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Structural change, individual modernity and fertility preference in Taiwan

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Iowa State University, 1987
Structural change, individual modernity and fertility preference in Taiwan

by

Konadu Acheampong

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DEDICATION

This piece of work is dedicated to my parents, the late Opanin Kwaku Acheampong and Obaapanin Yaa Nsiah whose foresight, dedication, encouragement and hard work on the LAND helped me through the first and second cycles of my academic career. It is an irony of fate that "Agyaaku could not live long enough to see his efforts come to fruition." To my wife and three children, especially the youngest, Adwoa Osaa Acheampong who, through a simple administrative fiat, has had to live through the first five years of her life with only a mental image of who daddy might be, I dedicate this effort. It is my fervent hope that whatever damage has been caused as a result of my long absence from home will heal with time. And finally, to all those who work day and night, rain or shine to make a living out of the LAND I dedicate this thesis.
CHAPTER I. INTRODUCTION

Continued high fertility rates coupled with significant reductions in mortality rates since World War II have resulted in unprecedented population growth in most Third World nations. It has been estimated that unless immediate steps are taken to slow down current population growth, most nations of the developing world will double their current populations by the close of the first quarter of the 21st century (Population Reference Bureau, 1986). One manifestation of the rapid population growth has been the ever-increasing disparity in standards of living between peoples of the developed and developing regions of the world. Thus the issue of population and development has become one of the unfolding dramas of our time.

The experiences of Europe and North America during the second half of the nineteenth century, and, indeed, a few success stories of birth control in some developing nations suggest that research-based population policies and programs can help ameliorate some of the population growth problems of the developing world. But attempts in this direction have precipitated a series of discipline-oriented and at times competing models, some of which woefully fail to address reality in most Third World settings. Perhaps a few examples will suffice.

From a purely economic standpoint, Leibenstein (1954) and Easterlin (1969) have argued with great conviction and urgency that the demand for children is a function of the family's income, the cost of children and the prices of other goods and services. This analysis presupposes that a rise in income allows households to pursue preferences which they have previously not been able to, or that it causes them to form new ones. Leibenstein further argues that the availability of
more and more superior goods on the market and the progressively greater and greater availability of these goods to more and more income classes lead people to prefer the consumption of such goods to having children. In his view, therefore, a rise in family incomes, over time, will predict a fall in fertility preferences. The logic of this argument is that having children is a foregone opportunity for a better life. Children are just not productive or "efficient," and inefficiency, in the economic sense, is anathema. This argument, however, seems to have little or no relevance for most of today's developing nations where a majority of the population lives in extreme poverty.

Using the same neoclassical price theory, Becker (1960) has argued to the contrary. He proposed that, given that families strive to maximize the utility they derive from children and other goods, households will be motivated to increase their demand for children if their incomes increase. Research by Caldwell (1975), Arnold et al. (1975) and Fawcett (1983) has found support for this proposition. However, the instability in these purely economic models across cultures has led some critics to characterize them as typical examples of situational determinism, in that, "income, price and time are modeled as the constraints influencing the choice of family size without any reference to the actual decision-making process" (Bagozzi and Van Loo, 1978:303).

Human fertility preferences have also been examined from the socio-structural perspective (Lorimer, 1955; Davis and Blake, 1956; Moore, 1974; Rice and Beegle, 1972). Proponents of this perspective tend to emphasize the conclusion drawn by Davis and Blake (1956:234) that:

The well documented but insufficiently analyzed contrasts should not be allowed to obscure the important fact that underdeveloped areas themselves
differ markedly in social organization and that these differences appear to bring about variations in fertility.

Another line of argument advanced in support of structural over psychological variables was the low predictive power of the latter found in the often cited Indianapolis Studies (Kiser and Whelpton, 1953; Rice and Beegle, 1972). To the advocates of socio-cultural models, therefore, notwithstanding geographical and cultural differences, a proper framework for fertility research should be derived from the nexus of sociology and demography (Moore, 1974). Since fertility is one of the cornerstones of demography, "we must always seek an explanation of fertility within a sociological framework" (Rice and Beegle, 1972:7). Hence, if the biological, attitudinal or psychological factors are to be recognized at all within a sociological framework, they must be viewed as intervening variables in their influence on fertility. But, as will be shown presently, subsequent studies have shown the contrary with respect to the low predictive power (Scanzoni, 1975; Kahl, 1968; Yamanaka et al., 1982) and the intervening function (Clifford, 1971; Williamson, 1970; Poston, 1975, Yamanaka et al., 1982) of psychological variables.

The extensive cross cultural studies on individual psychological modernism (Smith and Inkeles, 1966; McClelland, 1969), Kahl's (1968) comparative study of modernism in Brazil and Mexico, and, more recently, works by Fishbein (1972), Hass (1974) and Scanzoni (1975) have demonstrated the potential of psychological variables for fertility analysis in the Third World. These have been distinctive for the simple reason that they mostly included both multivariate measurement of psychological modernity and an analysis of a few fertility related variables. But attempts to integrate structural and psychological variables in models to explain fertility preferences, to say the least, have not been very conclusive.
Yet our quest to understand the complexities in human fertility in the developing world requires such refinement. Fawcett (1970:72) emphasized this point by noting that:

Greater understanding of the psychological components of modernity is clearly needed and studies on this topic are likely to have important implications for the analysis of fertility differentials in developing countries.

Statement of the Problem

Empirically, several studies have shown both short- and long-term inverse relationships between individual modernity and fertility preferences (Stolka and Barnett, 1969; Williamson, 1970; Rosen and LaRaia, 1972; Yamanaka et al., 1982). Some reversals within the broad outlines of these relationships have also been observed (Bagozzi and Van Loo, 1978; Knodel, 1983; Bollen and Entwisle, 1984). A review of these studies and several others shows three distinct patterns.

First, a significant consensus seems apparent among researchers with respect to the need to use integrated analytical models for a better prediction of fertility preferences, although opinions differ about the intervening function of psychological variables (Clifford, 1971; Williamson, 1970; Goldberg, 1974; Mukherjee, 1977, Yamanaka et al., 1982). Secondly, contrary to the early skepticism about the significance of psychological variables, evidence seems to be mounting with respect to the predictive power of psychological variables. Lastly, with the exception of a few variations, the modernity construct is often conceptualized within the broad framework of the four themes developed by Smith and Inkeles (1966) and later elaborated by Kahl (1968); namely, subjective efficacy, openness to change, value orientations and orientation to time.
The slight variations in the conceptualization of modernity stems, in part, from the fact that modernization means different things to different people. As Hettne (1982) points out, the same construct has been used variously as an attribute of history, as a historical transition process and as a development policy instrument. But within the context of social demography the construct is usually seen as a working out of universal historical forces which bear strong resemblance to the demographic transition. In other words, the structural changes which take place in the modernization process are seen to be accompanied by changes in the values and belief systems of social groups and individuals. In turn, the changes in values are assumed to translate into several behavior patterns, one of which is family-size limitation. In the words of Smith and Inkeles (1966:355):

Basically we assumed that modernity would emerge as a complex but coherent psychic disposition manifested in general qualities such as a sense of efficacy, readiness for new experience and interest in planning, linked in turn to certain dispositions to act in institutional relations - as in being an active citizen, valuing science, maintaining one's autonomy and accepting birth control.

Studies based on this assumption have pioneered the notion that as attitudes and perhaps social exchanges within the family become more modern, fewer children will be preferred regardless of the non-availability of the means to achieve the goal. In other words, the development of modern attitudes is seen or assumed as the impetus for fertility decline. At issue here is the direct relationship between the two constructs. As pointed out earlier, the instability in the empirical findings of this relationship have precipitated an unending quandary in the formulation of fertility theory; even to the point that Hawthorn (1982:284) has suggested a total abandonment of "the search for explanation, in that, there is no common explanation however complicated, at all."
Intuitively, however, it is still very difficult to abandon the conviction that the development of modern attitudes must have something to do with falling fertility preferences. Alternatively the suggestion has also been made that there may be as yet some undiscovered or at least unconceptualized factor, either working by itself or interacting with others that can explain better the attitude-fertility relationship as well as the transition in birth expectations across societies (Hawthorn, 1982).

Attempts in this direction have precipitated several theoretical and methodological propositions. Coale (1967) argued that in an urban industrial society, children are less of an economic asset and more of an economic burden than in an agricultural society. The disadvantage of having more children in industrial societies, he argued further, is reinforced by laws restricting child labor and making education mandatory. Blake and del Pinhal (1981) used this framework to determine how Americans perceive both the costs and benefits of having children, and how the cost-benefit equation differed for parents and non-parents. They found that the major perceived costs of children are the direct costs of parents' time, money and effort. One limitation to the generalizability of this finding is that the study "commissioned questions on attitudes and perceptions towards childlessness" (Blake and del Pinhal, 1981:237).

Complicating the situation further, Jejeebhoy (1983) has argued that during the process of modernization and fertility transition, the level of natural fertility increases potentially as a result of the improvement in health and nutrition and changes in lactation. Hence, it is the net effect of increases in natural fertility on one hand and deliberate regulation on the other that determines the course of fertility over time. Apparently, a methodological
complement of this theoretical argument has been suggested by Bollen and Entwisle (1984). They challenge the attitudinal modernity-fertility preference relationship and suggest that, perhaps, the least used form - the exponential - may provide a better fit.

Another solution to the dilemma has been proposed by Hendershot and Placek (1981). They suggest that the large and pervasive decline in birth expectations in the developed world must be accounted for in terms of changes in the means available to women for the achievement of their fertility desires. In a sense, there seems every reason to believe, among other things, that part of the change in fertility preference in the developed world is due to the spread of more effective means of contraceptives and other birth control devices. Thus if Third World nations want to reduce their populations, then the best way is to make available to their women of child-bearing age all the means of contraceptives and other birth control devices. This argument, however, runs counter to historical records. In Victorian England, for example, it was the perceived opportunity for social mobility that propelled couples to limit childbearing. And this was accomplished long before contraceptive devices as we know them today were invented (Andorka, 1978:266-7 and 341-2).

Again, these propositions and counter suggestions attest to our limited understanding of the attitudinal modernity-fertility desire relationship. The bottom line, however, is that the development of modern attitudes by individuals per se is not enough to predict birth expectations. Instead, individuals' modern attitudes should be examined in concert with their changing perceptions about their opportunity cost/benefit of childbearing as well as their knowledge of and/or the availability of alternative courses of action that can facilitate the achievement of their fertility goals. The
extent to which these propositions and several others can account for fertility differentials in the developing world forms part of the goals of this study.

Certainly, the parameters underlying an individual's attitude as well as her ability to evaluate the outcomes of specific activities generally vary according to the individual's position in the social structure as well as the overall level of development of the society under study. Also the individual's perceptions assumed to be influenced by her attitudes can by no means be isolated from the changing socio-economic milieu. Therefore, this study will examine the extent to which, within the constraints set by the socio-economic structure of a rapidly changing society, individuals' attitudes, their perceptions about cost/benefit of child-bearing, their choices of alternative lifestyles as well as their knowledge of contraceptives interact to determine their fertility preferences.

Objectives of the Study

In their attempts to set forth an analytical framework for the study of the relationships between socioeconomic change and fertility differentials, researchers have mostly used modernity as a proxy for several attitudinal variables through which structural factors affect individuals' fertility preferences. The fertility preferences of individuals, according to this perspective, are determined by the interactional effects of a set of structural and attitudinal variables. The goal of this study is to employ this analytical framework to study the fertility preferences of women of childbearing age in Taiwan. In doing so, however, the individual modernity construct is conceptualized to reflect the attitudinal, behavioral/lifestyle, and perceptual as well as the knowledge components of the individual
pertinent to family size preferences. This is done with the view to identifying the causal structure among the individual modernity variables in particular and between the structural variables and individual modernity variables in general. The contention is that, unlike previous studies, it is by so doing that the direct and indirect effects of each of the specified variables can be easily delineated.

Therefore, the specific objectives of this study are:

1. To determine the relative influence of a set of background/structural variables (i.e., age, residence, education and family income) on:
   i) modern attitudes,
   ii) ownership of modern appliances,
   iii) perceived cost of children,
   iv) knowledge of contraceptives, and
   v) fertility preferences.

2. To examine the causal structure among the set of attitudinal, behavioral, perceptual, knowledge of contraceptives and fertility preference variables.

3. To propose and test a model of a set of structural and individual modernity variables in explaining variance in fertility preferences.

Benefits to be Derived from the Study

In his treatise on the social cycle of scientific development, Kuhn (1964) pointed out that once a dominant paradigm emerges within a discipline, a period of "normal science" ensues where refinement is made in terms of extensions, enhancement, predictive power and replication. Sooner or later, he argued further, inconsistent and unexplainable events occur which lead to a revision, modification and/or additions to the paradigm. Kuhn's admonition serves as an anchor for this study, in that, the observed inconsistencies
in the attitudinal modernity-fertility preference relationship call for a reexamination and a possible modification or refinement of the paradigm. In terms of sociological methodology, therefore, the study provides a unique opportunity to use Joreskog and Sorbom's (1978) LISREL technique to examine simultaneously the causal structure between a set of structural and individual psychological and behavioral variables on one hand, and between the same set of variables and fertility intentions on the other.

As an intellectual pursuit, by proposing that socioeconomic variables influence individual fertility preferences through psychological and behavioral processes, the study meets the standards set in the philosophy of science which states, among other things, that theories of human behavior must model both the relationships between actions of individuals and the meanings these actions have for those people under study. This aspect of behavioral inquiry has been described by Kaplan (1964:32) as "the double process of interpretation," which, to him, is the defining character of social science. Again, the study contributes to the empirical testing of the implicit assumptions which underlie the definition of fertility change and the model of socioeconomic change as societies move from traditionalism to modernism (Notestein, 1945; Caldwell, 1975).

Lastly, most developing nations intend to reduce their population growth, and nearly 80% of Third World peoples live under governments that have family planning programs of one form or the other (Zopf, 1984). But in the face of dwindling national resources and the uncertainties surrounding external aid for population programs, the only option left for developing nations is to identify program areas where the investment of the available limited resources would yield maximum benefits. Cultural and developmental heterogeneity
notwithstanding, the study will help in the identification of factors which are more predictive of fertility control. This, in turn, will serve a useful purpose for policy-makers in terms of guidelines for resource allocation, especially in countries where planned change in the form of family planning appears to be the dominant approach for socioeconomic development.

Organization of the Study

Some introductory remarks about the study have been made in this chapter. Chapter II will explore the theoretical and empirical bases of the major theories of social change and development. As a prelude to the empirical analyses, Chapter III deals with the conceptualization and modeling of the concepts used in the study. Chapter IV deals with methodology, i.e., sample selection, data collection, and operationalization of test variables as well as the analytical techniques to establish the empirical relationships among the variables. The analysis and findings of the study constitute Chapter V while the discussion, conclusion and policy implications of the findings as well as suggestions for further inquiry are presented in Chapter VI.
CHAPTER II. THEORIES OF SOCIAL CHANGE AND DEVELOPMENT: A REVIEW

Introduction

A long-standing tradition in the philosophy of science is that all scientific inquiries must derive from a theory. It is generally believed that by clearly delineating one's theoretical orientations one establishes the frame of reference in which a scientific investigation is conducted. Yet fertility studies as an element of the overall process of social change and development seldom emerge from a single or unified theory; instead, several theoretical perspectives have been used or implied. The present study does not depart from this tradition, in that the complexities in human fertility preferences notwithstanding, one can hardly disagree with Etzioni (1973) that in the absence of a fully developed general theory of society, there can hardly be a single theory to offer a conclusive explanation of social change.

The chapter is divided into two main sections. The first deals with an overview of some of the major structural and social-psychological theories of social change and development. This is done with the view to identifying the merits and demerits of each theory in the analysis of change with emphasis on human fertility preferences. The second section deals with a synthesis and a model of the relevant constructs, and delineates a set of theoretical propositions pertinent to fertility change as societies move from traditionalism to modernism.

The classical view of change

Conflicting theoretical expositions of the causes, processes and consequences of social change and social development date back to the era of the ancient Greek
philosophers. Thinkers such as Plato, Aristotle and Socrates and several others at some point in their intellectual careers attempted to answer what later came to be known as the Hobbesian question, i.e., how societies come to being, sustained and changed.

Thinkers of the Platonic era held the view that change takes place in appearances only while the substratum remains unchanged. The idea of change, either in space or time, meant decadence; hence objects which changed were considered to be intrinsically worthless (Horowitz, 1966). Plato, for example, is reported to have emphasized that "whatever was considered to be true and good was changeless"; hence all forms of change were not only to be opposed but should as well be seen as threats to the established order. This notion of change was modified later in the Socratic era. Again, Horowitz (1966) points out that philosophers of the Socratic era emphasized that to the extent that no aspect of the physical, biological, or social life can resist the process of change (i.e., birth, development, and decay), change should always be seen as real. Although these early philosophers were not explicit on how to account for societal change and development, their imaginative ideas and concepts of change became the building blocks of several theories of social change.

The evolutionary theories of change

Early proponents of the evolutionary tradition spent much of their intellectual energies in an attempt to develop general laws of societal change and progress (Hoogvelt, 1982). Inspired by the successes of the natural sciences, social thinkers sought to apply the scientific method to the study of society. As Comte (1877:55) puts it, "the experiences of the past prove, in the most decisive manner, that the progressive march of civilization follows a natural and unavoidable course
which flows from the law of human organization and, in its turn, becomes the supreme law of all practical phenomena." In one sense, human societies of the present were seen as outgrowths of the past; therefore, to understand the present, in Comte's view, one must first step back into the past.

It is no surprise then that categories such as simple, complex, growth and specialization turned out to be the basic categories used by classical evolutionary theorists to account for the processes of societal evolution from the primitive to the "perfect" stage. This point is further elaborated by Spencer (cited in Etzioni and Etzioni-Halevy, 1973:9) when he wrote that:

as we progress from small groups to larger, from simple groups to compound groups, from compound groups to doubly compound ones, the unlikeness of parts increase. The social aggregate, homogeneous when minute, habitually gains in heterogeneity along with each increment of growth, and to reach great size, must acquire great complexity.

By implication all human societies are assumed to follow a singular course between two ideal types, namely, from simple-primitive to complex-modern society: thus Durkheim speaks of mechanical versus organic solidarity; Tonnies (1940) mentions **gemeinschaft** versus **gesellschaft**; Redfield (1933) talks about folk versus urban; while Henri Maine (1870, cited in Vago, 1980) contrasts status and contract societies.

One of the pioneers who integrated the evolutionary tradition into demographic analysis was Adolphe Coste. Coste, according to Timasheff (1967), saw the increasing density of population, as reflected in human agglomeration, as the sole determining factor of the evolution of society. He delineated five consecutive evolutionary stages (the borough, the city, the metropolis, the capital city and the capital of a federation) and ascribed to each stage a characteristic
pattern of government, economic production, property and socioeconomic organization.

Criticisms of the evolutionary paradigm revolve around the assumptions of unidirectionality and continuity of the evolutionary voyage of society. Perhaps the strongest indictment of the evolutionary heritage comes from Hoogvelt (1976) who raises issue with the rather simplistic nature of the primitive-modern dichotomy likewise the theoretical and methodological inadequacies in explaining the structure of the "in-between society on the evolutionary path" (Hoogvelt, 1982:109).

These criticisms and several others, notwithstanding, the evolutionary theories have and to some extent continue to exert a great deal of influence on development thinking and, indeed, several social change programs in the developing world.

**Functionalism and change**

The burden of all functional analysis has been placed upon the contribution of parts to some whole. One version of the functionalist theory, that of Malinowski to be precise, explains social phenomena by reference to individual biological and derived cultural needs. Malinowski (1944) asserts that every social activity has a function by virtue of its existence and that every activity is so integrated with all others that no single phenomenon is intelligible outside the whole social context.

Durkheim (1933) and Radcliffe-Brown (1952), however, caution that it is important to analyze separately the causes and functions of a sociocultural item since the causes of an item could be unrelated to its functions in the systemic whole.
Parsonian functionalism emerged partly in response to several criticisms leveled against the classical functionalist school. Drawing from the works of the early structural-functionalists, notably Radcliffe-Brown and Malinowski, the Parsonian school, otherwise known as modern structural-functionalists, sees society as an interrelated system of three subsystems; namely, the personality, the organism and cultural systems. By "structure" is meant a set of relatively stable and patterned relationships of social units while "function" refers to those consequences of any social activity that make for adaptation or adjustment of a given structure or its component parts (Vago, 1980).

