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Report on Study

Determinants of Family Planning Attitudes and Practices

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Report prepared at conclusion of contract covering field study

conducted in Taiwan during 1969-72

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Table of Contents

	Page
Chapter 1. Hypotheses and Questions Posed	
Introductory remarks	1
Hypotheses concerning the relation of infant and child mortality to fertility and family-planning behavior and attitudes	3
Questions concerning the impact of son preference on fertility and family-planning behavior and attitudes	12
Questions concerning reliability of questionnaire items concerned with fertility behavior and attitudes	14
References for Chapter 1	15
Chapter 2. Procedural Details of the Data Collection	17
Chapter 3. Setting for the Survey and General Characteristics of the Respondents	24
Setting for the Survey	24
General characteristics of the respondents	37
Chapter 4. The Method of Multiple Classification Analysis	42
References for Chapter 4	47
Chapter 5. The Perceived Level of Child Survival: Its Relation to Actual Survival and its Determinants	48
The gap between actual and perceived levels of child survival in eastern Kentucky	48
Congruence between actual and preceived levels of child survival in Taiwan	51
Determinants of the perception of child survival	52
Conclusions	55
References for Chapter 5	56

Table of Contents (continued)

	Page
Chapter 6. The Determinants of Fertility Behavior	57
Detailed findings for each table	59
Summary of statistically significant findings for each principal independent variable	89
Chapter 7. The Determinants of Fertility Attitudes	92
Detailed findings for each table	92
Summary of statistically significant findings for each principal independent variable	126
Chapter 8. Determinants of Child Survival	130
Chapter 9. Reliability of Results between First Interview Reinterview	141
Methodology of First-interview-reinterview matching	141
Available methods for measuring reliability	141
Substantive results	145
References for Chapter 9	157
Chapter 10. Summary and Conclusions	158
Study design and sample	158
Major findings	159
Suggestions for further refinement of the analyses	163
Implications of the study findings for policy	165
Chapter 11. Dissemination of Research Findings	167
Appendix A. Operational Definitions of Indices used in the Multiple Classification Analyses	168

Chapter 1: Hypotheses and Questions Posed

Introductory Remarks:

For several years a major debate has raged concerning the factors determining the success of family planning programs in less developed nations. One school of thought believes that success is largely dependent on the availability of appropriate contraceptives. A second school of thought is of the opinion that while the availability of appropriate contraceptives will prove highly valuable, this factor by itself will not be sufficient to reduce birth rates to desired levels. The latter group contends that persons in the less developed nations are still rationally motivated to have large families and will continue to have them until institutional changes occur which will change that motivation. Evidence for this viewpoint comes from recent findings concerning desired family size in many of the less developed nations. For example, in Taiwan, a nation generally considered to have a highly successful family-planning program, the average number children desired is still about four.[1]

Several social changes have been proposed as being of aid in reducing the motivation for high fertility. This study focuses on two such changes: (1) a reduction in the level of infant and child mortality, and (2) a reduction in the high preference for sons.

Grounds for belief in high infant and child mortality as a factor sustaining an elevated level of fertility comes from several recent studies. On the other hand, at least one researcher has come to the conclusion that for the particular locality and period he studied there was no evidence that differentials in child mortality among married couples resulted in differences in their fertility.

A change in the preference for sons might also have important effects for fertility reduction. In many agricultural societies where there is no system of old-age pensions to provide support for the elderly, a couple must have at least one surviving son to obtain sustenance in old age. In many such societies, the content of religion reinforces this practical need for sons. Recent studies have shown the number of living sons to be a very important predictor of the probability of acceptance of contraception. On the other hand, one recent study has shown that for at least four local areas in less developed nations there was no evidence for the effect on subsequent fertility of the sex of the existing offspring.

Another sharp debate concerns the validity and reliability of surveys concerned with fertility and family planning. The very noted University of Chicago demographer, Philip Hauser, has placed himself squarely in the camp of those persons who are highly sceptical of the reported results of such surveys. His remarks are worth quoting in some detail.[2]

> ....."Probably in no other field in social action has the sample survey been more widely utilized as a tool for policy formulation and program design as in family planning programs. Much in the volume [reviewed by Hauser] is based on the results of such surveys. Moreover, the sample survey may be expected to play an even greater role as the programs mature and as they are increasingly employed as one instrument for the evaluation of the action programs. It is of considerable importance, therefore, to examine the manner in which the sample survey has been employed in the field.....
>
> The Bureau of the Census over the past fifteen years has published a series of studies on response error in the census and in census-conducted surveys which report surprising magnitudes

of response error on questions which are relatively simple compared with most of those on KAP schedules. One would suppose that the results of this research would lead to intensive studies in response error in all surveys, and, in fact, in all collections of data based on interviews - communication between an enumerator and a respondent. Surprisingly enough, this has not been the case in sample surveys in general and KAP surveys in particular. It is to be hoped that the time is not far off when professional readers of survey results will simply refuse to read publications which do not include full appendices that permit analysis of response as well as sampling error. Unfortunately, this time has not yet arrived and, in consequence, it is a moot question whether surveys do not mislead as much as they inform. The danger of being misled may, of course, be much more expensive if the surveys are used for program design and administration, for practical matters, than solely for the acquisition of knowledge."

Hypotheses concerning the relation of infant and child mortality to fertility and family-planning behavior and attitudes

Differences in the community level of infant and child mortality can logically affect the behavior and attitudes both of those married couples who lose a child and those married couples who do not. When the level of infant and child mortality is high, all couples, even couples who never suffer the loss of a child may, nevertheless, fear such loss and may decide to have additional children as insurance against the possibility that one or more of them may die in the future. The

individual experience of child loss may also have important consequences for fertility behavior and attitudes. Comparing couples who have lost a child with couples who have not, the couples suffering child loss may logically, (1) exactly compensate for the loss of their children, i.e. end up with the same number of living children as those who have never lost a child, (2) undercompensate for their loss, i.e., end up with fewer living children than those couples who have not lost a child, or (3) overcompensate, i.e. end up with more living children than those couples never experiencing the loss of a child.

In short, when considering the impact of infant and child mortality upon fertility behavior and attitudes we must consider four different categories of respondents: (1) respondents living in a high-mortality community who have not experienced the loss of a child, (2) respondents living in a high-mortality community who have experienced the loss of one or more children, (3) respondents living in a low-mortality community who have not experienced the loss of a child, and (4) respondents living in a low-mortality community who have lost one child or more.

Our study has been purposefully designed so as to be able to secure respondents in each of these categories. Accordingly, we are able to test two separate hypothesesfor our study population. The first of these is that a high rather than a low level of infant and child mortality in the community will foster high fertility both among couples who lose a child and among those who do not. Our second hypothesis is that at any given level of infant and child mortality in the community, those couples suffering the loss of a child will have at each parity level higher subsequent fertility, lower use of contraception, a larger number of additional children desired, and a higher ideal family size.

Let us now consider both of these hypotheses in greater detail beginning with the discussion of our first hypothesis.

Considerable previous work is suggestive with respect to the validity of the first hypothesis but none so far has been conclusive.

Several studies in which nations or other areas were the unit of analysis have shown that fertility and mortality are positively correlated even after holding constant the impact of other relevant variables through means of a multivariate regression analysis. This statistical association has often been interpreted as caused by the impact of mortality upon fertility. However, logically, the association may be caused by the impact of fertility upon mortality. Furthermore, despite the control for many other variables which might affect the relationship, the possibility always exists that a relevant variable was not placed under statistical control and hence that the relationship is spurious.[3]

Other evidence bearing upon the validity of this hypothesis is purely deductive. The principal investigator and two of his colleagues were earlier engaged in elaborating several computer-simulation models designed to test the possible effect both of individual loss of children and of the community level of infant and child mortality upon fertility behavior.[4] The models presumed that parents could have, by and large, as many children as they wanted to have up to a maximum of around 12, but would also want to be highly certain that by the husband's 65th birthday there would be at least one surviving son, or alternatively at least two surviving children regardless of sex. The models all showed that the number of children born per mother would fall with each decline in mortality. Moreover, they also showed interesting variations in the relation between the net reproduction rate and the community level of mortality. The net reproduction rate was relatively low when mortality was high. In this situation many couples were not biologically capable of bearing as many sons as they would need in order to have high assurance of their survival. When mortality was at an intermediate level, the net reproduction rate reached a maximum. Now couples were biologically capable of bearing as many

children as needed but the desire on the part of each couple to have high assurance of living children led the population as a whole to a high positive net reproduction rate, i.e. one which guaranteed that the average couple would have more surviving sons (or children) than the minimum number it considered necessary. Finally, at low levels of mortality, the net reproduction rate approached unity. In this situation each couple could insure itself of a surviving son (or two surviving children) without having a number of surviving children which on the average was considerably greater than the minimum number each couple wished to have survive.

Only a small amount of data has previously been gathered relating to the impact of prior child loss on subsequent fertility. The earliest work, a study by Hassan of mothers in Cairo, Egypt provided tabulations of the number of children born to women of completed fertility according both to their educational attainment and whether or not they had experienced the loss of a child. At each educational-attainment level the number of births to women experiencing child loss was greater than among women not experiencing a child loss. However, the study is faulty in that no account is taken of the possibility that women with more births have a much higher probability of having at least one child die than do women with fewer births.[5]

A study by Wyon and Gordon contains data that have been analyzed in a much more satisfactory manner.[6] Wyon and Gordon presented data for a sample of women of completed fertility from rural villages in the Punjab state of India gathered in 1959. They examined fertility subsequent to any given attained parity dependent upon the survival of the births born either before or at the time the given parity level was reached. For example, they looked at the mean number of subsequent births to 586 women of third parity or higher dependent upon whether (1) none to one, or (2) two to three of the first three live births had survived. They found that in the former case the number of subsequent children was 4.9 and in the latter case 4.4. Although

the women who had experienced more child deaths among their first three births had more subsequent babies than those who did not, they did not compensate fully for their loss and had a smaller total number of surviving children (4.0 versus 5.0). Gordon and Wyon's data are of great interest. However, the size of the sample is relatively small and they do not control on any other variables, such as educational attainment, or breast feeding practices, which might affect the results.

A study by Knodel for a very different area and time period (rural Bavaria in the late 19th century) came to the conclusion that child loss made no difference in subsequent fertility behavior.[7] Knodel examined the age of mother at last birth as a function of the number of survivors of the first two and of the first three live births, holding constant age at marriage and whether the mother lived in a district where breast-feeding was common or rare. For a maximum sample of 377 women he found no evidence of any substantial difference in age of mother at live birth according to the survival status of the early births. Note that Knodel did not examine directly the number of children born subsequent to the second or third birth but only the age of mother at the last birth, which he took to be the functional equivalent of the latter.

Although they are prima facie contradictory, the results of Wyon and Gordon, on the one hand, and Knodel, on the other, can be reconciled if we hypothesize that a differential in subsequent fertility according to differential survival of existing births occurs only when the group experiencing little or no child loss feels that it has too many children. If, for example, a late age at marriage ensures that no couple will have too many children, then one would not expect a differential subsequent fertility dependent upon earlier differences in child survival. A sure sign that some couples do anticipate the possibility of excess fertility is the practice of birth control. Thus in populations where a substantial fraction of

married couples are known to practice birth control we might definitely expect to see an effect of child mortality differences upon subsequent fertility. In populations where birth control within marriage was not practiced, no such effect should be noted.

In preparing for the current study we made plans to select a locale where family-planning methods were available and where birth control was being practiced. We also made plans to choose two sites differing as much as possible in their level of infant and child mortality (given the constraint that both sites had to be fairly close to Taipei). We also planned for a large sample so that the number of cases of women who had experienced the loss of one or more children would be sufficient to make statistically precise statements. Finally we were aware that we would need to have a statistical control for many other variables which might plausibly account for any observed relationship between the two variables.

In designing the study so that interviewing would take place in two sites differing maximally in their level of infant and child mortality we gave ourselves the opportunity to separate out an areal effect from the effects of differences on the individual level. For example, we gave ourselves the opportunity to discover that after adjusting for individual differences in educational attainment, in economic status and in the experience of child loss, respondents in the high-mortality area had higher fertility than respondents in the low-mortality area. Unfortunately, if this were the whole of our procedure we would not be able to state that the remaining difference in fertility behavior by area was caused by the difference in the community level of infant and child mortality. A plausible alternative would be, for example, that the remaining fertility difference by area might be due to the lower average literacy level of the high-mortality area and the higher average literacy level of the low-mortality area. To discover the specific effect of living

in a high-mortality area versus a low-mortality area we would have to interview substantial numbers of respondents in each of many different areas so that we would have for example, substantial numbers of respondents in high mortality, high literacy areas and in low mortality, high literacy areas as well as the more prevalent high-mortality, low literacy areas and low-mortality, high literacy areas. Such a survey was obviously impossible given our budgetary constraints.

On the other hand, we could seek to measure the specific effect of the community level of infant and child mortality through another means. This was to measure on an individual level the probability of the perception of child survival. If the community level of infant and child survival was to have an influence upon fertility, it would do so through affecting the individual couple's perception of the chances of child survival in that community. Hence if we could show that the perception of child survival was related to actual child survival and that differences in perceptions of child survival were associated with differences in fertility behavior and attitudes, we could show that the community level of child survival did have an effect on fertility behavior and attitudes

However, no one had as yet attempted to measure individual perceptions of the probabilities of child survival. Therefore, we could not be sure that we would be able to measure these perceptions reliably. Thus several outcomes of our work were possible each with its own consequences for the validity of our hypothesis. These were as follows:

1. There would be no areal differences in fertility behavior or attitudes after holding constant individual differences in educational attainment, socio-economic status, individual experience of child loss, and other variables on the individual level other than perception of child survival. In this case we would be able to reject the hypothesis that the community level of child survival was an important force affecting fertility behavior and attitudes.

2. There would be no areal differences in fertility behavior or attitudes after holding constant differences in all of the individual variables; moreover, individual perception of child survival would be an important source of influence on fertility behavior and attitudes, and, furthermore, the individual perception would be closely related to the community level of infant and child mortality. In this case we would have confirmed the hypothesis that the community level of child survival affected fertility.
3. There would be substantial areal differences in fertility behavior or attitudes after holding constant differences in all of the individual variables including the perception of child survival; however, individual perception of child survival could be measured only with a low degree of reliability and would not be substantially associated with fertility differences. In this case we would not have compelling evidence that the community mortality level affected fertility; nevertheless, we would have grounds for belief that the community level of infant and child mortality might be an important factor in explaining differences in fertility.

The decision to attempt to measure the individual perception of child survival permitted us to test an additional hypothesis subsidiary to our hypothesis that the community level of child survival would affect fertility. This subsidiary hypothesis was that the perception of child survival would on the average be inaccurate and that the average respondent would perceive the chance of a child surviving to maturity to be poorer than it actually was. This hypothesis seems plausible because in many of the less developed nations in recent years the actual decline of infant and child mortality has been quite rapid. If one assumes that perception of this change lags behind the change itself, one comes to the conclusion that the perceived level of child survival should be lower than the actual level. Some empirical support for the hypothesis that perception of child survival lags behind the reality of such survival comes from a study conducted in 1960 by J. M. Stycos in Peru.[8] Stycos interviewed 1995 young currently-mated

female respondents in the capital city of Lima-Callao and 137 similar respondents from a rural coastal village. In answer to a question whether mortality had declined since their parent's generation respondents in the rural village saw little or no change, and respondents in the lower two of four social classes in Lima perceived mortality to have been even lower in the past generation than currently. Only respondents in the top two social classes perceived a reduction in mortality.

If in many of the less developed nations the perceived level of infant and child survival should prove to be substantially lower than the actual level, this fact would have important policy implications. This is because such a finding would imply the great value of educational programs emphasizing the current facts concerning the level of infant and child mortality as an important and inexpensive means of obtaining fertility decline.

Our procedure for testing whether the individual experience of child loss had an effect on fertility behavior and attitudes was much simpler than our procedure for testing whether the community level of child survival had such an effect. To test this hypothesis we needed a large enough number of cases to obtain some statistical precision and we needed to hold constant those variables which might be associated with the experience of child loss and had been shown from previous studies to be importantly related to fertility behavior and attitudes. The length of lactation was one such factor that previous work had shown to be important. If a child dies, a mother who has been breastfeeding soon ceases her lactation and the period of postpartum amenorrhea associated with that lactation comes to an end. For this strictly biological reason, in a population in which prolonged breastfeeding is common, women experiencing the early loss of their baby will have a shorter interval to the next birth, other things being equal, than women who do not experience the loss of a child. The other variables which we needed to hold constant were the variables that had been shown in one or more previous studies to have associations with fertility behavior and attitudes. These included age, parity, educational attainment, birth-control knowledge, the

wife's labor force status, and husband's income.

Finally, our study design allowed the opportunity to test the impact of prior fertility upon the mortality of subsequent children. Two hypotheses could be tested, namely, (1) whether a long interval between the given birth and the previous birth was associated with an increased chance of survival for the given birth, and (2) whether a lower parity for the mother was associated with an increased chance of survival for the given birth.

Among the studies with large samples concerned with factors incluencing infant and child mortality are those by Heady and Morris,[9] Yerushalmy and Beirman[10] and Shah and Abbey.[11] These studies relates previous birth interval and parity to infant mortality with the general conclusior that high parity and a short interval since the preceding birth are both associated with higher infant mortality. However, all of these studies were conducted in developed nations, namely, Great Britain and the United States. The major study of determinants of child mortality in a less developed nation is that by Wyon and Gordon.[12] Although, this study did analyze propectively the impact of parity and previous birth interval on infant and child mortality, the size of sample (1479 births) was relatively small. There is therefore a great need for studies with a large sample concerned with the impact of prior fertility on subsequent child mortality.

Questions concerning the impact of son preference on fertility and family-planning behavior and attitudes

A pronounced desire for a minimum number of children of a particular sex may have an important effect upon fertility provided there is no feasible and inexpensive means of choosing the sex of each child born. However, a review of the published literature indicates that the process whereby son preference affects fertility may be more complicated than many persons have assumed.

Numerous studies have shown very definitively that in many agricultural soieties the family with sons is considered more privileged than the family with daughters. Many reasons are apparent for this differential evaluation. First and perhaps of greatest importance, in many societies without organized systems of government support for the elderly and the dependent, sons are the chief if not only source of support for the couple in old age and for the widow if her husband dies prematurely. Secondly, many religions, in particular Hinduism and Confucianism, emphasize strongly the religious importance of having sons. For example, the Sanscrit word for hell is put and the term for son is putra, literally one who saves his ancestors from hell.[13] An ancient Sanscrit writing declares, "A man conquers the world by the birth of a son; he enjoys eternity by that of a grandson, and the great grand-fathers enjoy eternal happiness by the birth of a grandson's son."[14]

A third reason for desiring sons, common to all the patrilineal societies of the world is the transmission of family name and property.

A fourth factor relates to rules of residence. In some third-world agricultural societies, most notably India, rules of exogamy compel the daughters to marry out of the village. Even when this is not the case, daughters marry out of the parental household while sons remain and bring in their wives. Hence the possibility of emotional and other forms of support from daughters is substantially or at least somewhat limited.

Finally, in many third world agricultural societies, families must give out a large dowry at the marriage of their daughter whereas they receive a dowry at the marriage of a son.

The proportion of sons among all living children has previously been shown to be an important determinant of the acceptance of contraception. For example, Freedman and Takeshita in the now-famous Taichung study showed that in this Taiwanese city the acceptance of contraception was an important variable explaining both acceptance of the IUD and of all contraceptive methods combined.[15] For example, among a very large sample of women with exactly two living children the proportion of IUD

acceptors was 14 percent if there were one or two sons and only eight percent if there was no son.

In another well-known study, Poffenberger examined the ratio of living sons to living daughters among a sample of men electing a vasectomy operation in India. He found this average ratio of sons to daughters among men undergoing this operation to be 1.55.[16]

On the other hand, Robert Repetto in a very recent study reanalyzing the data collected in four separate fertility surveys in three different nations - India, Bangladesh, and Morocco - found no substantial association between the sex of the first three children born and subsequent fertility.[17] Indeed he found a slight tendency for women having more males among their earlier births to have more subsequent children than those having more females among their earlier births. Repetto concluded that although the married couples in these populations may have preferred to have had sons rather than daughters, those of them who had had daughters rather than sons had a greater burden of child support and therefore could not afford the luxury of further children. This added cost of supporting their existing children counterbalanced their desire to have more sons.

In the present study we decided to measure the preference for sons in two different ways. First of all, we would include attitudinal items in our questionnaire designed to measure the preference for having sons rather than daughters. Secondly, we would look at the impact of the sex of the surviving children upon subsequent fertility.

If the preference for sons was translated into action, then couples having mostly daughters should have higher subsequent fertility than couples having mostly sons.

Questions concerning reliability of questionnaire items concerned with fertility behavior and attitudes

Given the paucity of existing studies concerning the reliability of questionnaire items in surveys concerned with fertility behavior and attitudes, particularly those conducted in less developed nations where illiteracy rates were high, we decided that it would be very worthwhile to include within our study design provision for a

reinterview, to occur approximately 12 months following the first interview, in which the most important questions asked in the original survey would be repeated. Although this plan would provide no data on the validity of the answers to the first interview, it would give a good idea concerning their reliability. We were interested to find out the reliability of the items which served as our chief dependent variables and also the reliability of the items which served as our principal independent variables. If a dependent variable, such as the number of additional children desired, had poor reliability, one could not expect to be able to make good predictions concerning it even if all of one's independent variables were measured reliably. Moreover, if one's dependent variable were reliably measured, efforts at predicting it would be dependent on how reliably the independent bariables had been measured.

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Chapter 2. Procedural Details of the Data Collection

The work done under AID/csd 2478 built upon the work done earlier under AID/csd 2153. Under AID/csd 2153 the following tasks were accomplished: (1) an English-language version of the questionnaire later used in AID/csd 2478 was developed, (2) a pretest of this version took place in McCreary County, Kentucky in August 1968 in which 108 respondents were interviewed, (3) arrangements were made with Dr. Hsin-ying Wu, associate professor of biostatistics at the Institute of Public Health, National Taiwan University College of Medicine to conduct the fieldwork to be funded by AID/csd 2478, (4) the design for the main study was prepared and two rural townships close to Taipei city were selected as the site for the main study; namely, Kungliao township intended as the high-mortality township and Wuku township intended as the low-mortality township, (5) the English version of the questionnaire was translated into Chinese and pretested during the summer of 1969 upon 130 respondents in Shenkeng township, a rural area approximately 10 miles south of Taipei city, (6) a manual for the use of the interviewers was developed and translated into Chinese, (7) interviewer training for the main study was completed.

The study design, as developed under AID/csd 2153, was as follows. The household registration system in each township was to be used to transcribe all households in which there was an ever-married female. In all such households all ever-married women were to be interviewed. In one-fifth of the households currently-married males, if present, were to be interviewed. The households in which males were to be interviewed were the 3rd, 8th, 13th, 18th, etc. household in each lin (small subunit of a township).

The details of the interviewer training are of interest because the results of that training dictated a change in one of the two sites chosen for the interviewing. During August 1969 Dr. Wu conferred with the directors of the health stations in

Wuku and Kungliao townships and on their recommendation hired from each township four locally-residing candidates for the position of interviewer - three women (to interview females) and one man (to interview males). The interviewer candidates were required to have completed junior high school. They were also quite young on the average - many of them under age 20. These interviewer-candidates were told that they would be on probation through the period of their interview training. The training began on August 25, 1969. The candidates listened to lectures for two days and on the third day practiced interviewing each other. On following days they did practice interviewing in Shenkeng township (the site of the Taiwan pretest).

The training of the interviewers was made particularly difficult because of the fact that the written questionnaire was in Mandarin and the interviewer was required to read the Mandarin characters but then translate what he read into Taiwanese dialect. Since there is not invariably a one-to-one correspondence between a given Mandarin character and a particular Taiwanese phoneme, great pains had to be taken to insure that the interviewers attempted to give the identical oral equivalent to each Mandarin character.

By August 30 it had become obvious that the quality of the interviewers from Wuku (the low mortality township) was not as high as we considered desirable. We therefore decided that if improvement in the quality of work of the Wuku interviewer candidates was not soon forthcoming either we would discharge all of the unsatisfactory condidates and ask the director of the Wuku health station to make new nominations or we would consider the possibility of changing the interview site from Wuku to another township. Upon further consideration of the matter, Dr. Wu decided that the director of the Wuku health station would be antagonized if two or three of his interviewer candidates were discharged and that it would be best to seek a new interview site.

On September 22, Dr. Wu decided to shift the interview site from Wuku to Hsinchuang township. Hsinchuang, about three or four miles south of Wuku, was slightly more urban than the latter and also had a larger population. Its level of infant and child mortality was at approximately the same low level as that of Wuku. Because the population of the township was larger, and particularly because the central town of Hsinchuang township had a larger population than the central town of Wuku, we decided to interview only in those civil divisions of the township outside of the central town.

Interviewing in both townships was delayed beyond the planned October 1, 1969 starting date by the two typhoons which struck northern Taiwan on September 28 and October 4. In the first of these typhoons the roof of Dr. Wu's office was blown away. Interviewing began in Kungliao on October 21, 1969 and in Hsinchuang on November 1, 1969.

Dr. Wu hired two individuals, a research assistant and an associate research assistant, whose main responsibility was to give technical advice to the interviewers and to inspect the quality of their work. These two girls made frequent trips to Hsinchuang and to Kungliao to inquire of individuals presumably already interviewed whether they had in fact been interviewed and to inquire further concerning some of the most important questions covered in the questionnaire. Such visits insured that the interviewers would not be tempted to fabricate responses.

