. 29.

TABLE 11

ESTIMATED ANNUAL CRUDE DEATH RATES FOR SOUTH DAKOTA, 1960-1970^a

Year	Estimated Population	Recorded Deaths	Crude Death Rate
1960	683,000	6,616	9.7
1961	693,000	6,234	9.0
1962	705,000	6,577	9.4
1963	708,000	6,654	9.4
1964	701,000	6,599	9.4
1965	692,000	6,520	9.4
1966	683,000	6,576	9.6
1967	671,000	6,349	9.5
1968	669,000	6,532	9.8
1969	668,000	6,747	10.1
1970	666,000	6,547	9.8

^aCf., f.n., Table 10.

TABLE 12

SOUTH DAKOTA INFANT DEATHS AND DEATH RATES, 1960-1970^a

Year	Number Infant Deaths	Estimated Annual Infant Mortality Rate
1960	494	28.1
1961	409	23.3
1962	434	25.3
1963	414	24.8
1964	350	22.4
1965	315	23.1
1966	309	24.6
1967	252	22.1
1968	233	20.4
1969	226	19.8
1970	228	19.5

^aSouth Dakota Department of Health, *op. cit.*, p. 29.

infants under one year of age numbered 228 in 1970, representing an infant death rate of 19.5 per 1,000 live births, a decline from the 1960 rate of 28.1. The infant death rate for children born into the 1970 age cohort 0-4 has declined continuously from the 24.6 rate reported in 1966.

Child mortality has also declined (Table 13). In 1960 there were 570 deaths recorded for children 0-4 with an age-specific death rate of 6.9. In 1970 there were correspondingly 274 deaths with an age-specific death rate of 5.0.

TABLE 13
CHILD DEATHS AND DEATH RATES, 1960 AND 1970^a

Year	Total Population, Age 0-4	Number Deaths, Age 0-4	Child Specific Death Rate
1960	83,127	570	6.9
1970	54,258	274	5.0

^aSouth Dakota Department of Health, South Dakota Public Health Statistics, Annual Statistical Report, 1970. Pierre, S.D.: South Dakota Department of Health, Division of Public Health Statistics, 1970, p. 8; _____, South Dakota Annual Report, 1960. Department of Public Health Statistics. Pierre, S.D.: South Dakota Department of Health, Public Health Statistics, 1960, p. 23.

Nuptuality

South Dakota recorded 11,034 marriages in 1970, the greatest annual number ever reported since the initiation of State registration in

1905 (Table 14). This increase is consistent with the continuous growth in nuptial events recorded since 1960, an increase principally attributable to nonresidents who come to South Dakota to marry and then return to their home state following the ceremony.

TABLE 14
SOUTH DAKOTA MARRIAGES BY RESIDENCE STATUS OF
BRIDE AND GROOM, 1961-1970^a

Year	Total Marriages	Both South Dakota Residents	Groom South Dakota Resident	Bride South Dakota Resident	Both Non- Residents
1961	6,214	3,922	139	587	1,566
1962	6,954	3,956	151	627	2,220
1963	7,470	4,091	152	649	2,578
1964	8,055	4,057	156	682	3,160
1965	8,317	4,010	156	762	3,389
1966	8,517	4,129	164	759	3,465
1967	9,051	4,261	167	818	3,805
1968	10,347	4,736	208	813	4,590
1969	10,909	4,977	211	905	4,816
1970	11,034	5,128	177	861	4,868

^aCf., f.n., Table 13.

In 1960 marriages between non-resident couples accounted for 21.7 percent of all marriage contracts. By 1970 unions of non-resident parties represented 44.1 percent of all reported marriages.

Significant, however, is the increase in the number of marriages between parties both of whom are residents of South Dakota. Such couples are presumed to domicile within the State in greater proportion

than parties of different residential status. Such contracts increased from 3,922 in 1961 to 5,128 in 1970, a 30.7 percent gain during the decade.

Summary of General Demographic Changes

The changes in South Dakota population for the 1960-1970 decade reversed the small increases recorded in the 1940 to 1950 and the 1950 to 1960 decades. The State's total population was enumerated in 1970 as 665,507 persons, a -2.2 percent loss during the 3-year period.

During the same period fertility as measured by the crude birth rates dropped -8.2 points, the infant mortality rate and the child death rate dropped -8.6 and -1.9 points, respectively, and the number of marriages contracted between parties both of whom were South Dakota residents increased 30.7 percent.

The 1960-70 population decline appears related to a continuing rural depopulation, declining South Dakota fertility and the persistence of net out-migration patterns begun in the 1930's and continuing past three decades. South Dakota has lost through net out-migration the following: 122,902 (-17.3 percent) from 1930-40, 79,035 (-12.3 percent) from 1940-50, 93,962 (-4.3 percent) from 1950-60, and 93,310 (-13.7 percent) during the 1960-70 decade. During the last 30 years South Dakota has exported through net out-migration over one-quarter million of its people (266,307). Changes of such magnitude in the size, spatial distribution and vital rates for the population of a rural state such as South Dakota give rise to questions regarding possible change in the age composition of the population of South Dakota from 1960 to 1970.

II. POPULATION CHANGE BY AGE AND SELECTED DIFFERENTIALS

Changes by Age

Examination of the gross population data for the 1960-70 decade raises the question, "To what extent do changes in the population of South Dakota for the years 1960 and 1970 vary by age, and how is this variability by age related to such selected differentials as planning districts, urban-rural residence, sex and race?"

This section of the study examines changes in the composition of the population of South Dakota for the decade 1960-70 from the perspective of that question.

Study of changes by age in the population composition of the State for the past decade, presented in graphic form (Figure 1), demonstrates that changes in the composition have not been uniform but variable.

For purposes of analysis the population data for the State has been aggregated into the following age categories: ages 0-4, 0-14, 15-34, 35-64, 65+ and 75+. Age intervals 0-4 and 75+ are treated as sub-sets of intervals 0-14 and 65 or more. A tabulation of the numerical, percent and proportional changes for South Dakota's population for the past decade by selected age categories is given in Table 15.

Analysis of Table 15 reveals that age category 0-4 experienced the largest percentage and proportional loss in population, with -34.7 percent and -4.07, respectively. The next largest decline occurred in the age 0-14 youth category, recording a percentage loss of -13.6 percent and a proportion change of -3.91. The loss for age category 35-64 was -4.3 percent with a proportion loss of only -.65.

NUMBER IN THOUSANDS

NUMBER IN THOUSANDS		YEARS	PERCENT CHANGE, 1960 to 1970	
1970	1960		EACH ○ = 5%	- 0 +
341	24	75+		○○○○○○○○○○+37.9%
22	21	70-74		○+2.9%
25	26	65-69	-3.4%	
29	29	60-64		○+1.5%
32	31	55-59		○+3.8%
35	34	50-54		○+4.3%
30	37	45-49	-1.0%	
36	39	40-44	-9.0%	○○
33	4	35-39	-19.3%	○○○○
32	4	30-34	-21.9%	○○○○○
35	38	25-29	-6.5%	○○
49	39	20-24		○○○○○+24.2%
70	52	15-19		○○○○○○○○+34.4%
75	67	10-14		○○+10.5%
69	78	5-9	-11.9%	○○○
54	83	0-4	-34.7%	○○○○○○○○

Figure 1. South Dakota Population By Age: 1970 and 1960^a.

^aBureau of the Census, South Dakota General Population Characteristics, 1970 Census of the Population, p. 41.

TABLE 15

POPULATION GAINS OR LOSSES, PERCENT CHANGE AND PROPORTION CHANGE FOR SOUTH DAKOTA
BY SELECTED AGE CATEGORIES, 1960-1970

Age Category	1960 Total Population	1970 Total Population	Gain or Loss	Percent Gain or Loss	Proportion of Total Population, 1960	Proportion of Total Population, 1970	Net Change in Proportion of Population, 1960-1970
0-4	83,127	54,258	-28,869	-34.7	12.22	8.15	-4.07
0-14	228,482	197,398	-31,084	-13.6	33.57	29.66	-3.91
15-34	169,631	185,707	16,076	9.5	24.93	27.90	2.97
35-64	210,888	201,918	-8,970	-4.3	30.99	30.34	-.65
65 +	71,513	80,484	8,971	12.5	10.51	12.09	1.58
75 +	24,402	33,647	9,245	37.9	3.59	5.06	1.44

Three age categories gained in population from 1960 to 1970: age 15-34 young adults, population over age 65, and the population age 75 or more. These segments showed gains of 9.5 percent, 12.5 percent and 37.9 percent, respectively, with proportionate changes of 2.97, 1.58 and 1.44. The growth of the 15-34 young adult category of 16,076 with a net proportionate change of 2.97 represents the largest increase for a selected age category.

Changes by Age by District

Examination of changes by district for the years 1960 and 1970 for each of the age categories (Table 16) shows numerical, percent and proportionate losses for each of the State planning districts for age categories 0-4 and 0-14. The largest loss for age category 0-14 occurred in District I with a percent loss of -23.1 percent and a proportionate change of -5.59. Districts III, IV and V had mean percent and proportionate losses of -15.7 percent and -3.46. Districts II and VI, with the urban centers of Sioux Falls, Rapid City and with several college and university institutions, showed proportionate losses of -3.92 and -3.67.

In the 0-4 young child category Districts I, V and VI showed proportionate losses of -4.32, -4.38 and -3.49, and Districts II, III and IV -3.99, -3.52 and -3.71, respectively. This suggests a general decline of some magnitude in the size of the 0-4 cohort throughout the State.

Study of the young adult category age 15-34 revealed some interesting variations. All but District V showed a percent gain, but even though District V registered a percent loss of -6.4 percent it had a

TABLE 16

POPULATION GAINS OR LOSSES, PERCENT CHANGE AND PROPORTION-CHANGE FOR SOUTH DAKOTA
BY SELECTED AGE CATEGORIES AND RESIDENCE BY PLANNING DISTRICT, 1960-1970

District Residence Category by Age	1960 Total Population	1970 Total Population	Gain or Loss	Percent Gain or Loss	Proportion Total District Population, 1960	Proportion Total District Population, 1970	Net Change in Proportion of District Population, 1960-1970
0-4							
District I	12,023	6,940	-5,083	-42.3	11.38	7.06	-4.32
District II	16,704	11,724	-4,980	-29.8	11.98	7.99	-3.99
District III	11,639	7,558	-4,081	-35.1	11.27	7.75	-3.52
District IV	13,861	8,928	-4,933	-35.6	11.46	7.75	-3.71
District V	11,892	7,520	-4,372	-36.8	13.90	9.52	-4.38
District VI	17,008	11,588	-5,420	-46.8	13.50	8.91	-4.59
0-14							
District I	34,192	26,304	-7,888	-23.1	32.37	26.78	-5.59
District II	45,977	42,623	-3,354	-7.3	32.98	29.06	-3.92
District III	33,016	27,781	-5,235	-15.9	31.99	28.51	-3.48
District IV	39,874	33,436	-6,438	-16.1	32.98	29.05	-3.93
District V	31,637	26,862	-4,775	-15.1	36.98	34.02	-2.96
District VI	43,786	40,392	-3,394	-7.8	34.76	31.09	-3.67
15-34							
District I	25,367	27,848	2,481	9.8	24.02	28.35	4.33
District II	35,071	43,304	8,233	23.5	25.16	29.52	4.36
District III	23,927	24,572	645	2.7	23.18	25.22	2.04
District IV	28,705	30,446	1,741	6.1	23.74	26.45	2.71
District V	21,491	20,115	-1,376	-6.4	25.12	25.47	.35
District VI	35,070	39,422	4,352	12.4	27.84	30.34	2.50

Table 16. Continued

District Residence Category by Age	1960 Total Population	1970 Total Population	Gain or Loss	Percent Gain or Loss	Proportion Total District Population, 1960	Proportion Total District Population, 1970	Net Change in Proportion of District Population, 1960-1970
35-64							
District I	33,458	29,859	-3,599	-10.8	31.68	30.40	-1.28
District II	43,641	43,819	178	.0	31.31	29.87	-1.44
District III	33,361	30,847	-2,514	-7.5	32.33	31.66	-.67
District IV	38,909	35,885	-3,024	-7.8	32.19	31.17	-1.02
District V	25,113	23,984	-1,129	-4.5	29.36	30.37	1.01
District VI	36,406	37,524	-1,118	3.1	28.90	28.88	-.02
65 +							
District I	12,580	13,854	1,274	10.1	11.91	14.11	2.20
District II	14,691	16,908	2,217	15.1	10.54	11.53	.99
District III	12,880	14,228	1,348	10.5	12.48	14.60	2.12
District IV	13,384	15,327	1,943	14.5	11.07	13.32	2.25
District V	7,289	7,996	707	9.7	8.52	10.13	1.61
District VI	10,689	12,171	1,482	13.9	8.49	9.37	.88
75 +							
District I	4,299	5,990	1,691	39.3	4.07	6.10	2.03
District II	5,115	7,213	2,098	41.0	3.67	4.92	1.25
District III	4,599	6,061	1,462	31.8	4.46	6.22	1.76
District IV	4,284	6,291	1,997	46.6	3.54	5.46	1.92
District V	2,517	3,156	639	25.4	2.94	3.99	1.05
District VI	3,588	4,946	1,358	37.9	2.85	3.81	.96

proportionate gain of .35. All other districts showed percent and proportionate gains for the age category, with District II reporting a gain of 23.5 percent.