Institutions such as the family, government, economic system, religion and education are seen by modern structural-functionalists as the principal structures of society, each of which performs a function to facilitate the stability and continuity of the larger social whole. As Parsons (1973:16) puts it, "the concept of stable equilibrium implies that through integrative mechanisms endogenous variations are kept within limits compatible with the maintenance of the main structural patterns, and through adaptive mechanisms fluctuations in the relations between system and environment are similarly kept within limits." In other words, continuity of society and for that matter social order, to Parsons, is maintained through the processes of institutionalization, adaptation and integration. He considers a society to be in equilibrium when its boundaries with the other three systems are intact. Social equilibrium, in this sense, consists in boundary maintenance (Parsons, 1973).

The structural-functionalist's view of social change is eloquently presented by Parsons (1951) in his book, An Outline of the Social System and also by Merton (1968). Social change, considered as boundary destruction and equilibrium
restoration emanates from two main sources; namely, endogenous and exogenous. Among the endogenous sources, both Parsons and Merton emphasize strain and anomy resulting from certain disequilibria between inputs and outputs across the boundaries of the subsystems which, in turn, affect stability of the overall system, and consequently lead to social disorganization. On the other hand, the exogenous sources of social change, as Parsons (1951:71) put it, "consist in endogenous tendencies to change in the organisms, personalities and cultural systems articulated with social systems in question." Exogenous forces such as changes in the technique of exploiting natural resources or other forms of cultural influences from the outside may impact an otherwise stable system through the process of differentiation of subsystems (evolution) in the system in question.

The relevance of structural-functionalism in an analysis of fertility differentials lies in its reference to the functions of marriage as a social institution as well as its emphasis on the relationship between social change and behavioral and cultural change.

On the first point, marriage, and for that matter the family, serves as an institution through which society solves its recruitment problems. In other words, the functions of childbearing include ensuring a society's continuity or survival. However, when the rate of reproduction reaches a point where the survival or future welfare of the entire aggregate is threatened, society intervenes to preserve its interests. Familiar instances, as McNicoll (1978) points out, lie in the institutionalization of formal and informal education for individuals in the society, the modification of the rules of marriage, etc. Where it becomes necessary to confront the problem routinely, routine responses such as
elaborate family planning programs are implemented to restore what Merton (1968) describes as a "temporary equilibrium."

The point being made here is that social policies meant to facilitate freer access to education, redistribution of wealth, or availability of family planning services to all, are but a few of the mechanisms that a society can use to maintain stability in the social system. How far this can be achieved leads us to the second point (i.e., the recognition of the interrelationships between the social, cultural, and organism systems). For example, norms regulating role behaviors can reflect the general values and beliefs of culture. Also cultural values and other patterns can become internalized in the personality system and, hence affect that system's need structure, "which in turn determines an individual's willingness to enact roles in the social system" (Turner, 1982:46).

Put in Durkheimian terms, family-size limitation as a social fact is here viewed within the context of other social facts such as the redistribution of wealth, residential patterns and the constellation of individual and societal values, norms, beliefs and perceptions. All these facts lie in the structure and the functions of society - "that integrated system of mutually interrelated and functionally interdependent parts" (Merton, 1968:42).

Critics of structural functionalism's explanation of change are quick to point to the theory's overemphasis on consensus, integration and stability to the virtual neglect of deviance and conflict found to be pervasive in several societies. Dahrendorf (1958) has characterized functionalism as a "Utopia" for its lack of "historical antecedents" and its overemphasis on "universal consensus on prevailing norms and values." Others have also raised issue with the theory's failure to address the issue of power differentials in society (Gouldner, 1970; Wilson, 1983), and the inherent logical
problems of "illegitimate teleology and tautology" (Turner, 1982:61).

But valid as some of these criticisms may be, modern functionalism, and for that matter, contemporary structural-functionalism seem not to prohibit the analysis of social change. After all, as Turner (1982) later admits, models which give room for "imbalanced exchange" (Parsons, 1967) or "dysfunction" and "dynamic equilibrium" (Merton, 1968) can be used to address the issue of change.

Conflict and change

Vago (1980) credits the origins of conflict theory to the intellectual work of Karl Marx. Indeed, Marx's writings have generally been considered among the most basic and the most crucial in the study of conflict theory with regard to social change.

The central thesis of Marx's argument is that every society, whatever its stage of historical development, rests on an economic foundation. This he labels as the mode of production. Two elements constitute the mode of production; namely, the forces of production and the social relations of production.

By the forces of production is meant the raw materials, technological equipment, land and the labor power and skills necessary to produce commodities (Wilson, 1983). The social relations of production include the conditions and forms of ownership and control as well as administration; political control; forms of exchange, circulation and distribution; and the consumption of the social product.

The "materialistic" nature of Marx's theory is very much exemplified in his notion that the social world is explained only in terms of the interaction of humans and inanimate objects (nature) in the process of producing goods to meet
material needs. Thus, unlike Weber, Marx saw the origins of class and social inequality and hence social conflict in the relations of production. Division of labor, to Marx, therefore, becomes the source of all social evils because it leads to unequal distribution of work as well as the product of work. Hence the ensuing conflict between the two social groups (i.e., members of society who control the means of production and those who have no power over the control or the appropriation of the surplus) leads to a breakdown of the existing social structure and, ultimately, the development of new patterns of social relationships.

In summary, Marx sees the structural antagonism between the base and the superstructure and the class conflict resulting from the opposition of interests between classes as the driving force as well as the cause of social change.

Another influential conflict theorist is Ralf Dahrendorf. But unlike Marx, Dahrendorf (1959) focuses on the unequal distribution of power in society. He sees opposition of interests as the source of change while the formation of and the conflict between the interest groups represent the mechanism by which changes in the dominance relations take place.

In an apparent attempt to update his work, Dahrendorf (1973) rejects Marx's idea of internal contradictions which arise in historical development as the source of social change. Instead he focuses on pressures exerted on a given society by other societies, pressures which usually cannot be resolved but can be controlled through compromise.

A third variant of the conflict approach to the analysis of social change is proposed by Coser. While sharing the views of his counterparts that conflicts are inevitable in society, Coser (1957) argues further that conflicts can be destructive as well as constructive. He maintains that social
conflicts arise when the underprivileged class realizes that it has been deprived of its due share of social resources. As he puts it, "if certain groups within a social system compare their share in power, wealth and status honor with that of other groups and question the legitimacy of this distribution, discontent is likely to ensue" (Coser, 1973:120). The change which follows may take several forms, including the establishment of new group boundaries and value systems (positive) or a complete rebellion against and/or a full denunciation of a previously prized set of values (negative).

The differences in opinion with regard to the sources and processes of change notwithstanding, theorists of the conflict heritage share at least three common views about social change, namely: (a) change is explained in terms of antagonism or certain tension producing elements in society, (b) change is seen as a direct result of dialectic relationship between dominant and subjugated elements of society who compete for resources, and (c) they focus exclusively on those processes of social life that tend to instability in, and conflict between parts of society (Strasser and Randall, 1980).

The application of the conflict perspective to the analysis of fertility change particularly in the developing world has been very controversial, at best, and confrontational. The argument is advanced that population control efforts by rich countries and their surrogates - international development agencies in the Third World - are nothing more than attempts to reduce the relative or absolute population size of poor nations who may someday pose a threat to the welfare of the rich societies (Todaro, 1981). An alternate but more conventional economic argument is advanced by Clark (1969) who maintains that larger populations provide the
needed consumer demand as well as low-cost labor supply to achieve higher output levels.

More recently, Caldwell (1982) has applied the two central concepts of Marx's variant of the conflict heritage (forces of production and social relations of production) to account for fertility differentials in both pre- and post-industrial societies. He argues that high fertility by no means is of significant economic advantage in pre-industrial societies because the mode of production is kin-based and so the social relations of production do not extend beyond the family setup. The situation becomes different, he continues, in a complete capitalist mode of production where both the forces and social relations of production operate outside the family or kinship group. In such situations high fertility becomes economically disadvantageous, hence efforts are made voluntarily by individuals to inhibit human reproduction.

The main criticism of the conflict heritage lies in its overemphasis of the economic sphere to the total neglect of non-economic spheres. As Marx and Engels (1955:94) put it, "... the final causes of all social changes are to be sought ... in the modes of production and exchange." But as the foregoing analysis has shown, technological, economic, political, religious, ideological and demographic factors are all potential variables which influence each other as well as the course of society.

Modernization, social change, and development

Modernization theories, sometimes referred to as neoevolutionary theories (Hoogvelt, 1982), have, since World War II, provided the theoretical underpinnings for most socioeconomic change and development policies in the Third World. Historically, modernization and industrialization were seen as connected. Third World countries are seen as
predominantly traditional, in the sense that their demographic, economic, educational, religious and political structures are much like those that existed in Europe and North America prior to the onset of the industrial revolution. Hence the main objective of modernization in the Third World has been the transformation of the existing social structure and organization through education, industrialization and the dissemination of new norms and values. To be more precise, modernization has been seen as the transition from a traditional or pre-modern society to "types of technology and related social organization that characterize the advanced economically prosperous and relatively stable Western nations" (Moore, 1974:94).

Although theorists of this tradition are divided into two main "camps" (the structuralists and the social psychological perspectives) they tend to see the end product of the modernization process as "Westernization."

Modernization: The structuralist' perspective

Drawing on Durkheim, who saw structural differentiation as the motive force of modern societies, Smelser (1973) outlines three areas of structural differentiation during the process of modernization; namely, differentiation in economic activities, family activities and societal value systems.

The crucial link between differentiation and modernization, Smelser argues, lies in the fact that for every social function there is a distinct set of structural conditions under which it is optionally served. Smelser also challenges the linear or smooth assumption of the modernization process. To him, the process is frequently accompanied by outbursts of violence and, at times, mass hysteria which can be rectified through the formation of political parties, trade unions and other voluntary associations.
Vago (1980) elaborates further on Durkheim's concept of structural differentiation. He describes modernization as a general term for processes of industrialization, urbanization, bureaucratization and the development of national consciousness. These processes, to Vago, are highly intercorrelated and interdependent and must be seen as the cause and effect of social change.

The contribution of Rostow (1960) to the modernization paradigm came to be known as Rostow's "stages of economic growth." The Rostow doctrine (Hettne, 1982:31) postulates five stages through which all societies must pass in the process of modernization: namely, the traditional society - the pre-take off - the take off - the road to maturity - the mass consumption (modernized) society. The principal stage, according to Rostow, was the pre-take off stage where the modernizing nation was to mobilize both domestic and foreign savings in order to generate sufficient investment to accelerate economic growth (Todaro, 1981).

The endogenous character of Rostow's doctrine is made clearer by his assertion that although international relations may be necessary, the pace of change and development are determined by a sustained period of local capital formation.

Bert Hozelitz (1960) was among the first theorists to use Parson's pattern variables to address the issue of change and development. Implicit in his conceptualization of modernity was a process whereby the underdeveloped society gradually replaces ascriptive, particularistic and diffuseness tendencies with those of achievement, universalism and specificity - tendencies characteristic of Western nations.

Modernization: The social-psychological perspective

Theories expressive of this tradition are based on the assumption that "societies develop as a result of the workings
of certain psychological factors" (Vago, 1980:55); hence the focus is exclusively on individuals with unique personality attributes.

The work of Weber is perhaps second to none in the scope and depth of its influence on theorists of this tradition. In the often cited *The Protestant Ethic and the Spirit of Capitalism*, Weber (1958:76) argues that "the development of the spirit of capitalism is best understood as part of the development of rationalism as a whole, and could be deduced from the fundamental position of rationalism on the basic problems of life." The ultimate purpose in life, for Weber, therefore; is the acquisition of material wealth, ascetism and rational management, hence idleness, wastefulness and all forms of activities which could work against the achievement of the ultimate goal in life should not be tolerated.

Weber further argues that individuals with the capitalist spirit (i.e., the desire to make money) would have very little regard for traditions and values that would thwart their efforts for the acquisition of material wealth. As he puts it, "The most important opponent with which the spirit of capitalism . . . has had to struggle was the type of attitude and reaction to new situations which we may designate as traditionalism" (Weber, 1958:58-59).

Drawing partly from Weber's ideas, McClelland (1961) also emphasized internal factors such as the values and motives inherent in individuals that lead them to exploit opportunities, take advantage of trade situations and thereby shape their own destinies. The need for achievement, McClelland maintains, drives individuals to work harder at certain tasks, do their best work when it counts for the records rather than special incentives and, above all, choose experts over friends as working partners.
In addition, McClelland postulates significant levels of positive correlations between the concentration of individuals with such characteristics in a society and the society's level of development and growth. In this sense, structural constraints can be overcome once individuals develop a sufficiently high level of motivation. He sums the relationship between structural factors and individual motivation in the change process this way:

Men with high achievement will find a way to economic achievement given fairly wide variations in opportunity and social structure. . . . These results serve to direct our attention as social scientists away from an exclusive concern with the external events in history to the internal psychological concerns that in the long run determine what happens in history (McClelland, 1961:85).

Hagen (1962) does not depart from the fundamental assumption of the primacy of the individual as held by his colleagues. He, however, argues from the classical perspective of a traditionalism-modernity continuum to show that a change in society cannot materialize without a change in personalities. Creativity, curiosity and openness to experience, for Hagen, constitute the essential attributes of individuals in modern societies. Therefore, traditional societies will achieve modern status only when individuals shirk off their authoritarian, uncreative and non-innovational personalities.

Inkeles (1966) and Smith and Inkeles (1966) sought to determine the conceptual clarity of the modern man vis-a-vis his empirical identification in a modernizing society. They found that the modern man is not a theoretical construct but an identifiable social being who has distinctive characteristics. Like their contemporaries they identified the modern man as having (a) belief in the efficacy of science, (b) openness to change, (c) assertion of independence and allegiance from traditional authority structures, and
(d) abandonment of passivity and fatalism in the face of life difficulties.

Clark (1982) elaborates further on the ego structure as well as the information seeking and processing aspects of the modern man. He demonstrates that at the very core of individuals' mental structures lie both the devices that the ego uses to guide and direct the personality in its encounter with the environment as well as the mechanisms that are "brought into play to shield the personality from threat and attack" (Clark, 1982:56).

He argues further that unlike the traditional man who harbors mistrust for people outside his immediate family, the modernized person grants a trust in others if there is a rule or a legal document of some sort to insure that "the impersonal other can be expected to behave in a certain manner" (Clark, 1982:57).

Another related cognitive-behavioral aspect of the modern individual is that having to do with mass media exposure and the acquisition and use of related modern appliances for both information processing and as a symbol of social status. Clark (1982) maintains that the increase in literacy rates and the proliferation of electronic gadgets which accompany structural changes in the process of modernization are some of the crucial forces which facilitate the individual modernization process.

It is apparent from the exposition of the variants of the modernization theory that it derives from the evolutionary framework characteristic of Western cosmology. Secondly, the theory is interdisciplinary in that it is an amalgam of economic, sociological and psychological concepts, examples of which are: capital accumulation, structural differentiation, attitudes, cognition and behavior of individuals, etc.
These salient qualities of modernization theories explain, in part, why they form the basis or are implied in several middle range theories in social demography - the theory of demographic transition (Thompson, 1929; Notestein, 1945); Davis' (1963) theory of demographic change and response, the theory of relative income (Easterlin, 1968), Bogue's (1959) theory of metropolitan dominance and several others reflect evolutionary, and for that matter, modernization theories.

Like other social theories, modernization theories have drawn several criticisms. Critics are quick to point out (a) the vagueness of the concepts of tradition and modernity (Cardoso and Falleto, 1969), (b) their Euro and ethnocentric character (Hettne, 1982), (c) the fact that many present day developed societies exhibit strong particularistic and ascriptive tendencies (Frank, 1969) and above all (d) the total disregard for the impact of colonialism and imperialism on Third World economies (Frank, 1969; Baran, 1957; Amin, 1971; Wallerstein, 1976; 1980).

In place of modernization theories these critics have suggested some neo-Marxian perspectives some of which are referred to as the dependency theories, world system theories, internal colonialism, etc. - all of which fall outside the scope of the present study.

The central premise of these neo-Marxian theories is that it is impossible to comprehend the processes and problems of underdevelopment in the Third World without treating the wider socio-historical context of the expansion of West European industrialism, mercantilism and colonization of the Third World. Underdevelopment is seen as a created condition and not as an original stage of development. Frank (1969) goes at great lengths to explain the process of the British deindustrialization of India during the period of colonization and
the destructive effects of the slave trade on African societies.

A Synthesis and Some Theoretical Propositions

The criticisms and differences in opinion with respect to the sources, processes and consequences of social change, notwithstanding, it is apparent from the various theories reviewed that societies do change. And since individuals and/or groups constitute society, the argument is put forward that whatever structural changes do occur in society exert some influence on individuals in the society. It is further argued that the impact of such changes are felt differentially according to individuals' personal attributes and their psychological dispositions.

This relationship was expressed by Durkheim (1966) in his extensive study about Suicide. Berger (1963:121) also elaborates this relationship further when he states that:

Society does not only control our movements but shapes our identity, our thought and our emotions. The structure of society becomes the structure of our own consciousness. Society does not stop at the surface of our skins; society penetrates us as much as it envelops us.

To Berger, therefore, it is this dynamic relationship between society and individuals that gives social phenomena a sense of character and purpose.

A similar view is shared by Parsons (1951) in his "theory of action." Parsons argues, among other things, that the behavior of individuals can be understood if it is examined within a structural framework of interacting relationships. As actors in society, individuals, Parsons maintains, are always seeking goals. In doing so, however, they often resort to their inherent capacity to make choices and weigh alternative lines of action.
Put into the context of social change and development, the Taiwanese society is here conceptualized as a social system which, realizing the combined problems of underdevelopment and rapid population growth as a threat to its future continuity, instituted specific structural changes to arrest the situation. Structural changes such as the mobilization of foreign and local capital for industrialization, land reforms and an elaborate agricultural extension system (Lionberger and Chang, 1970), freer access to formal education and primary health care services, and above all, a large-scale family planning program (Freedman and Takeshita, 1969) were institutionalized.

How far these forces of structural modernization have influenced the individual Taiwanese woman of child-bearing age with respect to her fertility preferences, as stated earlier, is the objective of the present investigation. Here the woman of child-bearing age is conceptualized as an actor within a social system who seeks to accomplish specific fertility goals within a network of a changing societal values, beliefs and perceptions on the voyage of progress.

This relationship can be envisioned as a causal chain with three links and a series of theoretical propositions as presented below (Figure 1.1). It must be emphasized that some feedback relationships, particularly among the variables which go into the individual modernity construct, are not precluded.

Theoretical propositions
1. The goals of individuals in a society are directly and indirectly constrained by the structural conditions in which the individuals find themselves.
2. Individuals' attitudes, knowledge, perceptions and lifestyles are influenced by the changing socioeconomic milieu.
Figure 1.1. Model of structural change, individual change and fertility goals
3. Individuals' preference for specific goals are influenced by their attitudes, knowledge and perceptions about the goals as well as their lifestyles.
CHAPTER III. A CONCEPTUAL MODEL OF FERTILITY PREFERENCE

Introduction

Two broad components or concomitants of social change and development emerged from the theoretical considerations as possible predictors of human fertility preferences: structural change (modernity) and individual modernity. The purpose of this chapter is to derive appropriate concepts from the two constructs and establish the relationships among them. In doing so, however, relevant middle-range theories and empirical findings are cited to support each line of reasoning. The rationale behind this approach is that it is premature at this stage in sociology to imagine a unified system of a sociological theory in which "observations about every aspect of social behavior, organization and change promptly find their preordained place" (Merton, 1968:45).

The chapter is divided into two broad sections. The first section deals with the derivation and conceptualization of the structural modernity concepts. In the subsequent section, components of the individual modernity construct are discussed and the relationships between them and the structural variables are established. Also presented is a conceptual model showing all the specified relationships and a series of empirical hypotheses.

Structural Modernity

Countless indicators have been used in previous studies to represent structural modernity in fertility analysis. Indicators for this study are selected on the basis of theory and past research. In other words, the variables used are selected on the basis of whether they have theoretical and empirical validation in the literature, or can, by intuition,
offer explanation for individual variations in fertility preferences.

A recurring theme in the various theories of social change and development reviewed in the previous chapter is that the sources, patterns and consequences of social change are multi-faceted. Urbanization, education, industrialization, distribution of wealth, etc., for example, were also seen as subcomponents or concomitants of the overall structural change process.

But an individual's experiences with or adaptation to these emergent phenomena, as Parsons and Shils (1951) rightly point out, should be seen as a function of her ascribed, achieved and situational factors prior to and during the initial phase of the change process. Thus the individual's age (ascribed), level of education and income (achieved), and place of residence (situational) become crucial determinants of her psychological and behavioral dispositions, all of which would in turn influence her reproductive preferences.

Age

Several studies have suggested a consistent shift of attitudes in a conservative direction as individuals advance in age. A high association between age and resistance to change in voting preferences (Pederson, 1976) and the adoption of innovations (Rogers and Shoemaker, 1971; Rogers, 1983) have been reported. The usual conclusion is that with increasing age, attitudes and tastes become more and more rigid and consistent. Why this is so may be traced to the pioneering theoretical work of Karl Mannheim.