The initial plan was that interviewers in both Kungliao and Hsinchuang would be paid by the month and given a quota of interviews to complete. It soon became obvious that the interviewers in Hsinchuang were not meeting their quotas. It appeared that the monthly salary offered was adequate in Kungliao, where opportunities for good jobs were scarce, but was not sufficient in Hsinchuang, which due to its proximity to Taipei offered many other job opportunities. Dr. Wu and his

assistants prodded the Hsinchuang interviewers to work harder to complete their quota of interviews. As a result the three female interviewers in Hsinchuang announced their resignation in March 1970. After consultations with Dr. T.H. Sun, Deputy Director of the Taiwan Provincial Institute of Family Planning, we decided that all interviewing should be conducted on a piecework basis. Since the amount of money now to be budgeted for interviewing was greater than that originally planned, it was decided to recoup this loss through a reduction in the length of the reinterview questionnaire. Following the decision to institute a piecework system of interviewer payment, interviewing in Hsinchuang township was largely conducted by students from the National Taiwan University and to a small extent by public health nurses from the Provincial Institute of Health, which was located in the center of Hsinchuang township.

Interviewee cooperation was insured by giving to each respondent a towel and a tube of toothpaste upon completion of the interview.

The plan of interviewing was for the whole team of interviewers to contact all respondents in a particular village during a given time interval, usually around a week or more. The team traveled jointly to the village in the morning (by motorcycle in Kungliao and by bicycle in Hsinchuang). In all cases they returned from the village before dusk. Return travel in daylight hours was made necessary by the very poor, often extremely muddy, unpaved roads, particularly in Kungliao township. Thus interviewing during the evening was precluded. At least partly because of this interviewing strategy, there was a rather low rate of completed interviews for males. As a result of the difficulty in interviewing males who were not at home during the day, Dr. Wu eventually decided that a revision was necessary in the original plan whereby male interviews were confined to households where the right-hand digit

of the household number was three or eight. In the event that an interview with a male in the originally designated household could not be obtained, the interviewer was now asked to find a currently-married male either in the household with the next lower or next higher household number.

Interviewing of females was completed in September 1970 and that of males by the end of November 1970.

The number of completed interviews by township and by sex was as follows:

	Female	Male	Total
Kungliao	4,137	501	3,178
Hsinchuang	2,677	863	5,000
Total	6,814	1,364	8,178

The percentage of eligibles who were successfully interviewed can be computed only for females. For Kungliao females, the percentage was 77.4 and for Hsinchuang females 78.8 percent.

The reinterview questionnaire and an interviewer's reference manual for the reinterview were prepared in an English language version in the summer of 1970 and was translated into Chinese by Dr. Wu's staff.

The reinterview was begun in Kungliao township on November 20, 1970 and in Hsinchuang township on January 5, 1971. The second-round interviewing in Kungliao took place continuously throughout the year and was conducted by the locally-resident interviewers. Second-round interviewing in Hsinchuang was performed mostly by college students and was conducted principally during the January and the July and August vacations. All second-round interviews were completed by the end of September 1971. All interviewing payment for the reinterview was on a piecework basis. The total number of persons reinterviewed was 6,685 which constituted 81.7 percent of the number interviewed initially.

Coding for both the interview and the reinterview was performed in Taipei under the supervision of Dr. Wu. By far the greater part of both questionnaires was precoded. However, it was necessary for the coding clerks to compile summary data from the reproductive history and to code occupation into the categories of the International Labour Organization.

The Pacific Computer and Management Center in Taipei was hired to punch IBM cards and to perform sample verification. IBM Taipei was engaged to load a magnetic tape from the punched cards. The tape containing the first interviews from Kungliao arrived in Boston on November 5, 1971 and that for the first interviews from Hsinchuang on January 10, 1972. The tape for the reinterview from both townships arrived in Boston on April 29, 1972. All three tapes had first to be cleared by the Taiwan Garrison Command in order to ensure that they did not contain secret military data. These clearances took about six weeks for each tape.

A very elaborate computer program to check for illegitimate blanks, wild codes, and inconsistent entries was prepared by Ann Bowles, working in Boston. The program consisted of two parts. The first part checked for improper blanks. This was very difficult since a substantial proportion of the respondents were not asked to answer many of the questions. The second program checked for wild codes (a relatively easy task) and for inconsistencies, an exceedingly complicated operation. The programming for inconsistencies involved such matters as the consistency of various ages (current age, age at first marriage, age at menopause) relative to answers to such items as date of birth, date of interview, date of first marriage, date of menopause, etc. It also involved the checking for consistency within the very involved reproductive histories gathered and the checking of the accuracy of the summary data from the reproductive histories prepared by the coders. The large majority of

inconsistencies and wild codes discovered were converted into N.A. responses in the computer. A substantial minority were left to be corrected manually. These corrections were then merged into the tape and the tape put through the computer edit a second time in order to make sure that no errors had been introduced through the manual corrections. A small additional number of errors were manually corrected after this second run of the computer edit and the corrections merged onto the tape.

Chapter 3. Setting for the Survey and General Characteristics of the Respondents

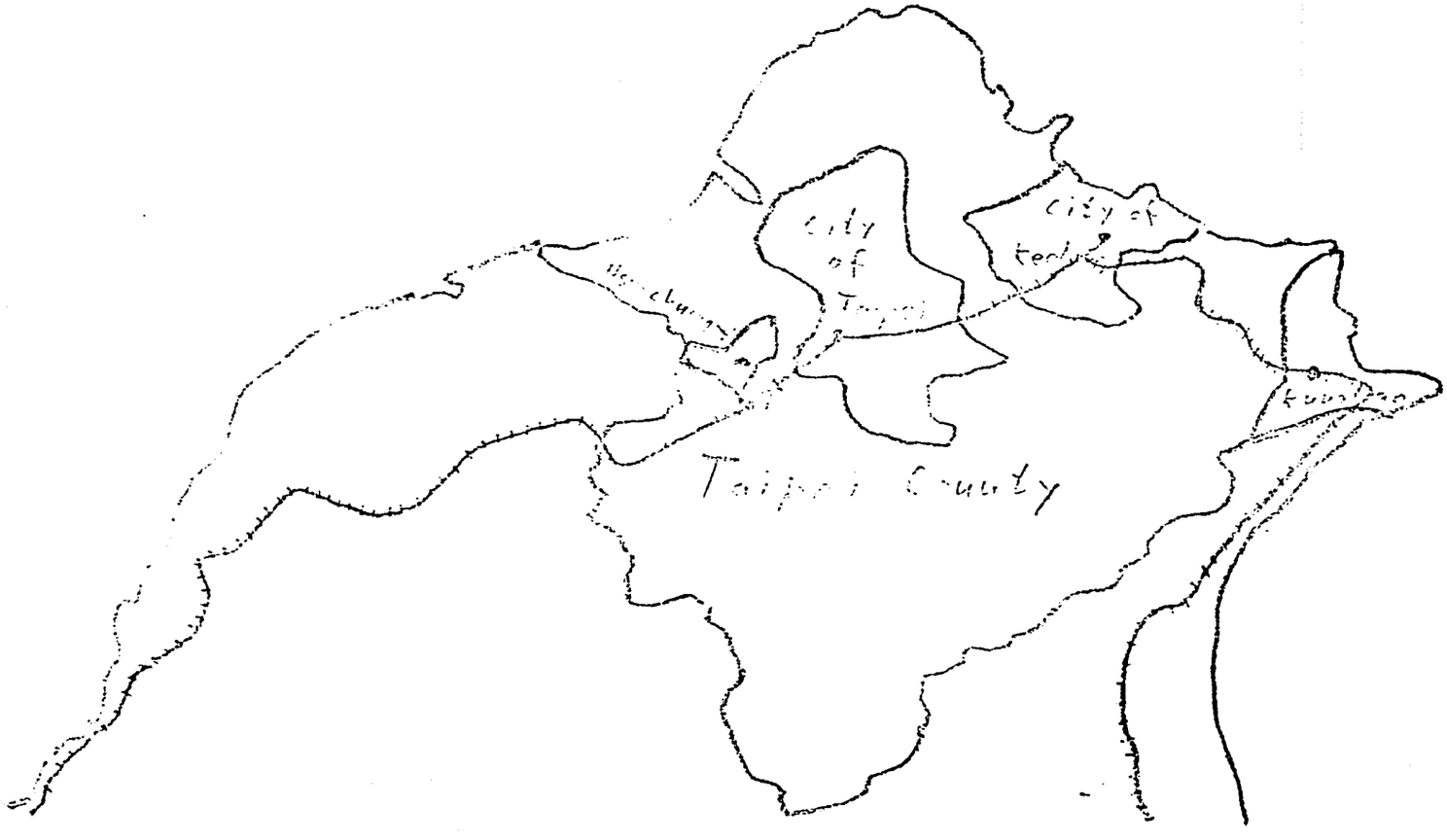
Setting for the Survey:

A crucial element in the study design was the plan to examine the association between the community level of infant and child mortality on the one hand and desired family size and the acceptance of family planning on the other. It was therefore proposed that the interviews be gathered in two separate rural communities and that within the constraints of feasible data collection these two communities would differ maximally in level of infant and child mortality.

A few remarks are now in order concerning the placement on an urban-rural continuum at Taiwan's official geographic subdivisions. Taiwan is politically subdivided into large cities (of which there are five) and counties (hsien). The counties are in turn subdivided into small cities (shih),urban townships (chen), and rural townships (hsiang). Urban townships have larger populations than rural townships and have a lower proportion of their total population engaged in agriculture. However, in both urban and rural townships one can separate out a central town from surrounding villages and countryside. As might be expected, the central town in the urban township has a substantially larger population on the average than in the rural township.

As we mentioned in Chapter 2, it was originally intended that interviews would be conducted in two rural townships in Taipei county within easy access of the National Taiwan University in the city of Taipei. Accordingly, Kungliao township was chosen to represent the high-mortality community and Wuku township was selected to represent the low-mortality community. However, because the interviewers recruited from Wuku were not sufficiently competent, a decision was then made to use Hsinchuang the urban township immediately to

Figure 3.1



the south of Wuku - as the site for interviews in a low-mortality community. Because Hsinchuang township had a considerably larger population than Wuku and because it was officially classed as an urban township, it was decided that interviews in Hsinchuang township would be conducted only in areas outside of the central town of Hsinchuang.

Figure 3.1 illustrates the geographical position of the two townships finally selected. Kungliao township is some 45 kilometers to the east of Taipei city. It is located on the railroad from Taipei to the east-coast city of Ilan. Hsinchuang township is located 10 kilometers to the west of Taipei city and in some respects can be considered to be partially suburban. Immediately to the east of Hsinchuang township is the city of Sanchung which has a population of more than 200,000 people and is located directly across the Tamshui river from Taipei.

Much of Kungliao township is hilly or mountainous and the large majority of the population lives directly on the sea coast or on the small river on which the town of Kungliao is located. Only a small portion of all land can be used for agriculture and almost all of this is used for rice paddy. Because of the nature of the terrain, the roads within Kungliao are very poor. Hsinchuang township lies within the Taipei basin on the north side of the Tamshui river. Most of the township consists of flat alluvial land used for rice paddy. Although the township is situated a short distance north of the main railroad from Taipei to Kaohsiung, it is directly located on one of the main highways leading southwest from Taipei and frequent buses travel to and from Taipei. Roads within the township are good although often crowded. The town of Hsinchuang is the site of Foojen University, a Roman Catholic Institution supported in large parts with funds from West Germany, and also of the Taiwan Provincial Institute of Health.

Table 3.1 Characteristics of the Population of Taiwan and of Hsinchuang and Kungliao townships, 1964-1969

	1964	1965	1966	1967	1968	1969	Percentage Change 1964-69
Total population (in thousands)							
Taiwan	12,281	12,654	13,021	13,363	13,683	14,096	+14.8
Hsinchuang	29.193	30.899	32.507	34.176	37.431	42.936	+47.1
Kungliao	17.985	18.254	18.632	18.944	19.139	19.256	+07.1
Crude birth rate per 1,000							
Taiwan	34.0	32.1	31.9	28.0	28.0	27.7	-18.5
Hsinchuang	34.4	33.1	31.3	30.6	34.3	34.5	+00.3
Kungliao	41.6	39.3	42.5	29.9	32.3	34.1	-18.0
Crude death rate per 1,000							
Taiwan	5.6	5.4	7.7	5.4	5.4	5.0	-10.7
Hsinchuang	6.4	5.3	6.1	5.0	4.8	5.2	-18.7
Kungliao	9.7	8.5	8.6	9.3	8.0	7.4	-23.7
Crude rate of natural increase per 1,000							
Taiwan	28.4	26.7	24.2	22.6	22.6	22.7	-20.1
Hsinchuang	28.0	27.8	25.2	25.6	29.5	29.3	+04.6
Kungliao	31.9	30.8	33.9	20.6	24.3	26.7	-16.3
Percentage of females 12 years and over illiterate[1]							
Taiwan	41.4	40.2	39.4	37.4	37.6	36.1	-12.8
Hsinchuang	35.6	34.4	32.4	29.0	31.4	27.6	-22.5
Kungliao	65.0	63.1	61.9	56.3	57.7	55.5	-14.6
Percentage of males 12 years and over illiterate[1]							
Taiwan	16.9	16.4	15.8	14.8	14.4	12.8	-24.3
Hsinchuang	16.0	14.2	14.2	12.4	11.7	10.5	-34.4
Kungliao	33.3	32.0	31.3	27.4	27.0	26.0	-21.9

Table 3.1

	1964	1965	1966	1967	1968	1969	Percentage Change 1964-69
Percentage of employed males 12 years and over in manufacturing[2, 3]							
Taiwan	11.7	11.9	12.0	13.8	15.7	14.8	+26.5
Hsinchuang	N.A.	22.9	23.2	33.0	32.6	33.1	N.A.
Kungliao	N.A.	01.5	01.8	02.2	03.8	03.9	N.A.
Percentage of employed males 12 years and over in agriculture and fishing[2]							
Taiwan	49.6	49.1	49.7	45.1	45.1	40.4	-18.5
Hsinchuang	39.6	39.3	38.3	29.0	30.5	25.3	-36.1
Kungliao	73.5	74.1	74.8	72.8	71.2	68.9	-06.3
Percentage of females 15 years and over employed in non-agricultural activity							
Taiwan	N.A.	N.A.	N.A.	10.6	10.8	12.4	N.A.
Hsinchuang	N.A.	N.A.	N.A.	17.7	14.3	13.7	N.A.
Kungliao	N.A.	N.A.	N.A.	2.0	3.6	6.5	N.A.
Ratio of males per 100 females							
Taiwan	109	109	109	109	110	110	+00.9
Hsinchuang	114	114	113	112	113	114	00.0
Kungliao	116	117	119	119	117	116	00.0
Death rate per 1,000 for children 0-4 years							
Taiwan	09.0	08.3	07.7	07.4	06.9	06.2	-31.1
Hsinchuang	06.4	08.1	04.2	05.6	04.8	05.0	-21.9
Kungliao	21.7	18.3	17.5	17.7	13.7	09.1	-58.1

Table 3.1

	1964	1965	1966	1967	1968	1969	Percentage change 1964-69
Percentage of females 20-24 years old currently married							
Taiwan	65.7	58.3	57.7	56.4	54.2	51.8	-21.2
Hsinchuang	50.5	50.5	50.4	49.3	51.1	52.8	+04.6
Kungliao	80.2	77.1	72.7	71.5	68.3	65.8	-18.0
Total fertility rate per 1,000 females							
Taiwan	5,100	4,825	4,815	4,220	4,325	4,120	-19.2
Hsinchuang	4,845	4,530	4,235	4,345	4,505	4,400	-09.2
Kungliao	7,300	6,920	7,700	6,175	5,965	6,130	-13.6
Total fertility rate per 1,000 currently married women 25 years old and over							
Taiwan	4,050	3,710	3,590	3,070	3,150	2,995	-26.0
Hsinchuang	4,205	3,675	3.350	3.350	3,510	3,180	-24.4
Kungliao	6,050	5,380	6,025	4,535	4,360	4,625	-23.6
Number of months of village health education nurse effort in family planning per 1,000 married women 15 to 49 years							
Taiwan	0.22	0.16	0.21	0.16	0.09	0.04	-81.8
Hsinchuang	--	--	0.04	0.02	0.02	--	0.0
Kungliao	--	--	2.25	0.74	--	--	0.0
Number of months of pre-pregnancy health worker effort in family planning per 1,000 married women 15 to 49 years							
Taiwan	0.62	1.41	1.38	1.73	1.97	2.05	230.6
Hsinchuang	2.30	2.82	2.65	2.05	1.98	1.69	-26.5
Kungliao	--	--	--	1.23	4.82	4.98	Infinite

Table 3.1

	1964	1965	1966	1967	1968	1969	Percentage change 1964-69
Number of months of trained doctor effort in family planning per 1,000 married women 15 to 49 years							
Taiwan	1.31	3.26	3.98	4.15	4.33	4.48	242.0
Hsinchuang	1.79	2.82	2.65	2.67	4.39	3.38	88.8
Kungliao	--	--	--	--	0.40	4.98	Infinite
New IUD acceptors as percentage of married women 15 to 49 years							
Taiwan	2.7	5.5	6.0	6.4	6.4	6.5	137.0
Hsinchuang	5.5	9.4	7.6	7.5	8.9	7.7	40.0
Kungliao	0.6	2.2	3.1	4.0	10.2	9.4	1,466.7
New pill acceptors as percentage of married women 15 to 49 years							
Taiwan	--	--	--	1.3	1.7	2.7	Infinite
Hsinchuang	--	--	--	1.2	0.6	1.2	Infinite
Kungliao	--	--	--	0.2	0.2	2.1	Infinite
In-migration rate per 1,000 from other townships within Taiwan for males							
Taiwan	NOT AVAILABLE					73.1	N.A.
Hsinchuang						193.3	N.A.
Kungliao						62.6	N.A.
Out-migration rate per 1,000 to other townships within Taiwan for males							
Taiwan	NOT AVAILABLE					72.3	N.A.
Hsinchuang						78.4	N.A.
Kungliao						66.2	N.A.

Table 3.1

	1964	1965	1966	1967	1968	1969	Percentage change 1964-69
Net-migration rate per 1,000 from or to other townships within Taiwan for males							
Taiwan						+ 0.8	N.A.
Hsinchuang		NOT AVAILABLE				+114.9	N.A.
Kungliao						3.6	N.A.
In-migration rate per 1,000 from other townships within Taiwan for females							
Taiwan						75.6	N.A.
Hsinchuang		NOT AVAILABLE				195.4	N.A.
Kungliao						30.1	N.A.
Out-migration rate per 1,000 to other townships within Taiwan for females							
Taiwan						74.7	N.A.
Hsinchuang		NOT AVAILABLE				79.9	N.A.
Kungliao						57.6	N.A.
Net-migration rate per 1,000 from or to other townships within Taiwan for females							
Taiwan						- 0.7	N.A.
Hsinchuang		NOT AVAILABLE				+115.5	N.A.
Kungliao						- 27.5	N.A.

Table 3.1 (concluded)

[1] The base in 1968 and 1969 is the population 15 years old and over.

[2] The base in 1967, 1968, and 1969 is the population 15 years old and over.

[3] Includes construction, electricity, gas, water, and sanitation.

Sources: 1964-1969 editions of Department of Civil Affairs, Taiwan Provincial Government, Taiwan Demographic Fact Book Republic of China; Taiwan Provincial Institute of Family Planning, Family Planning Reference Book, Taiwan, Republic of China, Volume I, Loop Acceptance, 1968, (October 1969); Committee on Family Planning, Taiwan Provincial Department of Health, Family Planning Reference Book, Taiwan, Repbulic of China, Volume II, Pill Acceptance, 1967-1968 (July 1970); personal communication from Dr. T.H. Sun, Executive Secretary, Committee on Family Planning, Taiwan Provincial Health Department.

It is evident from Table 3.1 that not only did Hsinchuang township have more people than Kungliao but its rate of population growth had been very much greater. From 1964 to 1969 the population rose 47.1 percent in Hsinchuang and only 7.1 percent in Kungliao. It is also evident from Table 3.1 that Kungliao and Hsinchuang townships differed as much in almost every aspect of modernity as they did in infant and child mortality. The proportion of illiterates was lower in Hsinchuang than in Kungliao. Furthermore, the proportion of males engaged in agriculture or fishing was very much higher in Kungliao than in Hsinchuang. Kungliao was quite unusual in the very high proportion of all males engaged in fishing. In 1966, the last year for which data are available, 42.1 percent of all employed males in Kungliao were fishermen. Fishing is done in small boats and without the aid of modern equipment. Although the proportion of males engaged in manufacturing in Kungliao was negligible, the proportion so engaged in Hsinchuang was considerably higher than the average for all of Taiwan. There are many new factories along the highway leading from Hsinchuang into Taipei. The establishment of these factories was a basic cause of the high population growth rate in Hsinchuang and the very high rate of net in-migration.

The proportion of women 15 years old and over employed in a non-agricultural activity differs substantially between the two townships. In Hsinchuang township this proportion is somewhat higher than the average for all of Taiwan but in Kungliao it is distinctly lower.

The contrast in mortality between Hsinchuang and Kungliao is also evident. This is reflected both in the crude death rate and in the death rate for persons under 5 years of age. Although random fluctuations from year to year are evident in each township due to the small size of the base population, it is

evident that the death rate for infants and young children was on the average at least twice as high in Kungliao as in Hsinchuang.

Finally, consider the variable related to fertility. After 1966 the crude birth rate was actually higher in Hsinchuang than in Kungliao. However, this was not because fertility was higher in Hsinchuang than in Kungliao but because of differences in age composition. The total fertility rate per 1,000 females, which is a pure measure unaffected by age composition, reveals the substantially higher fertility of Kungliao. Part of the reason for the lower fertility rate in Hsinchuang township was the higher age at first marriage. This is indicated indirectly in Table 1.1 by proportions of females married at ages 20 to 24. However, marital fertility at older ages (the principal target of family-planning programs) was also considerably lower in Hsinchuang than in Kungliao. This is operationalized here as the total fertility rate for currently married women 25 to 49 years of age (It should be noted that the total fertility rate for currently married women from ages 15 to 49 years of age is an unsatisfactory measure of marital fertility because marital fertility rates at ages 15 to 19 years and 20 to 24 years are strongly influenced by differences in the average age at marriage. This is so because whenever a large part of all the married women are newly married, a large proportion will be exposed to the risk of a birth rather than in an infertile state caused by postpartum amenorrhea.).

By the end of the period,family-planning programs had been successfully organized in both Kungliao and Hsinchuang townships. Prior to 1967 input into the family-planning program (expressed in terms of months of effort per 1,000 married woman of reproductive age) was substantially greater in Hsinchuang than in Kungliao. In the period prior to 1968, the success of the family-planning

program (in terms of new loop and pill acceptors per married woman of reproductive age) was also greater in Hsinchuang than in Kungliao.

It is also useful to examine the data in Table 3.1 with respect to the degree of change from 1964 to 1969. In many instances this change was exceedingly rapid. A marked decline in infant and child mortality occurred, particularly in Kungliao. Illiteracy for both males and females declined substantially in both townships. In Hsinchuang the proportion of employed males engaged in agriculture and fishing dropped very substantially while the proportion in manufacturing rose.

Declines in the total fertility rate occurred in both Hsinchuang and Kungliao. Taiwan's family-planning program was initiated on an island-wide basis in 1964. In Hsinchuang input into the family-planning program began at a high level and continued without very much increase throughout the period. Achievement from the program(in terms of new acceptors) was high from the beginning and did not show much pattern of change. In contrast, in Kungliao formal input into the program was not initiated until 1966 and the achievement of the program was accordingly very much greater at the end of the period than at the beginning. The possible effect of the family-planning program is indicated by the substantial decline in the fertility of currently married women 25 years old and over observed both for Hsinchuang and for Kungliao. Moreover, a rise in the age at marriage in Kungliao (but not in Hsinchuang) also contributed to the reduction of the total fertility rate in that township. However, in examining changes over time in the fertility data of Table 3.1 one must observe a certain measure of caution since it is obvious that year-to-year fluctuations are sometimes quite substantial.

Moreover, there are very definite errors in the measures of fertility for the years 1966 and 1967. The reported number of births for 1966 is too high and that for 1967 too low. (This error resulted in the following manner. Normally, a certain proportion of all births which take place during a given calendar year are not registered until sometime during the following year. However, because of the national census taken in December 1966, special efforts were made to ensure that all births taking place in 1966 were registered in that year. Since a proportion of all of the births registered in 1966 actually took place in 1965, the reported number of births in 1966 was inflated. Moreover, since a proportion of all of the births which would normally have been registered in 1967 (those occurring late in 1966) were registered in 1966 whereas other births which occurred in 1967 were not registered until 1968, the number of births registered in 1967 is biased downward.)

In summary, the data shown in Table 3.1 illustrate very clearly the very great contrasts between the two communities selected for the study. The two communities had been selected because they differed so much in their level of infant and child mortality. However, it was impossible to approximate a maximization of this difference without also creating very large differences in all other aspects of modernization.