The older adult category 35-64 had percent losses for each district except District II and proportionate losses for all but District V. The net proportionate losses ranged from a low of -.02 reported for District VI to a high of -1.44 for District II, both Districts containing sizeable urban centers. All districts showed increases in number, percent and proportionate measures for the age categories 65 plus and 75 or older, the percent changes ranging from 9.7 to 46.6 percent.

When the changes for 1960 and 1970 in the proportion of each age category for each district are rank ordered according to magnitude of loss, no relationship pattern of significance is perceptible.

Changes by Age by Urban-Rural Residence

The rural farm and small hamlet population (under 1,000 inhabitants) declined from 1960 to 1970 in the age category 0-14 by -21.8 percent (Table 17), and the number of persons in that category dwelling in towns of 1,000 to 2,499 dropped by -10.4 percent. However, this last segment of the population showed a proportionate gain of 0.26. The urban population showed proportionate gains in all segments of this age category, although a percent loss was recorded for those dwelling in urban communities of 10,000 to 49,999.

Large percent losses were experienced in all residence segments of the young child age 0-4 population for 1960 to 1970, ranging from -17.1 percent for urban communities of 2,500 to 9,999 inhabitants to -40.9

TABLE 17

POPULATION GAINS OR LOSSES, PERCENT CHANGE AND PROPORTION-CHANGE FOR SOUTH DAKOTA
BY SELECTED AGE CATEGORIES AND URBAN-RURAL RESIDENCE, 1960-1970

Residence Category by Age	1960 Total Population	1970 Total Population	Gain or Loss	Percent Gain or Loss	Proportion Total Pop- ulation by Residence, 1960	Proportion Total Pop- ulation by Residence, 1970	Net Change in Propor- tion of Total pop- ulation by Residence
0-4							
Total Urban	33,524	24,413	-9,111	-27.2	40.33	44.99	4.66
Urban Area	8,513	6,406	-2,107	-24.8	10.24	11.81	1.57
Urban, 10- 50 thousand	16,614	11,050	-5,564	-33.5	19.99	20.37	.38
Urban, 2,500 to 9,999	8,397	6,957	-1,440	-17.1	10.10	12.82	2.72
Total Rural	49,603	29,845	-19,758	-39.8	59.67	55.01	-4.66
Rural, 1,000 to 2,499	5,670	3,868	-1,802	-31.8	6.82	7.13	.31
Other Rural	43,933	25,977	-17,956	-40.9	52.85	47.88	-4.97
0-14							
Total Urban	87,426	84,497	-2,929	-3.4	38.26	42.81	4.55
Urban Area	22,496	22,685	189	.1	9.85	11.49	1.64
Urban, 10- 50 thousand	42,292	38,016	-4,276	-10.1	18.51	19.26	.75
Urban, 2,500 to 9,999	22,638	23,796	1,158	5.1	9.91	12.05	2.14
Total Rural	141,056	112,901	-28,155	-20.0	61.74	57.19	-4.55
Rural, 1,000 to 2,499	15,935	14,272	-1,663	-10.4	6.97	7.23	.26
Other Rural	125,121	98,629	-26,492	-21.8	54.76	49.96	-4.80

Table 17. Continued

Residence Category by Age	1960 Total Population	1970 Total Population	Gain or Loss	Percent Gain or Loss	Proportion Total Population by Residence, 1960	Proportion Total Population by Residence, 1970	Net Change in Proportion of Total Population by Residence
15-34							
Total Urban	74,171	97,195	23,024	31.0	43.72	52.34	8.62
Urban Area	18,150	23,577	5,427	29.9	10.70	12.70	2.00
Urban, 10-50 thousand	36,939	46,411	9,472	25.6	21.78	24.99	3.21
Urban, 2,500 to 9,999	19,082	27,207	8,125	42.6	11.25	14.65	3.40
Total Rural	95,460	88,512	-6,948	-7.3	56.28	47.66	-8.62
Rural, 1,000 to 2,499	11,597	12,402	805	6.9	6.84	6.8	-.16
Other Rural	83,863	76,110	-7,753	-9.2	49.44	40.98	-8.46
35-64							
Total Urban	78,564	83,328	3,764	4.8	37.25	40.77	3.52
Urban Area	20,609	22,153	1,544	7.5	9.77	10.97	1.20
Urban, 10-50 thousand	36,172	37,688	1,516	4.2	17.15	18.67	1.52
Urban, 2,500 to 9,999	21,783	22,487	704	3.2	10.32	11.14	.82
Total Rural	132,324	119,590	-12,734	-9.6	62.75	59.23	-3.52
Rural, 1,000 to 2,499	17,143	16,121	-1,022	-6.0	8.13	7.98	-.15
Other Rural	115,181	103,469	-11,712	-10.2	54.62	51.24	-3.38

Table 17. Continued

Residence Category by Age	1960 Total Population	1970 Total Population	Gain or Loss	Percent Gain or Loss	Proportion Total Population by Residence 1960	Proportion Total Population by Residence 1970	Net Change in Proportion of Total Population by Residence
65 +							
Total Urban	27,019	32,608	5,589	20.7	37.78	40.51	2.73
Urban Area	6,063	7,591	1,532	25.3	8.48	9.43	.95
Urban, 10-50 thousand	11,527	14,945	3,418	29.7	16.12	18.57	2.45
Urban, 2,500 to 9,999	9,429	10,072	643	6.8	13.19	12.51	-.68
Total Rural	44,494	47,876	3,382	7.6	62.22	59.49	-2.73
Rural, 1,000 to 2,499	8,966	10,361	1,395	15.6	12.54	12.87	.33
Other Rural	35,528	37,515	1,987	5.6	49.68	46.61	-3.07
75 +							
Total Urban	9,506	14,426	4,920	51.8	38.96	42.87	3.91
Urban Area	1,990	3,174	1,184	59.5	8.16	9.43	1.27
Urban, 10-50 thousand	4,046	6,490	2,444	60.4	16.58	19.29	2.71
Urban, 2,500 to 9,999	3,470	4,762	1,292	37.2	14.22	14.15	-.07
Total Rural	14,896	19,221	4,325	29.0	61.04	57.13	-3.91
Rural, 1,000 to 2,499	3,335	4,807	1,472	44.1	13.67	14.29	.62
Other Rural	11,561	14,414	2,853	24.7	47.38	42.84	-4.54

percent for the rural farm and hamlet population. Study of the proportionate changes for this category show that the number of young children increased as a proportion of the total population in all residential categories except rural farm and hamlet, apparently reflecting the abrupt lower cohort adjustment experienced by an area undergoing rural depopulation.

Substantial numerical, percent and proportionate gains in the population were shown for age category 15-34 for all residence segments of the population except rural farm and hamlet, which showed a percent and proportionate loss of -0.2 percent and -8.46. The large 42.6 percent growth in this age category in the urban towns of 2,500 to 9,999 probably reflects the relocation of rural persons to urban areas.

All urban residence segments had small numerical, percent and moderate proportionate gains for the age category 35-64, and rural farm areas and communities showed losses in this age category.

Numerical and percent gains of 5.6 percent and 29.7 percent were shown for the age category 65 plus and in all residence segments of the State for the 1960 to 1970 period, although a proportionate loss of -3.07 occurred in the rural farm and hamlet population.

Substantial percent gains up to 60.4 percent occurred in the age 75 or more category for all residence segments; however, the farm and hamlet population experienced a -4.54 proportionate loss in the age group, and the small urban population (2,500 to 9,999 inhabitants) showed a slight proportionate loss of -.07.

Changes in Age by Sex

Examination of changes by age and sex (Table 18) for the State from 1960 to 1970 reveals that although age categories 0-4 and 0-14 showed mean percent losses of -13.6 percent and -37.7 percent respectively, adjustments in the sex ratio (number of men to every 100 women) for these categories were nil in the 0-14 grouping and a slight -0.4 in the 0-4.

Changes in the young adult 15-34 category from 1960 to 1970 showed a minor decline of -0.5 in the sex ratio compared to an increase of 9.5 percent in that age group.

The age category 35-64 showed a sex ratio change of -5.2, which appears related to a -6.7 percent loss in the male population for that age group.

The advanced age categories 65 plus and 75 or more showed declining sex ratios of 83.1 and 75.7 respectively, with corresponding disproportionate increases of 22.4 percent and 53.0 percent for the female populations in those age categories, a phenomena apparently related to differential mortality.

Changes in Age by Race

Analysis of changes in age by race (Table 19) for the State from 1960 to 1970 shows a general number and percent increase in all age categories for non-whites. The race ratio, the number of whites for every 100 non-whites, shifted from 1,820 to 1,170 and 1,720 to 930 in the 0-4 and 0-14 age categories. Stated another way, there were 8.55 non-whites for every 100 whites in age category 0-14 in 1970 compared

TABLE 18

POPULATION GAINS OR LOSSES, PERCENT CHANGE AND PROPORTION-CHANGE FOR SOUTH DAKOTA
BY SELECTED AGE CATEGORIES AND SEX, 1960-1970

Age Category by Sex	1960 Population	1970 Population	Number Gain or Loss	Percent Gain or Loss	Sex Ratio for Age Category 1960	Sex Ratio for Age Category 1970	Net Change in Sex Ratio for Age Category, 1960-1970
0-4					103.7	103.4	-.4
Male	42,328	27,587	-14,741	-34.8			
Female	40,799	26,671	-14,128	-34.6			
0-14					103.7	103.7	.0
Male	116,333	100,513	-15,820	-13.6			
Female	112,149	96,885	-15,264	-13.6			
15-34					100.3	99.8	-.5
Male	84,937	92,740	7,803	9.2			
Female	84,694	92,967	8,273	9.8			
35-64					103.8	98.6	-5.2
Male	107,399	100,262	-7,137	-6.7			
Female	103,489	101,656	-1,833	-1.8			
65 +					99.1	83.1	-16.0
Male	35,602	36,518	916	2.6			
Female	35,911	43,966	8,055	22.4			
75 +					94.4	75.7	-18.7
Male	11,850	14,438	2,588	21.8			
Female	12,552	19,209	6,657	53.0			

TABLE 19

POPULATION GAINS OR LOSSES, PERCENT CHANGE AND PROPORTION-CHANGE FOR SOUTH DAKOTA
BY SELECTED AGE CATEGORIES AND RACE, 1960-1970

Age by Race	1960 Total Population	1970 Total Population	Gain or Loss	Percent Gain or Loss	Race Ratio by Age, 1960	Race Ratio by Age, 1970	Net Change in Race Ratio by Age, 1960-1970
0-4					1,720	930	-790
White	78,556	49,002	-29,554	-37.6			
Non-white	4,571	5,256	685	15.0			
0-14					1,820	1,170	-650
White	216,612	181,838	-34,774	-16.1			
Non-white	11,870	15,560	3,690	31.1			
15-34					1,960	1,650	-310
White	161,385	175,117	3,690	31.1			
Non-white	8,246	10,590	13,732	8.5			
35-64					3,510	2,680	-830
White	205,040	194,700	-10,340	-5.0			
Non-white	5,848	7,218	1,370	23.4			
65 +					4,830	4,360	-470
White	70,061	78,678	8,617	12.3			
Non-white	1,452	1,806	354	24.4			
75 +					4,710	5,090	380
White	23,895	32,999	9,104	38.1			
Non-white	507	648	141	27.8			

to 5.49 in 1960; and 10.8 non-whites for every 100 whites in age interval 0-4 in 1970 compared to 5.81 in 1960. Declines in the race ratio also occurred in the active population categories 15-34 and 35-64 and in the 65 plus group. The only age group not showing a decline in the race ratio was the age category 75 or more, which showed an increase of 380 in the number of whites to every 100 non-whites. Particularly significant is the increase of 31.1 percent in the number of whites age 15-34 when contrasted to the decrease of -37.6 percent in the number of whites 0-4, especially when compared to the non-white increase of 8.5 percent and 15.0 percent, respectively, for those age groupings. It suggests the possible differential effects of race as a factor explaining changes in the number of young children 0-4 between 1960 and 1970 for South Dakota.

Summary of Changes by Age

The data show that age category 0-4 experienced the largest percent and proportional decline from 1960 to 1970. When examined according to planning district, the loss in this category was more pronounced in the northeastern and western areas of South Dakota and of higher magnitude than any other age category in all districts. Whereas the 0-4 cohort showed a percent decline in all urban-rural residence categories, the only proportionate loss was in the farm and hamlet segment. Change in the sex ratio for the interval was negligible; however, the number of non-whites in this young child category increased substantially during the decade, perhaps the result of continued high non-white fertility.