In his often cited theory of generation, Mannheim (1952) attributes age-related attitudinal differences to the unique socialization and life experiences of members of specific age groups. He maintains that age-related differences plays a
major role in social change, in that it helps individuals to identify their social class and consequently predisposes them for a characteristic mode of thought and experience as well as a "characteristic type of historically relevant action" (Mannheim, 1952:291).

Smelser and Smelser (1981) also develop a similar line of reasoning although it is cast only in relation to the individual's past experiences. They argue that the relative psychological and "behavioral" openness of the young vis-a-vis the relative psychological rigidity of the elderly may be traced to the latter's past experiences as well as their investment in the status quo. Inkeles and his associates elaborate further on this view. They write:

One of the processes often noted as an accompaniment to modernization is the displacement of old people from positions of respect and authority in the family and in society as a whole (Inkeles et al., 1983:191).

Implicit here is the perception of change or modernity as an anathema or a threat to the status quo with regard to the elderly. The bottom line of these arguments is that individuals' receptivity to change or new ideas (attitudinally and behaviorally) vary according to their stage in the life-cycle. And since the elderly stand more to lose than to gain in the change process, older people will be more aversive to the various forces of modernization.

Education

The multiple functions of formal education in the process of societal change and individuals' transformation have been well documented (Vago, 1980; Cochrane, 1979; Rogers, 1983). Indeed education either as an instrument of socialization; or the acquisition of knowledge and skills through vocational and technical training; or formal literacy and numeracy, have
been found to have both direct and indirect attitudinal and behavioral impacts.

As an instrument of socialization, formal education helps in molding the attitudes and behavior patterns of its recipients (Clark, 1982). The effect of education on attitudes is that of increasing the support for liberal values, open mindedness, belief in the efficacy of science and the receptivity to change (Inkeles et al., 1983). In other words, education, as Hurin (1978) puts it, tends to be associated with cosmopolitan value-set that stresses diversity, tolerance, the questioning of received orthodoxy and the importance of societal and individual growth and development. This presupposes an in-built association between formal education and the development of modern attitudes.

Education, through literacy, also provides its recipients with, relatively, an unlimited access to sources of information and knowledge. This helps the individual to develop a wider perspective of her own culture as well as gain some insights about the cultures of the world at large. It has been found consistently that individuals who possess literacy and numeralcy skills are more apt to come in contact with change agents (family planning personnel included), have greater ability to acquire and process information and consequently are more likely to adopt innovations (Rogers, 1983).

Another facet of education as an instrument of modernization lies in the status it confers on individuals and consequently their ability to engage in social comparison processes (Festinger, 1954). Social comparison theory, as originally formulated, concerned itself primarily with the consequences of consonant and dissonant cognitive comparisons for self and, to a lesser extent, for behavior toward others (Singer, 1981; Festinger, 1954). But as Crosby (1976) has
noted, the theory has since developed close kin among such other social-psychological theories as level of aspiration theory, adaptation level theory and even the various balance theories. The central theme of these theories is that we evaluate ourselves, in part, by comparing our own socioeconomic status with that of others, specifically other people we know or are aware of. Education, in this sense, becomes the vehicle for the individual's class identification as well as class consciousness. This self-assessing element of education helps the individual to strive for, adopt and/or conform to certain attitudinal and behavioral patterns consistent with the individual's social class. Examples may include the desire for and acquisition of specific modern appliances, the adoption of certain lifestyles or consumption habits considered to be congruent with an attained social status.

In summary, formal education helps individuals to acquire knowledge and information; to explore and weigh alternatives and make relatively better judgments about issues, and above all, to compel individuals to adopt attitudinal structures and behavioral patterns consistent with modern life.

**Family income**

The theoretical basis of the relationship between a family's income level and its level of modernity is very fuzzy. It is, therefore, not surprising that empirical findings about the relationship have been inconclusive at best, and in most cases not adequately explained. However, it is very difficult to ignore intuitively that as the level of a family's income changes (either for better or for worse), multiple responses may follow.

An increase in a family's income may increase the family's level of aspiration and desire to conform to the attained
economic status. It may also make substitution for services rendered by one's own children easier through the hiring of domestic servants. Higher income may also facilitate the acquisition of material goods (Easterlin, 1969).

Consumer durables such as television sets, radios, refrigerators, etc., that an individual may acquire initially as a status symbol may ultimately serve as instruments of modernization by increasing the individual's knowledge about the immediate surroundings and the outside world at large. Thus to the extent that changes in a family's income raise the level of aspirations and awareness, higher family's income levels will be positively related to modernity.

Residence

Throughout human history, cities have been considered as the cradles of civilization and as centers of progress as well as the sources of agitation, revolution and change (Hawley, 1981). For years, social scientists have labored to explain how human residential patterns or human agglomerations influence social systems and individuals' personalities.

At the macro level, human ecologists have used a variety of theories to account for the processes and variations in human adaptation to the physical and socioeconomic environment. Bogue's (1950) theory of metropolitan dominance and Tarver's (1969) gradient principle are two examples of the theories used to explain the influences and systematic variations between urban and rural areas in socioeconomic, physical and spatial contexts.

One assumption of the metropolitan dominance theory, for example, is that the metropolitan center is the primary organizing agent that produces spatial distribution patterns of community social structure within the metropolitan region, or the sphere of influence of the metropolitan center. The
economy of the metropolitan community is viewed as "the characteristic and dominant type of modern social and economic organization" (Bogue, 1950:8).

The notion of the existence of fundamental differences in the personalities and social systems of rural and urban residents also runs deep into sociological thought. Redfield's (1933) concepts of folk and urban, Durkheim's (1933) mechanical and organic solidarity and Tonnies' (1940) gemeinschaft and gesellschaft, though questioned lately (Benvenuti, 1975; Newby and Buttel, 1980), have been used to describe characteristic attitudinal and behavioral patterns between rural and urban residents.

These differences are accounted for in terms of population size, density and heterogeneity. The dynamic density (Durkheim, 1933) and heterogeneity (Wirth, 1938) associated with urban areas, for example, are seen as the sources of new ideas and social ferment - changes that filter imperceptibly into the less populated hinterland. Wirth argues further that the density and heterogeneity of the urban population limit the individual's adherence to a common set of traditional values and belief systems. Wirth's view is shared by Fischer (1975), although the latter casts his argument in the context of spatial mobility. Fischer (1975) argues that regardless of an individual's membership in a specific ethnic group, since larger cities have more socially diverse hinterlands from which to draw migrants than do smaller cities, greater urbanism would be usually associated with subcultural variety. Consequently individuals would develop characteristic personality attributes consistent with modern life.

That the accessibility to off-farm employment and to better educational, recreational and health facilities is easier in the urban areas of the developing world than in the rural areas has been well documented. These facilities,
however, must be obtained at a cost to the individual. The relatively higher cost of living in the urban areas, for example, usually compels husband and wife to engage in economic activities outside the home. The greater availability of schools in the urban centers makes parents take their children out of productive activities (Rich, 1973) especially where there are laws which restrict child labor and make education mandatory (Coale, 1967). In this way urban parents would perceive children more and more as a socioeconomic liability rather than a socioeconomic asset. In summary, changes in residential patterns characteristic of societies experiencing structural changes lead to changes in the balance between the city and the hinterland. As economic activities and opportunities multiply in the urban centers, new social groups and norms emerge; these, in turn, influence the attitudes, knowledge, perceptions and lifestyles of residents.

Individual Modernity

In their book, Exploring Individual Modernity, Inkeles et al. (1983) use three models (analytical, topical, behavioral) derived from "thirty odd themes" to identify what they describe as the "modern man." The modern man, they emphasize, exhibits certain cognitive and behavioral characteristics distinct from his traditional counterpart. Although the concept, as used in the present study, derives from Inkeles and his associates' conceptualization, it is extended or modeled to reflect the total personality of the individual, pertinent to the object under investigation. In other words, the concept - individual modernity - is conceptualized to reflect the individual's attitudes, perceptions, lifestyle and knowledge pertinent to her fertility preferences.
Modern attitudes

Allport (1935:798) describes the concept of attitude as "the most distinctive and indispensable concept in contemporary American social psychology." That this is so is reflected in its extensive use as a building block in social psychological theorizing despite the lack of conceptual consensus among theorists.

Guttman (1950:51) defines attitude as a "delimited totality of behavior with respect to something." Katz (1960:168) sees it as the "predisposition ... to evaluate some symbol or object." Gergen (1974:620) moves a step further to define the concept as "the disposition to behave in particular ways toward specific objects." Following Fishbein and Ajzen's (1975) model, the attitude - behavior relationship is assumed in the present study regardless of the substantive debate and the lack of conceptual consensus about this relationship (Hill, 1981).

Pressures toward consistency in what one believes and how one behaves have been studied most intensively by Leon Festinger (1957) and his associates in a variety of ingeniously controlled, realistic situations. Festinger's dissonance theory, Osgood and Tannebaum's (1955) congruity theory and Newcomb's (1963) strain for symmetry all suggest that humans act to restore equilibrium in their systems of beliefs. Implicit here is the notion that once individuals have acquired the necessary information either to reinforce shaken convictions or consolidate those recently acquired, they will act in consonance with these convictions. This presupposes that individuals who develop modern attitudes (i.e., efficacy of modern science, planning values, activity and non-kinship orientations) would appreciate the cost of raising good quality children. They would also seek information and learn how to prevent unnecessary childbirth as
well as seek alternative sources of psychic and social satisfaction. These processes would ultimately lead to lower fertility preferences.

Ownership of modern appliances

One manifestation of the expanding economic activity and opportunities in a rapidly changing society is the proliferation of more and more consumer durables on the market and the progressively greater availability of these goods to more and more income classes (Leibenstein, 1975).

Apart from serving as a status symbol, the acquisition of some consumer durables also helps to accelerate the pace of the individual's modernization process. The acquisition of a television set, radio or subscription to a newspaper, for example, broadens the range and content of knowledge while the ownership of a means of transport (motorcycles, bicycles, cars, etc.) increases the spatial dimension of the individual's influence. Freedman (1970:26) expresses the modernizing influence of these consumer durables as follows:

The ownership of household appliances such as rice cooker, electric iron, or sewing machine lead to changes in the status of women by easing traditional chores, and in the case of sewing machine, by facilitating the acquisition of marketable skills. To the extent that the use of these modern durables leads to the adoption of modern ways, identification with the more modern sectors of society, ownership may constitute a modernizing force.

The acquisition of these consumer durables, however, entails some amount of trade-offs couples would usually have to make. In other words, couples would have to choose between spending their incomes on these goods or raising a large number of good quality children. Therefore, ownership of consumer durables is predicted to be positively related to perceived cost of raising children, and knowledge of contraceptives; and negatively related to fertility preferences.
Perceived cost of children

Several theories have been advanced to explain the relationship between an individual's perceived cost of children and her fertility preference. Becker's (1960) theory, which later came to be known as the New Home Economics, posits that the household makes a calculated decision whether or not to have a child on the basis of its income and expected value/costs (price) over time. Children, in this sense, are conceptualized as consumer durables which may or may not yield psychic income to parents. Although Becker's hypothesis tested empirically showed the contrary, his explanation for the contradictory negative relationship between income and fertility preference was based on the innate desire of people in higher socioeconomic status for good quality children.

Leibenstein (1976) refutes the basic premise of the New Home Economics perspective against the background assumption that every social group is divided into a hierarchy of socioeconomic status. He argues that as individuals move from lower to higher socioeconomic status groups, their economic value of any additional child decreases while the economic cost increases. Ultimately the higher economic costs (time and other status goods foregone) of having additional children would compel individuals to prefer smaller family sizes.

More recently, Caldwell's (1982) "wealth flow hypothesis" has placed the issue of perceived cost of children in a much broader perspective. From the standpoint of the Marxian concept of the mode of production (i.e., the forces and social relations of production), Caldwell argues that the value (cost/benefit) of children should be examined within the context of the relations of production vis-a-vis the level of socioeconomic development of the society under investigation. As he puts it, "each mode of production has its own economic
and dependent demographic laws" (Caldwell, 1982:158). Thus once a society embarks on industrialization, the factory-based mode of production gradually replaces the kin-based or familial mode of production and consequently the erosion of the benefits derived from larger family sizes. In other words, the modernization of the forces and social relations of production increases the social, psychological and economic costs of having children; hence an individual will seek methods to control births or prefer smaller family sizes.

The cutting edge of these theoretical arguments is that in a rapidly developing society where a significant proportion of the household's needs are acquired through the market system, a larger family size would be perceived as reducing a "family's potential standard of living" (Caldwell, 1982:179), or as an opportunity cost of acquiring consumer durables. Once individuals perceive children in this way, fewer and fewer children would be demanded or preferred. The perceived cost of children is, therefore, posited to be positively related to knowledge of contraceptives and negatively related to fertility preferences.

**Knowledge of contraceptives**

A popular view held by several social anthropologists is that even the most primitive societies recognize the need for family size limitation and, therefore, use a variety of contraceptives or methods of birth control (Douglas, 1977). Methods of population control such as infanticide (Knodel and Van de Walle, 1979), induced abortion and coitus interruptus (Andorka, 1982) have been used at different times in human history by several societies. Viewed in this context, the information about and/or use of contraceptives cease to be a modernizing force but rather an adjustment process. However, to the extent that most of the contraceptive devices in use
today or considered in this study were acquired through cultural borrowing, it is justifiable to consider their knowledge or use as a modernization process and hence an element of change.

The literature on the adoption and diffusion of innovations suggests that an essential element of an individual's innovation-decision process is the recognition or knowledge of the existence of the specific innovation (Rogers, 1983; Brown, 1981). Knowledge in this context is conceptualized as a resource-input (Newcomb, 1965) which occurs after the potential adopter has been exposed to the innovation's existence and is familiar with how it functions. Mere information about an innovation, in this sense, does not have utility until it is transformed into knowledge. Implicit here is the notion that knowledge is not a passive activity; rather it is gained through a behavior that must be initiated either by society or an individual (Rogers, 1983). Hence the individual's socioeconomic status as well as her attitudinal position become crucial determinants for knowledge acquisition.

Given that most change programs, especially family planning programs, in the developing world are usually headquartered in the urban centers and/or invariably begin in the urban centers and filter gradually into the hinterland, the individual's place of residence also becomes a determinant of the acquisition of knowledge about contraceptives. Finally consistency theories suggest that individuals generally tend to expose themselves to ideas that are in accordance with their interests, needs or existing attitudes, and consequently act in accord with those attitudes (Festinger, 1957). In this way, knowledge of contraceptives plays a dual role - as a modernizing force as well as a confidence builder - in an individual's fertility preferences. Thus to the extent that
knowledge of contraceptives serves as a modernizing force, it will be inversely related to fertility preference.

A Conceptual Model of Structural Change, Individual Modernity and Fertility Preferences

Consistent with the objective set for this chapter, this section deals with the development of a conceptual model considered to be important in the explanation of individuals' fertility preferences. This task is guided by the conceptual framework already discussed as well as by empirical findings reported in the literature. It must be emphasized, however, that since the relationships among the structural and individual modernity variables have been discussed extensively in the previous section, the focus will primarily be on the relationships between the former (i.e., exogenous variables) and the ultimate dependent variable - fertility preferences.

Age and fertility preferences

Previous studies have generally treated the ages of women in the childbearing years as a secondary or a control factor in fertility analysis (Rice and Beegle, 1972; Aborampah, 1981; Yamanaka et al., 1982). That this is so reflects researchers' apparent belief that the age variable may be a disturbing factor in the relation of fertility preferences to other conventional socioeconomic status variables, although the use of relatively more powerful analytical techniques may provide a solution to the "dilemma."

Secondly, the neglect of the age variable for fear of contaminating other variables underscores the significant role age plays as a benchmark in the life cycle as well as its function as the biological foundation in the human reproductive process (Rice and Beegle, 1972).
Figure 3.1. A conceptual model of structural change, individual modernity and fertility preference
The pervasive influence of age on fertility preference is typified in the alterations in age patterns of fertility and in the spacing of births through marriage. Among the changes in the age patterns of fertility that have occurred for some time now in the developed world are the shifts in the mean age at childbearing and the relative contribution that women in specific age groups make to gross total fertility. Lowenthal and David (1972), for example, have pointed out that in the developed world, particularly western Europe, women below the age of 20 years have ceased to make any significant contribution to gross total fertility. Although Lowenthal and David's observation reflects the trend at the macro level, it provides some insight into what pertains at the micro level.

Finally, the tendency of the age variable to correlate negatively with other socioeconomic status variables, and also to the extent that age is associated with the maintenance of traditional value set including large family sizes, direct and indirect positive relationships are predicted between age and fertility preferences.

**Education and fertility preferences**

Education, as pointed out by Thornton et al. (1986:191), "has been a workhorse in fertility research, albeit a workhorse of a very mixed breed." Certainly the effect of education on fertility preferences has been an issue of extensive debate although a consensus seems apparent with regard to an inverse relationship between the two variables, be it direct or indirect.

Contributing to the debate on the issue, Freedman (1963:232) wrote:

I suggest that with increased education and literacy, the population becomes involved with the ideas and institutions of a larger modern culture. If the individual is, or believes he is, part of a larger non-familial system, he begins to find rewards in
social relationships for which large numbers of children may be irrelevant.

Implicit in Freedman's argument, however, is the intervening role of modernity variables in the education-fertility preference relationship. A similar idea is expressed by Heer (1969), although he examines the relationship within the context of increased income which usually accompanies higher education. He notes that a rise in income which comes with education may enhance fertility preference, but other effects of education such as awareness of new goals and other alternatives may tend to raise the relative cost of children, and lower their relative preference. These two observations, in part, provide the basis for Fawcett and Bonstein's (1973:125) argument; in their view, people are not taught "in schools to have smaller families, but rather it is the attitudes, values and behaviors learned in school that interact with subsequent life experiences" to produce an overall trend toward lower fertility preferences. The bottom line of these arguments is that the observed inverse relationship between education and fertility preference may be spurious or consequent to the spillover effects of an individual's education (Cochrane, 1979).

Another set of studies have reported a direct positive relationship between education and fertility preferences: Olusanya (1967, Nigeria), Okedeji (1969, Nigeria), Lowenthal and David (1972, Belgium), Davidson (1971, United States). Others too have reported curvilinear relationship: Srinivasan (1967, India), Goldstein (1972, Thailand). Cochrane (1979) explains the positive relationship with the argument that in the developing world, improved education in conjunction with modern medical practice act to weaken the traditional pressures for prolonged lactation and abstinence, thus decreasing the interval between pregnancies and increasing the actual number of pregnancies per woman. She argues further
that in countries with low levels of female literacy, fertility in general tends to be higher among women with a small amount of education than among women with no education. This observation may be true to some extent in some African societies. The few African women who received education in the immediate post-independence era could support large family sizes due to their relatively higher socioeconomic status and their relatively easy access to health care (Aborampah, 1981).

However, numerous studies have reported negative relationship between education and fertility preferences both in the developed and developing worlds: Caldwell (1968; 1980, Ghana), Dow (1971, Sierra Leone); Freedman and Takeshita (1969), Yamanaka et al. (1982), Thorton et al. (1986) - all in Taiwan; Whelpton (1958) and Goldberg (1960) both in the United States; and Safilios-Rothschild (1969, Athens, Greece). Thus, regardless of the seemingly inconsistent empirical relationship between education and fertility preference, to the extent that education acts generally as a deterrent to child bearing, in that marriage is usually postponed for the sake of education, a direct inverse relationship is predicted.

**Family income and fertility preferences**

Like the education variable, some amount of disquiet surrounds the family income-fertility preference relationship. Competing theories and explanations have been advanced in support of observed contradictory findings.

At the macro level, the secular trend of the decline of fertility went parallel to the rising per capita income. The contrary has been shown through several survey results (Easterlin, 1966; 1968; Freedman, 1963) while others have shown U-shaped (Bernhardt, 1971) as well as no relationships at all (Bradshaw, 1971; Safilios-Rothschild, 1967).
Economists have been intent on establishing that the pure income effect on desired family size, for example, is positive on the basis of the consumers' demand theory. The central premise of this theory is that, given that families strive to maximize the utility they derive from children, households will be motivated to increase their demand for children if the family's income increases (Becker, 1960; Repetto, 1981). Supporting pieces of evidence of this theory are numerous in the literature. In a study of the Detroit area in the United States, for example, Freedman and Coombs (1966) found a positive relationship between family income and fertility preference. A similar observation has been made in Germany by Linke (1971), but he noted that the relationship weakens somewhat when controls are made for marriage duration.

Still in the developed world other studies have demonstrated that in one respect or another the link between the two variables is an inverse one (Davidson, 1971; Ritchey and Stokes, 1971). In a study based on the Survey of Economic Opportunity, Ritchey and Stokes (1971) concluded that in both urban and rural areas, fertility is inversely related to total family income.