General Characteristics of the Respondents

Table 3.2 presents a summary of the characteristics of the respondents of each sex interviewed in each township. As one would expect given the substantial differences by township shown in Table 3.1, we find that the respondents in Kungliao often differ markedly from those in Hsinchuang. Comparing Kungliao with Hsinchuang, average socio-economic status is lower, desired family size is higher, actual fertility is higher, child survival is less assured and is perceived as being less assured, and the reliance on sons as the chief support in one's old age is more pronounced.

However, the differences between the two townships should not obscure certain similarities. In both townships the desired number of children is sufficiently high to guarantee a substantial rate of natural increase, and the preference for sons is quite pronounced. Although substantial proportions of respondents in both townships manifest their entire approval of birth control, nevertheless the proportions actually practicing contraception are rather low.

Certain of the differences by sex may be due to the fact that the universe for male respondents consisted only of currently-married males whereas females were interviewed if they had ever been married.

Nevertheless, certain of the differences in characteristics between male and female respondents may be indicative of the bias caused by differential failure to obtain an interview. In particular, it is disturbing to find that 26 percent of the female respondents in Hsinchuang claim that their husband (or former husband) was a farmer whereas only 17 percent of the males stated that they were farmers. One may suppose that the proportion of farmers who could not be interviewed was higher than for other occupations. Alternatively, some men may have been farmers and also have had some other occupation. Their wives may have considered them to be farmers bu they themselves thought themselves to have another principal occupation. However, since the female report on husband's occupation appears to be much more consistent with the township

Table 3.2 Basic characteristics of the Respondents by Township and by Sex (Means and proportions are in all cases calculated on a base that excludes N.A. responses)

	Hsinchuang		Kungliao	
	Females	Males	Females	Males
A. Basic Demographic Data				
Mean age at interview	37.1	38.4	41.4	45.1
Mean age at first marriage	20.1	24.8	18.3	23.5
Proportion currently married	89.2	100.0	83.8	100.0
Proportion definitely past menopause	20.2	-	31.4	-
Mean number of pregnancies	4.44	-	5.62	-
Mean number of induced abortions	0.26	-	0.12	-
Mean number of live births	3.95	-	5.20	-
Proportion living and eating with relatives outside the nuclear family	45.5	30.6	61.1	57.1
Proportion with Chinese-mainland origin	3.8	17.5	1.4	5.0
B. Basic data on socio-economic status				
Mean number of school-years completed	4.16	7.35	1.52	3.64
Proportion never reading a newspaper	60.4	21.8	91.9	58.3
Proportion of females currently employed outside the home	10.5	-	1.3	-
Mean annual income of husband (or male respondent) in National Taiwan dollars	28,637	37,259	13,687	14,845
Proportion of husbands (or male respondents) who were farmers	26.4	17.0	39.7	41.5
Proportion of husbands (or male respondents) who were fishermen	0.0	0.0	33.4	29.1
Proportion of husbands (or male respondents) who were production workers	42.0	45.5	14.1	13.4
C. Variables concerned with Desired Fertility				
Mean additional number of children desired	0.66	0.61	0.68	0.56
Mean number of children advised for daughter (or for son)	3.75	3.62	4.54	4.42
Mean number of girls advised for daughter (or for son)	1.60	1.54	2.04	2.03
Mean number of boys advised for daughter (or for son)	2.16	2.09	2.50	2.43

Table 3.2 (continued). Basic characteristics of the Respondents by Twonship and by Sex

	Hsinchuang		Kungliao	
	Females	Males	Females	Males
Mean ideal number of children if life could be lived over	3.82	3.62	4.61	4.41
Mean ideal number of girls if life could be lived over	1.62	1.57	2.07	2.01
Mean ideal number of boys if life could be lived over	2.20	2.05	2.53	2.44
D. Variables concerned with Child Survival				
Proportion of births taking place 5 or more years prior to the interview surviving to age five	94.1	-	91.0	-
Proportion stating chances for child survival are much better than formerly	49.0	71.7	53.2	79.6
Mean proportion perceived as surviving to age 15 from 20 births	95.9	94.6	92.0	90.9
Mean proportion perceived as surviving to age 15 from 100 births	95.2	94.3	90.8	89.2
Mean proportion perceived as surviving to age 15 from mean number of births to women in the area	98.9	97.9	96.6	97.2
E. Variables concerned with Preference for sons and Reasons for Preferring Sons				
Proportion wanting two or more sons among next three children if they already had one boy and one girl	95.1	93.5	97.4	90.8
Proportion stating that couple with four girls should have another child	59.1	56.2	76.2	73.4
Proportion stating that couple with four boys should have another child	26.6	21.6	47.6	37.2
Proportion stating that couple with two girls and one boy should have another child	34.2	25.4	53.3	48.3
Proportion stating that couple with two boys and one girl should have another child	11.1	8.6	25.9	19.2
Proportion citing sons as most important source of old-age support	57.4	42.3	85.5	71.6
Proportion citing savings as most important source of old-age support	35.0	42.6	9.1	21.8

	Hsinchuang		Kungliao	
	Female	Male	Female	Male
Proportion citing government pension as most important source of old-age support	1.3	9.3	0.9	2.9
Proportion citing nongovernment pension as most important source of old-age support	0.3	2.5	0.0	0.0
Mean number of sons necessary for old-age support	1.77	1.49	2.32	2.38
F. Variables related to Family Planning				
Proportion entirely in favor of birth control	60.2	74.4	65.0	63.6
Proportion currently using:[1]				
IUD	7.6	13.1	5.7	5.8
Ota ring	5.2	5.9	4.1	2.4
Oral contraceptive	2.2	5.2	0.9	0.4
Female sterilization	4.6	5.5	2.6	3.8
Male sterilization	0.1	0.6	0.0	0.0
Condom	0.6	3.1	0.1	0.6
Jelly or cream	0.4	0.8	0.1	0.2
Rhythm	2.3	5.6	0.1	0.8
Diaphragm	0.1	0.5	0.0	0.0
Withdrawal	0.1	0.7	0.0	0.0
Proportion ever using abortion[1]	14.2	3.5	7.3	0.4

[1]Proportion is based on all respondents, and women born in 1924 or earlier, men with wives born in 1924 or earlier, and women not currently-married are automatically assumed not have used a contraceptive method.

data on occupation presented in Table 3.1 than is the male report on occupation (particularly so since we did not interview in the central part of the township), we have added grounds for believing that our male sample in Hsinchuang was biased against the inclusion of farmers.

On the other hand, the relatively large difference between Hsinchuang males and females in the proportion with Chinese mainland origin is real. Additional data not shown in Table 3.2 demonstrate that there are a large number of marriages in Hsinchuang in which the husband is a mainlander and the wife Taiwanese. Most of the husbands concerned are former members of the armed forces.

Chapter 4. The Method of Multiple Classification Analysis

The results presented in Chapters 5 through 7 are results of several multiple classification analyses. Since this type of analysis may not be known to many readers of this report, Chapter 4 will be devoted to an exposition of its procedure.[1]

Basically, multiple classification analysis is very similar both to multiple regression analysis and to analysis of variance. Comparing it to multiple regression analysis it presents certain definite advantages. The chief advantage is that it will admit the use not only of predictors which are measurable along an interval scale but also predictors which can only be measured by a nominal scale. In this respect multiple classification analysis is very similar to the method of multiple regression with dummy variables. Comparing multiple classification analysis with analysis of variance, both methods allow the computation of F tests indicating whether the amount of variance explained by all of the predicting variables is statistically significant and also whether the variance explained by any one predictor is significant.

The dependent variable in multiple classification analysis can be either an interval scale (without extreme skewness) or a dichotomy. For example, in one of the MCA's to be presented in Chapter 6 we use the interval scale of number of children born subsequent to the birth of the third child. In another MCA presented in Chapter 6 we use the dichotomy, current use or not of contraception. When a dichotomy is the dependent variable in an MCA, respondents having the attribute in question (i.e. current use of contraception) are given a score of 1 and respondents not having the attribute are assigned a score of 0. Thus if the dependent variable is a dichotomy, the mean for all respondents will be identical to the proportion of all respondents having the attribute (i.e. current users of contraception).

The output from the MCA program which we shall present in Chapter 5 through 7 consists of the following: (1) the square of the multiple correlation coefficient, (2) the value of Beta for each predictor, (3) the deviation from the grand mean for each category of each predictor, and (4) the adjusted coefficient for each category of each predictor. Additional output items are available from the MCA computer program but are not included in the tables of Chapters 5 through 7.

The square of the multiple correlation coefficient (multiple R^2) tells one the proportion of the total variance in the dependent variable explainable through knowledge of each respondent's status with respect to each of the independent variables (predictors). The concept of multiple R^2 is identical in both MCA and multiple regression analysis.

A value of Beta is computed for each predictor in MCA. A predictor may be in the form of an interval scale or a nominal scale but is always treated as if it were a nominal scale in MCA. To illustrate, we may wish to use as a predictor the amount of the husband's income. In regular multiple regression analysis we would use this variable directly as an interval scale. In MCA we must first subdivide the respondents into categories. For example we might subdivide respondents into three categories as follows: (1) income under $5,000, (2) income $5,000 to $15,000, (3) income $15,000 or more. Beta measures the importance of all categories of a given predictor in explaining variation in the dependable variable after holding constant the variance explainable by all of the other predictors. It is analogous to the standardized partial regression coefficients of multiple regression analysis and hence has been given the same name (Beta) that is conventionally used to denote that concept. Beta is defined as the square root of the ratio of the sum of squares based on the adjusted deviations from the grand mean for each category of each predictor to the total sum of squares. This leaves us to define what is meant by

the adjusted deviations from the grand mean. We shall do so soon because the term adjusted deviation from the grand mean is simply another (longer but more descriptive) name for the adjusted coefficient.

First, however, let us define the simpler concept - deviation from the grand mean. A deviation from the grand mean is computed for each category of each predictor. It is simply equal to the difference between the grand mean of the dependent variable for all respondents and the mean of the dependent variable for respondents belonging to the given category of the predictor.

The adjusted coefficient (otherwise known as the adjusted deviation from the grand mean) is similar to the deviation from the grand mean except that it measures the deviation from the grand mean which respondents in a particular category of a given predictor would have if the values of the dependent variable for respondents in that category were adjusted to reflect their differing values on all of the other predictors. The adjusted coefficient answers the question, "How different from the grand mean would the mean value of the dependent variable be for respondents in a given category of a given predictor if the respondents in this category were identical to all of the other respondents with respect to their categorization on all of the other predictors?"

Having described the output of MCA, let us now discuss an important restricting assumption of the MCA model.

As was pointed out earlier, the MCA model is less restrictive than the model of multiple regression analysis because it does not demand that the predictors be interval scales. As a consequence, in MCA we do not have to assume that a predictor is linearly related to the dependent variable as we would in multiple regression analysis. For example, in multiple regression analysis we would have to assume that number of years of completed school is linearly related to number of children desired if life could be lived over. In MCA, by way of contrast, we

could cope with a situation where level of schooling had no impact upon the desired number of children until it reached a certain threshold value. On the other hand, both multiple regression analysis and MCA assume that the independent variables are additive and that there is no interaction. This is an important restricting assumption. To illustrate, interaction would exist if husband's income had a positive effect on contraceptive use when the wife's education was low but a negative effect when the wife's education was high. More technically, interaction may be defined as existing when the impact on the dependent variable of a given category of a given predictor differs according to the categorization on some other predictor.

In reviewing the literature of previous fertility studies, we have beco convinced that no one as yet has shown positive proof of the existence of interaction effects. Therefore, we decided to make use of the MCA model despite the fact that we cannot prove that interaction effects do not exist.

Several additional matters merit discussion. One concerns the treatment of the N.A. (not ascertainable) category. In MCA respondents with N.A.responses do not have to be deleted from the analysis since in MCA there can be a special category of each predictor for persons with N.A. responses. Next we must consider the matter of differential weights. Our survey was designed to obtain responses from all ever-married women and from a one-in-five sample of the currently-married men, MCA allows one to assign differential weights to respondents to allow for such differential sampling. In those of our MCA runs in which we have included both male and female respondents, the males in each township have been given a weight equal to the ratio of the number of currently-married females interviewed to the number of males interviewed. For Kungliao this weight was 4.439 and for Hsinchuang 4.250.

One problem which arose in connection with the male respondents needs to be mentioned. We interviewed 178 males whose wives could not be interviewed. These male respondents constituted the overwhelming proportion of certain N.A. categories, in particular the N.A. category for wife's labor-force status and the N.A. categories for such variables as number of sons born and their survival, number of daughters born and their survival, number of living sons, and number of living daughters. Almost all of the respondents who were in the N.A. category for wife's labor-force status, an item obtainable for males only from their wife's questionnaire,were also in the N.A. categories for the other items obtainable for men only by going to their wife's questionnaire. As a result we had a situation which is termed multicollinearity. When multicollinearity exists, the MCA program is unable to compute meaningful values for the adjusted coefficients. These coefficients are computed by an iterative method and if a high degree of multicollinearity exists, the successive values computed do not converge. Accordingly, several tabulations originally planned to be presented for both sexes were rerun and confined to females only. A more expensive procedure, which we could not afford, would have been to delete from the analysis the males whose wives were not interviewed.

Finally, we must consider the matter of sampling error. Because of the very large size of our sample, we do not have to worry concerning the sampling error in our computation of multiple R^2 nor in our values of Beta. We do have to worry about the sampling error of the adjusted coefficients, particularly in those cases where they differ only slightly from zero or where they are based on less than 100 respondents.

We have followed a formula for computing the standard error of the adjusted coefficients devised by Kish and Frankel.[2]. It is that the standard error is equal to $\underline{a}$ divided by the square root of $\underline{n}$ where $\underline{a}$ is equal to the standard

deviation multiplied by the square root of (1 minus multiple R^2) and n is the number of cases (unweighted) in the category. By analogy to determine whether the difference between two adjusted coefficients is statistically significant we have multiplied the value of a by $\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}$ to obtain the standard error of the difference.

When we declare a particular result to be statistically significant, we are using a two-tailed test at the five-percent level of significance.

References for Chapter 4.

1. Frank Andrews, James Morgan, and John Sonquist, Multiple Classification Analysis: A Report on a Computer Program for Multiple Regression Using Categorial Predictors (Ann Arbor, Institute for Social Research, University of Michigan, 1967).

2. Op. cit., p. 125.

Chapter 5. The Perceived Level of Child Survival: Its Relation to Actual Survival and its Determinants

It is well known that in many of the less developed nations death rates for infants and children have declined dramatically within the last generation. A major aim of this study was to test the hypothesis that under these conditions the perceived level of infant and child survival lags behind actual survival so that at any given moment in time the perceived level will be substantially lower than the actual.

Many persons also believe that the perceived level of child survival is a crucial variable affecting the level of fertility in a society. It is hypothesized that whenever the average parent believes that a relatively low proportion of children will survive to maturity, he will be motivated to have an increased number of births in compensation. Thus if there is a substantial gap between the perceived level of infant and child survival and the actual level, the total fertility rate will be higher and acceptance of family planning lower than would be the case if no such gap existed.

The Gap between Actual and Perceived Levels of Child Survival in eastern Kentucky

The preliminary pretest of the questionnaire for the current study, conducted under AID/csd 2153, revealed at least one geographic area where there was a substantial discrepancy between the actual and perceived levels of infant and child survival. This pretest took place in 1968 in McCreary County, in the Appalachian mountains of eastern Kentucky.[1] The level of infant mortality in McCreary County in the years preceding the survey was

considerably higher than in the United States as a whole, averaging 43.3 per thousand for 1963-1966, a rate almost double that in the United States as a whole. Average per-capita income, which was only $754 in the county in 1963, was substantially lower than the $2,449 figure for the United States as a whole. Furthermore, the average educational attainment of McCreary County residents 25 years and older was less than 7.5 years in 1960 whereas it was 10.6 years for United States residents. The estimated total fertility rate for McCreary County, 4.71 in 1959-61 was also considerably higher than the total fertility rate for the United States, which was then 3.65.

The interviewing conducted under the auspices of AID/csd 2153 was done on a sample of 108 respondents who were selected for the interviewers by the local unlicensed midwife. For the most part these respondent couples were ones for whom the midwife had previously delivered a baby. For that reason the sample was not random but was biased toward older and poorer respondents. The average age of the 48 male respondents was 56 and that of the 60 female respondents 47. The median years of school attended was 6 for the female respondents and 4 for the male respondents.

Six questions were asked to measure quantitatively the respondent's perception of child survival. The first question read, "If there were 10 babies born in this area, how many of these babies do you think would live to reach age 15?" The next three questions were identically worded except that the number of babies was changed to 20, 30, and 100 respectively. The fifth question was derived from items relating to the average number of babies born per woman and the number of these which would survive to age 15. The last question asked again concerning the number out of 100 babies who would survive to age 15.

The six questions on child survival elicited consistent responses with between 69 and 79 percent of the babies perceived as surviving to age 15 on the average. This indicated a clearly-formed idea of child-survival changes, given the wide range of numbers used as bases and the difficulty in thinking in terms of numbers. The question about the survival of 100 babies yielded a mean number of 70.9 both times, although the answers given by individual respondents were not identical.

Despite their consistency, the responses were very clearly unrealistic in terms either of the respondent's own experiences or official statistics for the county. Eighty-nine percent of their own children (67 percent of whom were born before 1954 and were aged 15 years or older while only 15 percent of whom were 8 years old or younger) were living at the time of the interview. Indeed, even the 80 percent survival rate for siblings of respondents exceeded the respondents' perceived current survival rates. All of these siblings were presumed to be over age 15, since 87 percent of the respondents were born before 1930 and 97 percent before 1940. Therefore, the respondents were more than a generation behind the times in their perception of the threat of death during childhood.

To compare the perceived survival rates with an expected life-table value for survival to age 15, an appropriate life table had to be selected. The life table for nonwhites in the West South Central division of the United States was chosen because its value for the infant mortality rate was the closest of any U.S. regional life table to the observed average infant death rate for McCreary County in the 1963-1966 period. The West South Central infant mortality rates were 47.6 for males and 39.4 for females, yielding an average of about 43.5 per thousand, a figure extremely close to the McCreary County average of 43.3.

The statistics on survival to age 15 for nonwhites in the West South Central Division showed that 93.8 percent of boys and 94.9 percent of girls, or approximately 94 percent of all babies born, survived to age 15. If the same survival rate is presumed to have held in McCreary County, respondents perceived the risk of childhood mortality to be about four times as great as it actually was.

Congruence between Actual and Perceived Levels of Child Survival in Taiwan

The data elicited from Taiwan is in great contrast to that from eastern Kentucky; among the Taiwanese respondents there is no discernible gap between the actual and the perceived level of infant and child survival.

In the Taiwan survey an index of the proportion of children surviving to age 15 was constructed from three separate items, giving equal weight to each item. The first item concerned the proportion among 20 births surviving to age 15, the second concerned the proportion among 100 births, surviving to age 15 and the third concerned the proportion surviving to age 15 among the number of babies born to the average woman in the area.

The mean proportion of babies perceived as surviving among the Taiwanese respondents in both townships, computed according to this procedure, was 94.5 percent. In Kunglinao, the high mortality township, the mean proportion was 92.5 percent and in Hsinchuang, the low-mortality township, it was 95.9 percent.

It is not possible to determine precisely the true proportion surviving to age 15 at the present time in each of these townships. This is because Taiwanese vital statistics underreport the number of neonatal deaths and moreover, there seems to be a minority of cases in which the age at which children die is misstated. However, absolute precision is not needed to

conclude that the gap, if any, between the actual and perceived level of child survival in each of these two townships is exceedingly small.

We have estimated the proportion surviving to age 15 in each township from the death rates for children one to four years of age in 1969-1970. These were 2.11 in Hsinchuang and 5.27 in Kungliao. A life table very closely corresponding to the death rate at ages 1-4 for Hsinchuang in West model 21 and, to the death rate for Kungliao, West model 19.[2] For both sexes combined, West Model 21 shows that 94.8 percent will survive to age 15 and West model 19 shows 91.3 percent surviving.

These results would indicate that if anything the perception of child survival in Kungliao and Hsinchuang townships is actually higher than the actual level. However, it should be noted that it is probable that the death rates at age 1-4 in Kungliao and Hsinchuang townships were somewhat overstated. This is because there is a tendency in Taiwan to report children who actually die during the first year of life as dying at age one. This error occurs because of the difference between the Chinese way of reckoning age and the way commonly accepted in European nations. We conclude that the perceived level of child survival in these two townships is very close to the actual level, although whether it is slightly higher or slightly lower is impossible to determine.

Determinants of the Perception of Child Survival

A multiple classification analysis was performed to ascertain the factors which would best predict the perceived proportion of children surviving to age 15. The results of this analysis are presented in Table 5.1. In general the MCA yields no surprises.

Table 5.1. The Perceived Level of Infant and Child Survival

Mean is 94.5 percent

Value of Multiple R^2 is .182

Number of cases is 7944

Standard deviation is 6.4 percent

Rank of each predictor in terms of Size of Beta:

Township	.24
Percent of wife's births who died before age 15	.12
Sex	.11
Percent of mother's births who died before age 15	.07
Age	.05
Education	.05

Description of the categories of each predictor in terms of its deviations from the grand mean and its adjusted coefficient:

		Deviation from Grand Mean	Adjusted Coefficient	Number of cases
Township:				
	Kunglino	-02.1	-02.1	3,080
	Hsinchuang	+01.3	+01.0	4,864
Sex				
	Female	+00.4	+00.6	6,609
	Male	-00.4	-00.7	1,335
Age:				
	Under 25	+00.4	-00.6	954
	25 to 34	+00.6	+00.1	2,600
	35 to 44	+00.1	+00.3	1,996
	45 to 54	-00.6	+00.2	1,212
	55 to 64	-00.5	+00.6	746
	65 and over	-00.7	+00.4	436

Perceived Level of Infant and Child Survival (continued)

	Deviation from Grand Mean	Coefficient	Number of cases
Educational attainment:			
Less than primary graduate	-00.6	-00.2	4,331
Primary graduate but less than junior high graduate	+00.3	-00.1	2,793
Junior high graduate or more	+01.4	+00.7	820
Percent of wife's births dead before age 15:			
No births	-00.1	-00.4	342
None died before age 15	+00.6	+00.3	5,345
Less than 25 percent died	-01.2	-00.9	1,008
25 to 50 percent died	-02.2	-01.7	774
50 percent or more died	-01.6	-01.2	288
N.A.	+00.9	+00.9	187
Percent of mother's births dead before age 15:			
None died before age 15	+00.3	+00.4	4,523
Less than 25 percent died	+00.0	-00.1	1,351
25 to 50 percent died	-00.6	-00.6	858
50 percent or more died	-01.0	-01.0	258
N.A.	-00.1	-00.1	954

The value of multiple R^2 was .182. The three most important predictors were township (with a Beta of .24), the percent of the wife's births who died before age 15 (Beta of .12), and sex (Beta of .11). An analysis of the adjusted coefficients shows that residents of Kunglino perceived a significantly lower level of child survival than the average for all respondents and that those in Hsinchuang perceived a significanly higher level. Furthermore, males perceived significantly lower child survival than average whereas females perceived significantly higher survival. Unexpectedly, respondents under age 25 perceived a significantly lower proportion of children surviving than average whereas respondents who were 35 to 44 or 55 to 64 perceived a significantly higher proportion surviving. Respondents who had not suffered the loss of a child had a significantly higher perception of child survival whereas for each of the three categories of respondents for whom some babies died before age 15 the adjusted coefficient was significantly less than zero. Respondents who were at least junior high graduates had a significantly higher perception of child survival than average. Finally, respondents characterized by the fact that none of their mother's children died had a significantly higher perception whereas those characterized by the fact that 25 to 50 percent or 50 percent or more of their mother's children died before age 15 had a significantly lower perception of child survival.

Conclusions

It is difficult to speculate on just why there should have been such a large gap between actual and perceived levels of child survival in eastern Kentucky and no evidence of any such gap among the Taiwanese respondents. What is significant is that the divergent results of the two studies point out the possibility of wide variations between areas in the extent to which perceptions of child survival are congruent with reality. It may not be coincidental that in Taiwan there is both a congruence

between perceived and actual levels of child survival and a very successful family-planning program. In other nations or areas where with similar conditions of child survival, the family planning program has been less successful, it is possible that the lack of success may be due to a large gap between the actual and the perceived level of child survival.

The Multiple Classification Analysis for the Taiwanese respondents indicated that the perceived level of child survival was in large measure a function of the actual level. Thus Kungliao residents perceived lower child survival than those in Hsinchuang and the difference between the two townships in the perceived level of child survival, 3.4 percent, was approximately equal to the estimated difference in actual survival, which was 3.5 percent. Nevertheless, the level of educational attainment showed some small association with the perceived level of child survival implying that further expansion of educational facilities might be one policy measure tending to increase the perceived level of child survival. None of the other variables shown to be associated with the dependent variable would appear to be manipulatable through policy measures.

Reference for Chapter 5

1. David M. Heer, 1970. "Child Mortality, Son-Preference and Fertility: A Report with Particular Attention to the Kentucky Pretest," unpublished paper delivered as part of the final report for AID/csd 2153.

2. Ansley J. Coale and Paul Demeny, 1966. Regional Model Life Tables and Stable Populations (Princeton, N.J.: Princeton University Press), pp. 19-21.

Chapter 6. The Determinants of Fertility Behavior

In this chapter we shall examine the results of several Multiple Classification Analyses in which the dependent variables are respectively: (1) the number of subsequent births among currently-married women of third parity or higher and with the third birth at least one year prior to the interview, (2) the number of subsequent births among currently married women of second parity or higher and with the second birth at least one year prior to the interview, (3) current use of contraception among currently-married females born in 1925 or later, (4) current or previous use of contraception among currently-married females born in 1925 or later.