The age category 0-14, representing the child dependent population, showed the second largest decline in the State for the decade, a fact

related to the presence of the young child category 0-4 as a sub-set of this group. All of the planning districts showed losses for this interval, the smallest occurring in Districts II and IV. This small loss for these districts appears related to the percent gains experienced in this age category for urban areas. Additional growth was revealed in this category for that portion of the population resident in small urban towns of 2,500 to 9,999. There was no change in the sex ratio for the 0-14 age group; however, the number of non-whites increased in this age category.

The third age category experiencing percent and proportionate loss during the decade for the State as a whole was the age 35-64 segment of the population, showing a small decline. This decline occurred in all districts except Districts II and VI. When the decline was controlled for urban-rural residence, all urban segments of the age group showed a growth, whereas all rural elements recorded a decline. The sex ratio for the category declined moderately, the apparent result of differential mortality or possible selective migration of males. The race ratio showed a moderate to high increase in the number of non-whites, an increase probably related to the selective migration of whites from South Dakota and residential permanence associated with reservation life and tribal membership.

The young adult category 15-34 increased in size from 1960 to 1970, showing numerical, percent and proportionate growth. In fact, this category had the largest proportionate increase for any age segment. This increase occurred in all districts except District V, when calculated

on the basis of percent change, and in all districts when examined on the basis of proportionate change. Districts II and VI, while showing declines in the young child and child dependent age categories, had the largest increase in the young adult population.

Examination of changes in the young adult group by urban-rural residence revealed that the increase in this segment of the population occurred primarily in urban communities and principally in urban places of less than 10,000. Whereas the rural population age 15-34 declined in aggregate, rural communities of 1,000 to 2,499 experienced low to moderate growth in this age segment. Changes in the sex ratio were negligible, and the number of non-whites 15-34 increased slightly.

The aged dependent population (65 and over) increased 12.5 percent from 1960 to 1970 for the State as a whole, an increase representing the second largest proportionate gain for any age category for the decade. All districts showed proportionate increases for this category, with Districts II and VI having the least. Further, this segment of the population increased primarily in places urban of 10,000 to 50,000. In fact, a small proportionate loss occurred in the smaller urban places of 2,500-10,000 inhabitants. Whereas the rural portion of this age segment declined substantially, the proportionate 65 and over living in rural communities of 1,000 to 2,499 inhabitants increased slightly.

The sex ratio changed dramatically by -19.0 points from 1960 to 1970, an adjustment due probably not so much to differential mortality, but the selective migration of widowers and bachelors from the State in that age grouping.

The race ratio showed a slight increase in the number of non-whites age 65 and over, resulting apparently from selective migration opportunities for white retirees and the mobility restrictions associated with reservation life.

The category of persons 75 and over increased 37.9 percent, with a proportionate gain of 1.44 for the State at large. Examination of this growth by district showed the major proportionate increases to have occurred in districts with smaller urban centers or large reservation areas. Especially pronounced was the decline in this age category in the farm and hamlet (other rural) segment of the population. The decline in the sex ratio was -18.7 points for the decade; the race ratio increased 380.

GENERAL SUMMARY OF POPULATION CHANGE

South Dakota from 1960 to 1970 had -2.2 percent loss in population, reversing the small increases reported in previous decades. During the same period fertility declined -32 percent, infant mortality and child death rates decreased by -27 percent, and marriages between resident parties increased 31 percent. During this same period the loss to the State through net out-migration was 93,310, or -13.7 percent of the 1960 population.

Examination of changes in the population by age showed large declines by number, percent and proportion measures for the 0-4 young child category, with associated losses when differentiated by planning district and rural-urban residence. It was found that there were

negligible changes by sex and small increases for the non-white segment of this cohort.

Losses by age were also shown for age categories 0-14 and 35-64, though not of the magnitude experienced by the 0-4 young child cohort. Gains were reported for the age categories 15-34, 65 plus and 75 and over.

The general loss in the age 0-4 interval from 1960 to 1970 recorded for the State of South Dakota, the planning districts and for selected urban-rural residence segments provides an arena for further demographic study, especially when compared with the increase in the number of young adults 15-34, the general net out-migration pattern for the State, the continuing rural depopulation and urbanization, and the decline in both fertility and infant and child mortality rates.

CHAPTER VI

ANALYSIS AND FINDINGS

This chapter reports on the attempt to determine the association between selected demographic variables and the changes in the number of young children under five for the State of South Dakota for the years 1960 and 1970. The findings reported in this chapter are intended to fulfill Objective Three stated in Chapter I.

Statistical Test

For the purpose of testing the association between the variables a step-wise least squares multiple regression analysis was used. Each variable required no further operationalizing in that absolute plus or minus changes were used as a measure of the demographic process. The association between the variables was tested at the .05 level of significance. The final step-wise equation with the appropriate intercept and regression coefficients for the significant variables was:

$$Y = -38.49046 + 3.06068X_1 + 8.66572X_2 + .67130X_8 + .00672X_9 \\ + .87817X_3 + .93001X_4 + .02063X_5.$$

Null-Hypothesis

Currently, analysis of the association between the independent variables and the variation in a given dependent variable is accomplished by examining the relationship between a set of variables and the dependent variable.

The variables X_1 through X_8 were defined in Chapter IV as the plus or minus change from the year 1960 to the year 1970 for South Dakota by county in the number of events or persons so specified as belonging to the set designated by the variable. The defined set for each variable was:

X_1 = recorded live resident births,

X_2 = recorded resident deaths occurring to children under five,

X_3 = fecund females age 15-44,

X_4 = young adult females age 15-34,

X_5 = net migrants,

X_6 = rural farm residents and residents of towns under 1,000
inhabitants,

X_7 = white young adult females age 15-34,

X_8 = non-white young adult females age 15-34.

In addition to the above, variable X_9 , the size of the largest incorporated place in 1970 in the county, was included in order to test the effect of the size of the largest county community on the observed variation in the dependent variable.

The dependent variable Y was the plus or minus number change in young children under five in South Dakota by county from 1960 to 1970.

For purposes of testing the significance of the association hypothesized between the independent variables and the dependent variables, a null-hypothesis was formulated.

Assuming a "multivariate normal" population, and that the least-squares equation represents the best estimate of the linear regression

equation, and defining the multiple variables $X_1, X_2, X_3, \dots, X_9$ as a set, then the null-hypothesis was:

The set of independent variables will not contribute significantly to the explanation of the variation observed in the dependent variable.

The Statistical Findings

The statistical findings are given in Table 20.

TABLE 20

SUMS OF SQUARES AND PROPORTION OF VARIANCE ACCOUNTED FOR BY THE INDEPENDENT VARIABLES IN ORDER ENTERED INTO THE EQUATION (ORDER OF IMPORTANCE)

Variable Number	Sum of Squares Accounted for	Percent of Proportion Reduced	Cumulative Proportion Reduced Step-wise	Regression Coefficient through Step 7
X_1	19261664.000	95.7	95.7	3.06068
X_2	67926.188	0.4	96.1	8.66572
X_8	147412.938	0.7	96.8	.67130
X_9	50448.973	0.3	97.1	-.00672
X_3	45302.508	0.2	97.3	.87817
X_4	114062.188	0.5	97.8	-.93001
X_5	51768.902	0.3	98.1	.02063
X_6	5659.461	0.0	98.1	-
X_7	31.839	0.0	98.1	-

Variables X_1 , X_2 , X_8 , X_9 , X_3 , X_4 , and X_5 were found to contribute to the explanation of the variation observed in dependent variable Y at the .05 level of significance. The statement of null-association between these independent variables and the dependent variable is rejected.

Stated descriptively in terms of the research hypotheses, the findings were that within the context of the set of independent variables:

1. Changes in the number of recorded live resident births (X_1) accounted for 95.7 percent of the variation observed in the number of children under five (Y).
2. Changes in the number of recorded resident deaths occurring to children under five (X_2) accounted for 0.4 percent of the variation observed in the number of children under five (Y).
3. Changes in the number of non-white young adult females age 15-34 (X_8) accounted for 0.7 percent of the variation observed in the number of children under five (Y).
4. The size of the largest incorporated place in the county in 1970 (X_9) accounted for 0.3 percent of the variation observed in the number of children under five (Y).
5. Changes in the number of fecund females age 15-44 (X_3) accounted for 0.2 percent of the variation observed in the number of children under five (Y).
6. Changes in the number of young adult females age 15-34 (X_4) accounted for 0.5 percent of the variation observed in the number of children under five (Y).

7. Changes in the number of net migrants (X_5) accounted for 0.3 percent of the variation observed in the number of children under five (Y).

8. Changes in the number of rural farm residents and inhabitants of hamlets under 1,000 inhabitants (X_6) did not contribute significantly to the explanation of the variation observed in the dependent variable (Y).

9. Changes in the number of white young adult females age 15-34 (X_7) did not contribute significantly to the explanation of the variation observed in the dependent variable (Y).

CHAPTER VII

SUMMARY, CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

This chapter of the study includes the following sections:

1. A summary of the research problem, objectives and design.
2. A summary of the major findings derived from the general analysis and from the research related to the three objectives of the study, together with the conclusions drawn from each set of findings.
3. A presentation of the implications for South Dakota as suggested by the findings and conclusions.
4. A statement regarding the limitations of the study, with recommendations for further research.

I. SUMMARY OF THE RESEARCH PROBLEM, OBJECTIVE AND DESIGN

Census data for the decades 1940 to 1970 revealed marked population redistribution in the states of the North Central region. Aspects of this redistribution have been the continuing selective relocation of persons from rural to urban areas, the distortion of rural populations in terms of their composition by age, and the marked lessening of the proportion of young children under five to the total population.

The pervasiveness of such demographic phenomena in a rural population, such as located in South Dakota, gave rise to the problem selected for investigation, namely: "What changes have transpired from 1960 to 1970 in South Dakota's population for age categories 0-4, 0-14, 15-34, 35-64, 65 plus and 75 or more; how are these changes

differentiated when controlled for residence, sex and race; and what demographic processes appear related to the decline in the number of resident children under five?" These age categories were selected for analysis because each are functional segments of the total population: 0-4 includes the pre-school children; 0-14, the child dependent category; 15-34, the young adult active population; 35-64, the older adult active population; 65+, the aged dependent category; and 75+, the advanced aged group.

Based on the above problem, this study was developed around a set of objectives, which were to determine:

1. The changes that have transpired from 1960 to 1970 in the composition of the population of South Dakota for the age categories 0-4, 0-14, 15-34, 35-64, 65+ and 75+.
2. The variations in the changes observable in the selected age categories when controlled according to residence, sex and race differentials.
3. The extent to which changes in the basic demographic components of migration, fertility and mortality are associated with the changes in age category 0-4 for the State of South Dakota for the years 1960 and 1970.

Chapter II contained a review of selected literature related to the problem under study. Generalizations drawn from this review of literature relevant to the present study were summarized. Those pertinent to population change in an agricultural state such as South Dakota were:

1. Urban-rural fertility rates have been declining over time in the United States.
2. Fertility generally is lower for urban areas than for rural.
3. Recently, urban-rural fertility differentials are converging as a function of metropolitan dominance, rural migration to the city, or the selective redeployment of rural persons already "urbanized" to urban communities.
4. Mortality is lower in urban areas for persons under age thirty-five than in rural areas and higher for those over thirty-five years.
5. Migration from rural areas is selective by age, sex, residence and occupation.
6. Migrants tend to be females, age 15-34, unemployed or with professional training, who live in rural areas or areas of lowered economic prosperity.
7. A function of migration from rural areas is the curious distortion of the age composition of the population, a decline in the number of births, and a reduction in the number of children under five years of age.
8. The net out-migration from states in the North Central region from 1940 to 1960 is a function of changes in fertility and mortality, changing sex and age composition, rural depopulation, loss of reproductive persons and young adults, the decline of young farm operators and families, and the decline in the magnitude of the rural population.
9. Variations in birth, death and migration events are associated with changes in population composition by age and sex.

In Chapter III two conceptual models were discussed. The first related to "presumed causal forces" in demographic processes, and the second attempted to symbolize a multivariate profile for the analysis of change in population composition.

The conceptual models, together with the review of literature, generated a set of theoretical propositions and associated research hypotheses. The theoretical framework attempted to predict that South Dakota, as a State undergoing rural depopulation and urbanization, experienced differential rates of change by age and sex from 1960 to 1970 for various segments of its population; further, changes by age and sex were a function of adjustments in migration, fertility, mortality, residential distribution, and racial restructuring, particularly in the cohort of young children under five years of age.

On the operational level nine hypotheses relative to changes in the number of young children under five were given. Summarized as a set, they read:

The greater the designated plus or minus variation in the set of independent variables X_1, X_2, \dots, X_9 , the greater the decline in the number of children under five, when X_1 was the number of live resident births; X_2 , the number of resident deaths occurring to children under five; X_3 , the number of fecund females age 15-44; X_4 , the number of young females age 15-34; X_5 , the number of migrants; X_6 , the number of persons living in rural farm areas and towns of less than 1,000 inhabitants; X_7 , the number of young white females age 15-34; X_8 , the number of young non-white females age 15-34; and X_9 , the size of the largest incorporated place in each county.