Elsewhere in the developing world empirical findings about the family income-fertility preference relationship have not been very consistent. In a seven-nation study (Philippines, U.S., Turkey, Indonesia, Korea, Taiwan and Singapore). Bulatao and Fawcett (1983) found that permanent income generally had positive effects on desire for another child and ideal family size among husbands while the effects among wives were generally negative. However, in an attempt to "predict recent childbearing, permanent income was shown to have almost uniform negative effects" (Bulatao and Fawcett, 1983:75). However, no explanation was offered for the contradictory findings.
Some previous studies in Taiwan used other variables as a proxy for family income but the relationship with fertility also turned out to be inconclusive. Using land ownership and the ownership of consumer durables, Freedman (1971) reported an inverse relationship between family income and fertility preference although earlier studies by Prachuabmoh (1967) and Jain (1969) had shown a positive relationship.

Summing up, there seems to be some degree of instability in the family income-fertility preference relationship. Nevertheless, on the basis of Becker's (1960) theory and the weight of empirical evidence a direct positive relationship is posited.

Residence and fertility preferences

One of the earliest noted fertility preference differentials is the higher average for couples living in the rural areas compared with urban residents (Campbell, 1983). Although these differences have been observed empirically, opinions still differ as to whether the effect of urban or rural residence is direct or indirect through other structural and psychological variables (Rich, 1973; Yamanaka et al., 1982; Dow, 1971; Caldwell, 1968).

The argument usually advanced in support of the intervening function of other variables is that urban residence per se may not be an important inhibiting factor as much as other indirect factors that result in increased access to modern goods (Rich, 1973) as well as the education, industrialization or economic environment of the urban center. Valid as this argument may be, it tends to run counter to the classical demographic transition theory which apparently posits a direct inverse relationship between urbanism and fertility preferences.
Certainly the transition theory is traditionally extended to explain the phenomenon of the direct inverse fertility differentials found among socioeconomic and residential groups of populations during the transitional phase. This relationship is stated succinctly by Grabill and his associates as follows:

... the theory is that the decline begins in the so-called upper occupational classes in the urban areas, later the decline affect the so-called lower occupational classes. In the meantime the declines spread outward to the rural areas and presumably the process runs the same type of course there (Grabill et al., 1958:288)

Implicit here is the direct inhibiting effect of urban residence on fertility preferences regardless of the individual's level of socioeconomic status.

Despite the numerous supporting pieces of empirical studies in both the developed and the developing worlds: Brent (1970 in Eastern Europe), Bradshaw (1971 for Mexican Americans in the United States), Caldwell (1968 in Ghana), Goldstein (1972 in Thailand), Liu (1965) and Yamanaka et al. (1982) both in Taiwan, several other studies have shown ambiguous or inconclusive results with respect to the residence-fertility preference relationship: Addo (1970 in Ghana), Mueller (1972 in Taiwan), Thorat and Fliegel (1968 in India). At the other extreme a few studies in the developing world have shown positive relationships between urban residence and fertility preferences: Prachuabmoh (1967) with respect to family size desires in a district in Thailand, Goldstein (1970) concerning Moslems in Thailand and Mitchell (1971) among younger age groups in Hong Kong.

On the basis of theory as well as the weight of empirical evidence, urban residence is posited to have a direct inverse effect on fertility preferences.
Statement of Hypotheses

Thus far, the relationships among the variables in the model have been established at a relatively higher level of abstraction. This section concludes the chapter with a statement of the empirical hypotheses tested in the study. Consistent with the first two objectives of the study, the hypotheses are stated in a bivariate form for the purpose of examining the causal structure between each set of variables after removing any possible contamination from other variables. It must be emphasized that the presentation of the hypotheses in a bivariate form by no means rules out the possibility of reverse causation among some of the variables (for example, ownership of modern appliances can influence modern attitudes just as much as modern attitudes may influence the acquisition of modern appliances). However, consistent with the assumptions of fully recursive models (path analysis) reciprocal causation among variables is not considered in the present study.

1.0.0. Hypotheses involving structural and individual modernity variables:
1.1.0. Respondent's age (RAGE):
1.1.1. The older the respondent the lower her score on the modern attitude index
1.1.2. The older the respondent the fewer units of consumer durables she owns
1.1.3. The older the respondent the lower her score on the perceived cost of children index
1.1.4. The older the respondent the fewer the number of contraceptive devices and methods she is familiar with
1.2.0. Respondent's township of residence (RESI):
1.2.1. The higher the density of population at respondent's residential area the higher her score on the modern attitude index

1.2.2. The higher the density of population at respondent's residential area the more units of consumer durables she owns

1.2.3. The higher the density of population at respondent's residential area the higher her score on the perceived cost of children index

1.2.4. The higher the density of population at respondent's residential area the greater the number of contraceptive devices and methods she is familiar with

1.3.0. Respondent's education (REDU):

1.3.1. The greater the number of years of formal education attained by respondent the higher her score on the modern attitudes index

1.3.2. The greater the number of years of formal education attained by respondent the more units of consumer durables she owns

1.3.3. The greater the number of years of formal education attained by respondent the higher her score on the perceived cost of children index

1.3.4. The greater the number of years of formal education attained by respondent the greater the number of contraceptive devices and methods she is familiar with

1.4.0. Respondent's family income (FINC):

1.4.1. The higher the total monetary earnings of respondent's family the higher her score on the index of modern attitudes

1.4.2. The higher the total income of respondent's family the more units of consumer durables she owns
1.4.3. The higher the total income of respondent's family the higher her score on the perceived cost of children index

2.0.0. Hypotheses involving individual modernity variables only
2.1.0. Modern attitudes (MOAT):
2.1.1. The higher the respondent's score on the modern attitude index the more units of consumer durables she owns
2.1.2. The higher the respondent's score on the modern attitude index the higher her score on the perceived cost of children index
2.1.3. The higher the respondent's score on the modern attitude index the greater number of contraceptive devices and methods she is familiar with

2.2.0. Ownership of modern appliances (MOAP):
2.2.1. The more units of consumer durables owned by respondent the higher her score on the perceived cost of children index
2.2.2. The more units of consumer durables owned by respondent the greater the number of contraceptive devices and methods she is familiar with

2.3.0. Perceived cost of children (PCOS):
2.3.1. The higher the respondent's score on the perceived cost of children index the greater number of contraceptive devices and methods she is familiar with

3.0.0. Hypotheses involving fertility preference (EFS, DFS) variables:
3.1.0. Structural variables/EFS, DFS
3.1.1. The older the respondent the greater the number of children she expects/desires
3.1.2. The higher the density of population at respondent's residential area the fewer the number of children she would expect/desire

3.1.3. The greater the number of years of formal education attained by respondent, the fewer the number of children she would expect/desire

3.1.4. The higher the total earnings of respondent's family the fewer the number of children she would expect/desire

3.2.0. Individual modernity variables (INDMOD)/EFS, DFS

3.2.1. The higher the respondent's score on the index of modern attitudes the fewer the number of children she would expect/desire

3.2.2. The more units of consumer durables owned by respondent the fewer number of children she would expect/desire

3.2.3. The higher the respondent's score on the perceived cost of children index the fewer the number of children she would expect/desire

3.2.4. The greater number of contraceptive devices and methods respondent is familiar with the fewer the number of children she would expect/desire
CHAPTER IV. METHODOLOGY

Introduction

This chapter essentially deals with (a) the research setting, (b) the sampling procedures and data collection, (c) the operationalization of the test variables and (d) the statistical techniques used in analyzing the data. As a prelude however, a brief country summary is first provided.

Taiwan: An Overview

Taiwan, which translates "terraced bay" is a fairly small island nation off the east coast of the People's Republic of China. Shaped in the form of a tobacco leaf, Taiwan is 384 km from tip to tip and 136 km at its broadest points. About 66% of the land is covered by hills and mountains more than 3000 m above sea level, one of which is Yushan (3934.2 m) considered to be the loftiest peak in Northeast Asia (Tourism Bureau, n.d.). Consequently the nation's population of 16.8 million (1977) is spread unevenly on its 35989 km² surface area. Concentration is greatest in the north, south and west regions while the mountainous east is sparsely populated. Despite the relatively overall high population density (411.0/km², 1978), Taiwan, unlike several developing nations has had a consistent increase in its agricultural production index⁴ over the years.

Two things which are of central importance to this study are the nation's rapid socioeconomic development vis-a-vis its sharp fertility decline since the early 1950s. From a relatively low 5.0 in 1953, Taiwan's general industrial production index⁵ grew rapidly to 141.0 in 1978. During the same period, agricultural production index more than doubled from 40.6 to 102.1. The very period also saw the nation's general fertility rate drop from 194 per thousand to 96 per thousand (see Table 4.1).
Table 4.1. Some socioeconomic development indicators of Taiwan area: selected years (1953-1978)

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<td>National Income</td>
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<tr>
<td>(at market prices)(^a)</td>
<td>22</td>
<td>42</td>
<td>82</td>
<td>160</td>
<td>359</td>
<td>690</td>
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<tr>
<td>GDP (in purchasers value)(^a)</td>
<td>23</td>
<td>45</td>
<td>88</td>
<td>171</td>
<td>389</td>
<td>753</td>
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<tr>
<td>Gen. Indus. production index</td>
<td>5.0</td>
<td>7.6</td>
<td>13.2</td>
<td>30.7</td>
<td>77.6</td>
<td>141.0</td>
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<tr>
<td>Agric. production index(^b)</td>
<td>40.6</td>
<td>51.3</td>
<td>59.2</td>
<td>82.8</td>
<td>90.3</td>
<td>102.1</td>
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<td><strong>B. Health</strong></td>
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<td>Pop./hospital bed</td>
<td>N/A</td>
<td>2813</td>
<td>2642</td>
<td>2685</td>
<td>542</td>
<td>464</td>
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<tr>
<td>Pop./physician</td>
<td>N/A</td>
<td>1677</td>
<td>1819</td>
<td>2071</td>
<td>1844</td>
<td>1360</td>
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<td><strong>C. Education</strong></td>
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<td>- % of total public expenditure</td>
<td>10.05</td>
<td>11.44</td>
<td>13.91</td>
<td>15.34</td>
<td>13.37</td>
<td>14.36</td>
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<tr>
<td>- Total school enrollment (in millions)</td>
<td>1.27</td>
<td>2.03</td>
<td>2.80</td>
<td>3.59</td>
<td>4.30</td>
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\(^a\) In billions of New Taiwan dollars.

\(^b\) 1976 = 100.
Table 4.1. Continued

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<td><strong>D. Communication</strong></td>
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<td><strong>Radios</strong></td>
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<td>0/00 pop.</td>
<td>N/A</td>
<td>N/A</td>
<td>98.95</td>
<td>104.12</td>
<td>94.49</td>
<td>N/A</td>
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<tr>
<td><strong>TVs 0/00 pop.</strong></td>
<td></td>
<td></td>
<td>2.94</td>
<td>17.86</td>
<td>57.86</td>
<td>146.21</td>
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<td><strong>E. Population</strong></td>
<td></td>
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<tr>
<td>-Annual rate of increase</td>
<td>38.1</td>
<td>36.0</td>
<td>32.3</td>
<td>26.6</td>
<td>18.0</td>
<td>19.2</td>
</tr>
<tr>
<td>-General fertility rate 0/00</td>
<td>194</td>
<td>183</td>
<td>170</td>
<td>131</td>
<td>97</td>
<td>96</td>
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*Regulation for registration to radio and television was abolished in February 1977, hence data for sets of ratio are not available from that time. "Sets of television, however, could be obtained by subtracting the exports of each month from the sum of production of January 1977." The figures represent receivers per 1000 population.*
In the health, education and communication and family planning sectors, Taiwan's accomplishments may aptly be described as one of the few success stories of Third World development. The spread effect of these achievements is succinctly elaborated by Jacoby (1966:85). He writes:

The fruits of this economic progress were widely diffused throughout Taiwan. . . . Output and productivity rose steadily in nearly all branches of agriculture and industry. . . . Progress was general . . . in the country and cities. . . . All economic groups - farmers, villagers, industrial workers, professional personnel, civil servants and business enterprises - benefited from marked increases in levels of living.

Implicit here is the difference that careful planning backed by human will and international goodwill can make in the development of the Third World in general. It is, therefore, imperative to understand the internal dynamics or processes that led to, in particular, the decline in fertility for possible emulation by other developing nations.

The research setting

With the support of the Taiwan National Research Council, data for this study were collected by 22 trained interviewers in February 1979 under the supervision of the principal investigator, Professor H. C. Chang. The survey covered three out of four geographical regions. The distribution of the regions and their corresponding municipalities and counties were as follows:

**North:** The Taipei municipality, and the Taipei, Ilan, Taoyuan and Hsinchu counties.

**Central:** The central region comprised the Taichung municipality, and the Miaoli, Taichung, Nantou, Changhwa, Yunlin and Chiayi counties.
South: Included in the southern region were the Kaohsiung and Tainan municipalities as well as the Tainan and Pingtung counties.

**Sampling procedures and data collection**

Cities, precincts of municipalities and townships of each of the geographical regions were ranked from low to high on the basis of population density. For each level of population density, the number of sampling areas of each of the three regions were calculated on the basis of its population in proportion to the total population of the three regions. This yielded a total of 30 sampling areas.

From each of the 30 sampling areas a random sample of three Li, or villages, was taken. This yielded 90 Li, from which a random sample of respondents were taken for interviewing. The criteria for the selection of the 973 respondents were: women of child-bearing age (i.e., 15-44 years), married, having at least one child and "presently" living with their husbands. The face-to-face interview covered, among other things, respondents' socioeconomic background, their psychological orientations, and their opinions about having children as well as their reproductive intentions and behaviors.

**Representativeness of the sample**

Table 4.2 provides summary statistics of selected socio-demographic characteristics of the sample and that of the national population. The mean number of years of formal schooling of the sample was 6.1 compared to the national mean of 7.1 years. Also reported are the mean age, total family members, family income and population density for both the sample and the national population. With the exception of the family income as well as the slight differences in the other
Table 4.2. Comparison of sample means and population means of selected socioeconomic variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Sample Means</th>
<th>Population Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education</td>
<td>6.1</td>
<td>7.1</td>
</tr>
<tr>
<td>Age</td>
<td>30.9</td>
<td>26.7</td>
</tr>
<tr>
<td>Total family members</td>
<td>6.7</td>
<td>5.4</td>
</tr>
<tr>
<td>Population density/km²</td>
<td>2000</td>
<td>411.0</td>
</tr>
<tr>
<td>Family income</td>
<td>NT$193897.17</td>
<td>NT$39168</td>
</tr>
</tbody>
</table>


statistics notwithstanding Table 4.2 attests to the representativeness of the sample, hence the generalizability of the study findings for the overall national population.

Operationalization of Variables

Structural modernity

**Age (RAGE)** Defined as the chronological age of the respondent, the variable was measured by a single indicator, i.e., the number of years reported by a respondent concerning how old she was up to and including her last birthday. The responses ranged between 16 and 44 with a mean of 30.9.

**Residence (RESI)** In line with Speare et al.'s (1973:333) observation that, "it is extremely difficult in Taiwan to tell where an urban area ends and the rural area begins," the rural-urban continuum as an analytical category was not emphasized in this study. The variable, residence, was, therefore, defined and measured as the absolute population density of the place where the respondent lived at the time of the survey.

The density ranged between 600 persons/km\(^2\) in the countryside and over 40000 persons/km\(^2\) in the municipalities and city precincts. The residential areas were grouped into five categories (A-E) and assigned scores of 1 through 5. The higher the score, the greater the population density. Table 4.3 provides a summary of categories of residence by population density.

**Education (REDU)** The variable refers to number of years of formal education completed by the respondent at the time of the survey. Respondents were asked the question: how many years of formal education have you completed? Responses ranged from no education (0) through college graduate or higher (i.e., 16 years or more). The mean years of formal education completed was 6.1.
Table 4.3. Category of residence by population density

<table>
<thead>
<tr>
<th>Category</th>
<th>Density of pop. (km²)</th>
<th>Assigned score</th>
<th># of sampling areas</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>≤600</td>
<td>1</td>
<td>4</td>
<td>13.3</td>
</tr>
<tr>
<td>B</td>
<td>601-1000</td>
<td>2</td>
<td>5</td>
<td>16.7</td>
</tr>
<tr>
<td>C</td>
<td>1001-4000</td>
<td>3</td>
<td>8</td>
<td>26.7</td>
</tr>
<tr>
<td>D</td>
<td>4001-10000</td>
<td>4</td>
<td>6</td>
<td>20.0</td>
</tr>
<tr>
<td>E</td>
<td>&gt;10000</td>
<td>5</td>
<td>7</td>
<td>23.3</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>30</td>
<td>100.0</td>
</tr>
</tbody>
</table>
Family income (FINC) The variable is defined as the total earnings from all economic activities the family engaged in during the year preceding the survey (1978) measured in New Taiwanese dollars (NT$). The final figure for each family unit was arrived at by adding responses to a series of ten questions pertaining to different sources of incomes. They included: the annual salary of husband and wife (if both worked for pay), net earnings from business, agriculture or animal husbandry whichever was applicable. Included also were the monetary value of food raised and consumed at home, net earnings by live-in family members, and remittances from other relatives as well as net earnings from "pools."

The range of total family incomes was between NT$300.00 and NT$4,800,000.00 with a mean of NT$193,897.17. Given the rather wide variation in the total family income variable, the natural log (ln) was computed and used for the analysis. Also, for reasons explained elsewhere (see Chang, ca 1987) respondents who reported a total of less than NT$300 on all ten income questions were excluded from the analysis.

Individual modernity (INDMOD)

On the basis of theory (Fishbein and Ajzen, 1974; Smith and Inkeles, 1966) and past research findings (Williamson, 1970; Mukherjee, 1977; Inkeles and Smith, 1974), four indicators were used for the individual modernity construct. The variables were: modern attitudes, ownership of modern appliances/consumer durables, perceived cost of children and knowledge of contraceptive devices and methods. As stated earlier, these indicators were chosen to reflect the attitudinal, perceptual, lifestyles and knowledge of respondents pertinent to the object under investigation, i.e., fertility preferences.
Modem attitudes (MOAT) The variable refers to the respondent's attitudinal position on the traditionalism-modernism continuum based on responses to several issues related to human life. Respondents were asked to state the extent to which they agreed or disagreed with several statements about their relationship with their family members, specific societal and individual life-events, their orientation to work, and planning of activities ahead of time. The response categories were: strongly agree (1), agree (2), indifferent (3), disagree (4) and strongly disagree (5).

The application of the factor analytical technique to responses to 17 statements revealed two underlying factors; namely, beliefs and values. The 17 items and their corresponding factor loadings are provided as Appendix A. Using a factor loading of .4 or higher on either of the two factor variables as a selection criterion, responses to 14 statements were selected for the computation of individuals' modern attitude index. In other words, the total score of an individual on all 14 items (i.e., 8 belief and 6 value items) represented the individual's position of the traditional-modern attitude continuum. The higher the score the more modern the respondent's attitude. Table 4.4 provides a summary of the 14 items and their corresponding corrected item-to-total correlation. Also reported in Table 4.4 are the Cronbach's alpha (.784) and the standardized item alpha (.772).

The sum of individual responses on the modern attitude scale ranged from 24 through 75 with a mean of 52.3.

Ownership of modern appliances (MOAP) The variable refers to the absolute quantity of modern consumer durables owned by respondents at the time of the survey, and by implication, the choices individuals have made to facilitate a greater enjoyment of modern life in relative terms.
Table 4.4. Constituent items of the Likert scale measuring individuals' modern attitudes (MOAT)\textsuperscript{a}

<table>
<thead>
<tr>
<th>Item</th>
<th>Corrected item-to-total corr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Persons have duty to have children</td>
<td>.348</td>
</tr>
<tr>
<td>2. Birthdate has influence over life</td>
<td>.484</td>
</tr>
<tr>
<td>3. Fate is born; ill fate cannot be rectified</td>
<td>.516</td>
</tr>
<tr>
<td>4. Geomancy is related to destiny</td>
<td>.559</td>
</tr>
<tr>
<td>5. Moving must be done on an auspicious date</td>
<td>.409</td>
</tr>
<tr>
<td>6. Life is too short to be perfect</td>
<td>.400</td>
</tr>
<tr>
<td>7. Traditional weddings and funerals cannot be altered lightly</td>
<td>.460</td>
</tr>
<tr>
<td>8. Ancestral property cannot be sold</td>
<td>.342</td>
</tr>
<tr>
<td>9. Hard work leads to better life</td>
<td>.163</td>
</tr>
<tr>
<td>10. Planning is prerequisite to success</td>
<td>.142</td>
</tr>
<tr>
<td>11. Future cannot be predicted</td>
<td>.518</td>
</tr>
<tr>
<td>12. Purpose of work is to earn three meals</td>
<td>.492</td>
</tr>
<tr>
<td>13. Social development is the responsibility of government, we do not have to participate</td>
<td>.394</td>
</tr>
<tr>
<td>14. Some work belongs to men while others belong to women</td>
<td>.263</td>
</tr>
</tbody>
</table>

Cronbach's alpha                                                                                     .784
Standardized item alpha                                                                                  .772

\textsuperscript{a}Response categories were strongly agree (1), agree (2), indifferent (3), disagree (4), strongly disagree (5).