The main object of these analyses is to examine the apparent influence of nine principal independent variables: (1) the number and sex of survivors of the respondent's first three live births one year following the third live birth, (2) the number of survivors of the respondent's first three live births one year following the third live birth, (3) the sex of the first two live births and their survival status one year following the second live birth, (4) the number of sons born and whether or not they all survived, (5) the number of daughters born and whether or not they all survived, (6) the percentage of births who died before age 15, (7) the perception of child survival, (8) township - which serves as an imperfect proxy of the community level of child mortality, and (9) an index of the preference for sons.

It is obvious that the apparent effect of these variables upon the dependent variables cannot be examined without statistical control for other relevant variables. Among the most important of these other relevant variables are age, the number of living sons, and the number of living daughters. The other variables which are held constant include the respondent's educational attainment (and newspaper readership), labor-force status, husband's occupation, husband's income, educational aspirations for a nephew and for a niece, knowledge of birth-control, and mean length of breast feeding (lactation).

Of the nine principal independent variables, the first six and the eighth need no further explanation. We have already explained in some detail how the index of perception of child survival was constructed. It remains necessary to explain in some detail our index to measure the preference for sons. The index to measure preference for sons was constructed out of eight items. The wording of each of these is presented in Appendix A. Seven of the eight items in the scale were constructed out of questionnaire items asking the respondent whether hypothetical families should go on to have another child. To illustrate, for the first item of the scale the respondent was asked to look at a picture of a family with one boy and four girls and another picture of a family with one girl and four boys. The respondent was assigned a score of zero if he recommended that the family go on for another child when there was one boy and four girls but did not recommend the family with one girl and four boys to go on; the respondent was assigned a score of two if he recommended that the family with one boy and four girls not go on but that the family with one girl and four boys go on for another child. Respondents who stated that both families pictured should go on or who stated that neither family pictured should go on were given a score of one. Persons scoring zero clearly show son preference and persons scoring two clearly show daughter preference. Persons scoring one show neither son nor daughter preference. The final score was constructed by averaging the eight items together and then categorizing those with an average score of one or more as having no son preference, and those with average scores less than one into two categories of moderate and high son preference. An unfortunate drawback to the index of son preference is that respondents who had a very high ideal number of children did not reveal any son preference to some of the situations portrayed. Therefore, unfortunately, persons with high ideal family size tended to concentrate in the category of moderate son preference. As of the moment we have not found a way to obviate this difficulty with the son-preference index.

Detailed Findings for Each Table

Table 6.1 contains the results of two MCA runs in which the dependent variable is the number of subsequent births among currently-married women of third parity or higher and with the third birth at least one year prior to the interview. In Run A we used as a principal independent variable the number and sex of survivors of the first three live births one year following the third live birth; in run B we used the number of survivors of the first three live births one year following the third live birth. In both runs we also use township, perception of child survival, and preference for sons as principal independent variables.

From Table 6.1 we see that the average number of subsequent children is 2.72. Perusal of the results for Run A reveals that the number and sex of survivers of the first three live births is a very important determinant of subsequent fertility. Beta equals .32. If two sons and one daughter survive, the mean number of subsequent children after adjustment for the effect of other variables is .72 less than the average, whereas when there are no surviving children it is 1.27 greater than the average. When there have been no child deaths the results show there are fewer subsequent births when two or three of the first three births are male. Thus if there were three sons, the adjusted number of subsequent children is significantly less than if there were three daughters, and if there were two sons and one daughter the adjusted coefficient is significantly less than if there were one son and two daughters. When there have been one or more child deaths, the pattern of fewer subsequent children with more male survivors does not hold. Thus, if the survivors consists of two sons only, the adjusted coefficient is significantly higher than if the survivors are either one son and one daughter or two daughters; furthermore, if the only survivor is male the number of subsequent children is significantly greater than if the one survivor is female.

From Run B we see very clearly the importance of the total number of survivors of the first three live births without regard to their sex. If there are three survivors

Table 6.1. Number of subsequent births among currently-married women of third parity or higher and with third birth at least one year prior to the interview.

Mean is 2.729

Number of cases is 3,898

Standard deviation is 2.261

Value of multiple R^2 for run	
A	.490
B	.485

Rank of each predictor in terms of size of Beta:

	Run A	Run B
Age	.36	.37
Number and sex of survivors of the first three live births at one year following the mother's third live birth	.32	---
Number of survivors of the first three live births at one year following the mother's third live birth	---	.30
Mean length of lactation of all live births beginning with the third	.17	.17
Educational attainment	.10	.10
Husband's occupation	.06	.06
Labor-force status	.04	.04
Perception of child survival	.04	.04
Township	.04	.04
Preference for sons	.03	.03
Husband's income	.03	.03
Educational aspirations for nephew	.03	.03
Birth-control knowledge	.02	.02

Table 6.1. (continued) Number of subsequent births among currently-married women of third parity or higher and with third birth at least one year prior to the interview

Description of the categories of each predictor in terms of its deviations from the grand mean and its adjusted coefficient:

	Deviation from grand mean	Adjusted coefficient in run: A	B	Number of cases
Township:				
Kungliao	+0.588	+0.101	+0.102	1,691
Hsinchuang	-0.450	-0.077	-0.078	2,207
Age:				
Under 25	-2.182	-1.611	-1.613	64
25 to 29	-1.936	-1.299	-1.311	536
30 to 34	-1.241	-0.744	-0.765	835
35 to 39	-0.163	+0.106	+0.090	752
40 to 44	+0.904	+0.697	+0.671	614
45 and over	+1.623	+0.832	+0.880	1,097
Number and sex of survivors of the first three live births at one year following the mother's third live birth:				
3 sons	-1.243	-0.721	---	224
3 daughters	-0.938	-0.330	---	225
2 sons, 1 daughter	-1.413	-0.794	---	700
1 son, 2 daughters	-1.250	-0.526	---	731
2 sons, 0 daughters	+0.876	+0.384	---	291
2 daughters, 0 sons	+0.051	-0.007	---	159
1 son, 1 daughter	-0.094	-0.175	---	343
1 son, 0 daughters	+1.551	+0.743	---	443
1 daughter, 0 sons	+0.980	+0.370	---	179
No surviving children	+2.269	+1.271	---	443
N.A.	+1.340	+1.045	---	160

Table 6.1. (continued) Number of subsequent births among currently-married women of third parity or higher and with third birth at least one year prior to the interview

	Deviation from grand mean	Adjusted coefficient in run: A	B	Number of case
Number of survivors of the first three live births at one year following the mother's third live birth:				
3 survivors	-1.273	---	-0.609	1,880
2 survivors	+0.291	---	+0.063	793
1 survivor	+1.387	---	+0.613	622
0 survivors	+2.269	---	+1.244	443
N.A.	+1.840	---	+1.019	160
Perception of child survival:				
Less than 85 percent survival	+0.677	+0.341	+0.309	239
85 to 94 percent survival	+0.269	-0.018	-0.023	1,133
95 percent or more survival	-0.209	-0.029	-0.024	2,415
N.A.	+0.383	+0.082	+0.082	111
Preference for sons:				
High preference	+0.055	+0.064	+0.067	1,346
Moderate preference	+0.194	+0.053	+0.060	610
No preference	-0.133	-0.075	-0.079	1,7[illegible]2
Mean length of lactation of all live births beginning with the third:				
No lactation	+0.771	+0.038	+0.041	6
Less than 6 months	-0.821	+0.098	+0.091	2[illegible]6
6 to 11 months	+0.822	+0.638	+0.647	[illegible]4
12 to 17 months	-0.174	-0.174	-0.173	2,[illegible]7
18 months or more	-0.114	-0.569	-0.529	[illegible]
N.A.	-0.470	-0.031	-0.030	[illegible]

Table 6.1. (continued) Number of subsequent births among currently-married women of third parity or higher and with third birth at least one year prior to the interview.

	Deviation from grand mean	Adjusted coefficient in run: A	B	Number of cases
Husband's occupation:				
Fisherman	+0.527	-0.016	-0.012	575
Farmer	+0.585	+0.150	+0.159	1,371
Not in primary industry, worked for self or relative	-0.267	-0.021	-0.028	690
Not in primary industry, worked for nonrelative	-0.731	-0.139	-0.147	1,252
Husband not employed	+0.021	-0.828	-0.859	4
N.A.	-1.062	-0.783	-0.894	6
Husband's income:				
Less than NT$15,000	+0.637	+0.036	+0.034	1,446
NT$15,000 to NT$24,999	-0.501	-0.115	-0.120	908
NT$25,000 and over	-0.793	+0.035	+0.045	812
N.A.	+0.242	+0.033	+0.032	732
Educational attainment:				
Less than primary school graduate	+0.470	+0.117	+0.118	2,559
Primary graduate but less than junior high graduate and never reads a newspaper	-0.458	+0.026	+0.018	594
Primary graduate but less than junior high graduate and reads a newspaper	-1.124	-0.309	-0.305	570
Junior high graduate or more	-1.065	-0.788	-0.783	173
N.A.	-0.789	-0.977	-0.948	2

Table 6.1. (continued) Number of subsequent births among currently-married women of third parity or higher and with third birth at least one year prior to the interview.

	Deviation from grand mean	Adjusted coefficient in run: A		Number of cases
Labor-force status:				
Never worked and would not work in future	+0.593	+0.071	+0.073	2,130
Never worked but might work in future	-0.347	+0.021	+0.019	697
Previously worked	-1.002	-0.144	-0.152	844
Presently working	-0.769	-0.192	-0.187	223
N.A.	-0.729	+0.027	+0.099	4
Educational aspirations for nephew:				
Low	-0.095	-0.031	-0.035	555
Medium	-0.171	+0.076	+0.080	728
High	-0.030	-0.018	-0.018	2,607
N.A.	+0.771	+1.031	+1.111	8
Birth-control knowledge:				
Low	+0.565	-0.051	-0.049	1,172
Medium	-0.004	+0.004	+0.002	1,800
High	-0.707	+0.058	+0.059	926

the adjusted number of subsequent children is .609 less than the average whereas when there are no survivors it is 1.244 greater than the average. Thus after adjustment for the effect of other variables, respondents with no survivors go on to have 1.853 more children than respondents with three survivors. Although this is a large difference in number of subsequent children, note that it does not make up for all of the loss among the first three children. The proportion of the loss which is made up is simply 1.853 divided by three or 61.8 percent. Similarly it can be calculated that respondents with only one survivor make up 61.1 percent of their loss and respondents with two survivors make up 67.2 percent of their loss. Because of the large number of cases in each category, these estimates of the proportion of the loss which is made up are fairly precise. To illustrate, when there are no survivors the proportion of loss made up has 95 percent confidence limits of 61.8 percent, plus or minus 6.3 percent, when there is one survivor it has confidence limits of 61.1 percent plus or minus 7.7 percent, and when there are two survivors, it has confidence limits of 67.2 percent plus or minus 13.5 percent.

Both in Run A and in Run B respondents with a low perception of child survival go on to have .3 to .4 more additional children after adjustment for other variables than those with a high perception (the differences both in Run A and in Run B are statistically significant). However, the fact that most respondents are in the category perceiving 95 percent survival or greater means that the predictor as a whole has only a small value of Beta (.04). Preference for sons also exerts a significant effect in the predicted direction. However, the variation in the adjusted coefficients between the categories of this predictor is small.

Township is also shown to have a small but significant effect on subsequent births. After adjustment for other variables, Kungliao respondents go on to have .18 more births than those in Hsinchuang. If our measure of perception of child survival were completely reliable, one could state that the difference by township was due to some factor other than the community difference in child survival. Since the measure of

child survival does in fact have poor reliability, some of the township difference may be due to their difference in child survival.

Of the control variables shown in Runs A and B in Table 6.1 only one deserves special mention - the mean length of lactation of all live births beginning with the third. In both runs this is the third most important predictor. Respondents with a very long mean length of lactation are shown to have substantially fewer subsequent births than other respondents. However, the largest number of subsequent births comes from women with 6 to 11 months of lactation. Apparently, the women who do not breast-feed at all or whose mean duration of lactation is less than six months utilize contraceptive methods with greater frequency than other groups of the respondents.

Table 6.2 has as its dependent variable the number of subsequent births among currently-married women of second parity or higher and with the second birth at least one year prior to the interview. The mean number of subsequent children is 3.15. In Table 6.2 the focus of interest is on the impact of the sex and survival status of the first two live births. Given the sex composition of the first two births, we can examine the effect of child survival. Let us examine first the case where two sons were born. If both survive, the adjusted coefficient is -.525 whereas if only one survives it is +.446. In this case the initial loss was almost entirely made up (percent made up is (.525 + .446) / 1 equals .971) and the 95 percent confidence limits are $\pm$.237. Now consider the case where one son and one daughter were born. If the daughter died, the loss was also almost entirely made up, (.975 $\pm$ .196) whereas when the son died only a portion of the loss was made up on the average (.457 $\pm$ .284). Finally, consider the situation where two daughters were born. Here if one daughter died, little attempt was made on the average to make up the loss (.283 $\pm$ .292). The unexpected finding is the failure fully to make up the loss of the son when one son and one daughter were born. Further analysis might subdivide the group of one son and one daughter born into the two groups of older boy, younger girl and older girl, younger boy.

Table 6.2. The number of subsequent births among currently-married women of second parity or higher and with second birth at least one year prior to the interview

Mean is 3.154

Number of cases is 4,688 Multiple R^2 is .484

Standard deviation is 2.435

Rank of each predictor in terms of size of Beta:

Age	.42
Sex and survival status of the first two live births at one year following the second birth	.25
Mean length of lactation of all live births beginning with the second	.15
Educational attainment	.09
Labor-force status	.06
Husband's occupation	.06
Township	.05
Preference for sons	.03
Birth-control knowledge	.03
Husband's income	.03
Perception of child survival	.03
Educational aspirations for nephew	.03

Table 6.2.(continued). The number of subsequent births among currently-married women of second parity or higher and with second birth at least one year prior to the interview

Description of the categories of each predictor in terms of its deviation from the grand mean and its adjusted coefficient:

	Deviation from grand mean	Adjusted coefficient	Number of cases
Township:			
Kungliao	+0.718	+0.136	1,900
Hsinchuang	-0.489	-0.093	2,788
Age:			
Under 25	-2.534	-1.964	250
25 to 29	-1.876	-1.335	861
30 to 34	-0.949	-0.580	958
35 to 39	+0.253	+0.382	787
40 to 44	+1.229	+0.942	651
45 and over	+1.828	+1.086	1,181
Sex and survival status of the first two live births at one year following the second birth:			
2 sons born, both surviving	-1.030	-0.525	706
2 sons born, one surviving	+1.125	+0.446	298
1 son and 1 daughter born, both surviving	-1.213	-0.509	1,374
1 son and 1 daughter born, son only surviving	+1.424	+0.466	388
1 son and 1 daughter born, daughter only surviving	+0.334	-0.052	162
2 daughters born, both surviving	-0.932	-0.264	694
2 daughters born, one surviving	+0.361	+0.019	173
No children surviving	+2.160	+0.984	743
N.A.	+2.078	-1.072	190

Table 6.2. (continued) The number of subsequent births among currently-married women of second parity or higher and with second birth at least one year prior to the interview.

	Deviation from grand mean	Adjusted coefficient in table:	Number of cases
Perception of child survival:			
Less than 85 percent survival	+0.656	+0.246	279
85 to 94 percent survival	+0.274	+0.001	1,337
95 percent or more survival	-0.199	-0.027	2,941
N.A.	+0.282	+0.086	131
Preference for sons:			
High preference	+0.144	+0.072	1,568
Moderate preference	-0.009	+0.086	938
No preference	-0.618	-0.088	2,182
Mean length of lactation of all live births beginning with the second:			
No lactation	-1.255	-0.393	267
Less than 6 months	-0.889	-0.069	355
6 to 11 months	+0.589	+0.559	1,280
12 to 17 months	-0.078	-0.156	2,311
18 months or more	+0.173	-0.599	453
N.A.	-0.017	-0.170	22

Table 6.2.(continued) The number of subsequent births among currently-married women of second parity or higher and with second birth at least one year prior to the interview.

	Deviation from grand mean	Adjusted coefficient in table:	Number of cases
Husband's occupation:			
Fisherman	+0.630	-0.043	652
Farmer	+0.743	+0.182	1,534
Not in primary industry, worked for self or relative	-0.258	+0.002	837
Not in primary industry, worked for nonrelative	-0.805	-0.151	1,654
Husband not employed	+3.750	-0.132	4
N.A.	-0.868	-0.339	7
Husband's income:			
Less than NT$15,000	+0.793	+0.089	1,617
NT$15,000 to NT$24,999	-0.477	-0.095	1,120
NT$25,000 and over	-0.885	-0.031	1,086
N.A.	+0.246	-0.004	865
Educational attainment:			
Less than primary school graduate	+0.598	+0.126	2,890
Primary graduate but less than junior high graduate and never reads a newspaper	-0.413	+0.061	729
Primary graduate but less than junior high graduate and reads a newspaper	-1.168	-0.261	783
Junior high graduate or more	-1.809	-0.723	284
N.A.	-0.194	+0.211	2

Table 6.2. (continued) The number of subsequent births among currently-married women of second parity or higher and with second birth at least one year prior to the interview.

	Deviation from grand mean	Adjusted coefficient in table:	Number of cases
Labor-force status:			
Never worked and would not work in future	+0.775	+0.108	2,362
Never worked but might work in future	-0.329	+0.015	853
Previously worked	-1.102	-0.143	1,179
Presently working	-0.848	-0.313	288
N.A.	-1.154	-1.413	6
Educational aspirations for nephew:			
Low	-0.026	-0.030	657
Medium	+0.208	+0.097	860
High	-0.054	-0.023	3,162
N.A.	+0.846	+0.997	9
Birth-control knowledge:			
Low	+0.604	-0.094	1,353
Medium	-0.009	+0.004	2,177
High	-0.688	+0.102	1,158

We may also examine the effect on subsequent fertility of the sex of the first two live births holding constant their survival status. In accordance with our hypothesis, the number of subsequent births is significantly larger if two daughters were born and both survived than if two sons were born and both survived. Unexpectedly, however, subsequent fertility was significantly greater if two sons were born and only one survived than if two daughters were born and only one survived.

The remaining principal independent variables of Table 6.2 act much as they did in the runs shown in Table 6.1. After control for other variables, Kungliao respondents have significantly more subsequent children than Hsinchuang respondents; also those who perceive that less than 85 percent of babies born will survive have significantly more subsequent children, and those with no son preference have significantly less. Of the control variables, only the mean length of lactation shows an important influence.

Table 6.3 has as its dependent variable whether or not currently-married female respondents born in 1925 or later were currently practicing contraception. The grand mean was 21.8 percent currently practicing. The attempt to predict this variable is not very successful. In all three runs the value of multiple R^2 is only .125.

In Run A a principal independent variable was the number of sons born and their survival status. Added as a control variable was the number of living daughters. Run A attempted to investigate whether the death of one or more sons within each group of women with an identical number of sons born and an identical number of living daughters had an effect on current contraceptive practice. When either one, two or three sons have been born, respondents reporting that one or more of these sons were dead reported less practice of contraception after adjustment for other variables than those who reported no sons dead. The difference was especially great for those with two sons born. Here the adjusted coefficients were respectively -8.3 and +7.4 percent and the difference of 15.7 percent was significantly greater than 0. However, the number of respondents in the other categories in which one or more sons died was small and the results are accordingly not reliable. When four or more sons have been born, the difference by survival status was not in the expected direction. However, this may result because the two categories of the predictor may differ somewhat in total number of sons born. Further analysis might subdivide this group into those with exactly four sons born and those with five or more sons born.

Table 6.3 Current use of contraception among currently-married females born in 1925 or later

Mean is 21.8 percent

Number of cases is 4,688

Standard deviation is 41.3 percent

	Value of multiple R^2 for run
A	.125
B	.125
C	.125

Rank of each predictor in terms of size of Beta:

	Run A	Run B	Run C
Number of sons and their survival	.21	---	---
Number of living sons	---	.21	.21
Birth-control knowledge	.17	.17	.17
Educational attainment	.12	.12	.12
Number of living daughters	.10	---	.10
Number of daughters and their survival	---	.11	---
Age	.06	.06	.06
Husband's occupation	.04	.05	.04
Husband's income	.04	.04	.04
Labor-force status	.03	.03	.03
Perception of child survival	.03	.03	.02
Educational aspirations for nephew	.02	---	.02
Township	.02	.02	.02
Percentage of births who died before age 15	---	---	.02
Preference for sons	.01	.01	.01
Educational aspirations for niece	---	.01	---

Table 6.3.(continued). Current use of contraception among currently-married females born in 1925 or later

Description of the categories of each predictor in terms of its deviations from the grand mean and its adjusted coefficient:

	Deviation from grand mean	Adjusted coefficient in run: A	B	C	Number of cases
Township:					
Kungliao	-04.2	-01.2	-01.2	-01.2	1,657
Hsinchuang	+02.3	+00.7	+00.7	+00.7	3,031
Age:					
Under 30	-06.6	-02.8	-02.6	-02.7	2,110
30 and over	+05.4	+02.3	+02.1	+02.2	2,578
Number of sons and their survival:					
No sons born	-15.[illegible]	-14.3	---	---	790
1 son born, dead before age 15	-13.5	-09.8	---	---	24
1 son born, not dead before age 15	-04.6	-05.1	---	---	1,268
2 sons born, one or more dead before age 15	-08.9	-08.3	---	---	62
2 sons born, neither dead before age 15	+08.5	+07.4	---	---	1,129
3 sons born, one or more dead before age 15	+01.9	+00.8	---	---	122
3 sons born, none dead before age 15	+05.7	+0[illegible].2	---	---	625
4 or more sons born, one or more dead before age 15	+12.3	+12.9	---	---	252
4 or more sons born, none dead before age 15	+05.2	+07.0	---	---	388
N.A.	+06.7	+07.[illegible]	---	---	28

Table 6. (continued). Current use of contraception among currently-married females born in 1925 or later.

	Deviation from grand mean	Adjusted coefficient in run: A	B	C	Number of cases
Number of living sons:					
None	-15.0	---	-14.2	-14.2	824
One	-04.8	---	-05.3	-05.2	1,347
Two	+08.0	---	+06.9	+06.9	1,273
Three	+07.7	---	+08.1	+08.0	752
Four or more	+06.1	---	+07.9	+07.7	491
N.A.	-21.8	---	-02.4	-21.8	1
Number of daughters and their survival:					
No daughters born	-07.9	---	-07.3	---	965
1 daughter born, dead before age 15	-09.9	---	-09.2	---	42
1 daughter born, not dead before age 15	-01.7	---	-01.6	---	1,283
2 daughters born, one or more dead before age 15	+05.7	---	+04.6	---	80
2 daughters born, neither dead before age 15	+05.6	---	+04.3	---	983
3 daughters born, one or more dead before age 15	+07.4	---	+06.9	---	113
3 daughters born, none dead before age 15	+03.2	---	+03.0	---	542
4 or more daughters born, one or more dead before age 15	+03.6	---	+02.8	---	212
4 or more daughters born, none dead before age 15	+01.7	---	+02.9	---	450
N.A.	+05.9	---	+09.7	---	18

Table 6.3 (continued). Current use of contraception among currently-married females born in 1925 or later.