A research methodology was designed using the county as the unit of analysis, incorporating census and vital data, and following standard demographic methods.

General changes by number and percent in South Dakota's population from 1960 to 1970 by size, urban-rural distribution, expected natural increase and net migration were reported for the State, county and planning districts, together with changes in the number and rates for vital events.

The analysis of such changes suggested the value of inquiry into possible changes in the age composition of the population of South Dakota, particularly when differentiated by residence, sex and race. This was done in an attempt to fulfill Objectives One and Two of the study.

To fulfill Objective Three, the variation by county in the decline in the young child cohort under five from 1960 to 1970 for the State was tested for association and significance with selected demographic variables. The statistical test used was a step-wise least squares multi-variate linear regression. The specified level of significance was .05.

Chapters V and VI reported the findings of the analysis.

The next section of this chapter will focus on the major findings reported in Chapters V and VI, present some conclusions and offer related interpretations.

II. MAJOR FINDINGS AND CONCLUSIONS

In this section of the chapter the major findings reported in greater detail in Chapters V and VI will be reviewed and conclusions will be offered based on these findings, together with possible interpretations that may be associated with the findings. For this purpose, the major findings related to the general analysis of population change in South Dakota from 1960 to 1970 and the three objectives of the study will be used as a frame of reference.

General Analysis of Population Change: Major Findings and Conclusions

Major Findings: General Analysis. The findings contained in the general analysis of population change in South Dakota from 1960 to 1970 were summarized in Chapter V. The major findings were:

1. South Dakota's population had declined 15,007 persons, or -2.2 percent, from 1960 to 1970.
2. The shift of the population from rural areas to urban centers had continued, particularly from farms and rural hamlets to urban places of 2,500 to 10,000 inhabitants.
3. The magnitude in the variation of population gains or losses by county and district appeared associated with the location of State public and private universities and colleges, the size of the largest urban community, Indian reservation lands and federally funded projects.
4. The number of births had decreased 38,426 (-21.1 percent) for the 1960 to 1970 decade compared to the years 1950 to 1960, resulting

in a decline of 43,433 (-37.5 percent) in the natural increase for the decade (resulting also from a 5,007, 8.3 percent, mortality increase).

5. The natural increase of 78,303, even though lower than experienced in the previous decade, could have reflected a population gain for the State from 1960 to 1970 had it not been for a loss of 93,310 persons due to net out-migration.

6. The net out-migration from 1960 to 1970 for South Dakota was ubiquitous to all counties but four.

7. There were changes in the number of selected vital events from 1960 to 1970 in South Dakota, with the number of live births declining to the lowest level reported since 1907 (especially from 1966 to 1970), the number of infant and child deaths dropping markedly, and the number of marriages between parties, both of whom were South Dakota residents, increasing 30.7 percent.

Conclusions: General Analysis. The major findings reported in this study as part of the general analysis of population change in South Dakota from 1960 to 1970 suggest the following conclusions:

1. South Dakota population losses during the 1960-70 decade were apparently associated with rural depopulation and increased urbanization, a decline in the number of births, continued out-migration of the State's population, and the completion or discontinuance of federally funded programs.

2. Losses in the population from 1960 to 1970 varied by county and planning district, with population gains apparently associated with

such factors as larger urban centers, reservation Indian population, and adjacency to State private and public colleges and universities.

3. Net migration from South Dakota continued for the 1960-70 decade for counties generally and for all planning districts as both a persistent and ubiquitous phenomena.

4. South Dakota's fertility decline appears associated with the general adjustment in fertility levels observed in the United States during the last decade, occurring as part of a response to changes in the socio-economic environment and facilitated by improved contraceptive practices.

Objective One: Major Findings and Conclusions

Objective One of this study was to determine what changes in the composition of South Dakota's population for the decade 1960 to 1970 occurred for age categories 0-4, 0-14, 15-34, 35-64, 65 and over and 75 or more.

Major Findings: Objective One. The findings related to Objective One were summarized in Chapter V. The major findings were:

1. Changes in the population of South Dakota from 1960 to 1970 by selected age categories varied considerably.

2. The largest loss occurred in the young child interval age 0-4, followed respectively by smaller losses in the 0-14 youth category and the age 35-64 older active adult population.

3. Three age categories gained in population from 1960 to 1970: the 15-34 young adult segment, the population over 65, and the segment

75 years or more in age. The largest number and proportional gain was in the 15-34 young adult group, and the largest percent gain in the age category 75 or more.

Conclusions: Objective One. The major findings reported in this study as part of Objective One suggest the following conclusions:

1. The increase of 16,076 inhabitants recorded from 1960 to 1970 in South Dakota for the young adult category 15-34 appears as a function of the processional advance of that portion of the population aged 5-24 in 1960, a cohort which was the product of the post-war "baby boom." The segment age 15-34 in 1970 numbered 236,585 in 1960 and 185,707 ten years later. These data mean that even though this age category increased 16,076 in number in 1970 compared to 1960, this was not the consequence of net in-migration. In fact, the erosion of 50,578 persons (-21.5 percent) for the age group 15-34 in 1970 from its cohort base in 1960 was of such magnitude that it suggests that substantial selective out-migration of young adults from the State has continued the past decade.

2. The increase in the number of persons over age 65 and 75 or more for South Dakota from 1960 to 1970 appears as a function of the processional advance of those portions of the population age 55 or more and 65 and over in 1960, subject, of course, to losses from mortality and migration. The open-ended feature of these categories does not permit refined cohort comparison. However, it should be noted that the 1960 population of 26,091 and 21,020 for the age cohorts 65-69 and

70-74 was the largest in the history of South Dakota. They represented increases of 3,852 (17.3 percent) and 5,687 (37.1 percent), respectively, over the numbers reported for these age segments in 1960. The changes in the number of persons 65 and over and 75 or more in South Dakota from 1960 to 1970 appears associated with the fact that:

1)- the 1960 age cohort 65-74 may be assumed to constitute the bulk of the group in 1970 classified as 75 plus, and

2)- the age interval 75 or more is a sub-set of the category 65 plus.

3. The loss in the number of young children under five appears as a function of declining birth rates, selective migration, rural depopulation, and continued urbanization. Since the 0-4 interval was a sub-set of the age 0-14 child segment of the population, and since the dramatic leveling of lowered fertility in South Dakota did not begin until 1966, it is assumed that the decline in the 0-14 category from 1960 to 1970 is accounted for principally by the decline in the number of young children under five and secondly by the selective out-migration of the parental cohorts for the 0-14 age group.

Objective Two: Major Findings and Conclusions

Objective Two of this study was to determine the variations in the changes observable in the selected age categories when controlled for residence, sex and race differentials.

Major Findings: Objective Two. The findings related to Objective Two were summarized in Chapter V. The major findings were:

1. Changes by district for each of the age categories for the years 1960 to 1970 were similar to the variations observed by age categories for the State as a whole.

2. The segments of the population residing in urban areas showed proportionate gains in all age categories.

3. The segments of the population residing in rural areas showed proportionate losses in all age categories.

4. The number of children under five declined substantially from 1960 to 1970 in all residence categories, both urban and rural.

5. The number of young adults age 15-34 increased from 1960 to 1970 in all urban residential categories.

6. The number of persons age 65 and more and 75 or over increased from 1960 to 1970 in all residential categories, both urban and rural.

7. The sex ratio lowered markedly in age categories 65 and over and 75 or more from 1960 to 1970.

8. The number of non-whites in proportion to whites increased in all age categories except 75 or more from 1960 to 1970.

Conclusions: Objective Two. The variations observed in the changes by age in the population composition for South Dakota from 1960 to 1970 when controlled by selected differentials suggest the following conclusions:

1. Variations in the changes of the population of the selected age categories from 1960 to 1970 for South Dakota were not meaningful when analysed by Planning District, but were found to be associated with urban-rural residence distribution by size and type of place for

the State as a whole. This statement generates the following sub-conclusions:

A. Urban communities in South Dakota, from 1960 to 1970 appeared to have greater ability to attract newcomers and retain population levels than did rural communities and farm areas for both the active (age 15-64) and age dependent (age 65+) populations. This phenomenon was probably associated with:

- 1)- The greater occupational diversity and opportunity available to the active population, normally associated with urban communities.
- 2)- The greater medical, retirement and service facilities available for the age dependent population, normally associated with urban communities, particularly centers of over 10,000 inhabitants.
- 3)- The pervasive expansion of the urban culture, especially as an aspect of mass media, economic centralization, school consolidation and improved transportation.

B. Rural areas in South Dakota were subject to continued depopulation of increasing magnitude for the active population (15-64), particularly from farm residences and hamlets under 1,000 inhabitants. This phenomenon was apparently a function of selective relocation of the active population, probably associated with the decline in farm families and operators from 1960 to 1970, the closing of public schools in rural hamlets, and declining mercantile markets in these areas.

C. The numerical and percent gains for rural age dependent populations (65+) is a function of the processional advance of age cohorts and not the consequence of rural repopulation by persons in this age group. The decline in the proportion of the rural age dependent population from 1960 to 1970 supports this conclusion, as do the substantial increases reflected for the age dependent population in urban areas.

D. Although the number of young children under five and the child dependent population (0-14) generally has declined substantially for all residential segments, there has been a dramatic proportional relocation of these age categories from rural to urban areas. This appears associated with the selective redistribution of the active population from rural to urban areas.

2. Changes in the composition of the population of South Dakota by age and sex from 1960 to 1970 were a function of selective voluntary migration and differential mortality. The relative stability in the sex ratio of the under five cohort and the child dependent population (0-14) is an ascribed constant associated with the fact that the residence for members of these age groups is generally not voluntary but rather a consequence of parental decision.

The slight change in the 15-34 young adult category appears associated with higher male mortality, the fact that young adult males are eligible for non-voluntary military service, and that young adult males may attend out of state colleges and universities in disproportionate number. Military personnel and college students are enumerated at their

place of military or college residence and not their legal residence. The variant decline by sex in the number of persons 35 to 64 years of age supports the conclusion given above regarding the selectivity of mortality and migration, as do the differentiated mortality common to the aged dependent population (65+) and the probable selective migration from the State of rural widowers and aged bachelors.

3. The increase in the number of non-whites in proportion to whites in South Dakota from 1960 to 1970 for all age segments except the interval 75 plus was a function of differential fertility according to race, the convergence of differential mortality by race, the selective migration from the State of better educated whites, and the greater mobility restrictions that impinge on reservation residents. The decline in the proportion of non-whites to whites in the age category 75 plus appears associated with the selective out-migration opportunities available to white retirees.

Objective Three: Major Findings and Conclusions

Objective Three of this study was to determine the extent to which changes in the basic demographic components of migration, fertility and mortality are associated with the changes in age category 0-4 for the State of South Dakota for the years 1960 to 1970.

Major Findings: Objective Three. Seven independent variables were found to contribute significantly to the explanation of the variation observed in the number of children under five (Y) for South Dakota by county from 1960 to 1970.

Stated in order of importance, it was found that for South Dakota from 1960 to 1970 variation in the decline in the number of young children under five can be explained by:

1. Declines in the number of recorded live resident births (X_1 , R^2 : 95.7).
2. Increases in the number of recorded resident deaths occurring to children under five (X_2 , R^2 : 0.4).
3. Declines in the number of non-white adult females age 15-34 (X_8 , R^2 : 0.7).
4. The relative greater size of the largest incorporated place in the county in 1970 (X_9 , R^2 : 0.3).
5. Declines in the number of fecund females age 15-44 (X_3 , R^2 : 0.2).
6. Increases in the number of young adult females age 15-34 (X_4 , R^2 : 0.5).
7. Increases in the number of net out-migrants from the State (X_5 , R^2 : 0.3).

The variation in the number of persons living in rural farm areas and towns of less than 1,000 inhabitants (X_6) was found to contribute to the explanation of the variation observed in the number of children under five at a level below .05 significance; therefore, the statement of no association between X_6 and Y when X_6 was considered as part of the set of variables could not be rejected.

The same prevailed for the variation in the number of young white females age 15-34 (X_7).

Conclusions: Objective Three. Interpretation of the above findings presents a strong case for concluding that the decline in the number of young children under five for the State of South Dakota from 1960 to 1970 is principally the function of changing fertility patterns on the part of the fecund female population, particularly declines in the number of births occurring to young adult resident females 15-34 years of age. When examined according to the specified controls, the findings further suggest that non-white females age 15-34 have maintained relatively higher fertility rates than the white young adult female age 15-34. This is demonstrated by the fact that changes in the number of non-white adult females age 15-34 were significant when explaining variation in the changes in the number of children under five, whereas changes in the number of white young adult females age 15-34 were not.

The findings also suggest that women in the upper reproductive age have maintained relatively higher fertility experience than have young adult females age 15-34. The fact that declines in the number of fecund women age 15-44 are positively associated with declines in the number of children age 0-4, whereas decreases in the number of young adult women age 15-34 are negatively associated with declines in the number of young children under five, supports this conjecture.