\textsuperscript{b}Variables recoded to make scores consistent.
Respondents were asked to indicate whether or not they owned any of a list of 11 consumer durables. The items included gas stove, cameras, hi-fi TVs and stereo systems, cloth washers, etc. (see Appendix B for a complete list of items). To minimize the influence of individual family incomes, the items were given equal weights, i.e., each item owned was counted as one regardless of the unit cost or the quantity of the same item the family owned. Also, subscriptions to newspapers were not included to minimize the influence of education.

Response categories were "Yes" (scored 1 for each item owned) and "No" (scored zero for each item not owned). The total sum of scores across all 11 items represented an individual's score on the ownership of modern appliances index. Scores ranged from 1 through 11 with a mean of 6.7. Table 4.5 provides the frequency distribution of ownership of modern appliances (MOAP).

Perceived cost of children (PCOS) The concept, perception, as used here deals with the extent to which respondents realize the various costs associated with child bearing. It is used as an active individual pattern of response to a stimuli (DeFleur 1977), and for that matter, a reflection of the meaning an individual attaches to a situation - childbearing - on the basis of her past experiences and information, as well as her intentions.

Respondents were asked to state the extent of their agreement/disagreement to a series of statements pertaining to varied costs of raising children (i.e., financial, personal freedom, inconveniences, and other difficulties in child care). The four statements were as follows:

1. Raising children is a heavy financial burden for most people.
<table>
<thead>
<tr>
<th>Quantity owned (index)</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
<td>.5</td>
</tr>
<tr>
<td>2</td>
<td>21</td>
<td>2.2</td>
</tr>
<tr>
<td>3</td>
<td>28</td>
<td>2.9</td>
</tr>
<tr>
<td>4</td>
<td>69</td>
<td>7.2</td>
</tr>
<tr>
<td>5</td>
<td>104</td>
<td>10.9</td>
</tr>
<tr>
<td>6</td>
<td>176</td>
<td>18.5</td>
</tr>
<tr>
<td>7</td>
<td>193</td>
<td>20.3</td>
</tr>
<tr>
<td>8</td>
<td>179</td>
<td>18.8</td>
</tr>
<tr>
<td>9</td>
<td>115</td>
<td>12.1</td>
</tr>
<tr>
<td>10</td>
<td>51</td>
<td>5.4</td>
</tr>
<tr>
<td>11</td>
<td>11</td>
<td>1.2</td>
</tr>
</tbody>
</table>
2. Children limit you in what you want to do and where you want to go.

3. A couple ought to think seriously about the inconveniences caused by children before they have any.

4. Caring for children is a tedious job.

Response categories ranged from strongly agree (coded 5) to strongly disagree (coded 1). The sum of responses across all four items represented an individual's score on the perceived cost of children index. The scores ranged from 4 through 17 with a mean of 11.18; the higher the individual's score, the higher her perception, and by implication, her awareness of the costs associated with childbearing.

**Knowledge of contraceptives (CKNW)** In line with Rogers' (1983) conceptualization of knowledge about an innovation, the variable was operationalized to include the two main components of knowledge, i.e., the awareness knowledge and the how-to-use knowledge. The former deals with the awareness of the existence of an innovation while the latter deals with knowledge about how to use the innovation.

Respondents were asked a series of 13 questions about a variety of contraceptive devices and methods as well as how they are used. The first eight questions dealt with whether or not respondents have ever heard about several varieties of contraceptive devices and methods. This was followed by five questions dealing with whether or not respondents know how to use some of the devices and methods (the list of questions on devices and methods are provided in Appendix D).

Response categories for all 13 questions were "Yes" (coded 1) and "No" (coded 0). The sum of an individual's score across all 13 items represented her score on the knowledge of contraceptive index scale. The scores ranged from 0 (2.7% of the sample) through 13 (7.7%) with a mean of 7.5. The higher
the score, the more knowledgeable the individual is about contraceptives and, by implication, the more modernized.

Fertility Preferences (FERP)

Fertility preferences, as the ultimate dependent variable in the model, was represented by two indicators, expected family size (EFS) and desired family size (DFS). The two variables were, however, covered under two separate headings in the survey; the former, under fecundity, while the latter was treated specifically under birth expectations.

**Expected family size (EFS)**

Expected family size indicates the total number of children that a respondent expects to bear in her fertility career. Respondents were asked, "Have you passed childbearing age?" If she answered no, a follow up question was asked: "What is your expected family size?" Responses ranged from 1 through 10 with a mean of 3.33.

**Desired family size (DFS)**

The desired family size is an ideal number of children in a hypothetical life condition. Respondents were asked: "If you could choose the number of children you want, how many children would you want to have?" Responses ranged from 0 through 8 with a mean of 3.1. Table 4.6 provides a summary of variables, their measures, range of values, means and standard deviations.

Statistical Techniques/analysis

This section deals principally with the statistical techniques used in analyzing the data. The choice of techniques was made to satisfy the study objectives as outlined in the introductory chapter. Each technique is briefly described and, where appropriate, its advantages and limitations are outlined. However, since the factor analytical technique and reliability tests were dealt with in the previous section, the focus of this section is on zero-
Table 4.6. Summary of variables, their measures, range of values, means and standard deviation

<table>
<thead>
<tr>
<th>Variables</th>
<th>Measure</th>
<th>Range</th>
<th>Mean</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Min</td>
<td>Max</td>
<td></td>
</tr>
<tr>
<td>A. Structural Modernity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-Age (RAGE)</td>
<td>age in years incl. last birthday</td>
<td>16.0</td>
<td>44.0</td>
<td>30.9</td>
</tr>
<tr>
<td>-Residence (REST)</td>
<td>categories of population density</td>
<td>1.0</td>
<td>5.0</td>
<td>3.2</td>
</tr>
<tr>
<td>-Education (REDD)</td>
<td># of years of formal education</td>
<td>0.0</td>
<td>22.0</td>
<td>6.1</td>
</tr>
<tr>
<td>-Family Income (FINC)</td>
<td>Various (10) sources of income</td>
<td>300.0</td>
<td>4800000.0</td>
<td>193897.2</td>
</tr>
<tr>
<td>B. Individual Modernity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-Modern attitudes (MOAT)</td>
<td>14 items on a 5-point scale</td>
<td>24.0</td>
<td>75.0</td>
<td>52.3</td>
</tr>
<tr>
<td>-Modern appliances (MOAP)</td>
<td>11 items on a 2-point scale</td>
<td>1.0</td>
<td>11.0</td>
<td>6.7</td>
</tr>
<tr>
<td>-Perceived cost of children (PCOS)</td>
<td>4 items on a 5-point scale</td>
<td>4.0</td>
<td>17.0</td>
<td>11.2</td>
</tr>
<tr>
<td>-Knowledge of contraceptives (CKNW)</td>
<td>13 items on a 2-point scale</td>
<td>0.0</td>
<td>13.0</td>
<td>7.5</td>
</tr>
<tr>
<td>C. Fertility Preferences</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-Expected family size (EFS)</td>
<td>1 question item</td>
<td>0.0</td>
<td>10.0</td>
<td>3.2</td>
</tr>
<tr>
<td>-Desired family size (DFS)</td>
<td>1 question item</td>
<td>0.0</td>
<td>8.0</td>
<td>3.1</td>
</tr>
</tbody>
</table>
order (Pearson) correlations, path analysis, and Joreskog and Sorbom's (1981) Linear Structural Relationships by the Method of Maximum Likelihood (LISREL) techniques.

Zero-order (Pearson) correlations

Zero-order correlations provide a unique opportunity to do the initial examination of the significance and pattern of relationships among variables beyond the usual simple frequency counts. Where the analysis goes beyond the examination of simple bivariate relationships, the correlation matrix provides a useful means for assessing the extent of collinearity among the test variables, so that the researcher can choose appropriate strategies to address the problem. Thirdly, as would be fully explained presently the correlation matrix is one of the two main input data (the other is the covariance matrix) for use in Versions V and VI of Joreskog and Sorbom's Linear Structural Relationships methodology. Zero-order correlations were used to serve all three purposes in this study.

Path analysis

As an aid to the quantitative development of genetics, path analysis was first developed by the geneticist Sewell Wright in the early parts of this century. The original idea was to provide a synthesis of the line of theoretical reasoning of the researcher through a diagrammatic presentation of a series of variables on the basis of several assumptions and principles (Pedhazur, 1982). Although the technique was "not intended to accomplish the impossible task of deducing causal relations from the values of the correlation coefficients" (Wright, 1934:193), its application today in the social sciences connotes causality. To apply it,
however, demands the satisfaction of several conditions and the making of some assumptions.

Pedhazur provides an excellent outline of the assumptions of path analysis. He writes:

1. The relations among the variables in the model are linear, additive and causal. Consequently, curvilinear, multiplicative or interaction relations are excluded.
2. Each residual is not correlated with the variables that precede it in the model. Exogenous variables are treated as 'givens.' Moreover, when exogenous variables are correlated among themselves these correlations are treated as 'givens' and remain unanalyzed.
3. There is a one-way causal flow in the system. That is, reciprocal causation between variables is ruled out.
4. The variables are measured on an interval scale.
5. The variables are measured without error.

(Pedhazur, 1982:582)

Implicit in these assumptions is also the absence of specification error, that is, an error in translating theory into equations (Kenny, 1979). Kenny goes on to state that for one to make a causal inference, particularly from correlational data, at least three conditions must hold; namely, 1) time precedence, i.e., a causal relationship is asymmetric, 2) there must be a functional relationship between the cause and effect variables and 3) nonspuriousness, i.e., for a relationship between two variables to be nonspurious there must not be a third variable that causes the first two variables such that when it is removed the relationship between the two variables vanishes.

Several issues have been raised by researchers against the use of path analysis in social research (Pedhazur, 1982; Miller and Stokes, 1975; Land, 1969; Heise, 1969). Pedhazur (1982) and Heise (1969), for example, have questioned the assumption of random errors in the light of the frequent occurrence of systematic errors in social research. Mention
has also been made about the unrealistic nature of the assumption of non-reciprocal causation. Thirdly, some of the inherent difficulties in measuring complex social phenomena such as anomie, attitudes, etc., with single indicators assumed in path analysis have been raised (Miller and Stokes, 1975).

Notwithstanding these difficulties (appropriate strategies have been used in this study to solve most of the problems), path analysis dominates current sociological research for several reasons, two of which are (a) easy identification of the direct and indirect effect of a variable on another (i.e., the identification of explicit relationships among variables) and (b) the ability to evaluate the extent to which a specified model fits the data.

In this study, however, the application of path analysis was limited to the realization of the first two objectives of the study. This was due, in part, to its limitation in analyzing the relationships among two or more unmeasured constructs (i.e., individual modernity and fertility preference). To resolve that problem, recourse was made to the use of LISREL.

**LISREL**

Originally developed by Joreskog (1973), LISREL is based on the statistical theory of maximum-likelihood. The idea of maximum-likelihood as stated by Mulaik (1972:162) assumes a prior knowledge of the general form of the "population distribution from which a sample is drawn."\(^6\) LISREL also shares some of the assumptions of path analysis, but unlike the latter, it can be used where measurement errors, correlated residuals and error terms prevail as well as the examination of reciprocal causation among variables.

LISREL consists of two major components; namely, the structural equation model and the measurement model. The
structural equation model deals with the relationships among the exogenous and the latent or unmeasured endogenous variables while the measurement model specifies the relationships among the unobserved or latent endogenous and exogenous variables and their empirical indicators (Joreskog and Sorbom, 1981). For the purpose of estimation, the structural model is defined by the equation:

$$\eta = \beta \eta + r \xi + \zeta$$

where $\eta$ (eta) is a vector of unobservable dependent variables; $\xi$ (xi) is a vector of unobservable independent variables, $\beta$ (beta) is a matrix of coefficients of the effects of endogenous variables on other endogenous variables; $r$ (gamma) is the matrix of the effects of exogenous variables on endogenous variables (etas); and $\zeta$ (zeta) "is a random vector of residuals or errors in the equation" (Joreskog and Sorbom, 1981:1.5).

The measurement models are of two types; (1) that which deals with the relationships between the latent endogenous variables ($\eta$) and their measures ($y$) expressed as:

$$y = \Lambda \eta + \epsilon$$

where $y$ is a vector of the measurement of the dependent variables, $\Lambda$ (lambda) is a matrix of loadings or coefficients of $y$ on the unobserved dependent variables ($\eta$), $\epsilon$ (epsilon) is a vector of errors in the measurement of the dependent variables ($y$); and (2) that which examines the relationships between the latent (unobserved) exogenous variables ($\xi$) and their measures ($x$). The equation is expressed as:

$$x = \Lambda \xi + \delta$$

where $x$ is a vector of the measures of the exogenous variables ($\xi$), $\Lambda$ (lambda) is a matrix of loadings or coefficients of $x$ on the exogenous variables and $\delta$ (delta) is a vector of errors in the measurement of the exogenous variables. In this study
the x and ε are not considered since the exogenous variables (ε) were assumed to have been measured without error.

As stated earlier, the simple path analytical technique was used to assess the strength of the causal relationships among all the measured independent and dependent variables (see fig. 5.1 and 5.2). The LISREL technique, on the other hand, was used to examine the causal relationships between the set of measured exogenous variables and the unmeasured endogenous variables on one hand, and between the two unmeasured endogenous variables on the other (see fig. 4.1).

Specifically the LISREL technique was used to estimate the following structural and measurement equations.

**Structural equations:**
\[ \eta_1 = \gamma_{11} \xi_1 + \gamma_{12} \xi_2 + \gamma_{13} \xi_3 + \gamma_{14} \xi_4 + \xi_1 \]
\[ \eta_2 = \gamma_{21} \xi_2 + \gamma_{22} \xi_2 + \gamma_{23} \xi_3 + \gamma_{24} \xi_4 + \xi_{21} + \xi_2 \]

**Measurement equations:**
\[ Y_1 = \lambda_1 \eta_1 + \varepsilon_1 \]
\[ Y_2 = \lambda_2 \eta_1 + \varepsilon_2 \]
\[ Y_3 = \lambda_3 \eta_1 + \varepsilon_3 \]
\[ Y_4 = \lambda_4 \eta_1 + \varepsilon_4 \]
\[ Y_5 = \lambda_5 \eta_2 + \varepsilon_5 \]
\[ Y_6 = \lambda_6 \eta_2 + \varepsilon_6 \]
Figure 4.1. Measurement model of individual modernity and fertility preference
CHAPTER V. ANALYSES AND FINDINGS

Introduction

The results of data analyses are presented in this chapter. These are organized into three main sections. First, the zero-order (Pearson) correlation matrix is presented and briefly discussed. This is followed by the results of the empirical hypotheses proposed in Chapter III. Finally the proposed LISREL model involving the two unmeasured constructs - individual modernity and fertility preference - is tested and evaluated; tentative conclusions drawn from the empirical findings conclude the chapter.

Zero-Order Correlations

Table 5.1 presents the zero-order correlation matrix of all the ten test variables. It must be emphasized that, at this point, there is no implication of causality in stating the relationships between variables. The main point of examination is to establish the significance of the degree of association among the test variables.

In all but five cases the magnitude of correlation coefficients are significant at the .05 level or better (1-tailed test). Of special interest is the consistency in the results of the hypothesized inverse relationships between all the four individual modernity variables and the two fertility preference variables.

Two out of four hypothesized relationships between age and all four individual modernity variables are significant. The non-significant relationships (age-ownership of modern appliances and age-perceived cost of children) are, however, inverse as predicted. Interestingly the predicted inverse relationship between age and modern attitudes on one hand, and age and knowledge of contraceptives on the other are strongly
Table 5.1. Zero-order (Pearson) correlation coefficients (N = 952)

<table>
<thead>
<tr>
<th></th>
<th>RAGE</th>
<th>RESI</th>
<th>REDU</th>
<th>FINC</th>
<th>MOAT</th>
<th>MOAP</th>
<th>PCOS</th>
<th>CKNW</th>
<th>EPS</th>
<th>DPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>RAGE</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RESI</td>
<td>0.02</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>REDU</td>
<td>-0.29**</td>
<td>0.17**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FINC</td>
<td>-0.08*</td>
<td>0.20**</td>
<td>0.13**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>MOAT</td>
<td>-0.14**</td>
<td>0.14**</td>
<td>0.50**</td>
<td>0.20**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>MOAP</td>
<td>-0.02</td>
<td>0.36**</td>
<td>0.42**</td>
<td>0.26**</td>
<td>0.35**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCOS</td>
<td>-0.03</td>
<td>0.01</td>
<td>0.16**</td>
<td>0.06*</td>
<td>0.13**</td>
<td>0.12**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CKNW</td>
<td>-0.21**</td>
<td>0.18**</td>
<td>0.51**</td>
<td>0.15**</td>
<td>0.45**</td>
<td>0.35**</td>
<td>0.12**</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EPS</td>
<td>0.39**</td>
<td>-0.15**</td>
<td>-0.34**</td>
<td>-0.06*</td>
<td>-0.22**</td>
<td>-0.20**</td>
<td>-0.07*</td>
<td>-0.26**</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>DPS</td>
<td>0.22**</td>
<td>-0.10**</td>
<td>-0.23**</td>
<td>-0.03</td>
<td>-0.20**</td>
<td>-0.16**</td>
<td>-0.05*</td>
<td>-0.20**</td>
<td>0.42**</td>
<td>1.00</td>
</tr>
</tbody>
</table>

*Significant at .05 level or better. 1-tailed test.

**Significant at .01 level or better. 1-tailed test.
supported by the data. Age also consistently correlates positively with expected and desired family size.

Surprisingly, the relationship between residence and perceived cost of children is very low and not significant, although the result is in the predicted direction. Residence, however, correlates positively with modern attitudes, ownership of modern appliances and knowledge of contraceptives; it is also inversely correlated with expected and desired family size as predicted.

The hypothesized relationships between education and all four modernity variables on one hand, and the fertility preference variables on the other are very high. For example, education consistently correlates inversely with expected and desired family size although the magnitude of correlation coefficient is far higher with the former than the latter. All six correlations are significant at the specified level.

The hypothesized inverse relationship between family income and perceived cost of children shows the reverse. The reverse is also the case for the predicted positive relationships between family income and the fertility preference variables, although the magnitude of the correlation coefficients are very low. Of interest also are the significant positive relationships among all four individual modernity variables - an indication that they can be used as indicators for the unmeasured individual modernity construct. Similarly the relatively high and positive correlation between the ultimate dependent variables - desired and expected family size (.42) - suggests that they can be used as valid measures for the unmeasured construct, fertility preference.

In summary, a review of the correlation matrix suggests that there is no problem of collinearity and by implication
the data can be subjected to a relatively higher level of statistical analysis (Pedhazzur, 1982).

Results of Tests of Hypotheses

Results of the hypotheses are provided in Tables 5.2, 5.3 and 5.4. Results of hypotheses involving the structural and individual modernity variables are provided in Table 5.2. Table 5.3 contains results of the hypotheses involving the individual modernity variables only. In Table 5.4 the results of the hypotheses involving the ultimate dependent variables (expected and desired family size) and the structural and individual modernity variables are presented. The first two sets of information are presented in the following format. In the first column of each table, the hypotheses are restated with the predicted (+) or (-) sign in parentheses; then the zero-order correlation coefficients are given, followed by the standardized (g) path coefficient. Since the hypotheses involving the fertility preference variables were stated "jointly," columns two and three of Table 5.4 contain both the correlation coefficients (in parentheses) and the standardized (g) path coefficients of the specified relationships; i.e., the beta weights of the independent variable on the two dependent variables are reported in the following order: r, beta, beta, r. The results are also provided in a diagrammatic form on the two path diagrams (see Figures 5.1 and 5.2).

Direct effect of structural variables on individual modernity variables (Hypotheses 1.1.1. - 1.4.3.)