	Deviation from grand mean	Adjusted coefficient in run: A	B	C	Number of cases
Number of living daughters:					
None	-07.6	-06.9	---	-06.9	1,018
One	-01.4	-01.1	---	-01.1	1,367
Two	+06.0	+05.0	---	+04.9	1,121
Three	+02.5	+02.1	---	+02.0	646
Four or more	+02.5	+02.8	---	+03.2	535
N.A.	-21.8	+0[illegible].2	---	+31.2	1
Percentage of births who died before age 15:					
No births	-21.0	---	---	+00.1	229
None died	+00.3	---	---	-00.4	3,670
Less than 25 percent died before age 15	+07.7	---	---	+01.3	426
25 to 49 percent died before age 15	+04.6	---	---	+02.8	287
50 percent or more died before age 15	-13.7	---	---	+00.9	74
N.A.	-21.8	---	---	+04.0	2
Perception of child survival:					
Less than 85 percent survival	-00.2	+02.4	+02.5	+02.4	277
85 to 94 percent survival	+00.2	+01.3	+01.3	+01.[illegible]	1,30[illegible]
95 percent or more survival	+00.3	-00.8	-00.8	-00.7	2,99[illegible]
N.A.	-09.1	-0[illegible].4	-00.6	-00.6	110

Table 6.3.(continued). Current use of contraception among currently-married females born in 1925 or later

	Deviation from grand mean	Adjusted coefficient in run: A	B	C	Number of cases
Preference for sons:					
High preference	-00.5	-00.6	-00.6	-00.7	1,507
Moderate preference	+00.6	+00.6	+00.5	+00.6	891
No preference	+00.1	+00.2	+00.2	+00.2	2,290
Husband's occupation:					
Fisherman	-03.3	+01.1	+01.4	+01.1	583
Farmer	-05.6	-02.8	-02.9	-02.9	1,130
Not in primary industry, worked for self or relative	+02.3	+00.1	+00.1	+00.1	884
Not in primary industry, worked for nonrelative	+03.0	+01.1	+01.1	+01.2	2,078
Husband not employed	-21.8	-24.2	-29.1	-25.4	2
N.A.	-03.7	+11.7	+11.6	+11.7	11
Husband's income:					
Less than NT$15,000	-04.0	-00.9	-01.0	-01.0	1,193
NT$15,00 to NT$24,900	-01.3	-01.0	-00.9	-00.9	1,304
NT$25,00 and over	+07.3	+02.4	+02.5	+02.5	1,374
N.A.	-04.5	-01.3	-01.3	-01.2	817

Table 6.3.(continued). Current use of contraception among currently-married females born in 1925 or later

	Deviation from grand mean	Adjusted coefficient in run: A	B	C	Number of cases
Educational attainment:					
Less than primary school graduate	-03.8	-03.9	-03.8	-03.8	2,205
Primary graduate but less than junior high graduate and never reads a newspaper	-01.0	+00.4	+00.3	+00.4	889
Primary graduate but less than junior high graduate and reads a newspaper	+02.0	+01.7	+01.7	+01.7	1,136
Junior high graduate or more	+15.5	+13.7	+13.6	+13.7	455
N.A.	-21.8	-19.5	-22.5	-20.3	3
Labor-force status:					
Never worked and would not work in future	-02.5	-00.7	-00.8	-00.8	1,732
Never worked but might work in future	+00.2	+01.3	+01.2	+01.2	921
Previously worked	+01.5	-00.5	-00.3	-00.3	1,639
Presently working	+04.8	+02.4	+02.5	+02.5	387
N.A.	-21.8	-17.0	-19.8	-17.1	9
Educational aspirations for nephew:					
Low	-01.6	+00.5	---	+00.6	623
Medium	-01.4	+01.6	---	+01.7	842
High	+00.7	-00.5	---	-00.5	3,215
N.A.	-21.8	-07.7	---	-06.7	8

Table 6.3.(continued) Current use of contraception among currently-married females born in 1925 or later

	Deviation from grand mean	Adjusted coefficient in run: A	B	C	Number of cases
Educational aspirations for niece:					
Low	-02.6	---	+00.6	---	561
Medium	-01.5	---	+00.3	---	909
High	+00.1	---	-00.2	---	3,203
N.A.	-08.5	---	+01.9	---	15
Birth-control knowledge					
Low	-13.7	-09.6	-09.5	-09.6	1,113
Medium	-01.4	-01.1	-01.1	-01.1	2,225
High	+13.6	+09.7	+09.6	+09.8	1,390

In Run B a principal independent variable was the number of daughters born and their survival. The added control variable was the number of living sons. Run B seeks to find out whether the death of a daughter holding constant the number of daughters born and the number of living sons has an effect on contraceptive practice. When either one, two, or four or more daughters have been born, the results are in the expected direction. However, in none of the four possible comparisons are the differences by survival status significantly different from zero.

In Run C we inquire whether the proportion of the respondent's births who have died has an effect on contraceptive practice holding constant both the number of living daughters and the number of living sons. The differences between categories are small, none are significant, and the predictor taken as a whole has only a very small Beta (.02).

In retrospect it is obvious that the size of sample for Table 6.3 is not sufficient to bear the burden of analysis of the two separate variables of number of sons and their survival and number of daughters and their survival (as we have attempted in Runs A and B). A further MCA is desirable in which the chief dependent variable would be simply the number of children born and their survival.

Let us consider next the other principal independent variables. Contrary to our hypothesis, the perception of child survival is negatively related to contraceptive practice. The differences are small, and not significant; nevertheless, those who see fewer children surviving report greater current use of contraception. The influence of preference for sons is in the expected direction but the differences are again extremely small and not significant. The difference by township is also in the expected direction but the adjusted coefficient for Kunglidao (-1.2) is not markedly different from that for Hsinchuang (+0.7) and the difference between the two coefficients is not significant.

The overall results of Table 6.3 indicate that the number of living sons is the best predictor of current contraceptive practice. The other most important predictors are birth-control knowledge, educational attainment, and number of living sons. A word needs to be said about the relatively high ability of birth-control knowledge to predict contraceptive practice. It is likely that women who decide to make use of contraception learn more about it. Therefore, one cannot assume from these results that knowledge of birth control has a marked causal influence on contraceptive practice. Note that in Tables 6.1 and 6.2, in which the dependent variable was subsequent fertility, that birth-control knowledge had little explanatory power.

Table 6.4 has as its dependent variable the proportion currently or previously using contraception among currently-married females born in 1925 or later. This variable is considerably easier to predict than the proportion currently using contraception. In each of the three runs in this table the value of multiple R^2 was .26 in contrast to .13 in each of the three runs of table 6.1. Nothwithstanding, in general, the patterns of association between the various predictors and the dependent variable are quite similar in the two tables. As before when one, two, or three sons have been born, respondents who did not have a son die were more likely to be practicing contraception after adjustment for other variables. But the difference was only significant in the case where two sons had been born, since the small number of cases in the categories where one or more sons had died cause high sampling error. With respect to the number of daughters born and their survival, shown in Run B of Table 6.4, the small number of cases in the categories where one or more daughters died again causes heavy sampling error and the differences in adjusted coefficients by survival within each parity group are not statistically significant. With respect to the percentage of births who died before age 15, holding constant the number of living daughters and living sons and other relevant variables, Run C shows a slight tendency for those who have had some children die to have greater proportion ever using contraception than that for all respondents. The result is significant only for the category in which 25 to 49 percent of births died.

Table 6.4 Current or previous use of contraception among currently-married females born in 1925 or later

Mean is 40.5 percent

Number of cases is 4,688

Standard deviation is 49.1 percent

	Value of multiple R^2 for run
A	.260
B	.263
C	.262

Rank of each predictor in terms of size of Beta:

	Run A	Run B	Run C
Birth-control knowledge	.28	.28	.28
Number of sons and their survival	.28	---	---
Number of living sons	---	.28	.28
Number of daughters and their survival	---	.15	---
Number of living daughters	.14	---	.14
Age	.11	.10	.10
Educational attainment	.10	.10	.10
Township	.07	.08	.08
Husband's occupation	.06	.06	.06
Percentage of births who died before age 15	---	.04	---
Preference for sons	.04	.04	.04
Husband's income	.03	.03	.03
Labor-force status	.03	.03	.03
Perception of child survival	.03	.03	.03
Educational aspirations for nephew	.03	---	.03
Educational aspirations for niece	---	.02	---

Table 6.4.(continued) Current or previous use of contraception among currently-married females born in 1925 or later

Description of the categories of each predictor in terms of its deviations from the grand mean and its adjusted coefficient:

	Deviation from grand mean	Adjusted coefficient in run: A	B	C	Number of cases
Township:					
Kunglino	-08.4	-04.9	-05.0	-05.1	1,657
Hsinchuang	+04.6	+02.7	+02.7	+02.8	3,031
Age:					
Under 30	-12.7	-06.0	-05.6	-05.6	2,110
30 and over	+10.4	+04.9	+04.6	+04.6	2,578
Number of sons and their survival:					
No sons born	-25.6	-22.4	---	---	790
1 son born, dead before age 15	-15.5	-09.3	---	---	24
1 son born, not dead before age 15	-08.3	-08.4	---	---	1,768
2 sons born, one or more dead before age 15	-16.3	-13.9	---	---	62
2 sons born, neither dead before age 15	+11.9	+09.2	---	---	1,129
3 sons born, one or more dead before age 15	+10.4	+08.4	---	---	122
3 sons born, none dead before age 15	+15.0	+12.6	---	---	625
4 or more sons born, one or more dead before age 15	+17.9	+18.1	---	---	252
4 or more sons born, none dead before age 15	+11.9	+14.3	---	---	398
N.A.	+13.1	+14.0	---	---	28

Table 6.4. (continued) Current or previous use of contraception among currently-married females born in 1925 or later.

	Deviation from grand mean	Adjusted coefficient in run: A	B	C	Number of cases
Number of living sons:					
None	-25.3	---	-22.0	-22.2	824
One	-08.6	---	-08.5	-08.4	1,347
Two	+11.9	---	+09.4	+09.5	1,273
Three	+14.6	---	+14.1	+14.0	752
Four or more	+12.[illegible]	---	+14.4	+14.2	491
N.A.	-40.5	---	-05.3	-40.4	1
Number of daughters and their survival:					
No daughters born	-15.2	---	-12.6	---	965
1 daughter born, dead before age 15	-04.8	---	-03.6	---	42
1 daughter born, not dead before age 15	-01.9	---	-01.5	---	1,283
2 daughters born, one or more dead before age 15	+15.8	---	+13.0	---	89
2 daughters born, neither dead before age 15	+08.8	---	+07.0	---	983
3 daughters born, one or more dead before age 15	+13.5	---	+11.6	---	113
3 daughters born, none dead before age 15	+05.3	---	+03.8	---	542
4 or more daughters born, one or more dead before age 15	+05.3	---	+03.0	---	21[illegible]
4 or more daughters born, none dead before age 15	+04.0	---	+04.7	---	450
N.A.	+04.0	---	+10.4	---	18

Table 6.4.(continued). Current or previous use of contraception among currently-married females born in 1925 or later.

	Deviation from grand mean	Adjusted coefficient in run: A	B	C	Number of cases
Number of living daughters:					
None	-14.2	-11.4	---	-11.7	1,018
One	-01.2	-00.5	---	-00.5	1,367
Two	+09.5	+07.4	---	+07.3	1,121
Three	+04.4	+02.7	---	+02.7	646
Four or more	+04.8	+04.1	---	+04.8	535
N.A.	-40.5	-08.8	---	+52.7	1
Percentage of births who died before age 15:					
No births	-36.5	---	---	+00.4	229
None died	+00.3	---	---	-00.9	3,670
Less than 25 percent died before age 15	+14.5	---	---	+02.8	426
25 to 49 percent died before age 15	-08.7	---	---	+05.7	287
50 percent or more died before age 15	-18.8	---	---	+05.8	74
N.A.	-40.5	---	---	-09.4	2
Perception of child survival:					
Less than 85 percent survival	-01.1	+03.4	+03.5	+03.2	277
85 to 94 percent survival	-00.[illegible]	+01.7	+01.7	+01.5	1,302
95 percent or more survival	+00.8	-01.4	-01.1	-00.9	2,999
N.A.	-14.1	-00.3	+00.1	-00.5	110

Table 6.4.(continued) Current or previous use of contraception among currently-married females born in 1925 or later

	Deviation from grand mean	Adjusted coefficient in run: A	B	C	Number of cases
Preference for sons:					
High preference	-01.4	-02.1	-02.1	-02.2	1,507
Moderate preference	-00.8	-00.8	-00.9	-00.8	891
No preference	+01.3	+01.7	+01.7	+01.8	2,290
Husband's occupation:					
Fisherman	-07.4	+00.9	+01.0	+00.5	583
Farmer	-08.5	-04.8	-05.1	-04.9	1,130
Not in primary industry, worked for self or relative	+04.3	+01.0	+01.2	+01.2	884
Not in primary industry, worked for nonrelative	+05.0	+01.9	+02.0	+02.0	2,076
Husband not employed	-40.5	-56.4	-56.4	-56.3	2
N.A.	-13.2	+08.0	+08.0	+08.0	11
Husband's income:					
Less than NT$15,000	-05.9	-00.4	00.5	-00.5	1,193
NT$15,000 to NT$24,999	-00.5	-00.5	-00.5	-00.4	1,304
NT$25,000 and over	+10.3	+02.2	+02.2	+02.2	1,374
N.A.	-07.8	-02.3	-02.2	-02.3	81

Table 6.4. (continued) Current or previous use of contraception among currently-married females born in 1925 or later.

	Deviation from grand mean	Adjusted coefficient in run: A	B	C	Number of cases
Educational attainment:					
Less than primary school graduate	-04.0	-02.5	-02.5	-02.4	2,205
Primary graduate but less than junior high graduate and never reads a newspaper	-01.5	+00.6	+00.4	+00.5	889
Primary graduate but less than junior high graduate and reads a newspaper	+01.1	-01.2	-01.2	-01.3	1,186
Junior high graduate or more	+20.0	+14.0	+14.2	+14.0	455
N.A.	-07.1	-05.7	-07.2	-07.1	3
Labor-force status:					
Never worked and would not work in future	-04.0	-01.5	-01.5	-01.6	1,732
Never worked but might work in future	+05.4	+01.6	+01.4	+01.5	921
Previously worked	+02.6	+00.2	+00.3	+00.3	1,641
Presently working	+06.8	+02.5	+02.6	+02.7	387
N.A.	-26.2	-16.0	-14.6	-15.5	7
Educational aspirations for nephew:					
Low	-03.2	+01.1	---	-01.1	625
Medium	-02.3	+02.7	---	+02.7	842
High	+01.5	-00.5	---	-00.5	3,421
N.A.	-19.0	+05.7	---	-05.3	

Table 6.4. (continued) Current or previous use of contraception among currently-married females born in 1925 or later

	Deviation from grand mean	Adjusted coefficient in run: A	B	C	Number of cases
Educational aspirations for niece:					
Low	-05.0	---	-01.2	---	561
Medium	-00.5	---	+01.8	---	909
High	-01.1	---	-00.3	---	3,203
N.A.	-20.5	---	-08.3	---	15
Birth-control knowledge:					
Low	-24.7	-19.6	-19.3	-19.5	1,113
Medium	-01.7	-01.5	-01.6	-01.6	2,225
High	+23.1	+18.6	+18.6	+18.7	1,350

Consider finally, the other principal independent variables in Table 6.4. Contrary to hypothesis, a high perception of child survival is negatively related to current or previous contraceptive use, although the differences between categories are very small and are not significant. Preference for sons is associated negatively, as expected, with current or previous contraceptive practice. Although the difference in the adjusted coefficients is not large, the proportion ever using contraception is significantly greater in the no-preference category than in the high-preference category. The difference by township in previous or current contraceptive practice holding constant other variables is substantial and highly significant. The adjusted coefficient for Hsinchuang is almost 8 percentage points higher than for Kungliao in all three runs.

Summary of Statistically Significant Findings for each Principal Independent Variable

The preceding section of this chapter was very complicated. As a result the reader may have found it difficult to keep in mind what the main findings were. We shall therefore summarize the statistically significant findings but by a different organizing principle. This time we shall examine separately each of the principal independent variables in all of the tables in which it appeared.

Let us consider first the number and sex of survivors of the first three births, a variable which appeared only in Run A of Table 6.1. After adjustment for the other variables the number of subsequent children was significantly greater if the survivors consisted of three daughters rather than of three sons or if the number of survivors consisted of two daughters and one son rather than of two sons and one daughter. On the other hand, the number of subsequent children, after adjustment for the other variables, was significantly greater if the survivors consisted of two sons and no daughter rather than two daughters and no son, and was also significantly greater if the survivors consisted of one son and no daughters rather than one daughter and no sons. These last two findings are difficult to interpret. An interpretation which

is congruent with some of the later findings from Table 6.2 is that the death of an only son produces great trauma and a consequent unwillingness to have further children. On the other hand, the death of a daughter or of a son who is not the only son may inspire fear that the remaining son might die and thus might motivate the couple to have additional children as insurance against future loss of sons.

Run B of Table 6.1 focused on the number of survivors from the first three live births. The larger the number of survivors the fewer were the subsequent births. However, respondents who lost one or more of their first three children did not fully compensate for their initial loss. We were able to estimate with fair precision that respondents losing all three of their first children made up 61.8 percent of their loss, respondents losing two of their first three children 61.1 percent of their loss, and respondents losing one of their first three 67.2 percent.

The sex of the first two live births and their survival was the chief concern of Table 6.2. If two sons were born, the death of one led to a significantly greater number of subsequent births, after adjustment for the effect of the other variables, than if both survived. If one son and one daughter were born, the death of either led to a statistically significant adjusted increase in the number of subsequent children over the case where neither died. In accordance with hypothesis, the adjusted number of subsequent births was significantly larger if two daughters were born and both survived than if two sons were born and both survived. However, two very interesting findings were unexpected. The first was that if there was one son and one daughter, the death of the daughter led to a significantly greater adjusted number of subsequent children than the death of the son. The other was that adjusted subsequent fertility was significantly greater if two sons were born and only one survived than if two daughters were born and only one survived.

The number of sons born and their survival was employed as a variable in Tables 6.3 and 6.4. Among those respondents who had born exactly two sons, both current contraceptive use and current or past use was greater if both had survived than if one or both had died.

The percentage of births who died before age 15 provided one significant result. Current or previous use of contraception was greater after adjustment for the other variables, if 25 to 49 percent of the babies had died. This result is congruent with the finding from Table 6.1 that respondents having an initial loss of children do not compensate for all of the births which they have lost. Thus holding constant, as we have done, the number of living sons and the number of living daughters, we should expect greater use of contraception if there have been previous child deaths.

Township was a significant variable with respect to all of the dependent variables except current contraceptive use. After adjustment for the effect of other variables, Kunglico respondents had more subsequent children both after their second and after their third birth and reported a lower proportion ever using contraception. These results are congruent with our hypothesis that the community level of infant and child mortality elevates fertility and reduces the proportion of contraceptive users. As we indicated earlier, if our variable of perception of child survival were perfectly valid and reliable, then we would not expect township to have an influence on our dependent variables holding constant perception of child survival. However, since our measure of perception of child survival has poor reliability, we would expect the township variable to behave as it did if there is validity to the hypothesis that community level of infant and child mortality is an important independent factor.

Respondents who perceived that less than 85 percent of children survive to age 15 did have a significantly larger number of subsequent children after the second and after the third live birth, after adjustment for the other variables, than those who perceived a higher proportion of children to survive.

Finally, respondents with no preference for sons, after adjustment for the other variables, had significantly fewer subsequent births after the second and third child and reported a significantly higher proportion ever using contraception than did respondents with a high preference for sons.

Chapter 7. The Determinants of Fertility Attitudes

In this chapter we examine the results of additional Multiple Classification Analyses in which the dependent variables are: (1) additional number of children desired among currently-married respondents with wife born in 1925 or later, (2) the number of children advised for a daughter by female respondents, (3) the number of children desired if life could be lived over, and (4) attitude toward birth control.

The six principal independent variables are: (1) the number of sons born and whether or not they all survived, (2) the number of daughters born and whether or not they all survived, (3) the percentage of births who died before age 15, (4) the perception of child survival, (5) township, and (6) an index of the preference for sons.

The control variables are the same as those used for the tables of Chapter 6 except we no longer make use of the variable of mean length of lactation.

Detailed Findings for Each Table

TAble 7.1 presents the results with respect to the additional number of children desired by currently-married respondents with wife born in 1925 or later. The values of multiple R^2 found in each of the three runs in this table - approximately .52 in each case - are higher than those observed in any of the other tabels contained in this report.

The number of sons and their survival, with a Beta of .48, proves to be the most important variable of Run A. At each number of sons born, it can be seen that the adjusted coefficient is lower if all of the sons have survived than if some have died. When one, two, or three sons have been born, the results are particularly strong, and are all statistically significant. For example, when two sons have been born, those who have lost one or more of them wish to have .60 more children on the average after adjusting for the impact of other variables than those who have not suffered the loss of a son.

Table 7.1. Additional Number of children desired among currently-married respondents with wife born in 1925 or later

Mean is 0.660

Number of cases is 5,543

Standard deviation is 1.079

	Value of Multiple R^2 for run
A	.518
B	.519
C	.523

Rank of each predictor in terms of size of Beta:

	Run A	Run B	Run C
Number of wife's sons and their survival	.48	---	---
Number of living sons of wife	---	.48	.45
Number of living daughters of wife	.32	---	.30
Number of wife's daughters and their survival	---	.33	---
Wife's age	.19	.19	.19
Township	.09	.09	.09
Percentage of wife's births dying before age 15	---	---	.08
Wife's labor-force status	.08	.08	.08
Birth-control knowledge	.07	.08	.07
Sex	.07	.07	.07
Preference for sons	.05	.05	.05
Husband's occupation	.04	.05	.05
Educational attainment	.04	.03	.03
Educational aspirations for nephew	.02	---	.02
Husband's income	.02	.02	.02
Perception of child survival	.02	.02	.02
Educational aspirations for niece	---	.01	---

Table 7.1. (continued) Additional number of children desired among currently-married respondents with wife born in 1925 or later

Description of the categories of each predictor in terms of its deviations from the grand mean and its adjusted coefficient:

	Deviation from grand mean	Adjusted coefficient in run: A	B	C	Number of cases
Township:					
Kungliao	-0.008	+0.141	+0.138	+0.139	1,934
Hsinchuang	+0.004	-0.074	-0.072	-0.073	3,609
Sex					
Female	+0.026	-0.070	-0.073	-0.073	4,619
Male	-0.030	+0.081	+0.085	+0.085	924
Wife's Age:					
Under 30	+0.730	+0.297	+0.292	+0.301	2,236
30 and over	-0.331	-0.134	-0.131	-0.136	3,175
N.A.	-0.517	-0.220	-0.218	-0.220	132
Number of wife's sons and their survival:					
No sons born	+1.231	+1.030	---	---	899
1 son born, dead before age 15	+0.925	+0.885	---	---	26
1 son born, not dead before age 15	+0.274	+0.198	---	---	1,485
2 sons born, one or more dead before age 15	+0.283	+0.283	---	---	71
2 sons born, neither dead before age 15	-0.394	-0.319	---	---	1,374
3 sons born, one or more dead before age 15	-0.458	-0.294	---	---	151
3 sons born, none dead before age 15	-0.509	-0.455	---	---	742
4 or more sons born, one or more dead before age 15	-0.607	-0.415	---	---	303
4 or more sons born, none dead before age 15	-0.625	-0.508	---	---	461
N.A.	0.457	-0.470	---	---	31

Table 7.1. (continued) Additional number of children desired among currently-married respondents with wife born in 1925 or later

	Deviation from grand mean	Adusted coefficient in run: A	B	C	Number of cases
Number of living sons of wife:					
None	+1.216	---	+1.019	+0.941	934
One	+0.262	---	+0.192	+0.209	1,578
Two	-0.403	---	-0.323	-0.306	1,549
Three	-0.523	---	-0.445	-0.431	897
Four or more	-0.631	---	-0.483	-0.481	585
Number of wife's daughters and their survival:					
No daughters born	+0.830	---	+0.643	---	1,113
1 daughter born, dead before age 15	+0.337	---	+0.360	---	50
1 daughter born, not dead before age 15	+0.126	---	+0.058	---	1,532
2 daughters born, one or more dead before age 15	-0.282	---	-0.123	---	91
2 daughters born, neither dead before age 15	-0.207	---	-0.188	---	1,167
3 daughters born, one or more dead before age 15	-0.523	---	-0.231	---	129
3 daughters born, none dead before age 15	-0.458	---	-0.350	---	645
4 or more daughters born, one or more dead before age 15	-0.607	---	-0.336	---	249
4 or more daughters born, none dead before age 15	-0.524	---	-0.302	---	546
N.A.	-0.427	---	-0.278	---	21

Table 7.1.(continued). Additional number of children desired among currently-married respondents with wife born in 1925 or later

	Deviation from grand mean	Adjusted coefficient in run: A	B	C	Number of cases
Number of living daughters of wife					
None	+0.789	+0.616	---	+0.560	1,178
One	+0.105	+0.048	---	+0.068	1,625
Two	-0.249	-0.194	---	-0.173	1,328
Three	-0.477	-0.353	---	-0.342	765
Four or more	-0.537	-0.360	---	-0.365	647
Percentage of wife's sons who died before age 15:					
No births	+2.074	---	---	+0.373	254
None died	-0.026	---	---	-0.013	4,360
Less than 25 percent died before age 15	-0.561	---	---	+0.047	505
25 to 49 percent died before age 15	-0.408	---	---	-0.160	340
50 percent or more died before age 15	+0.867	---	---	+0.094	83
N.A.	-0.660	---	---	-1.748	1
Perception of child survival:					
Less than 85 percent survival	-0.068	-0.050	-0.042	-0.046	339
85 to 94 percent survival	-0.020	-0.020	-0.018	-0.019	1,616
95 percent or more survival	+0.008	+0.013	+0.111	+0.012	3,474
N.A.	+0.294	+0.086	+0.087	+0.091	114

Table 7.1.(continued) Additional number of children desired among currently-married respondents with wife born in 1925 or later

	Deviation from grand mean	Adjusted coefficient in run: A	B	C	Number of cases
Preference for sons:					
High preference	+0.008	+0.042	+0.043	+0.043	1,756
Moderate preference	+0.022	+0.074	+0.075	+0.071	1,065
No preference	-0.014	-0.055	-0.056	-0.054	2,722
Husband's occupation:					
Fisherman	+0.068	+0.056	+0.067	+0.072	667
Farmer	-0.119	+0.063	+0.067	+0.064	1,310
Not in primary industry, worked for self or relative	-0.008	-0.005	-0.010	-0.014	1,107
Not in primary industry, worked for nonrelative	+0.047	-0.044	-0.047	-0.044	2,447
Husband not employed	-0.660	-0.196	-0.197	-0.212	1
N.A.	+0.448	-0.194	-0.212	-0.212	11
Husband's income:					
Less than NT$15,000	-0.009	+0.017	+0.020	+0.018	1,378
NT$15,000 to NT$24,900	-0.009	+0.018	+0.017	+0.019	1,569
NT$25,000 and over	-0.008	-0.035	-0.036	-0.035	1,708
N.A.	+0.053	+0.017	+0.016	+0.014	888

Table 7.1.(continued) Additional number of children desired among currently-married respondents with wife born in 1925 or later

	Deviation from grand mean	Adjusted coefficient in run: A	B	C	Number of cases
Educational attainment:					
Less than primary school graduate	-0.185	-0.023	-0.020	-0.024	2,579
Primary graduate but less than junior high graduate and never reads a newspaper	+0.057	+0.034	+0.034	+0.036	1,063
Primary graduate but less than junior high graduate and reads a newspaper	+0.204	+0.044	+0.039	+0.042	1,354
Junior high graduate or more	+0.241	-0.070	-0.073	-0.064	544
N.A.	-0.349	+0.201	+0.188	+0.182	3
Labor-force status:					
Never worked and would not work in future	-0.185	-0.031	-0.033	-0.033	2,050
Never worked but might work in future	-0.022	+0.039	+0.039	+0.041	1,077
Previously worked	+0.157	-0.001	+0.002	+0.004	1,947
Presently working	+0.171	+0.022	+0.018	+0.011	465
N.A.	+4.271	+3.013	+2.984	+2.487	4
Educational aspirations for nephew:					
Low	-0.059	+0.040	---	+0.038	710
Medium	-0.004	+0.032	---	+0.028	1,050
High	+0.012	-0.017	---	-0.015	3,780
N.A.	+0.340	-0.489	---	-0.536	3

Table 7.1 (continued) Additional number of children desired among currently-married respondents with wife born in 1925 or later

	Deviation from grand mean	Adjusted coefficient in run: A	B	C	Number of cases
Educational aspirations for niece:					
Low	-0.081	---	+0.019	---	661
Medium	-0.054	---	+0.002	---	1,089
High	+0.031	---	-0.004	---	3,783
N.A.	-0.060	---	-0.080	---	10
Birth-control knowledge					
Low	+0.154	+0.132	+0.136	+0.131	1,330
Medium	-0.029	-0.021	-0.019	-0.021	2,533
High	-0.080	-0.074	-0.079	-0.072	1,680

The number of daughters born and their survival, featured in Run B, does not have an equal impact on the additional children desired. The value of Beta is only .33 in contrast to the value of .48 for the number of sons and their survival. For each number of daughters born, women who have lost one or more daughters desire more additional births, holding other variables constant, than women who have not lost a daughter. However, the difference is significant only when one daughter has been born.