III. IMPLICATIONS FOR SOUTH DAKOTA

A review of the findings and conclusions raises certain questions regarding the implications of these findings for the State of South

Dakota and its future. Some major implications may be stated as follows:

1. Whereas South Dakota experienced substantial losses in population from 1960 to 1970 due in large measure to net out-migration sufficient in magnitude to offset potential gains from natural increase, the reduction in the number of children under 14 and in the number of young children under five will produce even larger erosion due to net out-migration in subsequent decades as these smaller youth cohorts advance processionally into older age intervals.

2. The decline in fertility from 1960 to 1970 and the degree to which this decline served to explain the loss in the number of children under five implies that changes in desired family size are occurring in South Dakota consistent with such socio-economic value changes as may be occurring in the larger United States population.

This observation suggests that the convergence of rural-urban fertility patterns occurred in South Dakota about 1966 and may be an indicator of potential cultural convergence in other elements of urban-rural culture as the State continues urbanization. Further, the decline in fertility during a period when the number of marriages between South Dakota residents increased would suggest the use of relatively new contraceptives such as the "pill" with greater frequency by couples in South Dakota as part of their family planning program.

3. The fact that the location or absence of a State university or college in a county appears a factor associated with the variation in the population gains experienced by a county from 1960 to 1970, and the

fact that the loss of young adults age 15-34 was not sufficient to show a minus loss in that age category, suggest that the increased enrollments in our colleges and universities from 1960 to 1970 (estimated to be a gain of 10,000 students) accounts in part for the increase experienced in South Dakota from 1960 to 1970. This would imply that institutions of higher learning have some "holding power," or at least serve as temporary "dams," when associated with migrancy; or that higher education places a moratorium on the age at which persons migrate from South Dakota.

4. The fact that the young adult group age 15-34 experienced a number, percent and proportionate gain from 1960 to 1970 (even though the increase was primarily explained by the processional advance of larger 1960 younger cohorts into that age category by 1970) suggests that economic conditions in the nation as a whole during the late sixties were such as to stem the flow of young adult migrants from the State. If this were not the case, it would have to be assumed that approximately 8,000 new job opportunities were generated in the State from 1960 to 1970 to provide employment for at least the increase in the male portion of the age 15-34 young adult population. In a period of decreasing population, continuing reduction in the number of farms and farm operators, and declining economic activity, such an assumption lacks adequate support. On the other hand, South Dakota during the past decade indeed may be providing employment and education opportunities for young adults in greater magnitude than previously.

5. The large increase from 1960 to 1970 in the age dependent population (65+) suggests that additional services and facilities for the aged may be required in South Dakota communities during the next decade, particularly for females and for non-whites.

6. The fact that the variation in the number of young adult women age 15-34 was inversely related to the variation in the number of children under five from 1960 to 1970 suggests that in the next decade as the number of older reproductive women advance out of the reproductive ages, the number of young children under five to the proportion of the total population will decline even more.

7. As a result of continuing urbanization and rural depopulation, urban communities in South Dakota, especially centers over 10,000, will grow from 1970 to 1980 in active (15-64) and aged dependent (65+) populations, but show losses for the child (0-14) population. This will be explained by continued fluctuating lower fertility and the small number of children under five now resident. This fact has significance for agencies responsible for educational, recreational, religious and other programs orientated to youth.

8. Rural farm residence areas and hamlets under 1,000 generally will show additional losses in all age categories from 1970 to 1980, as persons continue to relocate to urban centers or communities of 1,000 to 2,500 inhabitants, suggesting that planning programs for regional rural development should be given maximized priority.

IV. LIMITATIONS AND RECOMMENDATIONS

Limitations of the Study

The precision of the study was limited due to the unavailability of the following data:

1. Survival ratio-method age specific migration rates for South Dakota women age 15-35 from 1960 to 1970.
2. Refined counts of the rural population for 1970 by farm and non-farm residence.
3. Race-sex-county specific mortality totals by yearly age intervals for women age 15-34 and children under five.
4. Race-county specific fertility totals by yearly age intervals for women 15-34 years of age.
5. Census socio-economic data for the year 1970.

Additionally, the precision may have been enhanced if the individual rather than the county had been used as the unit of analysis.

Recommendations for Further Study

The author recommends the following studies as logically related to findings of this investigation:

1. An effort to determine the young adult migration rates from 1960 to 1970 by county for the State of South Dakota, together with associated factors.
2. An investigation of changes in the number of children under five and changes in selected socio-economic factors from 1960 to 1970 for the State of South Dakota.

3. An examination of factors related to the differential fertility apparently existing between white and non-white female populations.

4. Examination of the association between selected demographic variables and changes in other age categories of South Dakota's population from 1960 to 1970, incorporating the theoretical model and methodology of this study.

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APPENDIX I

SOUTH DAKOTA POPULATION GAINS
AND LOSSES FOR COUNTIES BY
STATE PLANNING DISTRICTS,
1960 - 1970

APPENDIX I

SOUTH DAKOTA POPULATION GAINS AND LOSSES FOR COUNTIES BY
STATE PLANNING DISTRICTS, 1960-1970^a

Planning Districts and Counties	Final Census 1970	Final Census 1960	Gain or Loss	Percentage Gain or Loss
STATE TOTAL	665,507	680,514	-15,007	-2.2
<u>District I</u>	97,865	105,597	-7,732	-7.9
Brookings	22,158	20,046	2,112	10.5
Clark	5,515	7,134	-1,619	-22.7
Codington	19,140	20,220	-1,080	-5.3
Deuel	5,686	6,782	-1,096	-16.2
Grant	9,005	9,913	-908	-9.2
Hamlin	5,172	6,303	-1,131	-17.9
Kingsbury	7,657	9,227	-1,570	-17.0
Lake	11,456	11,764	-308	-2.6
Miner	4,454	5,398	-944	-17.5
Moody	7,622	8,810	-1,188	-13.5
<u>District II</u>	146,564	139,380	7,274	5.2
Clay	12,923	10,810	2,113	19.5
Lincoln	11,761	12,371	-610	-4.9
McCook	7,246	8,268	-1,022	-12.4
Minnehaha	95,209	86,575	8,634	10.0
Turner	9,872	11,159	-1,287	-11.5
Union	9,643	10,197	-554	-5.4

^aRiley and Wagner, South Dakota Population and Net Migration, 1960-1970, pp. 10-1.

Appendix I. Continued

Planning Districts and Counties	Final Census 1970	Final Census 1960	Gain or Loss	Percentage Gain or Loss
<u>District III</u>	97,428	103,184	-5,756	-5.6
Aurora	4,183	4,749	-566	-11.9
Bon Homme	8,577	9,229	-652	-7.1
Brule	5,870	6,319	-449	-7.1
Charles Mix	9,994	11,785	-1,791	-15.2
Davison	17,319	16,681	638	3.8
Douglas	4,569	5,113	-544	-10.6
Gregory	6,710	7,399	-689	-9.3
Hanson	3,781	4,584	-803	-17.5
Hutchinson	10,379	11,085	-706	-6.4
Jerauld	3,310	4,048	-738	-18.2
Sanborn	3,697	4,641	-944	-20.3
Yankton	19,039	17,551	1,488	8.5
<u>District IV</u>	115,094	120,872	-5,778	-4.8
Beadle	20,877	21,682	-805	-3.7
Brown	36,920	34,106	2,814	8.3
Day	8,713	10,516	-1,803	-17.1
Edmunds	5,548	6,079	-531	-8.7
Faulk	3,893	4,397	-504	-11.5
Hand	5,883	6,712	-829	-12.4
McPherson	5,022	5,821	-799	-13.7
Marshall	5,965	6,663	-698	-10.5
Roberts	11,678	13,190	-1,512	-11.5
Spink	10,595	11,706	-1,111	-9.5

Appendix I. Continued

Planning Districts and Counties	Final Census 1970	Final Census 1960	Gain or Loss	Percentage Gain or Loss
<u>District V</u>	78,957	85,530	-6,573	-7.7
Buffalo	1,739	1,547	192	12.4
Campbell	2,866	3,531	-665	-18.8
Corson	4,994	5,798	-804	-13.9
Dewey	5,170	5,257	-87	-1.7
Haakon	2,802	3,303	-501	-15.2
Hughes	11,632	12,725	-1,093	-8.6
Hyde	2,515	2,602	-87	-3.3
Jones	1,882	2,066	-184	-8.9
Lyman	4,060	4,428	-368	-8.3
Mellette	2,420	2,664	-244	-9.2
Perkins	4,769	5,977	-1,208	-20.2
Potter	4,449	4,926	-477	-9.7
Stanley	2,457	4,085	-1,628	-39.9
Sully	2,362	2,607	-245	-9.4
Todd	6,606	4,661	1,945	41.7
Tripp	8,171	8,761	-590	-6.7
Walworth	7,842	8,097	-255	-3.1
Ziebach	2,221	2,495	-274	-11.0

Appendix I. Continued

Planning Districts and Counties	Final Census 1970	Final Census 1960	Gain or Loss	Percentage Gain or Loss
<u>District VI</u>	129,509	125,951	3,558	2.8
Bennett	3,088	3,053	35	1.1
Butte	7,825	8,592	-767	-8.9
Custer	4,698	4,906	-208	-4.2
Fall River	7,505	10,688	-3,183	-29.8
Harding	1,855	2,371	-516	-21.8
Jackson	1,531	1,985	-454	-22.9
Lawrence	17,453	17,075	378	2.2
Meade	16,618	12,044	4,574	38.0
Pennington	59,349	58,195	1,154	2.0
Shannon	8,198	6,000	2,198	36.6
Washabaugh	1,389	1,042	347	33.3

APPENDIX II

BIRTHS, DEATHS, NATURAL INCREASE AND
NET MIGRATION FOR SOUTH DAKOTA
PLANNING DISTRICTS AND
COUNTIES,
1960-1970

APPENDIX II

BIRTHS, DEATHS, NATURAL INCREASE AND NET MIGRATION FOR SOUTH DAKOTA
PLANNING DISTRICTS AND COUNTIES, 1960-1970^a

Political Division	Total Births: April 1, 1960 to April 1, 1970	Total Deaths: April 1, 1960 to April 1, 1970	Natural Increase: April 1, 1960 to April 1, 1970	1970 Expected Popula- tion	Popu- lation: April 1, 1970	Net Mi- gration, Absolute Number	Net Mi- gration Percent
STATE TOTAL	143,495	65,192	78,303	758,817	665,507	-93,310	-13.7
<u>District I</u>	17,947	10,500	7,447	113,044	97,865	-15,179	-14.4
Brookings	3,859	1,614	2,245	22,291	22,158	-133	-0.7
Clark	917	797	120	7,254	5,515	-1,739	-24.4
Codington	3,778	2,008	1,770	21,990	19,140	-2,850	-14.1
Deuel	1,100	683	417	7,199	5,686	-1,513	-22.3
Grant	1,788	1,001	787	10,700	9,005	-1,695	-17.1
Hamlin	969	743	226	6,529	5,172	-1,357	-21.5
Kingsbury	1,284	942	342	9,569	7,657	-1,912	-20.7
Lake	2,113	1,225	888	12,652	11,456	-1,196	-10.2
Miner	797	562	235	5,633	4,454	-1,179	-21.8
Moody	1,342	925	417	9,227	7,622	-1,605	-18.2

^aRiley and Wagner, South Dakota Population and Net Migration, 1960-1970, pp. 31-3. Data compiled and furnished by the State Office of Public Health Statistics.