As indicated earlier the magnitude of the direct effects (beta) of the structural variables on the individual modernity variables are provided in column 3 of Table 5.2. Ten out of
Table 5.2. Results of hypotheses involving structural and individual modernity variables

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Zero-Order correlation</th>
<th>beta</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1.1. The older the respondent the lower her score on the modern attitude index (−)</td>
<td>-.14*</td>
<td>0.01</td>
</tr>
<tr>
<td>1.1.2. The older the respondent the fewer the units of consumer durables she owns (−)</td>
<td>-.02</td>
<td>0.09*</td>
</tr>
<tr>
<td>1.1.3. The older the respondent the lower her score on the perceived cost of children index (−)</td>
<td>-.03</td>
<td>0.01</td>
</tr>
<tr>
<td>1.1.4. The older the respondent the fewer the number of contraceptive devices and methods she is familiar with (−)</td>
<td>-.21*</td>
<td>-.08*</td>
</tr>
<tr>
<td>1.2.1. The higher the density of population at respondent's residential area, the higher her score on the modern attitude index (+)</td>
<td>0.14*</td>
<td>0.03</td>
</tr>
<tr>
<td>1.2.2. The higher the density of population at respondent's residential area, the more units of consumer durables she owns (+)</td>
<td>0.36*</td>
<td>0.25*</td>
</tr>
<tr>
<td>1.2.3. The higher the density of population at respondent's residential area, the higher her score on the perceived cost of children index (+)</td>
<td>0.01</td>
<td>-.04</td>
</tr>
<tr>
<td>1.2.4. The higher the density of population at respondent's residential area, the greater the number of contraceptive devices and methods she is familiar with (+)</td>
<td>0.18*</td>
<td>0.05*</td>
</tr>
</tbody>
</table>

*Significant at .05 level or better.
Table 5.2. Continued

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Zero-Order correlation</th>
<th>beta</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.3.1. The greater the number of years of formal education attained by the respondent, the higher her score on the modern attitude index (+)</td>
<td>0.50*</td>
<td>0.45*</td>
</tr>
<tr>
<td>1.3.2. The greater the number of years of formal education attained by the respondent, the more units of consumer durables she owns (+)</td>
<td>0.42*</td>
<td>0.30*</td>
</tr>
<tr>
<td>1.3.3. The greater the number of years of formal education attained by the respondent, the higher her score on the perceived cost of children index (+)</td>
<td>0.16*</td>
<td>0.11*</td>
</tr>
<tr>
<td>1.3.4. The greater the number of years of formal education attained by the respondent, the greater the number of contraceptive devices and methods she is familiar with (+)</td>
<td>0.51*</td>
<td>0.31*</td>
</tr>
<tr>
<td>1.4.1. The higher the total monetary earnings of respondent's family, the higher her score on the index of modern attitudes (+)</td>
<td>0.20*</td>
<td>0.18*</td>
</tr>
<tr>
<td>1.4.2. The higher the total income of respondent's family, the more units of consumer durables she owns (+)</td>
<td>0.26*</td>
<td>0.20*</td>
</tr>
<tr>
<td>1.4.3. The higher the total income of respondent's family, the lower her score on the perceived cost of children index (-)</td>
<td>0.06*</td>
<td>0.00</td>
</tr>
</tbody>
</table>
*Significant at .05 level or better.

Figure 5.1. Structural relationships among the observed variables.
*Significant at .05 or better.

Figure 5.2. Structural relationships among the observed variables
the fifteen hypothesized relationships are significantly confirmed by the data (p \leq .05).

Contrary to the results of the zero-order correlation, the direct effects of age on modern attitudes, ownership of modern appliances and perceived cost of children are positive although only the effect on ownership of modern appliances is significant (beta = .09). This indicates how widespread the fruits or benefits of Taiwan's economic development is within all the age categories of the Taiwanese society (Jacoby, 1966). The hypothesized inverse effect of age on contraceptive knowledge, however, is supported by the data (beta = -.08).

The three hypotheses linking respondent's residential population density with ownership of modern appliances, knowledge of contraceptives and modern attitudes are supported. The effect of residence on attitude, however, is not significant (beta = .03) - another indication that the population density of one's residential area may have very little to do with one's attitudes about modern life. The results leave unsupported the predicted positive effect of residence on perceived cost of children. Indeed the reverse is the case, although the beta value is not significant. In summary the data suggest that, while one's residential population density may have some positive effects on one's ownership of modern appliances as well as one's knowledge about contraceptive devices and methods, the same variable may have virtually nothing significant to do with one's attitudes or with one's perceptions about the cost of raising children.

Education shows up as the structural variable with the strongest positive impact on modern attitudes, ownership of modern appliances, perceived cost of children and knowledge of contraceptives. All four hypotheses are confirmed by the data; indeed, the magnitude of education's effect on modern
attitudes (beta = .45) reaffirms its characterization by Thorton et al. (1986) as the "work horse" of an individual's modernization process.

The effects of total family income on the individual modernity variables are generally mixed. While family income significantly affects modern attitudes as well as the ownership of appliances consistent with modern life, the hypothesized negative effect of family income on perceived cost of children is not supported. Indeed, the data seem to suggest that one's perceptions about the costs associated with childbearing are completely independent of or have nothing significant to do with one's level of income.

In summary, on the basis of level of significance, as well as the magnitude of effect coefficients, education exercises the strongest influence on all the individual modernity variables, followed by family income and residence in that order. The influence of age on the modernity variables is generally mixed.

Hypotheses linking individual modernity variables (H 2.1.1. - 2.3.1.)

Results of tests of hypotheses linking all the individual modernity variables are summarized in Table 5.3. Five out of six hypotheses are supported and significant although the magnitude of the effects between some of the specified relationships is less than anticipated. However, given the often reported low predictive power of individual/social psychological variables (Kiser and Whelpton, 1953; Rice and Beegle, 1972; Poston, 1975), most of the observed relationships may be considered as reasonable.

The strongest effects, in terms of beta weights, are between: modern attitudes and knowledge of contraceptives (beta = .22), modern attitudes and ownership of modern
Table 5.3. Results of hypotheses involving individual modernity variables only

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Zero-order correlation</th>
<th>Beta</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1.1. The higher the respondent's score on the modern attitudes index, the more units of consumer durables she owns (+)</td>
<td>0.35*</td>
<td>0.12*</td>
</tr>
<tr>
<td>2.1.2. The higher the respondent's score on the modern attitudes index, the higher her score on the perceived cost of children index (+)</td>
<td>0.13*</td>
<td>0.06*</td>
</tr>
<tr>
<td>2.1.3. The higher the respondent's score on the modern attitudes index, the greater the number of contraceptive devices and methods she is familiar with (+)</td>
<td>0.45*</td>
<td>0.22*</td>
</tr>
<tr>
<td>2.2.1. The more units of consumer durables owned by the respondent, the higher her score on the perceived cost of children index (+)</td>
<td>0.12*</td>
<td>0.07*</td>
</tr>
<tr>
<td>2.2.2. The more units of consumer durables owned by the respondent, the greater the number of contraceptive devices and methods she is familiar with (+)</td>
<td>0.35*</td>
<td>0.10*</td>
</tr>
<tr>
<td>2.3.1. The higher the respondent's score on the perceived cost of children index, the greater the number of contraceptive devices and methods she is familiar with (+)</td>
<td>0.12*</td>
<td>0.02</td>
</tr>
</tbody>
</table>

*Beta significant at .05 level or better.
appliances (beta = .12) and, ownership of modern appliances and knowledge of contraceptives (beta = .10). The effects of modern attitudes on perceived cost of children as well as the impact of ownership of modern appliances on perceived cost of children, though relatively low, are positive and are in the predicted direction. Surprisingly, the effect of perceived cost of children on knowledge of contraceptives, though positive as predicted, is not very significant. This suggests that an individual's knowledge of contraceptive devices and methods is independent of her perceptions about the costs associated with childbearing. This observation will be examined further in the subsequent section because of the theoretical and methodological relevance of that relationship to this study.

In summary, the strong positive effects of modern attitudes on both ownership of modern appliances and knowledge of contraceptives on one hand, and the effect of ownership of modern appliances on knowledge of contraceptives on the other, suggest that once an individual develops modern attitudes, there is the tendency for her not only to rearrange her priorities but also to seek for knowledge on the activities that shall lead her to achieve her specified goals (McClelland, 1961).

Hypotheses linking the structural and individual modernity variables to the fertility preference variables (H 3.1.1 - 3.2.4.)

Table 5.4 provides summary statistics of the tests of hypotheses linking all the structural and individual modernity variables to expected and desired family size. As pointed out earlier, the hypotheses and the results are presented concurrently for reasons of brevity.
Table 5.4. Results of hypotheses involving structural and individual modernity variables, and expected and desired family size (EFS, DFS)\(^a\)

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>EFS beta</th>
<th>DFS beta</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1.1. The older the respondent, the greater the number of children she expects/desires (+)</td>
<td>(.39(<em>)) 0.33(</em>) 0.18(<em>) (.22(</em>))</td>
<td></td>
</tr>
<tr>
<td>3.1.2. The higher the density of population at respondent's residential area, the fewer the number of children she would expect/desire (-)</td>
<td>(-.15(<em>)) -.10(</em>) -.05(<em>) (-.10(</em>))</td>
<td></td>
</tr>
<tr>
<td>3.1.3. The greater the number of years of formal education attained by the respondent, the fewer the number of children she would expect/desire (-)</td>
<td>(-.34(<em>)) -.15(</em>) -.09(<em>) (-.23(</em>))</td>
<td></td>
</tr>
<tr>
<td>3.1.4. The higher the total monetary earnings of respondent's family, the greater the number of children she would expect/desire (+)</td>
<td>(-.06(<em>)) 0.08(</em>) 0.08(*) (.03)</td>
<td></td>
</tr>
<tr>
<td>3.2.1. The higher the respondent's score on the index of modern attitudes, the fewer number of children she would expect/desire (-)</td>
<td>(-.22(<em>)) -.05(</em>) -.05(<em>) (.20(</em>))</td>
<td></td>
</tr>
</tbody>
</table>

\(^a\)Zero-order correlation coefficients are in parentheses.

\(^*\)Significant at .05 level or better.
Table 5.4. Continued

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>EFS</th>
<th>DFS</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.2.2. The more units of consumer durables owned by respondent, the fewer number of children she would expect/desire (-)</td>
<td>(-.20*)</td>
<td>-.08*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- .08* (-.16*)</td>
</tr>
<tr>
<td>3.2.3. The higher the respondent's score on the perceived cost of children index, the fewer number of children she would expect/desire (-)</td>
<td>(-.07*)</td>
<td>-.02</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-.01   (-.05*)</td>
</tr>
<tr>
<td>3.2.4. The greater the number of contraceptive devices and methods respondent is familiar with, the fewer the number of children she would expect/desire (-)</td>
<td>(-.26*)</td>
<td>-.06*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-.07*  (-.20*)</td>
</tr>
</tbody>
</table>
First on the list is the result of the specified relationship between age and the response variables. True to the prediction, age has significant positive effects on expected and desired family size. The magnitude of the effect coefficient, however, is larger on the former than the latter. This suggests that the respondents' responses to the expected family size question were provided against the backdrop of their actual total family members. Recall that the mean value of the expected family size variable ($\bar{x} = 3.2$) was slightly higher than the mean value of desired family size ($\bar{x} = 3.1$). Therefore, a compulsion to maintain cognitive consistency seems apparent (see Table 4.6).

Similar patterns of differential effects are obtained for the hypothesized relationships involving education and residence and the two response variables. In both cases also, the effects on expected family size are slightly higher than desired family size. Like age, the effect of family income on the fertility preference variables is positive. This result provides some support to Becker's (1960) thesis that links increased income to increased demand for children.

All the hypothesized negative effects of individual modernity variables on the fertility preference variables are confirmed by the data. Ownership of modern appliances has the strongest impact (.08) among all four modernity variables, followed by knowledge of contraceptives and modern attitudes. The effects of perceived cost of children on the response variables are inverse as predicted but they are not significant at the specified level - an indication that the expectation or desire for children is somewhat independent of perceptions about the costs associated with childbearing. This result seems a little surprising.

In summary, 23 of the 27 hypothesized relationships have been supported by the data. Twenty of them are very
significant at the specified (.05) level. One of the four unconfirmed hypotheses showed the reverse but the result is not significant, two were in the predicted direction but the results are also not significant while the hypothesized relationship between family income and perceived cost of children showed no relationship whatsoever.

Examining an Overall Model of Individual Modernity and Fertility Preference

Results of specific tests of hypotheses where each hypothesis was considered individually were presented in the previous section. A follow-up of the simple tests is to estimate the relationships among the exogenous variables and the unmeasured constructs - individual modernity and fertility preference. This is done with the view to determining the total, direct and indirect effects of the independent variables on the dependent variable as well as the overall contribution of the test variables in the explanation of human fertility preference. The first part of this section deals with the selection and justification of indicators for the unmeasured concepts. The selected manifest and resultant latent variables are then modeled consistent with the structural and measurement equations derived from the model proposed in Chapter IV (see Figure 4.1). Then the LISREL VI statistical package is used to delineate the total, direct and indirect effects of the independent variables on the dependent variables. Finally the proposed model is revised, re-tested and evaluated.

The choice of the LISREL VI statistical package over the usual practice of creating composite indices out of the manifest variables is that LISREL VI permits its user to separate the latent variable from the measurement errors of the manifest variables "thereby affording the study of
meaningful relations" (Pedhazur, 1982:641) among the latent variables.

Selection of Indicators for the Latent Variables

For the latent variable, individual modernity (INDMOD), all the four manifest variables (i.e., modern attitudes, ownership of modern appliances, perceived cost of children and knowledge of contraceptives) so far discussed under individual modernity are being retained as appropriate indicators of the concept. Also the two manifest variables (expected and desired family size) already considered under fertility preference will be considered as adequate measures for the latent fertility preference construct.

Three reasons may be assigned for the choices made. First, in the case of the fertility preference construct, the variables selected are the two main variables among the test variables that directly address the issue of the individual's birth expectations. The relatively high positive correlation between the two variables (.42) is another justification. A similar argument can be advanced in support of the selected indicators for the individual modernity construct, in that, all the four variables address issues pertinent to the individual's participation in modern life. The third reason relates to theory. All the theoretical arguments advanced in support of the specified relationships among the variables, thus far, have had some empirical validation from the preceding analysis. These views have been also expressed by Pedhazur (1982) and Labovitz and Hagedorn (1981). The latter contend that "the choice of indicators depends on the availability of information, the likelihood of obtaining certain kinds of information and the theory guiding the researcher" (Labovitz and Hagedorn, 1981:38).
Results of the Initial Model

The results of the initial model are summarized in Figure 5.3 and also in Table 5.5. Statistically significant lambda, gamma and beta maximum-likelihood estimates are denoted by an asterisk. The criterion for statistical significance of the parameters at the .05 level is a t-value of two or greater (Lewis-Beck; Joreskog and Sorbom, 1981). The first half of the table deals with estimates deemed very important for the analysis while the bottom half (B) contains summary statistics of the total, direct and indirect effects of the independent variables on the dependent variables. A full listing of all the parameter estimates is provided in appendix C.

Table 5.5 reveals that all the parameter estimates of the measurement model (lambdas) are significant (t \( \geq 2 \)). This indicates that all the indicators are valid measures of the two concepts they are being used to measure. Three of the eight gamma estimates are, however, not significant. Specifically, the paths radiating from residence, education and family income to fertility preference are not significant, although the path linking family income and fertility preference appears moderately strong (.054; t = 1.899). Notice that with the exception of age, all the structural variables have very strong and significant positive impact on individual modernity. Of special interest is the very strong and direct negative effect of individual modernity on fertility preference (beta = -.323, t = 8.196).

In summary, the following conclusions can be drawn from the data: (a) While fertility preference may be a direct function of age, the impacts of education, residence and family income are both direct and indirect through individual modernity. (b) The direct effect of the purely socioeconomic variables on fertility preference are very weak. (c) Individual modernity (measured by modern attitudes,
*Significant $t \geq 2$.

Figure 5.3. Initial model of fertility preference
Table 5.5. Maximum-likelihood estimates (MLE), standard errors (SE), T-values \( \times \times \) Total, direct and indirect effects of independent variables on dependent variables

<table>
<thead>
<tr>
<th>Parameter</th>
<th>MLE</th>
<th>SE</th>
<th>T-V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lambda Y 2,1</td>
<td>0.944*</td>
<td>0.064</td>
<td>14.618</td>
</tr>
<tr>
<td>3,1</td>
<td>0.305*</td>
<td>0.058</td>
<td>5.296</td>
</tr>
<tr>
<td>4,1</td>
<td>1.010*</td>
<td>0.065</td>
<td>15.450</td>
</tr>
<tr>
<td>5,2</td>
<td>1.541*</td>
<td>0.151</td>
<td>10.231</td>
</tr>
<tr>
<td>Beta 2,1</td>
<td>-.362*</td>
<td>0.089</td>
<td>-3.643</td>
</tr>
<tr>
<td>Gamma 1,1</td>
<td>0.009</td>
<td>0.020</td>
<td>0.460</td>
</tr>
<tr>
<td>1,2</td>
<td>0.118*</td>
<td>0.020</td>
<td>5.910</td>
</tr>
<tr>
<td>1,3</td>
<td>0.455*</td>
<td>0.026</td>
<td>17.354</td>
</tr>
<tr>
<td>1,4</td>
<td>0.122*</td>
<td>0.020</td>
<td>6.120</td>
</tr>
<tr>
<td>2,1</td>
<td>0.209*</td>
<td>0.025</td>
<td>8.196</td>
</tr>
<tr>
<td>2,2</td>
<td>-.041</td>
<td>0.021</td>
<td>-1.899</td>
</tr>
<tr>
<td>2,3</td>
<td>-.003</td>
<td>0.043</td>
<td>-0.064</td>
</tr>
<tr>
<td>2,4</td>
<td>0.054*</td>
<td>0.022</td>
<td>2.489</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variable Names</th>
<th>Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dependent</td>
<td>Independent</td>
</tr>
<tr>
<td>Individual modernity</td>
<td>Age</td>
</tr>
<tr>
<td></td>
<td>Residence</td>
</tr>
<tr>
<td></td>
<td>Education</td>
</tr>
<tr>
<td></td>
<td>Family Income</td>
</tr>
<tr>
<td>Fertility preference</td>
<td>Age</td>
</tr>
<tr>
<td></td>
<td>Residence</td>
</tr>
<tr>
<td></td>
<td>Education</td>
</tr>
<tr>
<td></td>
<td>Family Income</td>
</tr>
<tr>
<td>Fert. Preference</td>
<td>Individual Modernity</td>
</tr>
</tbody>
</table>

*\( t > 2 \) is significant at .05 or better.
ownership of modern appliances, perceived cost of children and knowledge of contraceptives) has strong negative effect on fertility preference independent of the structural variables. (d) Finally the proposed model explains approximately 75% of the variance in fertility preference, $\chi^2(24) = 104.52$, $p = 0.000$.

Revision of the Proposed Model

The suggestion has been made that path coefficients that do not meet the criterion of statistical significance after the initial test should be deleted and the model re-examined (Duncan, 1975, Heise, 1969). By implication the non-significant paths are to be hypothesized to be equal to zero and the overall model re-examined. The idea is that if the null hypotheses should be accepted there should be significant changes in the parameter estimates, the $R^2$ and the chi-square value of the revised model. This approach which has been variously described as overidentifying restrictions (Pedhazur, 1982) and theory trimming (Heise, 1969), has been criticized by McPherson (1976) and several others because of its post hoc nature. However, given the exploratory nature of this study, resort is made to Duncan's (1975) and Heise's (1969) suggestion, i.e., the paths are dropped and the model revised.

The results of test of hypotheses that the non-significant paths are equal to zero are provided in Figure 5.4 and Table 5.6. Notice that no significant changes occur in the parameter estimates of the remaining paths. Also the change in the chi-square (i.e., $108.73 - 104.52 = 4.21$) and the associated change in degrees of freedom (i.e., $27 - 24 = 3$) is less than their associated critical value of 7.815 (from tables $\alpha = .05$). This indicates that regardless of their low beta weights the deletion of the non-significant paths
*Significant $t \geq 2$.