Run C tests the effect of the percentage of births who died before age 15 holding constant the number of living sons and the number of living daughters. The differences in each category are small and for the most part not statistically significant. However, if 25 to 49 percent of the births died, the adjusted coefficient for mean number of additional children desired, (-.16) is less than zero at a statistically significant level.

The differences by township are quite considerable and highly significant. In all three runs township is the fourth most important variable in terms of the size of Beta (.09 in all three runs). In all three runs the mean additional number of children desired in Kungliao after adjustment for the impact of the other variables was .14 greater than average and in Hsinchuang .07 less than average.

The adjusted coefficients for each category of perception of child survival were all small and were not significantly different from zero.

Respondents with no preference for sons wanted fewer additional children and those with a moderate or high preference for sons wanted a greater number of additional children. The differences in the adjusted coefficients for three categories of this predictor were small but statistically significant.

Table 7.2 presents the results when the number of children advised for one's daughter is the dependent variable. As in previous tables, Run A includes the variable of number of sons born and their survival, controlling for the number of living daughters. Run B includes the variable of number of daughters born and their

Table 7.2. Number of children advised for daughter by female respondents

Mean is 4.038

Number of cases is 6,752

Standard deviation is 1.000

Value of multiple R^2 for run:	
A	.260
B	.260
C	.262

Rank of each predictor in terms of size of Beta:

	Run A	Run B	Run C
Township	.24	.24	.24
Educational attainment	.14	.14	.13
Age	.10	.10	.09
Birth-control knowledge	.10	.10	.10
Preference for sons	.08	.08	.08
Percentage of births who died before age 15	---	---	.07
Husband's occupation	.07	.07	.07
Number of sons and their survival	.06	---	---
Number of daughters and their survival	---	.06	---
Labor-force status	.04	.04	.04
Number of living sons	---	.04	.04
Educational aspirations for nephew	.04	.03	.03
Perception of child survival	.03	.03	.03
Number of living daughters	.03	---	.04
Husband's income	.02	.02	.02

Table 7.2.(continued) Number of children advised for daughter by female respondents

Description of the categories of each preductor in terms of its deviations from the grand mean and its adjusted coefficient:

	Deviation from grand mean	Adjusted coefficient in run: A	B	C	Number of cases
Township:					
Kungliao	+0.476	+0.294	+0.293	+0.293	2,660
Hsinchuang	-0.309	-0.191	-0.190	-0.191	4,092
Age:					
Under 30	-0.329	-0.108	-0.110	-0.098	2,124
30 to 44	-0.026	-0.023	-0.022	-0.019	2,605
45 and over	+0.379	+0.143	+0.145	+0.127	2,023
Number of sons and their survival:					
No sons born	-0.183	+0.013	---	---	987
1 son born, dead before age 15	+0.416	+0.274	---	---	55
1 son born, not dead before age 15	-0.214	-0.043	---	---	1,531
2 sons born, one or more dead before age 15	+0.361	+0.086	---	---	148
2 sons born, neither dead before age 15	-0.165	-0.065	---	---	1,364
3 sons born, one or more dead before age 15	+0.331	+0.096	---	---	248
3 sons born, none dead before age 15	+0.136	+0.068	---	---	875
4 or more sons born, one or more dead before age 15	+0.384	+0.050	---	---	741
4 or more sons born, none dead before age 15	+0.224	+0.000	---	---	755
N.A.	+0.064	-0.153	---	---	48

Table 7.2(continued) Number of children advised for daughter by female respondents

	Deviation from grand mean	Adjusted coefficient in run: A	B	C	Number of cases
Number of living sons:					
None	-0.103	---	-0.061	+0.028	1,093
One	-0.143	---	-0.021	-0.029	1,750
Two	-0.064	---	-0.040	-0.038	1,700
Three	+0.181	---	+0.050	+0.062	1,146
Four or more	+0.246	---	-0.018	+0.012	1,060
N.A.	+0.795	---	+0.342	+0.795	3
Number of daughters and their survival:					
No daughters born	-0.274	---	-0.084	---	1,219
1 daughter born, dead before age 15	+0.289	---	+0.093	---	84
1 daughter born, not dead before age 15	-0.189	---	-0.032	---	1,571
2 daughters born, one or more dead before age 15	+0.395	---	+0.156	---	177
2 daughters born, neither dead before age 15	+0.001	---	+0.038	---	1,280
3 daughters born, or more dead before age 15	+0.365	---	+0.103	---	243
3 daughters born, none dead before age 15	+0.067	---	+0.023	---	782
4 or more daughters born, one or more dead before age 15	+0.407	---	+0.066	---	588
4 or more daughters born, none dead before age 15	+0.187	---	-0.012	---	774
N.A.	+0.297	---	-0.082	---	34

Table 7.2. (continued) Number of children advised for daughter by female respondents

	Deviation from grand mean	Adjusted coefficient in run: A	B	C	Number of cases
Number of living daughters					
None	-0.192	-0.041	---	-0.070	1,357
One	-0.113	-0.003	---	-0.006	1,788
Two	+0.051	+0.031	---	+0.035	1,560
Three	+0.132	+0.026	---	+0.040	994
Four or more	+0.238	-0.015	---	+0.014	1,050
N.A.	+0.795	+0.412	---	-0.741	3
Percentage of births who died before age 15:					
No births	-0.164	---	---	+0.036	320
None died	-0.128	---	---	-0.029	4,581
Less than 25 percent died before age 15	+0.255	---	---	-0.028	887
25 to 49 percent died before age 15	+0.377	---	---	+0.104	693
50 percent or more died before age 15	+0.564	---	---	+0.276	267
N.A.	+0.587	---	---	+0.227	4
Perception of child survival:					
Less than 85 percent survival	+0.113	-0.105	-0.110	-0.114	426
85 to 94 percent survival	+0.168	+0.028	+0.028	+0.027	1,945
95 percent or more survival	-0.098	-0.005	-0.005	-0.004	4,205
N.A.	+0.204	+0.067	+0.072	+0.069	176

Table 7.2. (continued) Number of children advised for daughter by female respondents

	Deviation from grand mean	Adjusted coefficient in run: A	B	C	Number of cases
Preference for sons:					
High preference	+0.077	+0.052	+0.053	+0.052	2,171
Moderate preference	+0.192	+0.118	+0.118	+0.118	1,350
No preference	-0.132	-0.084	-0.085	-0.084	3,231
Husband's occupation:					
Fisherman	+0.500	+0.056	+0.051	+0.045	888
Farmer	+0.310	+0.077	+0.078	+0.079	2,118
Not in primary industry, worked for self or relative	-0.180	-0.011	-0.010	-0.010	1,215
Not in primary industry, worked for nonrelative	-0.350	-0.078	-0.078	-0.077	2,512
Husband not employed	-0.288	-0.242	-0.249	-0.267	4
N.A.	-0.105	-0.029	-0.029	-0.026	15
Husband's income:					
Less than NT$15,000	+0.264	-0.003	-0.001	-0.003	1,881
NT$15,000 to NT$24,900	-0.157	-0.006	-0.008	-0.007	1,465
NT$25,000 and over	-0.467	-0.033	-0.033	-0.031	1,526
N.A.	+0.237	+0.034	+0.034	+0.033	1,880

Table 7.2.(continued) Number of children advised for daughter by female respondents

	Deviation from grand mean	Adjusted coefficient in run: A	B	C	Number of cases
Educational attainment:					
Less than primary school graduate	+0.286	+0.085	+0.084	+0.083	4,025
Primary graduate but less than junior high graduate and never reads a newspaper	-0.140	-0.005	-0.004	-0.003	1,005
Primary graduate but less than junior high graduate and reads a newspaper	-0.462	-0.113	-0.112	-0.110	1,222
Junior high graduate or more	-0.898	-0.401	-0.400	-0.396	497
N.A.	+0.295	+0.210	+0.164	+0.138	3
Labor-force status:					
Never worked and would not work in future	+0.304	+0.029	+0.030	+0.028	3,310
Never worked but might work in future	-0.022	-0.001	+0.001	+0.002	1,099
Previously worked	-0.414	-0.039	-0.041	-0.038	1,871
Presently working	-0.434	-0.037	-0.038	-0.038	466
N.A.	-0.988	-1.014	-1.022	-1.022	6
Educational aspirations for nephew:					
Low	+0.120	+0.070	+0.069	+0.069	936
Medium	+0.166	+0.028	+0.026	+0.027	1,230
High	-0.070	-0.021	-0.021	-0.021	4,578
N.A.	+0.262	-0.285	-0.263	-0.295	8

Table 7.2. (continued) Number of children advised for daughter by female respondents

	Deviation from grand mean	Adjusted coefficient in run: A	B	C	Number of cases
Birth-control knowledge					
Low	+0.323	+0.108	+0.108	+0.107	2,204
Medium	+0.023	+0.004	+0.005	+0.005	2,975
High	-0.495	-0.159	-0.160	-0.159	1,573

survival controlling for the number of living sons, and Run C includes the variable of the percentage of births who died before age 15 controlling both for the number of living sons and the number of living daughters. In all three runs the value of multiple R^2 is equal to .26.

In Run A the number of sons and their survival is not a strong variable and its Beta is only .06. However, holding constant the number of sons born, the number of living daughters and the other variables, in all of the four possible comparisons the survival of sons does affect the dependent variable in the predicted direction. The difference between the two relevant categories are statistically significant when the number of sons born is either one or two. For example, if two sons have been born, the adjusted coefficient when one or more are dead is +.086 and when all have survived -.065. The difference of .151 has a T of 2.01.

The number of daughters and their survival, featured in Run B, shows the expected pattern of adjusted coefficients. Regardless of the number of daughters born, if one or more daughters died, the adjusted coefficient is higher than if all survived. However, none of the four comparisons yields statistically significant results.

The proportion of births who died before age 15, shown in Run C, has a positive association with the number of children advised for one's daughter; the higher the proportion of births who have died, the higher is the number of children advised for one's daugheter holding constant the impact of the other variables. The value of the adjusted coefficient is significantly less than zero when none of the births have died and significantly greater than zero when either 25 to 49 percent or 50 percent or more of the births have died.

Township has the highest Beta, .24, of all of the predictors in all three runs. After adjustment for other variables residents of Kungliao advise their daughters to have about .48 more children than do residents of Hsinchuang. The difference is very highly significant.

The difference by category of perception of child survival are small but not always in the predicted direction. Respondents perceiving less than 85 percent child survival advise fewer children than average and the adjusted coefficient of -.114 is significantly less than zero. The adjusted coefficients for the other two categories of this predictor are not significantly different from zero.

Preference for sons in the fifth most improtant variable, with a Beta of .08. Respondents with no son preference advise fewer children than average and those with a moderate or high preference for sons more than average. All three results are statistically significantly different from zero.

In Table 7.3 the dependent variable is the number of children desired if life could be lived over. Runs A, B, and C of Table 7.3 includes essentially the same variables as their counterparts of Table 7.2 except that because these runs include all respondents of both sexes a new variable - sex - is added. The values of R^2 are approximately .26 in all three runs. On the basis of the Kentucky pretest experience, we came to the conclusion that the dependent variable of Table 7.3 was not as good a variable as the dependent variable of Table 7.2. Our prior conclusion was confirmed by the fact that the number of living daughters and the number of living sons each has a much higher Beta with respect to the number of children desired if life could be lived over than with respect to the number of children advised to a daughter. Thus, as we suspected, the number of children desired if life could be lived over is in part merely a rationalization for the existing number of living children, and therefore, not the optimal measure of desired number of children.

Run A features the number of sons and their survival. When one, two or four or more sons have been born, the desired number of children after adjustment for other variables is greater if one or more have died than if all have survived. The reverse is true when there are three sons born. The only one of the four comparisons in which the difference is statistically significant is that in which

Table 7.3. Number of children desired if life could be lived over

Mean is 4.030

Number of cases is 8,090

Standard deviation is 1.176

Value of multiple R^2 for run:	
A	.258
B	.258
C	.260

Rank of each predictor in terms of size of Beta:

	Run		
	A	B	C
Number of living daughters of wife	.22	---	.35
Number of living sons of wife	---	.22	.13
Wife's labor-force status	.18	.19	.15
Township	.16	.16	.16
Birth-control knowledge	.14	.14	.14
Number of wife's sons and their survival	.11	---	---
Number of wife's daughters and their survival	---	.11	---
Percentage of wife's births who died before age 15	---	---	.13
Educational attainment	.11	.11	.11
Age	.10	.10	.09
Husband's occupation	.07	.07	.07
Preference for sons	.06	.06	.06
Perception of child survival	.06	.06	.06
Sex	.05	.06	.05
Husband's income	.05	.05	.05
Educational aspirations for nephew	.03	---	.03
Educational aspirations for niece	---	.02	---

Table 7.3.(continued) Number of children desired if life could be lived over

Description of the categories of each predictor in terms of its deviations from the grand mean and its adjusted coefficient:

	Deviation from grand mean	Adjusted coefficient in run: A	B	C	Number of cases
Township:					
Kungliao	+0.490	+0.244	+0.244	+0.238	3,149
Hsinchuang	-0.307	-0.152	-0.152	-0.148	4,941
Sex					
Female	+0.099	+0.060	+0.061	+0.058	6,741
Male	-0.115	-0.069	-0.070	-0.067	1,349
Age:					
Under 30	-0.422	-0.126	-0.135	-0.118	2,318
30 to 44	-0.102	-0.044	-0.048	-0.043	3,329
45 and over	+0.470	+0.158	+0.170	+0.152	2,443
Number of wife's sons and their survival:					
No sons born	-0.276	-0.706	---	---	1,127
1 son born, dead before age 15	+0.268	+0.763	---	---	63
1 son born, not dead before age 15	-0.343	-0.159	---	---	1,793
2 sons born, one or more dead before age 15	+0.291	+0.009	---	---	168
2 sons born, neither dead before age 15	-0.131	-0.023	---	---	1,651
3 sons born, one or more dead before age 15	+0.377	+0.086	---	---	294
3 sons born, none dead before age 15	+0.279	+0.186	---	---	1,031
4 or more sons born, one or more dead before age 15	+0.592	+0.197	---	---	843
4 sons born, none dead before age 15	+0.419	+0.112	---	---	886
N.A.	+0.316	+0.146	---	---	234

Table 7.3. (continued) Number of children desired if life could be lived over

	Deviation from grand mean	Adjusted coefficient in run: A	B	C	Number of cases
Number of living sons of wife:					
None	+0.201	---	-0.097	-0.054	1,244
One	-0.266	---	-0.203	-0.128	2,043
Two	-0.041	---	-0.084	-0.002	2,041
Three	+0.367	---	+0.130	+0.225	1,344
Four or more	+0.445	---	+0.050	+0.167	1,232
N.A.	-0.342	---	+0.890	-0.342	186
Number of wife's daughters and their survival:					
No daughters born	-0.392	---	-0.180	---	1,398
1 daughter born, dead before age 15	+0.114	---	-0.043	---	94
1 daughter born, not dead before age 15	-0.247	---	-0.105	---	1,877
2 daughters born, one or more dead before age 15	+0.238	---	-0.003	---	203
2 daughters born, neither dead before age 15	+0.029	---	+0.055	---	1,521
3 daughters born, one or more dead before age 15	+0.443	---	+0.114	---	266
3 daughters born, none dead before age 15	+0.208	---	+0.146	---	917
4 or more daughters born, one or more dead before age 15	+0.571	---	+0.130	---	671
4 or more daughters born, none dead before age 15	+0.437	---	+0.171	---	922
N.A.	-0.311	---	-0.071	---	221

Table 7.3.(continued) Number of children desired if life could be lived over

	Deviation from grand mean	Adjusted coefficient in run: A	B	C	Number of cases
Number of living daughters of wife:					
None	-0.323	-0.213	---	-0.290	1,553
One	-0.194	-0.163	---	-0.209	2,120
Two	+0.867	-0.011	---	-0.050	1,835
Three	+0.288	+0.090	---	+0.065	1,156
Four or more	+0.468	+0.084	---	+0.080	1,240
N.A.	-0.342	+0.917	---	+1.514	186
Percentage of wife's births who died before age 15:					
No births	-0.296	---	---	+0.115	352
None died	-0.103	---	---	+0.020	5,442
Less than 25 percent died before age 15	+0.375	---	---	-0.059	1,025
25 to 49 percent died before age 15	+0.480	---	---	+0.164	786
50 percent or more died before age 15	+0.411	---	---	+0.291	298
N.A.	-0.341	---	---	-0.537	187
Perception of child survival:					
Less than 85 percent survival	+0.097	-0.143	-0.141	-0.149	532
85 to 94 percent survival	+0.107	-0.008	-0.008	-0.008	2,425
95 percent or more survival	-0.097	+0.008	+0.007	+0.009	4,926
N.A.	+0.654	+0.340	+0.351	+0.343	207

Table 7.3(continued) Number of children desired if life could be lived over

	Deviation from grand mean	Adjusted coefficient in run: A	B	C	Number of cases
Preference for sons:					
High preference	+0.080	+0.024	+0.025	+0.025	2,543
Moderate preference	+0.194	+0.117	+0.118	+0.122	1,618
No preference	-0.127	-0.062	-0.063	-0.064	3,929
Husband's occupation:					
Fisherman	+0.477	+0.033	+0.033	+0.035	1,030
Farmer	+0.452	+0.121	+0.120	+0.122	2,459
Not in primary industry, worked for self or relative	-0.179	-0.054	-0.053	-0.054	1,530
Not in primary industry, worked for nonrelative	-0.393	-0.072	-0.073	-0.073	3,051
Husband not employed	-0.280	-0.534	-0.523	-0.561	4
N.A.	-0.235	-0.250	-0.250	-0.254	16
Husband's income:					
Less than NT$15,000	+0.330	-0.049	-0.046	-0.049	2,219
NT$15,000 to NT$24,900	-0.108	+0.018	+0.017	+0.018	1,853
NT$25,000 and over	-0.480	-0.044	-0.046	-0.045	1,996
N.A.	+0.368	+0.108	+0.107	+0.108	2,022

Table 7.3(continued) Number of children desired if life could be lived over

	Deviation from grand mean	Adjusted coefficient in run: A	B	C	Number of cases
Educational attainment:					
Less than primary school graduate	+0.350	+0.077	+0.078	+0.080	4,685
Primary graduate but less than junior high graduate and never reads a newspaper	-0.155	-0.021	-0.023	-0.024	1,209
Primary graduate but less than junior high graduate and reads a newspaper	-0.410	-0.032	-0.034	-0.035	1,519
Junior high graduate or more	-0.895	-0.338	-0.337	-0.341	673
N.A.	+1.164	+0.860	+0.820	+0.804	4
Wife's Labor-force status:					
Never worked and would not work in future	+0.364	+0.067	+0.070	+0.058	3,825
Never worked but might work in future	+0.025	+0.096	+0.098	+0.085	1,287
Previously worked	-0.403	+0.043	+0.045	+0.033	2,234
Presently working	-0.493	-0.057	-0.050	-0.066	555
N.A.	-0.352	-0.819	-0.866	-0.686	189
Educational aspirations for nephew:					
Low	+0.282	+0.071	---	+0.071	1,117
Medium	+0.137	+0.007	---	-0.005	1,555
High	-0.104	-0.013	---	-0.014	5,409
N.A.	+1.304	+0.507	---	+0.496	9

Table 7.3.(continued) Number of children desired if life could be lived over

	Deviation from grand mean	Adjusted coefficient in run: A	B	C	Number of cases
Educational aspirations for niece:					
Low	+0.270	---	+0.035	---	1,099
Medium	+0.134	---	+0.012	---	1,583
High	-0.101	---	-0.012	---	5,392
N.A.	+1.220	---	+0.595	---	16
Birth-control knowledge					
Low	+0.439	+0.209	+0.209	+0.206	2,638
Medium	+0.019	-0.025	-0.025	-0.026	3,425
High	-0.535	-0.206	-0.207	-0.203	2,027

one son has been born.

Run B features the number of daughters and their survival. When one or four or more daughters have been born, the desired number of children after adjustment for other variables is greater when one or more have died; when two or three daughters have been born,there is a reversed situation. However, none of the four comparisons yields a statistically significant difference.

Run C features the percentage of the wife's births who have died holding constant both the number of living sons and the number of living daughters. When either 25 to 49 percent of the wife's births or 50 percent or more of them have died, respondents desire more children if they could live their life over than the average of the other respondents. The two coefficients of +.164 and +.291. are both significantly greater than zero. When less than 25 percent have died, the adjusted coefficient, contrary to hypothesis, is negative. However, the value of this coefficient (-0.059) is not significantly different from zero.

Township is an important predictor with a Beta of .16 in all three runs of Table 7.3. After adjustment for other variables residents of Kungliao would have about .39 more children, if they could live their life over, than residents of Hsinchuang. The difference is very highly significant.

Contrary to our hypothesis, respondents perceiving less than 85 percent of children to survive want fewer children than average; in all three runs the adjusted coefficients are significantly less than zero. The adjusted coefficients for the other two categories of this predictor are not significantly different from zero.

Respondents with no son preference desire fewer children than average and the adjusted coefficients in each of the three runs of Table 7.3 are statistically significant. Those with a moderate or high preference want more children than average. Although the adjusted coefficients are significant only for the category of moderate preference, the difference between those with high preference and those with no preference is significant.

The dependent variable of Table 7.4 is attitude toward birth control. A low score indicates a more favorable attitude on an item which had a range of scores from one to five. Runs A, B, and C include the same variables as Table 7.2. The universe, as in Table 7.2, is all female respondents. In all three runs the values of multiple R^2 are extremely low - about .14.

Run A of Table 7.4 features the number of sons born and their survival. When two sons have been born, the mean attitude toward birth control, holding constant the effect of the other variables, is more favorable if none of the sons have died than if one or more have died. The respective coefficients are -.03 and +.26. The difference between these two coefficients is statistically significant. The identical comparisons for the situations where one, three, or four or more sons have been born do not yield statistically significant differences.

Run B highlights the number of daughters born and their survival. None of the four possible comparisons by survival status yields a statistically significant difference.

Run C is concerned with the percentage of births who died before age 15. None of the adjusted coefficients for this predictor are significantly different from 0.

Township is the third most important of all of the independent variables in each of the three runs of Table 7.4 with Beta equal to .09 in each run. Surprisingly, holding constant the impact of the other variables, respondents in Kungliao are more favorable to family planning than those in Hsinchuang. The difference is substantial and highly significant. The difference by township in the adjusted coefficients reverses the difference in the deviations from the grand mean. When other variables are not held constant, respondents in Kungliao are slightly less favorable to family planning than respondents from Hsingchuang.