Appendix II. Continued

Political Division	Total Births: April 1, 1960 to April 1, 1970	Total Deaths: April 1, 1960 to April 1, 1970	Natural Increase: April 1, 1960 to April 1, 1970	1970 Expected Population	Population: April 1, 1970	Net Migration, Absolute Number	Net Migration Percent
<u>District II</u>	29,377	12,937	16,440	155,820	146,654	-9,166	-6.6
Clay	2,268	945	1,323	12,133	12,923	790	7.3
Lincoln	1,850	1,351	499	12,870	11,761	-1,109	-9.0
McCook	1,393	840	553	8,821	7,246	-1,575	-19.0
Minnehaha	20,536	7,435	13,101	99,676	95,209	-4,467	-5.2
Turner	1,559	1,257	302	11,461	9,872	-1,589	-14.2
Union	1,771	1,109	662	10,859	9,643	-1,216	-11.9
<u>District III</u>	19,565	10,797	8,768	111,952	97,428	-14,524	-14.1
Aurora	830	539	291	5,040	4,183	-857	-18.0
Bon Homme	1,539	1,040	499	9,728	8,577	-1,151	-12.5
Erule	1,470	643	827	7,146	5,870	-1,276	-20.2
Charles Mix	2,528	1,250	1,278	13,063	9,994	-3,069	-26.0
Davison	3,425	1,849	1,576	18,257	17,319	-938	-5.6
Douglas	939	507	432	5,545	4,569	-976	-19.1
Gregory	1,340	822	518	7,917	6,710	-1,207	-16.3
Hanson	799	367	432	5,016	3,781	-1,235	-26.9
Hutchinson	1,903	1,135	768	11,853	10,379	-1,474	-13.3
Jerald	622	475	147	4,195	3,310	-885	-21.9
Sanborn	689	496	193	4,834	3,697	-1,137	-24.5
Yankton	3,481	1,674	1,807	19,358	19,039	-319	-1.8

Appendix II. Continued

Political Division	Total Births: April 1, 1960 to April 1, 1970	Total Deaths: April 1, 1960 to April 1, 1970	Natural Increase: April 1, 1960 to April 1, 1970	1970 Expected Popula- tion	Popu- lation: April 1, 1970	Net Mi- gration Absolute Number	Net Mi- gration Percent
<u>District V</u> continued							
Sully	561	197	364	2,971	2,362	-609	-23.4
Todd	1,825	562	1,263	5,924	6,606	682	14.6
Tripp	1,867	853	1,014	9,775	8,171	-1,604	-18.3
Walworth	1,687	745	942	9,039	7,842	-1,197	-14.8
Ziebach	690	192	498	2,993	2,221	-772	-30.9
<u>District VI</u>	33,610	11,291	22,319	148,270	129,509	-18,761	-14.9
Bennett	867	285	582	3,635	3,088	-547	-17.9
Butte	1,654	915	739	9,331	7,825	-1,506	-17.5
Custer	864	549	315	5,221	4,698	-523	-10.7
Fall River	1,516	1,285	231	10,919	7,505	-3,414	-31.9
Harding	397	203	194	2,565	1,855	-710	-29.9
Jackson	449	217	232	2,217	1,531	-686	-34.6
Lawrence	3,798	1,680	2,118	19,193	17,453	-1,740	-10.2
Meade	2,876	1,185	1,691	13,735	16,618	2,883	23.9
Pennington	17,625	3,973	13,652	71,847	59,349	-12,498	-21.5
Shannon	3,175	877	2,298	8,298	8,198	-100	-1.7
Washabaugh	389	122	267	1,309	1,389	80	7.7

Appendix II. Continued

Political Division	Total Births: April 1, 1960 to April 1, 1970	Total Deaths: April 1, 1960 to April 1, 1970	Natural Increase: April 1, 1960 to April 1, 1970	1970 Expected Population	Population: April 1, 1970	Net Migration, Absolute Number	Net Migration Percent
<u>District IV</u>	22,778	11,884	10,894	131,766	115,094	-16,672	-13.8
Beadle	3,954	2,152	1,802	23,484	20,877	-2,607	-12.0
Brown	7,376	3,114	4,262	38,368	36,920	-1,448	-4.2
Day	1,612	1,217	395	10,911	8,713	-2,198	-20.9
Edmunds	1,202	563	639	6,718	5,548	-1,170	-19.2
Faulk	827	454	373	4,770	3,893	-877	-19.9
Hand	1,238	591	647	7,359	5,883	-1,476	-22.0
McPherson	866	485	381	6,202	5,022	-1,180	-20.3
Marshall	1,162	682	480	7,143	5,965	-1,178	-17.7
Roberts	2,749	1,450	1,299	14,489	11,678	-2,811	-21.3
Spink	1,792	1,176	616	12,322	10,595	-1,727	-14.8
<u>District V</u>	20,218	7,783	12,435	97,965	78,957	-19,008	-22.2
Buffalo	663	198	465	2,012	1,739	-273	-17.6
Campbell	619	283	336	3,867	2,866	-1,001	-28.3
Corson	1,621	551	1,070	6,868	4,994	-1,874	-32.3
Dewey	1,584	477	1,107	6,364	5,170	-1,194	-22.7
Haakon	661	310	351	3,654	2,802	-852	-25.8
Hughes	2,886	1,010	1,876	14,601	11,632	-2,969	-23.8
Hyde	521	265	256	2,858	2,515	-343	-13.2
Jones	421	181	240	2,306	1,882	-424	-20.5
Lyman	983	472	511	4,939	4,060	-879	-19.9
Mellette	684	278	406	3,070	2,420	-650	-24.4
Perkins	945	558	387	6,364	4,769	-1,595	-26.7
Potter	1,156	410	746	5,672	4,449	-1,228	-24.8
Stanley	844	241	603	4,688	2,457	-2,231	-54.6

APPENDIX III
INDEPENDENT AND DEPENDENT
VARIABLES

VARIABLE X₁

NUMBER, GAIN OR LOSS, AND PERCENT CHANGE IN NUMBER OF LIVE
RECORDED BIRTHS BY COUNTY, 1960 AND 1970

County	Number in 1960	Number in 1970	Gain or Loss	Percent Change
Aurora	122	60	-62	-50.8
Beadle	535	314	-221	-41.3
Bennett	98	66	-32	-32.7
Bon Homme	207	112	-95	-45.9
Brookings	489	343	-146	-29.9
Brown	868	642	-226	-26.0
Brule	168	93	-75	-44.6
Buffalo	58	47	-11	-19.0
Butte	208	136	-72	-34.6
Campbell	71	36	-35	-49.3
Charles Mix	304	176	-128	-42.1
Clark	125	59	-66	-52.8
Clay	242	232	-10	-4.1
Codington	468	297	-171	-36.5
Corson	167	111	-56	-33.5
Custer	106	66	-40	-37.7
Davison	384	306	-78	-20.3
Day	198	117	-81	-40.9
Deuel	146	79	-67	-45.9
Dewey	226	128	-98	-43.4
Douglas	109	75	-34	-31.1
Edmunds	151	83	-68	-45.0
Fall River	213	92	-121	-56.8
Faulk	111	52	-59	-53.2
Grant	237	123	-114	-48.1
Gregory	170	94	-76	-44.7
Haakon	87	62	-25	-28.7
Hamlin	123	75	-48	-39.0
Hand	160	84	-76	-47.5
Hanson	108	61	-47	-43.5

Variable X_1 . Continued

County	Number in 1960	Number in 1970	Gain or Loss	Percent Change
Harding	62	24	-38	-61.3
Hughes	385	229	-156	-40.5
Hutchinson	241	152	-89	-36.9
Hyde	60	38	-22	-36.7
Jackson	47	34	-13	-27.7
Jerauld	90	47	-43	-47.8
Jones	51	37	-14	-27.5
Kingsbury	197	107	-90	-45.7
Lake	248	179	-69	-27.8
Lawrence	401	309	-92	-22.9
Lincoln	243	167	-74	-30.5
Lyman	132	93	-39	-29.5
McCook	189	97	-92	-48.7
McPherson	125	61	-64	-51.2
Marshall	136	88	-48	-35.3
Meade	301	228	-73	-24.3
Mellette	79	65	-14	-17.7
Miner	103	45	-58	-56.3
Minnehaha	2,477	1,797	-680	-27.5
Mocdy	160	101	-59	-36.9
Pennington	2,149	1,490	-659	-30.7
Perkins	155	75	-80	-51.6
Potter	149	81	-68	-45.6
Roberts	324	207	-117	-36.1
Sanborn	113	52	-61	-54.0
Shannon	318	315	-3	-.9
Spink	242	136	-106	-43.8
Stanley	132	44	-88	-66.7
Sully	82	36	-46	-56.1
Todd	171	224	+53	31.0
Tripp	224	134	-90	-40.2
Turner	209	112	-97	-46.4
Union	199	165	-34	-17.1
Walworth	232	115	-117	-50.4
Washabaugh	50	37	-13	-26.0

Variable X_1 . Continued

County	Number in 1960	Number in 1970	Gain or Loss	Percent Change
Yankton	397	324	-73	-18.4
Ziebach	92	51	-41	-44.6

VARIABLE X_2

NUMBER, GAIN OR LOSS, AND PERCENT CHANGE IN NUMBER OF RECORDED DEATHS
TO CHILDREN UNDER FIVE BY COUNTY, 1960 AND 1970

County	Number in 1960	Number in 1970	Gain or Loss	Percent Change
Aurora	2	4	2	100.0
Beadle	13	8	-5	-38.5
Bennett	9	2	-7	-77.8
Bon Homme	4	2	-2	-50.0
Brookings	12	8	-4	-33.3
Brown	19	11	-8	-42.1
Brule	7	2	-5	-71.4
Buffalo	4	2	-2	-50.0
Butte	7	3	-4	-57.1
Campbell	3	1	-2	-66.7
Charles Mix	9	3	-6	-66.7
Clark	1	2	1	100.0
Clay	7	2	-5	-71.4
Codington	7	9	2	28.6
Corson	10	5	-5	-50.0
Custer	3	3	0	.0
Davison	13	5	-8	-61.5
Day	10	1	-9	-90.0
Deuel	5	0	-5	-100.0
Dewey	5	2	-3	-60.0

Variable X₂. Continued

County	Number in 1960	Number in 1970	Gain or Loss	Percent Change
Douglas	1	4	3	300.0
Edmunds	4	0	-4	-100.0
Fall River	9	5	-4	-44.4
Faulk	1	2	1	100.0
Grant	6	3	-3	-50.0
Gregory	5	2	-3	-60.0
Haakon	2	0	-2	-100.0
Hamlin	2	1	-1	-50.0
Hand	2	1	-1	-50.0
Hanson	2	0	-2	-100.0
Harding	2	0	-2	-100.0
Hughes	17	2	-15	-88.2
Hutchinson	12	1	-11	-91.7
Hyde	2	2	0	.0
Jackson	1	2	1	100.0
Jerauld	4	1	-3	-75.0
Jones	2	1	-1	-50.0
Kingsbury	6	2	-4	-66.7
Lake	10	2	-8	-80.0
Lawrence	18	13	-5	-27.8
Lincoln	7	5	-2	-28.6
Lyman	7	1	-6	-85.7
McCook	5	4	-1	-20.0
McPherson	3	1	-2	-66.7
Marshall	1	1	0	.0
Meade	10	6	-4	-40.0
Mellette	4	3	-1	-25.0
Miner	0	1	1	--
Minnehaha	56	41	-15	-26.8
Moody	8	1	-7	-87.5
Pennington	77	22	-55	-71.4
Perkins	5	0	-5	-100.0
Potter	2	1	-1	-50.0
Roberts	18	7	-11	-61.1
Sanborn	3	0	-3	-100.0

Variable X₂. Continued

County	Number in 1960	Number in 1970	Gain or Loss	Percent Change
Shannon	27	20	-7	-25.9
Spink	10	7	-3	-30.0
Stanley	3	0	-3	-100.0
Sully	3	0	-3	-100.0
Todd	22	11	-11	-50.0
Tripp	7	7	0	.0
Turner	5	4	-1	-20.0
Union	9	4	-5	-55.6
Walworth	5	0	-5	-100.0
Washabaugh	4	2	-2	-50.0
Yankton	7	6	-1	-14.3
Ziebach	3	0	-3	-100.0

VARIABLE X₃

NUMBER, GAIN OR LOSS, AND PERCENT CHANGE IN THE NUMBER OF FECUND
FEMALES, AGE 15-44, BY COUNTY, 1960 AND 1970

County	Number in 1960	Number in 1970	Gain or Loss	Percent Change
Aurora	781	667	-114	-14.6
Beadle	4,163	4,140	-23	-.6
Bennett	552	579	27	4.9
Bon Homme	1,586	1,482	-104	-6.6
Brookings	3,827	5,055	1,228	32.1
Brown	6,726	8,175	1,449	21.5
Brule	1,121	1,003	-118	-10.5
Buffalo	288	300	12	4.2
Butte	1,539	1,457	-82	-5.3
Campbell	627	485	-142	-22.6

Variable X₃. Continued

County	Number in 1960	Number in 1970	Gain or Loss	Percent Change
Charles Mix	2,031	1,641	-390	-19.2
Clark	1,199	842	-357	-29.8
Clay	2,175	3,298	1,123	51.6
Codington	3,606	3,585	-21	-.6
Corson	1,052	881	-171	-16.3
Custer	897	866	-31	-3.5
Davison	3,063	3,359	296	9.7
Day	1,645	1,378	-267	-16.2
Deuel	1,120	881	-239	-21.3
Dewey	948	929	-19	-2.0
Douglas	879	764	-115	-13.1
Edmunds	1,009	882	-127	-12.6
Fall River	1,768	1,099	-669	-37.8
Faulk	704	644	-60	-8.5
Grant	1,653	1,489	-164	-9.9
Gregory	1,208	1,066	-142	-11.8
Haakon	555	485	-70	-12.6
Hamlin	980	743	-237	-24.2
Hand	1,171	991	-180	-15.4
Hanson	764	612	-152	-19.9
Harding	382	299	-83	-21.7
Hughes	2,565	2,426	-139	-5.4
Hutchinson	1,896	1,668	-228	-12.0
Hyde	404	430	26	6.4
Jackson	372	272	-100	-26.9
Jerauld	675	522	-153	-22.7
Jones	349	347	-2	-.6
Kingsbury	1,459	1,235	-224	-15.6
Lake	2,095	2,222	127	6.0
Lawrence	3,152	3,582	430	13.6
Lincoln	2,011	1,983	-28	-1.4
Lyman	733	738	5	.7
McCook	1,324	1,084	-240	-18.1
McPherson	1,044	881	-163	-15.6
Marshall	1,076	967	-109	-10.1