Figure 5.4. Revised model of fertility preference
Table 5.6. Maximum-likelihood estimates, $R^2$ and $\chi^2$ of the initial and revised models

<table>
<thead>
<tr>
<th></th>
<th>Initial</th>
<th>Revised</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lambda</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1</td>
<td>1.000</td>
<td>1.000</td>
</tr>
<tr>
<td>2.1</td>
<td>.935</td>
<td>.944</td>
</tr>
<tr>
<td>3.1</td>
<td>.305</td>
<td>.305</td>
</tr>
<tr>
<td>4.1</td>
<td>1.006</td>
<td>1.010</td>
</tr>
<tr>
<td>5.2</td>
<td>1.549</td>
<td>1.541</td>
</tr>
<tr>
<td>6.2</td>
<td>1.000</td>
<td>1.000</td>
</tr>
<tr>
<td><strong>Beta</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1</td>
<td>-.323</td>
<td>-.362</td>
</tr>
<tr>
<td><strong>Gamma</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1</td>
<td>.009</td>
<td>.000</td>
</tr>
<tr>
<td>1.2</td>
<td>.118</td>
<td>.128</td>
</tr>
<tr>
<td>1.3</td>
<td>.455</td>
<td>.448</td>
</tr>
<tr>
<td>1.4</td>
<td>.122</td>
<td>.119</td>
</tr>
<tr>
<td>2.1</td>
<td>.209</td>
<td>.203</td>
</tr>
<tr>
<td>2.2</td>
<td>-.041</td>
<td>.000</td>
</tr>
<tr>
<td>2.3</td>
<td>-.003</td>
<td>.000</td>
</tr>
<tr>
<td>2.4</td>
<td>.054</td>
<td>.052</td>
</tr>
<tr>
<td><strong>$R^2$</strong></td>
<td>.745</td>
<td>.746</td>
</tr>
<tr>
<td><strong>$\chi^2$</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\chi^2_{(24)}$</td>
<td>104.52</td>
<td></td>
</tr>
<tr>
<td>$\chi^2_{(27)}$</td>
<td>108.73</td>
<td></td>
</tr>
</tbody>
</table>

$\Delta\chi^2 = 108.73 - 104.52 = 4.21$  \hspace{1cm} Let $\alpha = .05$, $cv: 7.815$

$\chi^2_{(3)}, 4.21 < 7.815$ N.S.
does not lead to any significant improvement in the originally proposed model. Consequently the initial model is retained in its entirety for the rest of the analysis.

Assessment of Fit of the Proposed Model

Several tools have been suggested for the assessment of the fit and the detection of lack of fit following the application of LISREL VI statistical package to data. While some of the tools are generated automatically by the LISREL statistical package, others have been developed, lately, in view of some observed inadequacies in some of the previously used tools. The absolute chi-square value and its associated probability level, for example, have been found to be very sensitive to larger sample sizes as well as departures from multivariate normality assumed in the use of the method of maximum-likelihood (Joreskog and Sorbom, 1983; Long, 1983). The choice of assessment criteria, therefore, is a function of sample size.

Given the relatively large sample size of this study (N = 952), the following suggested criteria generated by the LISREL VI statistical package are used in the assessment of fit: standard errors (SE), squared multiple correlation (SMC), total coefficients of determination ($R^2$), goodness of fit index (GFI), adjusted goodness of fit index (AGFI) and the root mean square residual (RMR). Two other measures that take account of sample size and degrees of freedom - the relative chi-square ($\chi^2/df$) and the critical number (CN), proposed by Wheaten et al. (1979) and Hoetler (1983) respectively - are also used in the assessment of fit of the proposed model.

Following is a brief description as well as the computation procedures of some of the selected assessment of fit criteria. The test statistic of GFI and AGFI takes the values of zero to one. The higher the statistic the greater
the fit of the model to the data. The RMR also has the same range of values, but unlike GFI and AGFI the closer its test statistic is to zero the better the fit of the model to the data (Joreskog and Sorbom, 1983).

The relative chi-square (Wheaten et al., 1975) is the ratio of the chi-square value to the degrees of freedom; and if the value is less than five (i.e., $\chi^2/df < 5$), the model is considered as a good fit. Finally, the CN which derives from the statistical theory of normality and the Z transformation is computed by the formula:

$$CN = \frac{(Z_{\text{critical}} + \sqrt{2 \cdot df - 1})^2}{2 \chi^2/N - G} + G$$

where:
- $Z_{\text{critical}}$ = Z value for the normal distribution (i.e., 1.96; $a = .05$)
- $df$ = Degrees of freedom (24)
- $\chi^2$ = Chi-square (104.52)
- $N$ = Sample size (952)
- $G$ = Number of groups being analyzed (1)

According to Hoetler (1983) a critical number (CN) greater than 200G denotes a good model fit. A question might be raised as to why the "magic" figure of 200G. Hoetler (1983) explains that at 200G the average residual variation between two estimated parameters when standardized is always less than 1%. He also contends that maximum-likelihood estimates have been found to be robust to departures from normality when the sample size (N) exceeds 200.

Table 5.7 provides summary statistics on the assessment of fit of the model to the data by criteria. The first part of the table deals with criteria for the overall fit of the model. Statistics on some additional criteria for the
Table 5.7. Assessment of fit of proposed model by criteria

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Overall fit of model to data</strong></td>
<td></td>
</tr>
<tr>
<td>Goodness of Fit Index (GFI)</td>
<td>0.98</td>
</tr>
<tr>
<td>Adjusted Goodness of Fit Index (AGFI)</td>
<td>0.95</td>
</tr>
<tr>
<td>Root Mean square Residual (RMR)</td>
<td>0.04</td>
</tr>
<tr>
<td>Relative chi-square (104.52/24)</td>
<td>4.36</td>
</tr>
<tr>
<td>Critical Number (CN)</td>
<td>208.59</td>
</tr>
<tr>
<td><strong>B. Goodness of Fit of Model</strong></td>
<td></td>
</tr>
<tr>
<td>Measurement model; SMC SE</td>
<td></td>
</tr>
<tr>
<td>MOAT ( (Y_1) )</td>
<td>0.402</td>
</tr>
<tr>
<td>MOAP ( (Y_2) )</td>
<td>0.352</td>
</tr>
<tr>
<td>PCOS ( (Y_3) )</td>
<td>0.038</td>
</tr>
<tr>
<td>CKNW ( (Y_4) )</td>
<td>0.407</td>
</tr>
<tr>
<td>EFS ( (Y_5) )</td>
<td>0.651</td>
</tr>
<tr>
<td>DFS ( (Y_6) )</td>
<td>0.271</td>
</tr>
<tr>
<td>Structural equations; ( ^a )</td>
<td></td>
</tr>
<tr>
<td>INDMOD ( (\eta_1) )</td>
<td>0.677</td>
</tr>
<tr>
<td>FERP ( (\eta_2) )</td>
<td>0.386</td>
</tr>
<tr>
<td>Total coefficient of determination for the structural model; ( ^c )</td>
<td>0.745</td>
</tr>
</tbody>
</table>

\( ^a \)The proportion of variance in the indicators that is explained by their relationships with the latent endogenous variables.

\( ^b \)The proportion of variance in the latent endogenous variables that is explained by the variables to which they are related in the model.

\( ^c \)The proportion of variance in the latent endogenous variables that is explained by the model (Total R\(^2\)).
assessment of goodness of fit are also provided in the second part of the table.

The table reveals that the values of GFI (0.98) and AGFI (0.95) are closer to one while that of RMR (0.04) is closer to zero - all of which indicate an overall good fit. Secondly, the relative chi-square value of 4.36 and CN value of 208.59 are respectively less than and greater than 5 and 200. Therefore both values also provide evidence of the overall fit of the model to the data.

Results of the other goodness of fit criteria also show that none of the squared multiple correlations is negative; neither is the total coefficient of determination negative. Also none of the standard errors is "extremely" large; all of these observations indicate goodness of fit of the model (Joreskog and Sorbom, 1983:1-36). Nevertheless, the rather low squared multiple correlation coefficient of the perceived cost of children variable \[PCOS (Y_3)\] raises some concern. This indicates the low predictive power of the variable which, in part, reflects some inadequacies in its measurement. Recall that the test reliability on the variables which went into the PCOS index yielded a Cronbach alpha value of .43, but the variable was not dropped due to the exploratory character of this study. In summary, on the basis of the results from the application of the various tools for assessment, the proposed model fits the data very well.

Summary of Findings

Results from the application of the various analytical tools to the data and the brief discussion of the empirical findings provide some leads to draw the following tentative conclusions:

1. While individual experiences with structural changes such as improved access to formal education, changing patterns
of human population concentration and income distribution may have some impacts on human fertility preference, the experiences evidently produce their greatest impacts through individuals' attitudinal dispositions, their knowledge about contraceptives, and their perceptions about the costs of childbearing as well as their chosen lifestyles.

2. Although education may have a very negligible direct effect on individual's fertility preference, the magnitude of its indirect effect on fertility preference is very substantial.

3. The role of education in changing the attitudes of individuals in particular and the total transformation of the personality is very tremendous.

4. Individual modernity has the strongest negative effect on fertility preference independent of the structural variables. This by no means negates the significant role of the structural change variables.

5. When the individual modernity variable is broken down into its major component parts, ownership of modern appliances has the strongest inhibiting effect on fertility preference.

6. Modernity attitudes of individuals have direct positive effects on their knowledge, their perceptions and their chosen lifestyle, and an inverse effect on their fertility preference.

7. Fertility preference is inversely related to knowledge of contraceptives and perceptions about the costs of childbearing.

These findings and their implications are discussed at length in the subsequent chapter.
CHAPTER VI. DISCUSSION, IMPLICATIONS AND CONCLUSION

Introduction
This chapter is divided into three main sections. First, the empirical findings are discussed within the contexts of the proposed model and previous research. The theoretical and policy implications of the study are provided in section two. Finally the study's limitations are briefly discussed and suggestions for further inquiry provided.

Discussion
Demographic analyses in general have shown consistent relationships between overall societal and individual modernity and fertility preference. Opinions, however, differ among researchers as to whether the structural or the individual component of modernity offer a better explanation of human fertility preference.

Proponents of the structural modernity perspective (Lorimer, 1955; Davis and Blake, 1956; More, 1959; Rice and Beegle, 1972) are quick to point out that, cultural and geographical differences, notwithstanding, since all societies differ markedly in social organization, a better explanation of human fertility preference should be sought within a socio-structural framework. Consequently, they emphasize social stratification variables such as education, religion, income, urban-rural residence, work status of women and several others in analyzing fertility preferences within and between societies. To the structuralists, therefore, appropriate attitudes, and more importantly, appropriate behavior will be forthcoming once the necessary structural changes are set into motion.

Advocates of the social psychological perspective, on the other hand, view human behavior (fertility preference
included) as the result of many individual acts and decisions made within a framework of motivational, attitudinal and biological constraints (McClelland, 1969; Smith and Inkeles, 1966; Hagen, 1962; Hawthorn, 1982). For example, McClelland (1969) and Hagen (1962) have argued with a great deal of conviction that society, as a whole, develops as a result of the workings of certain psychological factors. Where these factors are present, change will take place. Consequently they suggest that rather than concentrating on technological and stratification factors, the focus should be on individuals with unique personality attributes. In summary, attitudinal and value changes, according to the social psychological perspective, should be seen as the prerequisites for the creation of a modern society, economy and political system.

The viewpoint taken in this study, as in a few recent ones (Miller and Inkeles, 1974; Bagozzi and Van Loo, 1978; Yamanaka et al., 1982), is that for a better explanation of human intentions and ultimately their behavior, both approaches are needed, and, indeed, they complement each other. This study however differs from the previous ones in that it moves beyond the conceptualization of individual modernity from the purely attitudinal aspects to incorporate the perceptions, preferred lifestyle and knowledge of the individual pertinent to the intention or behavior under investigation. In other words, the implicit assumption in the model proposed and tested in this study is that structural change (modernity) affects the modal characteristics of individuals and that it is the interaction between societal modernity (i.e., self-sustaining growth in the economy, improved access to education, changing residential patterns, etc.) and individual modernity (i.e., diffusion of secular-rational norms, knowledge, lifestyles, etc.) that translate into specific behavioral patterns over time. Also implied in the model is the assumption that
individuals respond to changes in society in terms of their personal goals, not societal goals (Davis, 1963). Thus if, following structural changes in a society, the individual members in the society do not stand to gain by behaving in a particular way (childbearing included), they will not behave that way. It is in this light that the empirical findings of this study are discussed.

Most of the predictions derived from the proposed model were supported by the data, a few others were not, and in one case the evidence was inconclusive. Results relevant to the confirmed predictions will now be reviewed, and in the few cases where the results were in the reverse or inconclusive, the focus will be on the direction of the observed relationship.

Structural (Change) Modernity and Fertility Preference

Age

The finding may seem mundane on the surface, but all the three analytical approaches used in this study showed that the age structure of a population is one of the most "potent forces of social change" (Weeks, 1986:220). The direct and consistent positive effect of age on fertility preference is supportive of the conclusion drawn by Rindfuss and Bumpass (1978) that age by itself can alter fertility intentions. Several factors may account for the observed relationship, and here, the various consistency theories may be relevant.

The first explanation may have to do with the actual initiation and termination of childbearing (Bulatao and Fawcett, 1981). For instance, women who had their first children at a relatively early age are likely to have subsequent children more rapidly and end up with larger family sizes. Another possible explanation rests with the tendency
among individuals who are attaining their original fertility goals to "overshoot, because of the psychosocial and economic costs involved in regulating fertility" (Bulatao, 1983:72).

But since none of these possible intermediate variables (Davis and Blake, 1956) was incorporated in the proposed model, it is difficult to pinpoint the underlying cause of the observed relationship without recourse to theory and some inferences. Thus, given the main criteria for the selection of the sample (women of childbearing age, having at least one child . . .), the observed relationship can be explained within the framework of the consistency theories (Festinger, 1957; Osgood and Tannebaum, 1955; Newcomb, 1950). In other words one can infer that the observed positive effect of age on fertility preference may stem from the desire of the older respondents (who were obviously far advanced in their fertility careers) to maintain cognitive balance by "equating" their actual with their preferred family sizes. Another possible explanation is that the older women started family making when Taiwan was far less developed; therefore, their fertility norms and/or behavior reflected their social upbringing. The relatively strong effect of age on the expected family size variable attests to these inferences.

**Residence**

Very interestingly, while the overall (total) effect of residence on fertility preference was negative and significant, a decomposition of the effect into direct and indirect effects indicated that, though both were negative, neither of them was significant. This finding is very interesting because it suggests that Taiwan could be in the final stages of the demographic transition (Abu-Lughod, 1964). According to this perspective, the lack of significant direct effect of residence on fertility preference implies that an
individual's residential location (rural-urban) in Taiwan does not make any significant difference in her preference for children. The transition theory as reformulated by Abu-Lughod (1964) postulates that fertility preference is about the same for both rural and urban residents in the initial stage of the transition process. This however gives way to a marked rural-urban difference in the transitional phase when birth control is first initiated among the urban upper classes. Finally, when the birth rate becomes low and controlled in the terminal phase of the transition, the "economic and cultural dominance of the hinterland by the city supposedly renders rural and urban differences in fertility non-significant" (Johnson et al., 1978:670).

The finding is also supportive of the argument advanced earlier that individuals respond to changes in society in terms of their personal goals, in that, women who would want to take advantage of the increasing work opportunities in both the personal and impersonal market sectors in Taiwan (Stokes and Hsieh, 1983) would opt for fewer children regardless of their residential location. The evidence also confirms an earlier finding by Yamanaka et al. (1982) and the conclusion drawn by Speare et al. (1973:333) that "many of the aspects of urbanization which are likely to be related to fertility are available to both urban and rural residents in Taiwan."

In interpreting this result, however, one must be a little cautious, given the small area of the island nation relative to its population size as well as the manner in which the residence variable was conceptualized and measured in this study. Goldberg (1974), for instance, has reported that slum residence leads to the conservation of traditional attitudes and behavior (larger family-size preference included) some of which are anachronistic in the urban setting. Given that slums are generally found in and around cities of the
developing world, that they are densely populated, and the fact that residents are generally poor (Hawley, 1981), the use of a single measure (population density) for the residence variable could have distorted the results.

The possible problems of conceptualization and measurement notwithstanding, the rather weak direct effect of residence on fertility preference vis-a-vis its strong positive effect on individual modernity reinforces the argument that it is the individual's reaction to the changing socio-economic milieu that leads to specific behavioral patterns over time.

**Education**

The inverse relationship between education and fertility preference is one of the most "clear cut" relationship often reported in the literature on social demography (see Cochrane, 1979, for an excellent review). Bogue (1969), for example, has argued with a great deal of conviction that education is perhaps one of the most important forces of fertility control. He went on further to speculate that if that be the case, "it should be comparatively easy to discover what aspect of rising literacy and educational attainment is most intimately related to lower fertility and then mass produce it" (Bogue, 1969:676).

The initial bivariate analyses of the data provided some support for the direct education-fertility preference relationship. However when the individual modernity variable was incorporated in the analytical model, the direct effect of education turned out to be non-significant, though negative as predicted. This finding is supportive of Cochrane's (1979) observation that the usually observed direct inverse effect of education on fertility preference may be spurious or consequent to the spillover effects of an individual's level of educational attainment. Fawcett and Bornstein (1973:125)
put it more precisely when they noted that the effect of education on fertility cannot be direct; children, they maintain, are not "taught in school to have smaller families, but rather the attitudes, values and behaviors learned in school interact with subsequent life experiences" to produce an overall trend to lower fertility preference.

Furthermore, the strong positive effect of education on individual modernity reinforces the latter part of Fawcett and Bornstein's (1973) argument. Indeed the present evidence suggests that, as far as the Taiwanese sample is concerned, education influences fertility preference by first altering the traditional attitudes, perceptions and lifestyles of individuals in addition to providing them with knowledge about the methods and procedures to achieve their fertility goals. These by no means exhaust the list of variables through which education can work to reduce fertility preference. Its role in prolonging the age at which an individual enters into a marital union (Davis and Blake, 1956), for example, falls outside the scope of this study.

However, what remains unclear is the determination of the educational threshold when the observed individual attitudinal, behavioral and perceptual changes take place and ultimately lead to lower fertility preferences. Safilios-Rothschild (1969) has emphasized that the long-run inverse effect of education on fertility preference may hold true for all countries but does not operate at the same threshold. Instead, according to the level of development of each country, these interrelationships become effective at different points on the continuum. In an earlier study on Taiwan, for example, Speare et al. (1973) found that decline in fertility preference occurs at the post senior school level, but this was only when the sex preference of the desired child was controlled. Yet in another study in Sri
Lanka, threshold appears to be junior secondary school (Fernando, 1977); and immediately after the primary school in most Latin American countries (Aborampah, 1981). These findings suggest that aside from the instability of the level of economic development hypothesis, there is the question of sex preference which would differ from one individual to another according to how her attitudes about specific societal traditions are changing or ingrained.

Thus, however one looks at it, difficulties are bound to be encountered in ascertaining the direct relationship between level of education and fertility preferences in light of the many interrelated processes involved. What seems clear, on the basis of the Taiwan sample, is that the negative effect of education on fertility preference is indirect; and that the bulk of its effects are felt through its role in changing the modal characteristics of individuals.

**Family income**

The effect of family income on fertility preference is one of the subjects most hotly debated in fertility analysis. The most decisive difference among researchers is between those who assume that children are inferior goods and those who do not. The first group who includes Leibenstein (1975), argues that the positive effect of income on fertility preference is more than offset by the positive effect of income on the propensity to consume normal and superior goods. The second group which includes Becker (1960), Freedman and Coombs (1966) and Linke (1971), argues that, given that families strive to maximize the utility they derive from children and other goods, households will be motivated to increase the demand for children if their incomes increase.

Judged by the magnitude of the effect coefficient, the initial bivariate analysis showed that the direct effect of
family income on ownership of modern appliances is greater than its effect on expected and desired family sizes put together. This seems to provide some partial support for the argument advanced by Leibenstein (1975). However, when the individual modernity variable was introduced into the model, the direct effect of income on fertility preference remained positive, though slightly diminished, while the indirect effect turned negative (see Figure 5.3 and bottom half of Table 5.5).

The question now is, since the indirect effect of family income (obviously through individual modernity) is negative, and the direct effect is positive, does it follow that increases in families' incomes stimulate preference for children? According to the Taiwan sample, the answer is in the affirmative. The finding is also supportive of the works of Krause (1958), Becker (1960) and Goldsheider (1971) as well as the hypothesis advanced by Heer (1966) that the direct effect of economic development, and for that matter income increases, is to increase human fertility preference.

Other explanations specific to the Taiwanese case may be relevant here. One relates to an analysis by Easterlin (1966, 1968) of Kuznets cycles. In his interpretation, couples compare their own income level to those of their parental family when they were young children and adolescents. In this way, the expectations of young couples were formed when they lived in their parental family. Thus in periods when the young adult cohorts feel they are better off and can maintain, at least, the levels of living similar to or better than what they had in their parental family, they would go for larger family sizes. The reverse may be the case when the young adult cohort realizes that they might be worse off than they were in their parental families.
Although this explanation was proposed by Easterlin (1966, 1968) in connection with the events of the baby-boom period, it may be relevant for the Taiwanese sample. The relative prosperity of the average Taiwanese family of today as compared to that three decades back, according to Easterlin's explanation, would enjoin couples to prefer larger family sizes once they realize they can still maintain an acceptable level of living compared to their childhood experiences.