Table 7.4. Attitude toward birth control by female respondents (The lower the score the more favorable the attitude)

Mean is 1.642

Number of cases is 6,661

Standard deviation is 1.030

Value of multiple R^2 for run	
A	.137
B	.138
C	.138

Rank of each predictor in terms of size of Beta:

	RUN A	RUN B	RUN C
Birth-control knowledge	.20	.20	.20
Age	.19	.19	.18
Township	.09	.09	.09
Number of sons and their survival	.09	---	---
Number of living sons	---	.09	.08
Educational attainment	.07	.07	.06
Educational aspirations for nephew	.06	.06	.06
Preference for sons	.05	.05	.05
Percentage of births who died before age 15	---	---	.04
Husband's income	.04	.04	.04
Husband's occupation	.03	.03	.03
Labor-force status	.02	.02	.02
Perception of child survival	.02	.02	.02
Number of living daughters	.02	---	.01

Table 7.4,(continued) Attitude toward birth control by female respondents

Description of the categories of each preductor in terms of its deviations from the grand mean and its adjusted coefficient:

	Deviation from grand mean	Adjusted coefficient in run: A	B	C	Number of cases
Township:					
Kungliao	+0.004	-0.118	-0.118	-0.119	2,617
Hsinchuang	-0.003	+0.076	+0.077	+0.077	4,044
Age:					
Under 25	-0.124	-0.118	-0.130	-0.116	962
25 to 34	-0.213	-0.154	-0.150	-0.147	2,177
35 to 44	-0.138	-0.070	-0.066	-0.066	1,553
45 to 54	+0.223	+0.175	+0.176	+0.170	965
55 to 64	+0.494	+0.341	+0.341	+0.327	621
65 and over	+0.706	+0.449	+0.444	+0.428	393
Number of sons and their survival:					
No sons born	+0.062	+0.139	---	---	968
1 son born, dead before age 15	+0.282	+0.045	---	---	53
1 son born, not dead before age 15	-0.056	+0.049	---	---	1,512
2 sons born, one or more dead before age 15	+0.043	+0.260	---	---	145
2 sons born, neither dead before age 15	-0.129	-0.030	---	---	1,349
3 sons born, one or more dead before age 15	+0.039	-0.076	---	---	242
3 sons born, none dead before age 15	-0.028	-0.035	---	---	868
4 or more sons born, one or more dead before age 15	+0.182	-0.078	---	---	730
4 or more sons born, none dead before age 15	-0.005	-0.143	---	---	748
N.A.	+0.140	-0.105	---	---	46

Table 7.4 (continued) Attitude toward birth control by female respondents

	Deviation from grand mean	Adjusted Coefficient in run: A	B	C	Number of cases
Number of living sons:					
None	+0.108	---	+0.156	---	1,069
One	+0.003	---	+0.070	---	1,724
Two	-0.090	---	-0.052	---	1,683
Three	-0.030	---	-0.069	---	1,130
Four or more	+0.063	---	-0.115	---	1,052
N.A.	+0.024	---	-0.757	---	3
Number of daughters and their survival:					
No daughters born	-0.030	---	+0.020	---	1,202
1 daughter born, dead before age 15	+0.126	---	-0.021	---	82
1 daughter born, not dead before age 15	-0.087	---	-0.005	---	1,565
2 daughters born, one or more dead before age 15	+0.125	---	-0.027	---	176
2 daughters born, neither dead before age 15	-0.039	---	+0.024	---	1,254
3 daughters born, or more dead before age 15	+0.237	---	+0.046	---	241
3 daughters born, none dead before age 15	-0.046	---	-0.046	---	765
4 or more daughters born, one or more dead before age 15	+0.150	---	-0.028	---	578
4 or more daughters born, none dead before age 15	+0.093	---	-0.008	---	764
N.A.	-0.269	---	-0.186	---	34

Table 7.4 (continued) Attitude toward birth control by female respondents

	Deviation from grand mean	Adjusted coefficient in run: A	B	C	Number of cases
Number of living daughters					
None	-0.008	+0.014	---	+0.009	1,336
One	-0.048	-0.001	---	-0.011	1,779
Two	-0.010	+0.017	---	+0.015	1,530
Three	-0.006	-0.022	---	-0.018	973
Four or more	+0.113	-0.018	---	+0.002	1,040
N.A.	-0.024	-0.678	---	+0.193	3
Percentage of births who died before age 15:					
No births	+0.117	---	---	-0.038	312
None died	-0.072	---	---	+0.003	4,525
Less than 25 percent died before age 15	+0.028	---	---	-0.070	887
25 to 49 percent died before age 15	+0.211	---	---	+0.051	677
50 percent or more died before age 15	+0.467	---	---	+0.116	256
N.A.	-0.142	---	---	-0.776	4
Perception of child survival:					
Less than 85 percent survival	-0.085	-0.046	-0.049	-0.056	420
85 ot 94 percent survival	-0.032	-0.021	-0.022	-0.021	1,928
95 percent or more survival	+0.009	+0.010	+0.011	+0.011	4,147
N.A.	+0.352	+0.095	+0.099	+0.102	166

Table 7.4.(continued) Attitude toward birth control by female respondents.

	Deviation from grand mean	Adjusted coefficient in run: A	B	C	Number of cases
Preference for sons:					
High preference	-0.030	-0.021	-0.020	-0.021	2,144
Moderate preference	+0.110	+0.095	+0.095	+0.094	1,319
No preference	-0.026	-0.025	-0.026	-0.025	3,198
Husband's occupation:					
Fisherman	-0.008	-0.002	+0.005	-0.002	866
Farmer	+0.199	+0.028	+0.028	+0.030	2,081
Not in primary industry, worked for self or relative	-0.031	+0.010	+0.008	+0.009	1,203
Not in primary industry, worked for nonrelative	-0.150	-0.029	-0.030	-0.030	2,190
Husband not employed	+0.358	+0.011	+0.026	+0.020	6
N.A.	+0.291	+0.251	+0.257	+0.266	15
Husband's income:					
Less than NT$15,000	+0.670	-0.003	-0.002	-0.004	1,851
NT$15,000 to NT$24,900	-0.168	-0.060	-0.061	-0.061	1,460
NT$25,000 and over	-0.216	+0.005	+0.005	+0.007	1,519
N.A.	+0.246	+0.047	+0.047	+0.046	1,831

Table 7.4. (continued) Attitude toward birth control by female respondents

	Deviation from grand mean	Adjusted coefficient in run: A	B	C	Number of cases
Educational attainment:					
Less than primary school graduate	+0.151	+0.047	+0.046	+0.046	3,947
Primary graduate but less then junior graduate and never reads a newspaper	-0.092	+0.002	+0.004	+0.002	996
Primary graduate but less then junior high graduate and reads a newspaper	-0.254	-0.090	-0.089	-0.088	1,219
Junior high graduate or more	-0.393	-0.153	-0.157	-0.153	497
N.A.	-0.142	+0.007	+0.013	+0.020	2
Labor-force status:					
Never worked and would not work in future	+0.149	+0.017	+0.018	+0.017	3,246
Never worked but might work in future	-0.113	-0.029	-0.020	-0.027	1,086
Previously worked	-0.150	+0.001	-0.001	-0.000	1,859
Presently working	-0.177	-0.050	-0.054	-0.051	464
N.A.	-0.142	-0.458	-0.426	-0.445	6
Educational aspirations for nephew:					
Low	+0.244	+0.142	+0.142	+0.141	897
Medium	+0.072	+0.023	+0.021	+0.023	1,212
High	-0.068	-0.035	-0.034	-0.034	4,546
N.A.	+0.691	+0.318	+0.301	+0.322	6

Table 7.4. (continued) Attitude toward birth control by female respondents

	Deviation from grand mean	Adjusted coefficient in run: A	B	C	Number of cases
Birth-control knowledge					
Low	+0.400	+0.274	+0.272	+0.273	2,126
Medium	-0.088	-0.057	-0.057	-0.057	2,961
High	-0.375	-0.262	-0.260	-0.261	1,574

The perception of child survival contributes little to explaining attitude toward birth control. In all three runs the value of Beta is only .02. In all three runs the adjusted coefficients for each of the three categories do not differ significantly from zero.

Preference for sons proves to be only a slightly more important variable than perception of child survival; in each of the three runs Beta is equal to .05. In each of the three runs the adjusted coefficients for high preference for some and for no preference for sons are not significantly different from zero; the adjusted coefficients for moderate son-preference are, however, significantly greater than zero (thus moderate son-preference is associated with an unfavorable attitude to birth control).

In examining the independent variables of Table 7.4 other than the principal ones, note should be made of birth-control knowledge. In all three runs this is the most important variable with Beta equal to .20. Holding the other variables constant, birth-control knowledge is directly related in a very strong manner to attitude to birth control.

Summary of Statistically Significant Findings for each Principal Independent Variable

In order to communicate the findings of chapter 7 more clearly, we shall summarize the statistically significant findings for each of the six principal independent variables in the same manner as we did at the conclusion of Chapter 6.

Let us take up first the number of sons born and their survival. In Table 7.1 we found that when either one, two, or three sons were born, respondents losing one or more sons desired significantly more additional children after adjustment for the effect of other variables than respondents who had lost no sons. In Table 7.2 we found that when either one or two sons had been born respondents losing one or more of them would advise their daughter to have significantly more children after adjustment for the effect of other variables

than respondents suffering no loss of sons. In Table 7.3 we found that when one son had been born, respondents, losing that son, would want (after adjustment) significantly more children if they could live their life over than respondents not losing that son. In Table 7.4 we found that when two sons had been born respondents were significantly more favorable to birth control after adjustment for the effects of other variables if neither son died than if one or more of them had died.

The number of daughters born and their survival proved to be a much less important variable than the number of sons born and their survival. However, in Table 7.1 if one daughter had been born, respondents who lost that daughter wanted significantly more additional children after adjustment for the effects of the other variables than respondents whose one daughter survived.

The percentage of births dying before age 15 had several significant associations. In Table 7.1 respondents with 25 to 49 percent of their births dying, after adjustment for the effect of the other variables, wanted significantly fewer additional children than average. Remember that we are holding constant the number of living sons and the number of living daughters. This finding is then consistent with the finding from Chapter 6 that respondents suffering initial child loss do not fully compensate for this loss in the number of their subsequent births. On the other hand, in Table 7.2 we find that the greater the percentage of births dying, the larger is the number of children advised for one's daughter. Specifically, those experiencing no deaths advised significantly fewer children for their daughter (after adjustment for the effect of other variables) than average, and those experiencing the loss of either 25 to 49 percent or 50 percent or more of their births advised significantly more children to their daughter (after adjustment) than average. The findings in Table 7.3 are similar to those in Table 7.2. Those experiencing the loss of either 25 to 49 percent of their births or 50 percent or more of their births

would have, if they could live their life over, significantly more children than average after adjustment for the effect of the other variables.

The township variable provided significant differences in all four tables. In Table 7.1 residents of Kungliao (the high-mortality township) after adjustment for the effect of other variables wanted significantly more additional children than residents of Hsinchuang. In Table 7.2 township made an especially large difference. The value of Beta was .24 and residents of Kungliao (after adjustment for the effect of other variables)would advise their daughter to have almost one-half child more than residents of Kungliao. If they could live their life over, residents of Kungliao would also have a significantly larger number of children after adjustments for the effect of other variables than residents of Hsinchuang. Surprisingly, however, residents of Kungliao, the high-mortality township, were more favorable to birth control after adjustment for the effect of the other variables than residents of Hsinchuang.

The variable of perception of child survival provided two unexpected but significant results. After adjustment for the effect of other variables, respondents perceiving less than 85 percent of children surviving to age 15 would advise their daughter to have fewer children than the average of all respondents. Similarly, after adjustment respondents perceiving less than 85 percent survival would have fewer children if they could live their life over than the average of all respondents.

Although preference for sons does not show a high Beta in any of the tables of this chapter, it does provide a large number of statistically significant results. In Table 7.1 the additional number of children desired was significantly higher than average (after adjustment for the effect of other variables) when there was high or moderate son preference and significantly lower than average when there was no son preference. In Table 7.2 the adjusted number of children advised for one's daughter was significantly larger than average,

for respondents with moderate or high son preference and significantly lower for respondents with no son preference. Likewise, Table 7.3 revealed that the adjusted number of children desired if life could be lived over was significantly higher than average for respondents with no son preference. Finally, we learned from Table 7.4 that the attitude of birth control was less favorable than average (after adjustment for the effect of other variables) among respondents with a moderate son preference.

Chapter 8. Determinants of Child Survival

Two MCA runs were conducted to look at the determinants of child survival to age five. In the first run, the results of which are reported in Table 8.1, the universe consisted of all births born five years or more prior to the interview. The unique independent variable of this run was the relationship of the given birth to the previous birth - a predictor which included categories distinguishing not only the number of months between the given birth and the preceding birth but also whether or not the previous child died prior to the birth of the given child. In the second run, for which results are presented in Table 8.2, the universe consisted of all births of eleventh birth order or less who were born five or more years prior to the interview. The unique independent variable of this run was the number of previous births. Independent variables included in both runs were township, sex of birth, decade of birth, mother's age at birth, mother's educational attainment, and father's income.

Let us consider first the results of Table 8.1. The mean proportion of babies dying by age five is found to be 7.31 percent. Prediction of death is very difficult and the value of multiple R^2 is only .018. The most important of the predictors is decade of birth (with a Beta of .11); next in importance is the relationship to the previous birth (with a Beta of .10). Township was third in importance, with a Beta of .05. The other four independent variables all were of relatively little importance.

As one might expect, babies born before 1940 or between 1940 and 1949 had a higher than average precentage dying by age five after adjusting for the effect of the other variables; furthermore, babies born in 1950 to 1959 or in 1960 to 1965 had a smaller than average proportion dying by age five after adjustment for the effect of the other variables. All four of these results were statistically significant.

Table 8.1. Probability of death by age five for each live birth born five years or more prior to the interview

Mean is 7.34 percent

Number of cases is 23,502

Standard deviation is 26.09 percent Value of multiple R^2 is .027

Rank of each predictor in terms of size of Beta:

Decade of birth	.12
Relationship to previous birth	.10
Township	.05
Sex of birth	.02
Mother's educational attainment	.02
Mother's age at birth	.01
Father's income	.01

Value of deviation from the grand mean and of the adjusted coefficient for each category of each predictor:

	Deviation from the grand mean	Adjusted coefficient	Number of cases
Township:			
Kungliao	+1.61	+1.38	11,100
Hsinchuang	-1.44	-1.24	12,402
Sex of birth:			
Female	-0.10	-0.04	11,313
Male	+0.09	+0.03	12,188
N.A.	+92.65	+95.66	1
Decade of birth:			
Before 1940	+4.24	+4.04	4,159
1940 to 1949	+3.95	+4.16	4,301
1950 to 1959	-1.59	-1.55	8.167
1960 to 1965	-3.14	-3.21	6,875

Table 8.1 (continued) Probability of death by age five for each live birth born five years or more prior to the interview

	Deviation from grand mean	Adjusted coefficient	Number of cases
Relationship to previous birth:			
No previous birth	+0.87	+0.23	5,071
Interval since previous birth 36 months or more	-0.80	-1.31	4,916
Interval since previous birth 24 to 35 months and previous child survived to date of this birth	-1.80	-1.33	7,167
Interval since previous birth 24 to 35 months and previous child died before this birth	+5,66	+4.49	346
Interval since previous birth 18 to 23 months and previous child survived to date of this birth	+0.26	+1.49	2,811
Interval since previous birth 18 to 23 months and previous child died before this birth	+8.91	+7.81	203
Interval since previous birth less than 18 months and previous child survived to date of this birth	+3.49	+4.39	1,670
Interval since previous birth less than 18 months and previous child died before this birth	+13.84	+13.59	321
N.A.	-2.43	-4.22	997
Mother's age at birth:			
Under 20	+3.62	+1.11	2,142
20 to 29	+0.00	-0.03	13,805
30 and over	-1.03	-0.26	7,555

Table 8.1 (continued) Probability of death by age five for each live birth five years or more prior to the interview

	Deviation from grand mean	Adjusted coefficient	Number of cases
Mother's educational attainment:			
Less than primary school graduate	+0.59	+0.06	18,368
Primary-school graduate but less than junior high graduate and never reads a newspaper	-1.55	+0.20	3,242
Primary-school graduate but less than junior high graduate and reads a newspaper	-1.82	+0.20	904
Junior high graduate or more	-4.21	-1.92	988
Father's income:			
Less than NT$15,000	+0.75	+0.30	8,108
NT$15,000 to NT$24,900	-0.96	+0.32	4,193
NT$25,000 or more	-2.54	-0.57	3,681
N.A.	+0.96	-0.23	7,520

Various interesting findings emerge with respect to the predictor - relationship to previous births. First of all consider the three categories of this predictor in which the previous child survived to the birth of the given child. Under these circumstances, the shorter the interval since the preceding birth the higher is the probability that the given child will die. When the interval is 24 to 35 months the probability of death is 1.3 percentage points less than average whereas when the interval is less than 18 months it is 4.4 percentage points greater than average. After adjustment for the effect of the other variables, the proportion dying when the interval is less than 18 months is significantly higher than when the interval is 18 to 23 months; furthermore the proportion dying when the interval is 18 to 23 months is significantly higher than when the interval is 24 to 35 months. The identical comparison can be made when the previous child died before the birth of the given child. In this case the pattern of rising mortality with a shortened interval since the previous birth is also observed. The difference is statistically significant, however, only for the difference between the 18 to 23 month interval and the interval of less than 18 months.

Two possible explanations for the above-mentioned findings are possible. First of all, a longer interval since the preceding birth may give the mother added strength and this strength may improve either the given baby's prenatal condition or his postnatal care. Secondly, a baby who is born prematurely will have both a higher probability of death and also a shorter interval since the preceding birth than will a baby born after a normal gestation length. A decision on the relative weight to be placed on these two plausible explanations of the present findings would demand a control for the length of gestation of the given birth. Such control is not possible in this study since the relevant questions were not asked.

The other interesting set of findings with respect to relationship to previous birth is the very much higher mortality experienced by the given birth if the previous baby had already died. Three comparisons are possible - when the previous birth interval was 24 to 35 months, 18 to 23 months, and less than 18 months. In all three situations the difference between the two adjusted coefficients is significantly greater than zero even despite the small number of cases where the previous child had died. To illustrate, when the previous birth interval was less than 18 months, the probability of death for the given child was 13.6 percentage points higher than average if the previous child were dead and only 4.4 percentage points higher if the previous child were alive.

Only a small part of this difference by survival status of the previous birth can be explained by the hypothesis that both the given child and the previous child died from the same disease at approximately the same time because the tabulations specified that the preceding child must have died by the time the given child was born. We are therefore inclined to accept a hypothesis that "poor mothering" is responsible for the higher probability of death for the given child if the previous child is already dead. Such "poor mothering" might include the fact that neither child received breastfeeding for an adequate length of time. This specific hypothesis could be tested in later tabulations of the data.

After adjustment for the effect of other variables, township still proved a predictor of child death. Kungliao births had an adjusted coefficient of +1.38 percent and Hsinchuang births of -1.24 percent. Both adjusted coefficients were very significantly different from zero. It is interesting to note that the adjusted coefficient for each township differs little from that township's deviation from the grand mean. Thus our control for two measures of socio-economic status does not appear to have very much effect on the township mortality differential.

After adjustment for the effect of other variables male births, show slightly higher mortality than female births. However, neither of the two adjusted coefficients is significantly different from zero.

Births occurring to mothers under age 20 had significantly higher mortality than average. The negative adjusted coefficients for births occurring to mothers 20 to 29 years old, and to mothers 30 years old and over were not statistically significant.

Births occurring to mothers who had attained educational attainment of junior high graduate or more were significantly less likely than average to die by age five. The adjusted coefficients for births in other categories by mother's educational attainment were not significantly different from zero.

Finally, none of the adjusted differences in mortality by father's income proved to be significantly different from zero.

Table 8.2 features the predictor number of previous births instead of relationship to previous birth. In Table 8.2 the value of multiple R^2 is even lower (.018) than it was in Table 8.1. As in Table 8.1 decade of birth is the most important predictor with a Beta of .11. Township is the second most important variable with a Beta of .05. The third most important variable is mother's age at birth with a Beta of .04. Number of previous births - the distinguishing predictor of Table 8.2 - is fourth in importance with a Beta of .03.

The apparent pattern is that births of fifth order or less have a smaller chance of dying after holding constant the effect of other variables, and those of sixth order or higher a larger chance. However, the differences are slight and none of the adjusted coefficients are significantly different from zero.

With respect to the other predictors, there is a very high degree of correspondence between the value of each adjusted coefficient shown in Table 8.2 and its counterpart in Table 8.1. As in Table 8.1 all of the adjusted coefficients in the decade of birth predictor are significantly different from zero; the two town-

Table 8.2. Probability of death by age five for each live birth of 11th birth order or less born five years or more prior to the interview

Mean is 7.31 percent

Number of cases is 23,392 — Value of multiple R^2 is .018

Standard deviation is 26.03 percent

Rank of each predictor in terms of size of Beta:

Decade of birth	.11
Township	.05
Mother's age at birth	.04
Number of previous births	.03
Sex of birth	.02
Mother's educational attainment	.01
Father's income	.01

Value of deviation from the grand mean and of the adjusted coefficient for each category of each predictor:

	Deviation of grand mean	Adjusted coefficient	Number of cases
Township:			
Kungliao	+1.60	+1.35	11,037
Hsinchuang	-1.43	-1.21	12,355
Sex of birth:			
Female	-0.09	-0.01	11,255
Male	+0.07	+0.00	12,136
N.A.	+92.69	+94.80	1
Decade of birth:			
Before 1940	+4.27	+3.97	4,153
1940 to 1949	+3.87	+3.85	4,274
1950 to 1959	-1.60	-1.56	8,132
1960 to 1965	-3.11	-2.97	6,833

Table 8.2 (continued) Probability of death by age five for each live birth of 11th birth order or less born five years or more prior to the interview

	Deviation from grand mean	Adjusted coefficient	Number of cases
Number of previous births:			
0	+0.91	-0.35	5,071
1	+0.37	-0.16	4,387
2	-0.56	-0.72	3,702
3	-0.27	-0.02	3,012
4	-0.91	-0.14	2,344
5	-0.37	+0.83	1,800
6	-0.89	+0.42	1,261
7	+1.14	+0.28	864
8	-0.86	+0.64	512
9	-0.87	+0.83	295
10	+1.72	+3.55	144
Mother's age at birth:			
Under 20	+3.66	+2.04	2,142
20 to 29	+0.04	+0.44	13,805
30 and over	-1.13	-1.39	7,445

Table 8.2 (continued) Probability of death by age five for each live birth of 11th birth order or less born five years or more prior to the interview

	Deviation from grand mean	Adjusted coefficient	Number of cases
Mother's educational attainment:			
Less than primary school graduate	+0.57	-0.01	18,265
Primary-school graduate but less than junior high graduate and never never reads a newspaper	-1.50	+0.32	3,235
Primary-school graduate but less than junior high graduate and reads a newspaper	-1.78	+0.68	904
Junior high graduate or more	-4.17	-1.58	988
Father's income:			
Less than NT$15,000	+0.74	+0.25	8,058
NT$15,000 to NT$24,900	-0.93	+0.48	4,182
NT$25,000 or more	-2.52	-0.42	3,676
N.A.	+0.96	-0.34	7,476

ship categories are also both significantly different from zero, and neither the sex of birth nor the father's income categories are significantly different from zero. Unlike Table 8.1, the adjusted coefficient in Table 8.2 for births occurring to mothers who were junior high graduates or more failed to reach a level of statistical significance.

Chapter 9. Reliability of Results between First Interview and Reinterview

Methodology of First-Interview - Reinterview Matching

In order to obtain a valid data base for a comparison of the first interview with the reinterview, it was first necessary to match correctly the data from the first interview with that from the reinterview. Although the identification numbers for the same person were identical in both of the two interviews, in order to avoid the possibility that a different person had actually been interviewed in the reinterview we decided to compare first-interview and reinterview responses on certain key items as a way of determing whether a match really existed. Specifically, we determined whether (1) ts'un number (village within township) matched exactly, (2) lin number, (geographic unit within the village), matched exactly, (3) within-lin household number, matched exactly, (4) year of birth matched within five years, (5) age at first marriage matched within three years, (6) the number of children of the respondent's mother matched within two, and (7) the number of children of the respondent's mother who died before age 15 matched within one. In the comparison of items 4 through 7, we considered a match to exist even if there was an N.A. on either of the first-interview item or the reinterview item. Finally, we decided that two respondents with the same identification number would be considered to be matched if they failed no more than one of the seven above-mentioned item matches.

The results of this procedure were a total of 6,441 matched individuals and 244 individuals who were considered nonmatches.Unfortunately, any matching procedure is likely to consider as nonmatches some persons who actually were true matches and as matches some persons who were actually nonmatches. An examination of the individuals we considered to be nonmatches revealed that many of them differed both in the number of children born to mother and in the number who had died before age 15 but had identical values for the difference between the number of mother's children born and the number of the mother's children dead before age 15. In these cases the respondent in the reinterview probably was the same as the respondent in the first interview.

Available Methods for Measuring Reliability

There is no commonly accepted method for measuring reliability. The variety of possible methods is indicated in works by Goodman and Kruskal,[1] the U.S. Bureau of the Census,[2] and Ryder and Westoff.[3] In this study we have made use of the three different summary measures. Each of these methods has separate strengths

and weaknesses. For items which are in the form of either a nominal or an interval scale we show the results of two different methods. For items in the form of an interval scale we present results from only one method.

Let us consider first the two measures we show for nominal or ordinal items. The first measure, the probability of agreement, is simply the proportion of all responses which fall in the identical category in both first interview and reinterview. For example, suppose we have attitude to birth control coded into five categories from the first interview and the identical five categories from the reinterview. We now measure the proportion of all responses which fall into the identical category in both interviews.