Variable X₃. Continued

County	Number in 1960	Number in 1970	Gain or Loss	Percent Change
Meade	1,955	2,971	1,016	52.0
Mellette	450	428	-22	-4.9
Miner	868	699	-169	-19.5
Minnehaha	17,360	20,443	3,083	17.5
Moody	1,564	1,376	-188	-12.0
Pennington	12,116	13,152	1,036	8.6
Perkins	1,008	821	-187	-18.6
Potter	836	771	-65	-7.8
Roberts	2,083	1,821	-262	-12.6
Sanborn	755	604	-151	-20.0
Shannon	1,119	1,590	471	42.1
Spink	2,039	1,841	-198	-9.7
Stanley	790	466	-324	-41.0
Sully	483	415	-68	-14.1
Todd	851	1,272	421	49.5
Tripp	1,575	1,471	-104	-6.6
Turner	1,820	1,587	-233	-12.8
Union	1,709	1,688	-21	-1.2
Walworth	1,466	1,419	-47	-3.2
Washabaugh	172	268	96	55.8
Yankton	3,340	3,919	579	17.3
Ziebach	455	370	-85	-18.7

VARIABLE X₄

NUMBER, GAIN OR LOSS, AND PERCENT CHANGE IN THE NUMBER OF YOUNG
ADULT FEMALES, AGE 15-34, BY COUNTY, 1960 AND 1970

County	Number in 1960	Number in 1970	Gain or Loss	Percent Change
Aurora	546	455	-91	-16.7
Beadle	2,829	2,937	108	3.8
Bennett	378	425	47	12.4
Bon Homme	1,081	1,060	-21	-1.9
Brookings	2,792	4,166	1,374	49.2

Variable X₄. Continued

County	Number in 1960	Number in 1970	Gain or Loss	Percent Change
Brown	4,729	6,329	1,600	33.8
Brule	762	680	-82	-10.8
Buffalo	205	230	25	12.2
Butte	1,030	1,003	-27	-2.6
Campbell	415	328	-87	-21.0
Charles Mix	1,396	1,131	-265	-19.0
Clark	756	546	-210	-27.8
Clay	1,625	2,787	1,162	71.5
Codington	2,394	2,612	218	9.1
Corson	752	645	-107	-14.2
Custer	584	616	32	5.5
Davison	2,088	2,479	391	18.7
Day	1,035	942	-93	-9.0
Deuel	736	580	-156	-21.2
Dewey	698	660	-38	-5.4
Douglas	584	519	-65	-11.1
Edmunds	644	583	-61	-9.5
Fall River	1,141	753	-388	-34.0
Faulk	477	418	-59	-12.4
Grant	1,097	1,051	-46	-4.2
Gregory	783	739	-44	-5.6
Haakon	394	339	-55	-14.0
Hamlin	620	501	-119	-19.2
Hand	773	648	-125	-16.2
Hanson	513	424	-89	-17.3
Harding	245	220	-25	-10.2
Hughes	1,807	1,778	-29	-1.6
Hutchinson	1,214	1,146	-68	-5.6
Hyde	277	281	4	1.4
Jackson	241	198	-43	-17.8
Jerauld	444	364	-80	-18.0
Jones	236	243	7	3.0
Kingsbury	970	816	-154	-15.9
Lake	1,416	1,658	242	17.1
Lawrence	2,154	2,679	525	24.4

Variable X_4 . Continued

County	Number in 1960	Number in 1970	Gain or Loss	Percent Change
Lincoln	1,279	1,362	83	6.5
Lyman	514	510	-4	-.8
McCook	820	725	-95	-11.6
McPherson	675	553	-122	-18.1
Marshall	711	672	-39	-5.5
Meade	1,332	2,030	698	52.4
Mellette	321	309	-12	-3.7
Miner	538	463	-75	-13.9
Minnehaha	11,926	15,174	3,248	27.2
Moody	1,032	1,055	23	2.2
Pennington	8,669	9,820	1,151	13.3
Perkins	662	540	-122	-18.4
Potter	609	523	-86	-14.1
Roberts	1,412	1,248	-164	-11.6
Sanborn	469	394	-75	-16.0
Shannon	852	1,203	351	41.2
Spink	1,365	1,236	-129	-9.5
Stanley	580	341	-239	-41.2
Sully	339	271	-68	-20.1
Todd	601	936	335	55.7
Tripp	1,046	1,023	-23	-2.2
Turner	1,158	1,048	-110	-9.5
Union	1,101	1,164	63	5.7
Walworth	1,106	980	-36	-3.5
Washabaugh	120	209	89	74.2
Yankton	2,365	2,950	585	24.7
Ziebach	321	259	-62	-19.3

VARIABLE X₅

NUMBER, GAIN OR LOSS, AND PERCENT CHANGE IN THE NUMBER
OF NET MIGRANTS BY COUNTY, 1960 AND 1970

County	Number in 1960	Number in 1970	Gain or Loss	Percent Change
Aurora	-1,021	-857	164	16.2
Beadle	-3,225	-2,607	618	19.2
Bennett	-997	-547	450	45.1
Bon Homme	-1,522	-1,151	371	24.4
Brookings	-1,197	-133	1,064	88.9
Brown	-4,475	-1,448	3,027	67.6
Brule	-892	-1,276	-384	-43.0
Buffalo	-470	-273	197	41.9
Butte	-953	-1,506	-553	-58.0
Campbell	-1,165	-1,001	164	14.1
Charles Mix	-6,578	-3,069	3,509	53.3
Clark	-2,262	-1,739	523	23.1
Clay	-1,642	790	2,432	148.1
Codington	-2,217	-2,850	-633	-28.6
Corson	-1,972	-1,874	98	5.0
Custer	-1,282	-523	759	59.2
Davison	-2,390	-938	1,452	60.8
Day	-3,292	-2,198	1,094	33.2
Deuel	-1,849	-1,513	336	18.2
Dewey	-1,005	-1,194	-189	-18.8
Douglas	-1,382	-976	406	29.4
Edmunds	-2,372	-1,170	1,202	50.7
Fall River	-1,141	-3,414	-2,273	-199.2
Faulk	-1,215	-877	338	27.8
Grant	-1,962	-1,695	267	13.6
Gregory	-2,353	-1,207	1,146	48.7
Haakon	-508	-852	-344	-67.7
Hamlin	-1,629	-1,357	272	16.7
Hand	-1,809	-1,476	333	18.4
Hanson	-1,147	-1,235	-88	-7.7

Variable X₅. Continued

County	Number in 1960	Number in 1970	Gain or Loss	Percent Change
Harding	-360	-710	-350	-97.2
Hughes	2,219	-2,969	-750	-33.8
Hutchinson	-2,010	-1,474	536	26.7
Hyde	-714	-343	371	52.0
Jackson	-130	-686	-556	-27.7
Jerauld	-1,063	-885	178	16.7
Jones	-637	-424	213	33.4
Kingsbury	-2,220	-1,912	308	13.9
Lake	-1,681	-1,196	485	28.9
Lawrence	-2,343	-1,740	603	25.7
Lincoln	-2,014	-1,109	905	44.9
Lyman	-985	-879	106	10.8
McCook	-1,954	-1,575	379	19.4
McPherson	-2,293	-1,180	1,113	48.5
Marshall	-2,244	-1,178	1,066	47.5
Meade	-1,176	-2,283	-1,107	-94.1
Mellette	-923	-650	273	29.6
Miner	-1,729	-1,179	550	31.8
Minnehaha	10	-4,467	-4,477	-44,770.0
Moody	-1,631	-1,605	26	1.6
Pennington	8,717	-12,498	-21,215	-243.4
Perkins	-1,868	-1,595	273	14.6
Potter	-857	-1,223	-366	-42.7
Roberts	-4,039	-2,811	1,228	30.4
Sanborn	-1,253	-1,137	116	9.3
Shannon	-1,535	-100	1,435	93.5
Spink	-2,063	-1,727	336	16.3
Stanley	1,357	-2,457	-1,100	-81.1
Sully	-730	-2,362	-1,632	-223.6
Todd	-1,263	682	1,945	.2
Tripp	-2,061	-1,604	457	22.2
Turner	-2,350	-1,589	761	32.4
Union	-1,930	1,216	714	37.0
Walworth	-1,000	-1,197	-197	-19.7
Washabaugh	-839	80	919	109.5

Variable X₅. Continued

County	Number in 1960	Number in 1970	Gain or Loss	Percent Change
Yankton	-1,722	-319	1,403	81.5
Ziebach	-724	-772	-48	-6.6

VARIABLE X₆

NUMBER, GAIN OR LOSS, AND PERCENT CHANGE IN THE NUMBER OF RURAL
RESIDENTS DWELLING ON FARMS OR COMMUNITIES OF UNDER 1,000
INHABITANTS, BY COUNTY 1960 AND 1970

County	Number in 1960	Number in 1970	Gain or Loss	Percent Change
Aurora	4,749	4,183	-566	-11.9
Beadle	7,502	6,578	-924	-12.3
Bennett	1,869	1,840	-29	-1.6
Bon Homme	5,696	5,766	70	1.2
Brookings	9,488	8,441	-1,047	-11.0
Brown	9,970	9,423	-547	-5.5
Brule	3,721	3,244	-477	-12.8
Buffalo	1,547	1,739	192	12.4
Butte	4,505	3,589	-916	-20.3
Campbell	3,531	2,866	-665	-18.8
Charles Mix	7,935	6,988	-947	-11.9
Clark	5,650	4,159	-1,491	-26.4
Clay	4,708	3,795	-913	-19.4
Codington	6,143	5,752	-391	-6.4
Corsen	5,798	4,994	-804	-13.9
Custer	2,801	3,101	300	10.7
Davison	4,126	3,894	-232	-5.6
Day	8,107	6,461	-1,646	-20.3
Deuel	5,645	4,529	-1,116	-19.8
Dewey	5,257	3,819	-1,438	-27.4

Variable X₆. Continued

County	Number in 1960	Number in 1970	Gain or Loss	Percent Change
Douglas	5,113	4,569	-544	-10.6
Edmunds	4,948	4,361	-587	-11.9
Fall River	3,973	1,897	-2,076	-52.3
Faulk	3,346	3,893	547	16.3
Grant	6,413	5,278	-1,135	-17.7
Gregory	5,921	4,954	-967	-16.3
Haakon	2,189	2,802	613	28.0
Hamlin	6,303	5,172	-1,131	-17.9
Hand	4,631	3,735	-896	-19.3
Hanson	4,584	3,781	-803	-17.5
Harding	2,371	1,855	-516	-21.8
Hughes	2,637	1,933	-704	-26.7
Hutchinson	8,431	7,411	-1,020	-12.1
Hyde	1,524	1,342	-182	-11.9
Jackson	1,985	1,531	-454	-22.9
Jerauld	2,560	2,010	-550	-21.5
Jones	2,066	1,882	-184	-8.9
Kingsbury	7,903	6,321	-1,582	-20.0
Lake	6,344	5,141	-1,203	-19.0
Lawrence	4,137	4,963	826	20.0
Lincoln	8,070	7,290	-780	-9.7
Lyman	4,428	4,060	-368	-8.3
McCook	7,080	5,855	-1,225	-17.3
McPherson	4,266	3,475	-791	-18.5
Marshall	5,221	4,500	-721	-13.8
Meade	7,405	6,277	-1,128	-15.2
Mellette	2,664	2,420	-244	-9.2
Miner	4,190	3,279	-911	-21.7
Minnehaha	18,130	16,641	-1,489	-8.2
Moody	6,681	5,595	-1,086	-16.3
Pennington	15,796	12,342	-3,454	-21.9
Perkins	3,565	2,772	-793	-22.2
Potter	2,976	2,534	-442	-14.9
Roberts	9,972	8,584	-1,388	-13.9
Sanborn	3,606	3,697	91	2.5

Variable X₆. Continued

County	Number in 1960	Number in 1970	Gain or Loss	Percent Change
Shannon	4,744	5,430	686	14.5
Spink	8,754	7,652	-1,102	-12.6
Stanley	1,436	1,009	-427	-29.7
Sully	2,607	2,362	-245	-9.4
Todd	4,661	6,606	1,945	41.7
Tripp	5,056	4,382	-674	-13.3
Turner	10,017	8,867	-1,150	-11.5
Union	6,726	6,075	-651	-9.7
Walworth	3,706	3,297	-409	-11.0
Washabaugh	1,042	1,389	347	33.3
Yankton	8,272	7,120	-1,152	-13.9
Ziebach	2,495	2,221	-274	-11.0