Another explanation has been proposed by Andorka (1982) who argues that "in homogeneous social groups the expectations of the families are supposed to be more or less similar. When the income of the family increases or the couple expects favorable changes in its income, they are willing to have more children, as in the short run, their expectations concerning the desirable standard of living do not usually change very much" (Andorka, 1982:27). Again, given the relative prosperity enjoyed by the average Taiwanese couple in recent times as well as the fact that a little over 90% of the study sample are of the Amoy ethnic stock, Andorka's (1982) perceived prosperity and homogeneity theses may account for the observed positive direct effect of income on fertility preference, at least, for the Taiwanese sample.

These explanations should, however, be taken with a little caution for three reasons. First, the fact that it is the income relative to the expectation concerning the standard of living which influences fertility preference, points out the limitations of the influence of income. Second, the explanation proposed by Easterlin (1966, 1968) was basically tied to a specific event in history (i.e., the post World War II baby boom) which may be a little different from the situation in contemporary Taiwan. Finally, the often reported problems in generating income data in the developing world setting call for some caution in the interpretation of
findings, especially in the case of the present study where the income of the family was reported by the wife (see Chang, in process).  

Individual Modernity and Fertility Preference

In general, with the exception of the dual impact of the education variable, the foregoing analyses have supported the theory that purely socioeconomic factors affect fertility preference through their impacts on the modal characteristics of the individual. However, when the component features of individual modernity are examined in terms of their relative importance, the data suggest that ownership of modern appliances has not been given the attention it deserves in fertility research.

One reason why modern consumer durables are singled out in this discussion is that since they are relatively new and highly valued in several parts of the developing world, they should have considerably greater marginal utility to the individual than having more children. This would predict a fall in fertility preference according to Leibenstein (1975). This is exactly what the results of this study seem to suggest. Elsewhere, Freedman (1970) emphasized the modernizing influence of ownership of modern appliances by referring to how they can help to alter the attitudes of individuals and also change the status of women. The analyses have shown that in addition to performing the two functions, ownership of modern consumer durables has the tendency to influence the perceptions and knowledge of individuals on issues pertinent to fertility preferences.

Several previous studies lend support to this line of reasoning either directly or indirectly. For example, Oshima (1961) cites the aspirations for consumer durables as a factor for increased work participation by women in Japan; Mack
(1956) reported that the desire to enjoy modern consumer goods can motivate people to put in extra effort at the work place; while Smithies (1961) stressed the importance of feasible consumption goals for development efforts in the developing world. The bottom line, according to the Taiwanese sample, is that ownership of consumer durables have both direct and indirect effects on fertility preference. The question is: how can this potential force for birth control be incorporated in Third World population policy, given the existing economic and cultural differences? This issue is addressed in the subsequent section.

Next in importance (again, in terms of magnitude of the effect) is the knowledge of contraceptive variable. Obviously, as Andorka (1982) points out, birth control information is obtained at cost both in monetary and psychological terms. Even under programs where such information is supposed to be provided free of charge, individuals need to spend time to acquire both the awareness and how-to components of knowledge of contraceptives. It is under such circumstances that the individual's self motivation or drive to succeed (McClelland, 1969) comes into play. The finding also provides partial support to Andorka's (1982) argument that the knowledge of the population about methods of birth control is an important and independent factor influencing fertility preference.

Thus far, the discussion seems to have de-emphasized the "crucial" role of the attitudinal component of the individual modernity variable. The contrary is the case, although the direct effects of modern attitude on the fertility preference variables are not very strong. The importance of the attitudinal factor is best understood by examining its location in the causal ordering in the path model as well as its observed influence on the remaining individual modernity
variables. Certainly the attitude of fatalism, for example, may have something directly to do with fertility preference. This attitude is in part a functional outcome of the individual's real inability to control her destiny, but it is also likely to be overgeneralized (Fawcett and Bornstein, 1973).

Indeed as far as the Taiwanese sample is concerned, the direct effects of modern attitudes on ownership of modern appliances and knowledge of contraceptives respectively are about two times higher than its effects on the fertility preference variables (see Figures 5.1 and 5.2). These revelations, therefore, suggest that much as modern beliefs and values may have something to do directly with an individual's fertility preference, the bulk of the effects may depend on the extent to which the learned attitudes are channeled into molding the other components of the individual's personality (i.e., lifestyle, perceptions, knowledge, etc.).

The study failed to build a significant support for the perceived cost of children-fertility preference relationship although the direction of the relationship is exactly as predicted. Undoubtedly, individual perceptions about the value of children in general differ by social class and parity, as do the weights parents attach to these costs and benefits in the process of fertility decision-making (Bulatao, 1979). Again, an individual's perceptions regarding the importance of sons and daughters may be a direct function of how many of each she already has as well as her position on the traditional-modernity continuum. Traditions, they say, die hard.

The rapid pace of modernization/socioeconomic development notwithstanding, studies and indeed recent reports indicate that preference for sons is still pervasive in the Taiwanese
society (Speare et al., 1973; Freedman and Takeshita, 1969).
Speare et al. (1973:329), for example, report that about 50% of their study sample (3555 women) reported that they will "be trying to obtain a minimum of one or two sons" if they reached their desired number of children but failed to have any sons, ostensibly, regardless of the cost involved in going the "extra mile or two." Thus a more appropriate approach to estimate the perceived cost of children-fertility preference relationship would probably involve controlling for the sex of children variable.

In summary, education has consistently strong direct and indirect effect on fertility preference. The bulk of its effect, however, is through individual modernity. Age also shows a high predictive power of fertility preference. In contrast, however, while residence and family income showed significant positive effects on individual modernity their direct effects on fertility preference are not strong.

Individual modernity has the strongest effect among all the variables examined in the proposed model. When the variables which go into the individual modernity construct are examined individually, ownership of modern appliances followed by knowledge of contraceptives have the strongest effects on fertility preference while the effect of perceived cost of children was not significant.

Finally judging by the magnitude of the indirect effect coefficients, the intervening effects of individual modernity between the structural change variables and fertility preference are not significant with the exception of education. This suggests that individual modernity is much more an independent predictor of fertility preference than an intervening variable between the latter and the stratification variables.
The Study's Contribution to the General Theory of Sociology

This study was based on the proposition that fertility preference as a social behavior is a complex phenomenon and therefore demands a multidisciplinary approach to unravel some of its inherent complexities. Beginning with social, social-psychological and economic theories and their related propositions, the theory proposed in this study posits that human fertility preference is a function of the changing socioeconomic and demographic milieu and how they impinge on the individual within the social system. However, rather than taking the individual's psychic disposition, lifestyle, perceptions and knowledge as givens, and, as a result, modeling structural variables as direct determinants of fertility preference of the individual, the theory predicts that these structural factors influence fertility preference through their impact on the modal characteristics of the individual. The individual is not seen as a passive on-looker; rather she is an active person who takes advantage of the emergent structural changes to satisfy her specific needs and not societal needs on the basis of her modal characteristics.

Attitudes are conceptualized as containing two components: beliefs and values. Knowledge of contraceptives is posited to consist of the awareness and how-to components, while preferred lifestyle is seen as the choices made by the individual in respect to her acquisition of property consistent with modern life. All these characteristics in addition to the individual's perceptions are posited as determinants of the individual's position on the traditional-modernity continuum which in combination with the structural factors would predict the individual's behavior (fertility preference included).
The rather eclectic approach used in the formulation of the theory has several advantages aside from providing a better understanding and interpretation of social phenomena. First, it frees the investigator from confining him/herself to only one part of a rather complex phenomenon and thus leaving several aspects unaccounted for as usually happens in a singular theoretical approach. Secondly, and most important of all, the use of singular theoretical perspective has the tendency to mislead the investigator in the interpretation of an observed relationship that falls outside the domain of the theory used (Etzioni, 1973). As such, the study's contribution to the general sociological theory of human fertility differential can be observed through its eclectic character as well as the fact that with the exception of the dual impact of education, the data support the theory.

Again by proposing and empirically testing that social stratification variables influence an individual's fertility preference through their impacts on the individual's psychic disposition, knowledge, perceptions and preferred lifestyles, the study fulfills one of the traditions in the philosophy of science, which, according to Winch (1963) stipulates that theories of human behavior must model the interrelationships between the structure and individuals' actions as well as the meanings the actions have for them.

At the conceptual level the theory proposed in this study has some inherent advantages over previous theories of human fertility preferences. First it contains an explicit set of attitudinal, taste, perceptual and knowledge variables of the individual pertinent to the behavior under investigation, and specific hypotheses are formulated to examine the interrelationships among these variables as well as their overall contribution to the ultimate behavior. Secondly it moves beyond examining the individual from only her psychic
disposition to incorporate three other important aspects of the individual's personality. Thirdly rather than modeling social, demographic and economic determinants as proxies for the modal characteristics of the individual, as pertains in several previous studies, these variables are modeled as the fundamental process of the overall process of social change. These factors are then shown to affect human behavior through the individual's response to the changing socioeconomic milieu. This is a clear departure from several previous approaches that treated the structural variables as direct determinants of behavior, such as, individual fertility preference.

Policy Implications

Evidence from this study suggests that individual modernity and education have strong effects on human reproductive intentions and apparently on people's reproductive behavior as well. Indeed, there is a good case to be made for the reasonableness of policies aimed at making formal education accessible to all, especially in countries of the Third World where planned change in the form of family planning constitutes one of the several approaches for socioeconomic development. Emphasis on formal education will be particularly helpful in changing the attitudes and aspirations as well as broadening the mental horizons of individuals in the developing world. But since it takes relatively longer time for the investments in education to be fully realized, it appears several Third World nations cannot wait until a substantial percentage of their populations have had education to enable them to enjoy the advantages of lower birth rates.

The alternative might be through the transfer of technology. Cultural and economic differences notwithstanding, the study has shown that ownership of modern
appliances, for example, has positive effects on contraceptive knowledge and is inversely related to fertility preferences. Hence the introduction and mass adoption of some of these modern consumer durables can serve several purposes despite their possible negative effects on savings and investment.

The choice of goods, however, must be carefully made so that those highly desirable are chosen, since the ultimate objective will be to make them competitive with having children as well as exerting a modernizing influence on the user. The goods should also be chosen with a view toward their effect on production and employment. Furthermore, to maximize both forward and backward linkages, the items should lend themselves to production in simple workshops with a high labor component and a minimum of imported resources.

Limitations and Suggestions for Future Research

Conclusion

The purpose of this study has been to contribute to the arduous process of developing a general theory of fertility. The setting of the study is the relatively small island nation of Taiwan - a country which has experienced about three decades of sustained socioeconomic development and substantial fertility decline.

Besides helping to unravel some of the complexities in human fertility behavior, the study has demonstrated that humans react differently to economic and social stimuli depending upon their unique needs and the dynamics of their individual modal characteristics. It has also been shown that these modal characteristics of the individual are as much a force as the traditional structural variables in the explanation of an individual's intentions and apparently her behavior.
In doing so, however, a few problems have been encountered which would need to be further investigated to enhance the explanatory power of the model proposed in this study.

Like other social science research, perhaps, the most crucial problem encountered in this study has been the difficulty of determining whether an observed association is causal. This emanates from the fact that the data used were generated from a cross-sectional survey. Thus, a whole dynamic approach whereby the investigator would follow the respondents through the various stages of the life cycle, instead of a static analysis, may shed more light on the utility of the proposed model. Another benefit of a longitudinal study would be seen in the area of extending the proposed model to its logical conclusion, i.e., fertility preference to fertility behavior.

The four structural variables by no means exhaust the list. Stratification variables such as work status of women, religion, mass media exposure and occupational status have been found to have some influence on individuals as they make their fertility decisions. Similarly the prevailing social exchanges between husband and wife as well as the extent of male/female dominance in family decision-making may work in various combinations with other individual variables to determine the individual's position on the tradition-modernity continuum. The incorporation of some of these variables in the proposed model in the future will enhance our understanding of human fertility preference.

Several indexes were used with varying degrees of success in the proposed model. The low explanatory power of the perceived cost of children index, for example, reflects some inadequacies in its conceptualization and measurement. Future studies using the variable should increase the number of statements to capture several dimensions of an individual's
perceptions about having children. One way out might be to develop statements about the perceived benefits and costs of having children so that the difference between the two sets could represent the individual's net perception about having children.

The measurement of family income/personal income has been a nagging problem for researchers operating from Third World settings; the present study is no exception. Despite elaborate efforts made in the collection of data for this study to come up with an appropriate estimate, the wide variation between the sample mean and the national mean suggests that the problem still exists. One way out of this dilemma may be the use of several indicators as proxies for the income variable. And this is one of several areas where Joreskog and Sorbom's Linear Structural Equation Methodology holds a great deal of promise for future social science research.
FOOTNOTES

1. Taiwan as used in this study consists of Taiwan Province and Taipei and Kaohsiung Municipality. This is the geographical area of the main island of Taiwan and the Pescadore Islands.

2. The term lifestyle was originally coined by Max Weber who posited that social status was, in part, a reflection of one's style of life, how one consumed, rather than how one produced. As he put it, "certain goods become objects of monopolization by status groups. . . . The decisive role of a style of life . . . means that groups are the specific bearers of all conventions" (Max Weber, 1966).

3. The concept "structure" as used in this study refers to Blau's (1974) "second" group of parameters - graduated parameters - which differentiates people in terms of status rank order. In principle, as Blau (1974:617) puts it, "the status gradation is continuous, which means that the parameter itself does not draw boundaries between strata; but the empirical distribution may reveal discontinuities that reflect hierarchical boundaries." Hence, structure, status, and stratification are used interchangeably. For details see Blau (1974).


5. The general industrial production index covers mining, manufacturing, electricity, gas and water and new building construction. For details about the sources and
computation procedures, see Statistical Year Book of the Republic of China, 1979.

6. For details of the idea of a maximum-likelihood estimator see Mulaik, 1972.

7. The actual meaning of the term multicollinearity has been a subject of debate among researchers. While some use it to refer to the existence of any "correlations among independent variables" (Pedhazur, 1982:233), others use it to describe situations in which the independent variables are highly correlated. The latter definition is used as a basis for the conclusion that collinearity is not a problem on inspection of the correlation matrix; i.e., the correlation coefficients are relatively low.

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Goldscheider, Calvin  

Goldstein, Sidney  

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Guttman, L.  

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Hass, P. H.

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Hawthorn, Geoffery

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Oshima, Harry

Parsons, Talcott

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Singer, Eleanor

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Whelpton, P.

Williamson, J. B.

Wilson, John

Winch, Peter

Wirth, Louis

Wright, Sewall

Yamanaka, K., H. C. Chang and F. O. Lorenz

Zopf, P. E.
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APPENDIX A: FACTOR ANALYSIS OF ITEMS USED IN CONSTRUCTING THE MODERN ATTITUDE INDEX
Table A1. Factor analysis of items used in constructing the modern attitude index

<table>
<thead>
<tr>
<th>Item</th>
<th>Factor 1 (Belief)</th>
<th>Factor 2&lt;a&gt; (Value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Persons have duty to have children</td>
<td>.563</td>
<td>.061</td>
</tr>
<tr>
<td>2. Birthdate has influence over life</td>
<td>.620</td>
<td>.143</td>
</tr>
<tr>
<td>3. Fate is born; ill fate can't be rectified</td>
<td>.704</td>
<td>.065</td>
</tr>
<tr>
<td>4. Geomancy is related to destiny</td>
<td>.520</td>
<td>.421</td>
</tr>
<tr>
<td>5. Moving must be done on auspicious date</td>
<td>.650</td>
<td>.049</td>
</tr>
<tr>
<td>6. Life is too short to be perfect</td>
<td>.532</td>
<td>.129</td>
</tr>
<tr>
<td>7. Traditional weddings and funerals cannot be altered lightly</td>
<td>.592</td>
<td>.120</td>
</tr>
<tr>
<td>8. Ancestral property can't be sold</td>
<td>.503</td>
<td>.034</td>
</tr>
<tr>
<td>9. Hard work leads to better life</td>
<td>.123</td>
<td>.621</td>
</tr>
<tr>
<td>10. Planning is prerequisite to success</td>
<td>.171</td>
<td>.650</td>
</tr>
<tr>
<td>11. Future cannot be predicted</td>
<td>.447</td>
<td>.482</td>
</tr>
<tr>
<td>12. Purpose of work is to earn 3 meals</td>
<td>.407</td>
<td>.522</td>
</tr>
<tr>
<td>13. Social development is responsibility of government, we don't have to participate</td>
<td>.249</td>
<td>.540</td>
</tr>
<tr>
<td>14. Some work belong to men while others belong to women</td>
<td>.161</td>
<td>.410</td>
</tr>
<tr>
<td>15. Won't risk investment regardless of how wealthy I am</td>
<td>.176</td>
<td>.290</td>
</tr>
<tr>
<td>16. Hire relatives when you need help&lt;a&gt;</td>
<td>.208</td>
<td>.158</td>
</tr>
<tr>
<td>17. To work with others is less desirable than work alone</td>
<td>.254</td>
<td>.194</td>
</tr>
</tbody>
</table>

<a>Loadings calculated using varimax orthogonal rotation.

<a>Items deleted from index construction.
APPENDIX B: LIST OF APPLIANCES USED IN THE COMPUTATION OF THE OWNERSHIP OF MODERN APPLIANCE INDEX
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Gas stove</td>
</tr>
<tr>
<td>2.</td>
<td>Motorcycle or scooter</td>
</tr>
<tr>
<td>3.</td>
<td>Cloth washer</td>
</tr>
<tr>
<td>4.</td>
<td>Camera</td>
</tr>
<tr>
<td>5.</td>
<td>Television set (color)</td>
</tr>
<tr>
<td>6.</td>
<td>Refrigerator</td>
</tr>
<tr>
<td>7.</td>
<td>Indoor toilet</td>
</tr>
<tr>
<td>8.</td>
<td>Telephone</td>
</tr>
<tr>
<td>9.</td>
<td>Air conditioner</td>
</tr>
<tr>
<td>10.</td>
<td>Tap water</td>
</tr>
<tr>
<td>11.</td>
<td>Rug (more than or equal to 20 square feet)</td>
</tr>
</tbody>
</table>
APPENDIX C: MAXIMUM-LIKELIHOOD ESTIMATES (MLE) STANDARD ERRORS (SE) AND T-VALUES (TV) FOR THE FULL (PROPOSED) MODEL
Table Cl. Maximum-likelihood estimates (MLE), standard errors (SE) and T-values (T-V) for the full (proposed) model

<table>
<thead>
<tr>
<th>Parameter</th>
<th>MLE</th>
<th>SE</th>
<th>T-V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lambda Y</td>
<td>2,1</td>
<td>0.944</td>
<td>0.064</td>
</tr>
<tr>
<td></td>
<td>3,1</td>
<td>0.305</td>
<td>0.058</td>
</tr>
<tr>
<td></td>
<td>4,1</td>
<td>1.010</td>
<td>0.065</td>
</tr>
<tr>
<td></td>
<td>5,2</td>
<td>1.541</td>
<td>0.151</td>
</tr>
<tr>
<td>Beta</td>
<td>2,1</td>
<td>-0.362</td>
<td>0.089</td>
</tr>
<tr>
<td>Gamma</td>
<td>1,1</td>
<td>0.009</td>
<td>0.020</td>
</tr>
<tr>
<td></td>
<td>1,2</td>
<td>0.118</td>
<td>0.020</td>
</tr>
<tr>
<td></td>
<td>1,3</td>
<td>0.455</td>
<td>0.026</td>
</tr>
<tr>
<td></td>
<td>1,4</td>
<td>0.122</td>
<td>0.020</td>
</tr>
<tr>
<td></td>
<td>2,1</td>
<td>0.209</td>
<td>0.025</td>
</tr>
<tr>
<td></td>
<td>2,2</td>
<td>-0.041</td>
<td>0.021</td>
</tr>
<tr>
<td></td>
<td>2,3</td>
<td>-0.003</td>
<td>0.043</td>
</tr>
<tr>
<td></td>
<td>2,4</td>
<td>-0.054</td>
<td>0.022</td>
</tr>
<tr>
<td>Phi</td>
<td>1,2</td>
<td>0.020</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>1,3</td>
<td>-0.290</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>1,4</td>
<td>-0.800</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
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APPENDIX D: CONSTITUENT ITEMS USED IN THE COMPUTATION OF THE KNOWLEDGE OF CONTRACEPTIVE INDEX (CKNW)
Table D1. Constituent items used in the computation of the knowledge of contraceptive index (CKNW)

A. Information component:

1. Have you ever heard about the condom?
2. Have you ever heard about the rhythm method?
3. Have you ever heard about the pill?
4. Have you ever heard about the cap?
5. Have you ever heard about the foam?
6. Have you ever heard about the IUD?
7. Have you ever heard about male ligation?
8. Have you ever heard about female ligation?

B. How-to-use component:

9. Do you know how to use a condom?
10. Do you know how to use the rhythm method?
11. Do you know how to use the pill?
12. Do you know how to use the cap?
13. Do you know how to use the foam?