VARIABLE X₇

NUMBER, GAIN OR LOSS, AND PERCENT CHANGE IN THE NUMBER OF YOUNG
ADULT WHITE FEMALES, AGE 15-34, BY COUNTY, 1960 AND 1970

County	Number in 1960	Number in 1970	Gain or Loss	Percent Change
Aurora	525	443	-82	-15.6
Beadle	2,823	2,919	96	3.4
Bennett	301	290	-11	-3.7
Bon Homme	1,069	1,053	-16	-1.5
Brookings	2,778	4,135	1,357	48.9
Brown	4,692	6,237	1,545	32.9
Brule	756	675	-81	-10.7
Buffalo	88	93	5	5.7
Butte	1,020	986	-34	-3.3
Campbell	414	327	-87	-21.0
Charles Mix	1,206	1,001	-205	-17.0
Clark	751	543	-208	-27.7
Clay	1,611	2,744	1,133	70.3
Codington	2,387	2,590	203	8.5
Corson	508	440	-68	-13.4

Variable X₇. Continued

County	Number in 1960	Number in 1970	Gain or Loss	Percent Change
Custer	566	600	34	6.0
Davison	2,066	2,444	378	18.3
Day	999	895	-104	-10.4
Deuel	731	578	-153	-20.9
Dewey	407	329	-78	-19.2
Douglas	584	517	-67	-11.5
Edmunds	644	583	-61	-9.5
Fall River	1,058	712	-346	-32.7
Faulk	476	417	-59	-12.4
Grant	1,094	1,048	-46	-4.2
Gregory	739	701	-38	-5.1
Haakon	388	329	-59	-15.2
Hamlin	620	500	-120	-19.4
Hand	772	647	-125	-17.3
Hanson	512	423	-89	-17.4
Harding	245	219	-26	-10.6
Hughes	1,706	1,684	-22	-1.3
Hutchinson	1,214	1,144	-70	-5.8
Hyde	274	276	2	.7
Jackson	214	186	-28	-13.1
Jerauld	444	363	-81	-18.2
Jones	229	231	2	.9
Kingsbury	969	814	-155	-16.0
Lake	1,414	1,653	239	16.9
Lawrence	2,134	2,620	486	22.8
Lincoln	1,278	1,353	75	5.9
Lyman	442	423	-19	-4.3
McCook	817	723	-94	-11.5
McPherson	674	553	-121	-18.0
Marshall	696	651	-45	-6.5
Meade	1,300	1,956	656	50.5
Mellette	210	204	-6	-2.9
Miner	537	463	-74	-13.9
Minnehaha	11,867	15,038	3,171	26.7
Moody	777	791	14	1.8

Variable X₇. Continued

County	Number in 1960	Number in 1970	Gain or Loss	Percent Change
Pennington	8,197	9,235	1,039	12.7
Perkins	656	539	-117	-17.8
Potter	599	521	-78	-13.0
Roberts	1,215	1,000	-215	-17.7
Sanborn	467	392	-75	-16.1
Shannon	129	175	46	35.7
Spink	1,347	1,216	-131	-9.7
Stanley	559	323	-236	-42.2
Sully	336	268	-68	-20.2
Todd	248	284	36	14.5
Tripp	988	936	-52	-5.3
Turner	1,157	1,044	-113	-9.8
Union	1,099	1,156	57	5.2
Walworth	986	915	-71	-7.2
Washabaugh	86	83	-3	-3.5
Yankton	2,301	2,849	548	23.8
Ziebach	180	110	-70	-38.9

VARIABLE X₈

NUMBER, GAIN OR LOSS, AND PERCENT CHANGE IN THE NUMBER OF YOUNG
ADULT NON-WHITE FEMALES, AGE 15-34
BY COUNTY, 1960 AND 1970

County	Number in 1960	Number in 1970	Gain or Loss	Percent Change
Aurora	21	12	-9	42.9
Beadle	6	18	12	200.0
Bennett	77	135	58	75.3
Bon Homme	12	7	-5	-41.7
Brookings	14	31	17	121.4

Variable X_g. Continued

County	Number in 1960	Number in 1970	Gain or Loss	Percent Change
Brown	37	92	55	148.6
Brule	6	5	-1	-16.7
Buffalo	117	137	20	17.1
Butte	10	17	7	70.0
Campbell	1	1	0	.0
Charles Mix	190	130	-60	-31.6
Clark	5	3	-2	-40.0
Clay	14	43	29	207.1
Codington	7	22	15	214.3
Corson	244	205	-39	-16.0
Custer	18	16	-2	-11.1
Davison	22	35	13	59.1
Day	36	47	11	30.6
Deuel	5	2	-3	-60.0
Dewey	291	331	40	13.7
Douglas	0	2	2	--
Edmunds	0	0	0	--
Fall River	83	41	-42	-50.6
Faulk	1	1	0	.0
Grant	3	3	0	.0
Gregory	44	38	-6	-13.6
Haakon	6	10	4	66.7
Hamlin	0	1	1	--
Hand	1	1	0	.0
Hanson	1	1	0	.0
Harding	0	1	1	--
Hughes	101	94	-7	-6.9
Hutchinson	0	2	2	--
Hyde	3	5	2	-66.7
Jackson	27	12	-15	-55.6
Jerauld	0	1	1	--
Jones	7	12	5	71.4
Kingsbury	1	2	1	0
Lake	2	5	3	150.0
Lawrence	20	59	39	195.0

Variable X_g. Continued

County	Number in 1960	Number in 1970	Gain or Loss	Percent Change
Lincoln	1	9	8	800.0
Lyman	72	87	15	20.8
McCook	3	2	-1	-33.3
McPherson	1	0	-1	-100.0
Marshall	15	21	6	40.0
Meade	32	74	42	131.3
Mellette	111	105	-6	-54.5
Miner	1	0	-1	-100.0
Minnehaha	59	136	77	130.5
Moody	255	264	9	3.5
Pennington	472	584	112	23.7
Perkins	6	1	-5	-83.3
Potter	10	2	-8	-80.0
Roberts	197	248	51	25.9
Sanborn	2	2	0	.0
Shannon	723	1,028	305	42.2
Spink	18	20	2	11.1
Stanley	21	18	-3	-14.3
Sully	3	3	0	.0
Todd	353	652	299	118.2
Tripp	58	87	29	50.0
Turner	1	4	3	300.0
Union	2	8	6	300.0
Walworth	30	65	35	116.7
Washabaugh	34	126	92	270.8
Yankton	64	101	37	57.8
Ziebach	141	149	8	5.7

VARIABLE X₉

SIZE OF LARGEST INCORPORATED PLACE IN COUNTY, 1970

County	Size of Largest Incorporated Place
Aurora	613
Beadle	14,299
Bennett	1,248
Bon Homme	1,566
Brookings	13,717
Brown	26,476
Brule	2,626
Buffalo	0
Butte	4,236
Campbell	672
Charles Mix	1,655
Clark	1,356
Clay	9,128
Codington	13,388
Corson	863
Custer	1,597
Davison	13,425
Day	2,252
Deuel	1,157
Dewey	625
Douglas	925
Edmunds	1,187
Fall River	4,434
Faulk	955
Grant	3,727
Gregory	1,756
Haakon	983
Hamlin	624
Hand	2,148
Hanson	598
Harding	393
Hughes	9,699
Hutchinson	1,611
Hyde	1,173
Jackson	815

Variable X₉. Continued

County	Size of Largest Incorporated Place
Jerauld	1,300
Jones	865
Kingsbury	1,336
Lake	6,315
Lawrence	5,420
Lincoln	2,665
Lyman	922
McCook	1,391
McPherson	1,547
Marshall	1,465
Meade	4,536
Mellette	617
Miner	1,175
Minnehaha	72,488
Moody	2,207
Pennington	43,836
Perkins	1,997
Potter	1,915
Roberts	3,094
Sanborn	852
Shannon	0
Spink	2,943
Stanley	1,448
Sully	785
Todd	739
Tripp	3,789
Turner	1,005
Union	1,655
Walworth	4,545
Washabaugh	0
Yankton	11,919
Ziebach	523

VARIABLE Y

NUMBER, GAIN OR LOSS AND PERCENT CHANGE IN THE NUMBER OF YOUNG CHILDREN, AGE 0-4, BY COUNTY, 1960 AND 1970 (Y)

County	Number in 1960	Number in 1970	Gain or Loss	Percent Change
Aurora	565	310	-255	-45.1
Beadle	2,499	1,492	-1,007	-40.3
Bennett	404	343	-61	-15.1
Bon Homme	938	578	-360	-38.4
Brookings	2,305	1,519	-786	-34.1
Brown	4,104	3,037	-1,067	-26.0
Brule	818	498	-320	-39.1
Buffalo	227	243	16	7.0
Butte	1,006	577	-429	-42.6
Campbell	436	260	-176	-40.4
Charles Mix	1,502	863	-639	-41.5
Clark	746	312	-434	-58.2
Clay	1,099	914	-185	-16.8
Codington	2,468	1,538	-930	-37.7
Corson	889	528	-361	-40.6
Custer	523	358	-165	-31.5
Davison	1,900	1,351	-549	-28.9
Day	1,094	625	-469	-42.9
Deuel	781	393	-388	-49.7
Dewey	803	588	-215	-26.8
Douglas	588	383	-205	-34.9
Edmunds	693	481	-212	-30.6
Fall River	1,057	445	-612	-57.9
Faulk	528	311	-217	-41.1
Grant	1,164	717	-447	-38.4
Gregory	801	488	-313	-39.1
Haakon	449	263	-186	-41.4
Hamlin	653	376	-277	-42.4
Hand	865	448	-417	-48.2
Hanson	571	353	-218	-38.2

Variable Y. Continued

County	Number in 1960	Number in 1970	Gain or Loss	Percent Change
Harding	318	146	-172	-54.1
Hughes	1,754	988	-769	-43.8
Hutchinson	1,198	752	-466	-37.2
Hyde	315	181	-134	-42.5
Jackson	260	121	-139	-53.5
Jerauld	412	223	-189	-45.9
Jones	245	159	-86	-35.1
Kingsbury	1,018	454	-564	-55.4
Lake	1,367	765	-602	-44.0
Lawrence	2,045	1,352	-693	-33.9
Lincoln	1,332	830	-502	-37.7
Lyman	606	358	-248	-40.9
McCook	938	576	-362	-38.6
McPherson	644	327	-317	-49.2
Marshall	705	453	-252	-35.7
Meade	1,387	1,323	-64	-4.6
Mellette	381	266	-115	-30.2
Miner	569	299	-270	-47.5
Minnehaha	11,112	8,077	-3,035	-27.3
Moody	952	567	-385	-40.4
Pennington	8,899	5,495	-3,404	-38.3
Perkins	710	357	-353	-49.7
Potter	698	405	-293	-42.0
Roberts	1,511	1,035	-476	-31.5
Sanborn	534	225	-309	-57.9
Shannon	951	1,237	286	30.1
Spink	1,218	719	-499	-41.0
Stanley	737	238	-499	-67.7
Sully	379	187	-192	-50.7
Todd	715	931	216	30.2
Tripp	1,103	629	-474	-43.0
Turner	1,119	583	-536	-47.9
Union	1,104	744	-360	-32.6
Walworth	1,020	681	-339	-33.2
Washabaugh	158	191	33	20.9
Yankton	1,812	1,534	-278	-15.3
Ziebach	425	261	-164	-38.6

APPENDIX IV
CORRELATION MATRIX, MEAN AND
STANDARD DEVIATION FOR
VARIABLES

CORRELATION MATRIX

	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	Y
X_1		0.70775	-0.62580	-0.68418	0.71107	0.55439	-0.69713	-0.08636	-0.92133	0.97839
X_2	0.70775		-0.38646	-0.40772	0.80369	0.43064	-0.38331	-0.34425	-0.59274	0.73350
X_3	-0.62580	-0.38646		0.98793	-0.26707	-0.06865	0.97582	0.40535	0.83456	-0.58010
X_4	-0.68418	-0.40772	0.98793		-0.28142	-0.13641	0.99469	0.34710	0.88117	-0.65196
X_5	0.71107	0.80369	-0.26707	-0.28142		0.49219	-0.27710	-0.12343	-0.53958	0.73072
X_6	0.55439	0.43064	-0.06865	-0.13641	0.49219		-0.17917	0.34886	-0.37150	0.57462
X_7	-0.69713	-0.38331	0.97582	0.99469	-0.27710	-0.17917		0.24874	0.88790	-0.67007
X_8	-0.08636	-0.34425	0.40535	0.34710	-0.12343	0.34886	0.24874		0.20187	-0.02971
X_9	-0.92133	-0.59274	0.83456	0.88117	-0.53958	-0.37150	0.88790	0.20187		-0.89888
Y	0.97839	0.73350	-0.58010	-0.65196	0.73072	0.57462	-0.67007	-0.02971	-0.89888	

MEAN AND STANDARD DEVIATION FOR VARIABLES

Variable	Mean	Standard Deviation
X_1	-88.13432	112.98347
X_2	-4.40298	7.28023
X_3	57.32835	538.19141
X_4	123.47760	535.07275
X_5	9.83582	2849.91333
X_6	-656.26855	748.81299
X_7	104.70149	518.09058
X_8	18.77611	56.85318
X_9	4881.20703	10752.56250
Y	-430.88037	552.15479