There are two drawbacks to this method. The first disadvantage is that when a respondent is not identically reported we do not discriminate between the situation where he is reported in two substantively similar categories from the situation where he is reported in two very dissimilar categories. For example, we would not distinguish the respondent entirely in favor of birth control in the first interview and moderately in favor in the reinterview from the respondent entirely in favor in the first interview and entirely opposed in the reinterview. Furthermore, when there are only a small number of categories, the substantive difference between adjacent categories is likely to be much greater than if there are many categories. For example, an item dichotomizing respondents into those ever or never using a given contraceptive method provides more substantive contrast between adjacent categories than a five-category item on favorability to birth control in which the categories are entirely in favor, moderately in favor, uncertain, moderately opposed, and entirely opposed. For this reason in presenting the probability of agreement, we routinely report the total number of categories. We thus make it possible to compare items with a large number of categories, which generally will have a low value for the probability of agreement, only with other items also containing a large number of categories.

The second drawback of the probability of agreement is that it does not tell us how reliably each of the first-interview categories is reported. Generally speaking, the larger the number of cases in the category, the higher will be the number reported in the identical category in the retest. Therefore we have decided to supplement the probability of agreement (the percentage of all responses which fall in the identical category in both first-interview and reinterview) with the percentage of responses in the first-interview category with the smallest number of cases which are identically reported in the reinterview. The proportion of agreement from this second measure is often dramatically lower than that obtained from the first measure.

For interval-scale data we have decided to use the product-moment correlation coefficient as the measure of reliability. Although the product-moment correlation coefficient has been used very widely to measure reliability, it must be recognized that it has some very different properties from our first measure, the probability of agreement. To its credit, the product-moment correlation coefficient generally does distinguish minor discrepancy from major discrepancy, and, accordingly, the value of the coefficient will usually be considerably lower in the latter case than in the former. On the other hand, the value of the correlation coefficient will not be affected by a uniform change in response. Assume, for example, that we were measuring the reliability of the number of additional children desired. If every single respondent in the reinterview stated that he wanted exactly one more child than the number he stated he wanted in the first interview, then the value of the correlation coefficient would be equal to unity, indicating perfect reliability. However, in this same case the probability of agreement would have a value of zero. A third difference between the correlation coefficient and the probability of agreement has to do with the way in which they are affected by the variance of the distribution. If the variance is low, the product-moment correlation coefficient will generally show a low value,

indicating poor reliability. In the identical situation of low variance, the probability of agreement is likely to show a very high value. To take two examples from the present study, the reliability of the perceived survival to age 15 of 100 babies born when measured by the product moment correlation coefficient is low partly because a large proportion of all respondents perceived at least 95 percent would survive. On the other hand, the reliability of the item on current or past use of male sterilization, as measured by the probability of agreement, is extremely high partly because so few respondents reported ever using this method. For those items in which we have measured reliability by the probability of agreement, we are able to indicate the effect of low variance by also providing data on the probability of agreement for the response with the smallest number of cases. For example, in the case of current or past use of male sterilization, the probability of agreement is 99.8 percent whereas the probability of agreement for the smallest category, i.e. current or past users of male sterilization, is only 37.5 percent.

It should be noted that an item having a low variance, and hence low in reliability when the correlation coefficient is used as the measure of reliability, will not be a good predictor of another variable even if it were to have high reliability as measured by the probability of agreement. Furthermore, items with a high reliability, as measured by the probability of agreement, will also have poor ability to predict another variable if they have a low variance. Thus neither the item on perceived survival from 100 births (which has a low reliability measured by correlation coefficient) nor the item on whether male sterilization had ever been used (which has an extremely high probability of agreement but also an extremely low variance) can be a good predictor of a dependent variable (such as additional number of children desired).

Substantive Results

The various measures of reliability for nominal and ordinal items are presented in Table 9.1 and for items measured on an interval scale in Table 9.2. Despite all of our previous cautionary remarks, it is evident that some items are much more reliable than others. In general, behavioral items have very high reliability compared to attitudinal items. One reason for this is that the behavioral items have been designed to measure the behavior as of the time of the first interview. On the other hand, the attitudinal items measure feelings as of the moment. Thus when respondents did change their mind over the course of the interval between the two interviews the reliability of results was reduced. However, one may suspect that the attitudinal items with the lowest reliability are those in which the respondents have never thought about the question previously and did not have strong feelings about the issue at either interview.

It is worthwhile to examine the measures of reliability for some of the items which were used as dependent variables in the multiple classification analyses. The total number of live births, used as the dependent variable in Tables 6.1 and 6.2 was quite reliably reported. Items dealing with past or present use of contraception also had high reliability. On the other hand, the reliability of the components for the index of perception of child survival was very low. Also rather low were the reliabilities of attitude to birth control, the number of additional children desired, the number of children advised to daughter (or son), and the ideal number of children if life could be lived over. Among the behavioral items with relatively low reliability was the survival status of the first birth. On this item, only 61.1 percent of respondents who reported their first live birth as dead at the first interview reported the child as dead at the reinterview.

Table 9.1. Percentage of all first-interview responses in same category on reinterview, percentage of first-interview responses in category with smallest number of cases in same category on reinterview, and total number of categories (Tabulations exclude all persons with a blank or N.A. value on either first interview or reinterview)

First-interview question number and description	Percentage of all responses in same category on reinterview	Total number of cases	Percentage of responses in category with smallest number of cases in same category on reinterview	Number of cases in smallest category	Number of categories
Q.4 - Marital status for females	97.9	5324	100.0	3	7
Q.11- Ease of child survival	51.8	6000	0.0	25	5
Q.28- Menopausal status (recoded) for females	98.0	5391	96.4	1261	2
First live birth - sex	95.5	5072	94.7	466	2
First live birth - whether breastfed	92.5	5065	65.3	479	2
First live birth - Survival status at time of first interview	95.4	4871	0.6	457	2
Q.46- Should family with five children and one son have another child	67.6	6414	8.2	134	3

Table 9.1 (continued)

First-interview question number and description	Percentage of all responses in same category	Total number of cases	Percentage of responses in category with smallest number of cases in same category on reinterview	Number of cases in smallest category	Number of categorie
Q. 47 -Should family with five children and one son have another child if the son died	63.3	6405	7.6	249	3
Q. 71 -If all but one of number of children advised for daughter (son) were girls should respondent have another child	66.3	6282	6.5	46	4
Q.73--Whether female resp. would advise her daughter to work	47.1	5273	25.6	856	3
Q. 74 A-Female labor-force status (recoded)	82.1	5324	72.1	341	3
Q. 77 -Level of respondent's schooling	86.5	6440	30.6	36	8
Q. 79 -Level of spouse's schooling	81.2	6194	31.7	60	8

Table 9.1 (continued)

First-interview question number and description	Percentage of all responses in same category	Total number of cases	Percentage of responses in category with smallest number of cases in same category on reinterview	Number of cases in smallest category	Number of categories
Q. 85--Should 18-year-old nephew stay in school	63.6	6412	12.2	747	3
Q. 87 -Should 15-year-old niece stay in school	63.4	6409	22.1	869	3
Q. 90--Occupation and industry of husband's (male respondent's) job[1]	82.6	5776	41.2	17	8
Q. 93A-Grown-up son's help in husband's job[2]	64.7	3952	35.0	725	3
Q. 93B-Young son's help in husband's job[2]	79.1	5011	27.1	133	3
Q. 94A-Do you read a newspaper often	79.3	6431	22.4	473	4
Q.103A-Preferred no. of sons among next 3 children	70.6	6375	0.0	5	5
Q.104 -Reliance upon government pension for support in old age	94.8	4464	70.5	434	2

Table 9.1 (continued)

First-interview question number and description	Percentage of all responses in same category	Total number of cases	Percentage of responses in category with smallest number of cases in same category on reinterview	Number of cases in smallest category	Number of categories
Q.105-Reliance upon savings for support in old age	65.1	4478	47.8	1493	2
Q.106-Reliance upon rents for support in old age	81.0	4460	26.9	516	2
Q.107-Reliance upon nongovern-ment pension for support in old age	93.1	4411	39.0	195	2
Q.108-Reliance upon sons for support in old age	89.7	4445	63.6	517	2
Q.109-Reliance upon daughters for support in old age	73.5	4414	48.2	1278	2

First-interview question number and description	Percentage of all responses in same category	Total number of cases	Percentage of responses in category with smallest number of cases in same category on reinterview	Number of cases in smallest category	Number of categories
Q.110-Reliance upon friends and relatives for support in old age	94.4	4481	13.8	188	2
Q.112-Most important source of old-age support	67.5	4472	4.8	21	8
Q.113-No. of sons necessary for old-age support	43.7	6038	0.0	1	8
Q.117A-Do people expect to live with their children in their later years	68.1	4485	21.0	62	5
Q.118-Do people expect support from children even if not living with them	59.8	4467	29.3	82	5
Q.122 -Attitude to birth control	60.0	6255	19.8	207	5
Q.128A-Current or past use of loop (recoded)[1]	88.5	4591	75.9	864	2
Q.128B-Current or past use of Ota ring (recoded)[1]	90.9	4590	66.4	539	2

Table 9.1 (continued)

First-interview question number and description	Percentage of all responses in same category	Total number of cases	Percentage of responses in category with smallest number of cases in same category on reinterview	Number of cases in smallest category	Number of categories
Q.128C-Current or past use of oral pill (recoded)[1]	93.5	4591	63.8	362	2
Q.128D-Current or past use of abortion (recoded)[1]	90.6	4592	71.3	574	2
Q.128E-Current or past use of female sterilization (recoded)[1]	98.3	4592	84.0	213	2
Q.128F-Current or past use of male sterilization (recoded)[1]	99.8	4591	37.5	8	2
Q.128G-Current or past use of condom (recoded)[1]	95.9	4591	55.3	141	2
Q.128H-Current or past use of jelly or cream (recoded)[1]	97.7	4591	43.9	107	2
Q.128I-Current or past use of rhythm (recoded)[1]	94.1	4591	51.4	208	2
Q.128K-Current or past use of diaphragm (recoded)[1]	99.0	4591	24.1	29	2

Table 9.1 (concluded)

First-interview question number and description	Percentage of all responses in same category	Total number of cases	Percentage of responses in category with smallest number of cases in same category on reinterview	Number of cases in smallest category	Number of categories
Q.128L-Current or past use of withdrawal[1]	98.9	4591	23.1	26	2
Q.131- Does respondent plan to use birth control in the future	66.4	2027	12.6	270	3

[1] At time of first interview

[2] Excluding persons who changed job since the first interview

Table 9.2. Product-moment correlation coefficient between identical items in first interview and reinterview

First-interview question number and description	Correlation coefficient	Number of cases
Q. 6 - Number of births to respondent's mother	.903	5140
Q. 7 - Number of mother's births dying before age 15	.705	5090
Q. 12 - Perceived number surviving to age 15 from 20 births	.290	5454
Q. 13 - Perceived number surviving to age 15 from 100 births	.285	4800
Q. 15 - Month of respondent's birth	.842	5817
Q. 15 - Year of respondent's birth	.945	6441
Q. 25 - Age at first marriage	.938	6353
Q. 31 - No. of abortions at first interview (females only)	.731	3786
Q. 32 - No. of pregnancies at first interview (females only)	.948	3777
Q. 33 - No. of miscarriages, stillbirths, and abortions at first interview (females only)	.732	3777
Q. 34 - No. of live births at first interview (females only)	.969	3785
Q. 35 - No. of live births who died before age 15 at first interview (females only)	.723	5312

Table 9.2 (continued). Product-moment correlation coefficient between identical items in first interview and reinterview

First-interview question number and description	Correlation coefficient	Number of cases
First live birth - Month of birth	.767	4868
First live birth - Year of birth	.773	5161
First live birth - No. of months breastfed	.511	3716
First live birth - Month of death	.681	240
First live birth - Year of death	.760	396
Q. 36 - No. of additional children expected[1]	.485	2702
Q. 52 - Ideal no. of children if life could be lived over	.547	6285
Q. 52 - Ideal no. of daughters if life could be lived over	.481	6262
Q. 52 - Ideal no. of sons if life could be lived over	.495	6264
Q. 53 - No. of additional children desired[1]	.557	3666
Q. 60 - No. of children people around here like to have	.331	5404
Q. 61 - No. of childern people around here do have	.438	5723
Q. 62 - No. of children surviving to age 15 from average no. born	.406	5553
Q. 63 - No. of children advised to daughter		

Table 9.2 (continued). Product-moment correlation coefficient between identical items in first interview and reinterview

First-interview question number and description	Correlation coefficient	Number of cases
Q. 64 - No. of girls advised to daughter (son)	.449	6207
Q. 65 - No. of boys advised to daughter (son)	.462	6207
Q. 72 - No. of children advised to daughter (son) at most	.450	6017
Q. 80A - Minimum years of schooling necessary for boy to be successful	.299	6164
Q. 80B - Minimum years of schooling necessary for girl to be successful	.364	6153
Q. 81 - Rung of social-status ladder	.414	6382

[1]Data from reinterview recoded to subtract any births occurring in the interim between first interview and reinterview

We have not yet discussed the matter of net shifts from first interview to reinterview. This topic is not covered by the measures presented in Tables 9.1 and 9.2. However, a net shift was noted in certain items and merits discussion. In nine of the eleven items dealing with current or past use of a specific birth-control method, the proportion reporting use at the time of the first interview was greater at reinterview than at first interview. For example, with reference to the loop, 18.8 percent of respondents answering the question reported use at first interview and 21.2 percent at reinterview. Equally striking was the increase in abortion from 12.5 percent at first interview to 14.7 percent at reinterview reporting use prior to the first interview. It is probable that some of the discrepancy is caused by persons adopting use of the method after the first interview and forgetting that they had not used the method before the first interview. Another reason may be increased willingness to admit to the use of birth control.

There is also a sizeable net shift with respect to the survival status of the first live birth. Among the matched respondents the number of women at the time of the first interview reporting their first child dead was 457 whereas at the reinterview only 320 women reported their first child dead as of the time of the first interview. In the first interview, a complete pregnancy history was taken and only then were details concerning the first birth elicited. No such pregnancy history was obtained at reinterview. If it is presumed that the answer from the first interview is more valid than the answer from the reinterview, the omission of the pregnancy history from the reinterview may explain the lower number of deaths from the reinterview.

References for Chapter 9

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Chapter 10. Summary and Conclusions

Study Design and Sample

This study was designed with several purposes in mind. We wished first of all to examine the effect on fertility behavior and attitudes both of the community level of infant and child mortality and of the individual experience of child loss. To this end we planned our study to include interviews from two rural areas in the vicinity of Taipei which differed sharply in the level of infant and child mortality. The interviewing site with high mortality was Kungliao township and that with low mortality Hsinchuang township (excluding the central urban portion). An innovative feature of the study design was the plan to measure individual perceptions of the level of child survival. If indeed the community level of infant and child mortality affected the fertility behavior and attitudes of all married couples, not just those who experienced child loss, there should be differences in behavior and attitudes by township after controlling for differences on an individual level such as the individual level of educational attainment, socioeconomic status, female labor-force participation, etc. However, if we were able to measure the individual perception of child survival validly and reliably, the difference by township attritutable to the community level of infant and child mortality would disappear when we also held constant the individual perception of child survival. Moreover, measurement of the individual perception of child survival enabled us to test the hypothesis that the actual level of child survival was higher than the average level perceived by individuals. If a gap between actual and perceived level existed and constituted an impediment to the acceptance of family planning, an educational campaign to reveal the true facts concerning the level of child survival might have important effects on the birth rate.

We were also interested in examining the effect of high son preference on fertility behavior and attitudes. We planned to examine this variable in two ways: (1) by looking at the effects on fertility behavior and attitudes of differences in actual sex composition of the early births, and (2) by examining the effects of expressed differences in preference for sons.

Another interest was the effect of prior fertility differences on child mortality. We wished to examine the effect on survival to age five of birth order and the length of the interval between the given birth and the preceding birth.

A final concern was in measuring the reliability of response over time to the items of interest to us. Accordingly, we planned to reinterview the same respondents a second time approximately 12 months after they had first been interviewed.

The study design called for the interview of all ever-married women in the two areas designated and of all currently-married men residing in every fifth household in these areas. In all 8,178 respondents were interviewed. This number included 3,178 respondents from Kungliao, the high mortality township, and 5,000 from Hsinchuang, the low-mortality township. The number of women interviewed was 6,814 and of men 1,364. The total number of persons reinterviewed was 6,685.

Major Findings

The analysis of findings from the first interview utilized Multiple Classification Analysis (MCA). Accordingly, we were able to investigate the effect of any one independent variable on fertility behavior or attitudes holding constant the effect of all other variables. The findings quoted in this section from MCA analyses refer in all cases to such statistically-controlled associations. Unless there is a statement to the contrary, all findings summarized here are statistically significant in a two-tailed test at the .05 level.

The major findings will now be summarized for each principal independent variable.

1. The average perception of child survival in the two townships was shown to be extremely accurate. This situation was in great contrast to the finding from our Kentucky pretest where the average perceived level of child survival was very much lower than the actual level. There were several determinants of the perception of child survival other than the very important factor of residence in the low-mortality township versus residence in the high-mortality township. Female respondents (or their husbands) none of whose own births died before age 15 had a higher perception of child survival whereas respondents some of whose own births had died had a lower perception. Similarly, those who had had no siblings die before age 15 had a higher perception and those who had lost 25 percent or more of their siblings a lower perception. Females had a higher perception of survival than males; junior high graduates a higher perception than average; and respondents under age 25 had a lower than average perception, whereas respondents 35 to 44 and 55 to 64 had a higher than average perception. Unfortunately, the individual perception of child survival could not be reliably measured. For example, the correlation between the proportion of 100 children perceived as surviving to age 15 at first interview with that at reinterview was only .285. Undoubtedly because the reliability of response was so low, the perception of child survival did not prove to be a particularly important independent variable in accounting for fertility behavior and attitudes. Nevertheless, using the index of perception of child survival as an independent variable, some interesting results were obtained. Comparing those respondents perceiving less than 85 percent of children surviving to age 15 with those perceiving 95 percent or more surviving, the former had more subsequent births after the second and after the third birth than the latter. On the other hand, suprisingly, respondents perceiving less than 85 percent survival would advise their daughter to have fewer children than the

average respondent and also would desire fewer children than the average respondent if life could be lived over. The last two results imply that the consequences of having a low perception of child survival may be more complicated than supposed in our original hypotheses.

2. The variable of township did prove to be an important variable in predicting fertility behavior and attitudes. Respondents in Kungliao had higher subsequent fertility, a lower proportion ever using contraception, a larger number of additional births desired, larger family-size ideals, and, surprisingly, a more favorable attitude to family planning than respondents in Hsinchuang. We cannot definitely attribute these township differences to the difference between the two townships in their actual level of child survival.However, since perception of child survival was so unreliably measured the fact that these township differences persisted after controlling for a large number of other variables on the individual level gives ground for belief that the community level of infant and child mortality is an important variable affecting fertility behavior and attitudes.

3. The individual experience of child loss among the first two or three births proved to be an important predictor of subsequent fertility. If all of the first three live births were dead one year following the third birth, the number of subsequent children was 1.6 greater than if none of the first three children had died by that time. Although subsequent fertility was greater when the number of early births who died was larger, couples did not fully compensate for their child loss. On the average the subsequent fertility compensated for about 60 to 70 percent of the original child loss.

4. The sex of the first two or three births was also an important determinant of subsequent fertility. Providing all of the early births survived, the number of subsequent births was smaller if there was at least one male than otherwise. On the other hand, there was evidence that the loss of the only son was a traumatic event

which reduced subsequent fertility.

4. Another important variable was the survival status of sons given an equal number of male births. The results were strongest when two sons had been born. Given two male births, respondents losing one or more sons were shown to practice contraception less frequently, to have a higher family size-ideal for their daughter, to want more additional children, and to have a less favorable attitude to birth control.

5. The survival status of daughters given an equal number of female births was a less important variable than the survival status of sons given an equal number of male births. However, if there was only one daughter born, the death of that daughter was associated with a higher number of additional children desired.

6. The proportion of the respondent's (or wife's) births who had died before age 15 holding constant the number of living sons and the number of living daughters provided some significant results. If 25 to 49 percent of the births had died, the number of additional children desired was less and the proportion ever using contraception greater. These two results are congruent with the finding that couples suffering child loss do not fully compensate for that loss. On the other hand if either 25 to 49 percent or 50 percent or more of their births had died, respondents would advise a greater number of children to their daughter and would want more children if life could be lived over.

7. An attitudinal preference for sons was shown to have a small but consistent relationship with fertility behavior and attitudes. Comparing respondents with no son preference to those with high preference, the former had: (1)less subsequent fertility, (2) a higher proportion who had ever used contraception, (3) a smaller number of additional children desired, (4) a smaller ideal family size for their daughter, and (5) a smaller desired number of children if life could be lived over.

8. Survival of births to age five was affected by several factors. If the previous child survived, the longer the previous birth interval the higher the chance of survival for the given child. Moreover, if the previous birth had died prior to the given birth, the survival chance of the given birth was considerably reduced. Births of fifth order or higher had lower chances of survival than births of fourth order or less but the differences by specific birth order were small and none differed significantly from the average. Births occuring: (1) to mothers under age 20, (2) in Kungliao, and (3) before 1950 had a reduced chance of survival.

9. The reliability of behavioral items between first interview and reinterview was generally high. However, the reliability of attitudinal items was rather low. The low reliability of attitudinal items extended to the items which served as principal dependent variables for the various MCA's. The reliability of the individual items which were components of the index of perception of child survival was particularly low.

Suggestions for Further Refinement of the Analyses

This final report was prepared under rather severe budgetary and time constraints. The MCA tabulations were prepared and run and for the most part there was no opportunity to rerun them with any further changes in the independent variables. In retrospect several revisions of the MCA tabulations would appear to have value. These changes will now be listed.

Perhaps the most helpful change would be the addition of age at marriage to the independent variables used in Table 6.1 and 6.2 dealing respectively with fertility subsequent to the third and second births. For the most part we probably already have a control for age at marriage through our control for educational attainment, husband's occupation and wife's labor-force status. However, we do not have the

control directly. Moreover, there is evidence from Tables 8.1 and 8.2 that children of mothers under age 20 have higher mortality than other children. Therefore the number of survivors of the early births may be related to age at marriage and age at marriage will also be related to subsequent fertility.

Another useful change to Table 6.2 would be a further breakdown of the category of no surviving children in the predictor entitled sex and survival status of the first two live births. The number of cases in this category (743) is sufficiently large so that it could be broken down into three separate categories, i.e. (1) two sons born, none surviving, (2) two daughters born, none surviving, and (3) one daughter and one son born, none surviving.

In Table 6.3, in which the dependent variable is current contraceptive use, it would be useful to have an additional run in which a predictor to be entitled number of children and their survival would be substituted for the two predictors of number of sons and their survival and number of living daughters.

In Tables 8.1 and 8.2, in which the survival of a birth to age five is the dependent variable, it would be useful to add as an independent variable a predictor categorizing the average length of lactation for the preceding births which survived. This variable could serve as a proxy for the intended lactation length of the given birth. It could be hypothesized that the longer the lactation for the preceding births, the greater would be the chance of survival for the given birth.

Another useful change to Table 8.2 would be a reduction in the number of categories in the birth-order predictor. Reducing the number of categories from ten to two would most probably lead to statistically significant results.

Tables 7.2 and 7.4 had been originally planned to include a universe of both male and female respondents. When the results did not converge, the tabulations had to be rerun and confined to females. The failure of convergence came about

because the males whose wives had not been interviewed could not be removed from the tabulations except at considerable expense of time and money. However, inclusion of the male respondents (minus those whose wives were not interviewed) would reduce sampling error and provide an additional independent variable.

Another MCA analysis originally planned but dropped because there was insufficient time or money to have it programmed was one in which the dependent variable was whether or not a female respondent had a pregnancy not ended by induced abortion in the interval between the first interview and the reinterview. Results from such a tabulation would also prove to be of interest.

Finally, there is room for much more analysis of the first-interview-reinterview reliability. It would be helpful to have tabulations not only for all respondents but for respondents broken down by township, by educational attainment, and by sex. It would also be helpful to categorize many of the items which are in the form of interval scales and compute the probability of agreement for the categorized versions of these items for comparison with the correlation coefficient already computed for the original versions.

Implications of the Study Findings for Policy

For some time there has been a sharp controversy as to whether governmental efforts to reduce infant and child mortality might, first of all, help to reduce fertility, and secondly, even help to reduce the rate of natural increase. This study has shown quite conclusively that in the particular cultural context of the study population, a reduction in child mortality would reduce the fertility of those suffering child loss. The study has not been able to show whether a reduction in infant and child mortality would raise or lower the rate of natural increase. If the only effect of a reduced level of infant and child mortality were on those couples who

actually experienced child loss, our findings indicate that the rate of natural increase would rise following a reduction in infant and child mortality. This is because couples who lost children did not fully compensate for that loss. On the other hand, if a high level of infant and child mortality in the community affects the behavior of couples who do not experience a child loss and serves to elevate their fertility, then a reduction in infant and child mortality might even reduce the rate of natural increase. The findings of our study give grounds for belief that the community level of infant and child mortality may have an independent effect on fertility; nevertheless, they do not give conclusive proof for such a hypothesis.

Although we found no gap in Taiwan between the actual and the perceived level of child survival, we did find such a gap in our Kentucky pretest. The implication of these two contrasting findings is that there may be several populations throughout the world in which there is a sizeable gap between the actual and the perceived level of child survival. Furthermore, this gap may be an impediment to the success of family-planning programs. If in future studies, such gaps are found to exist and to impede the success of family-planning programs, governments may find it expedient to conduct educational campaigns to acquaint their peoples with the true facts concerning current chances of child survival.

Another policy which has received some support is governmental encouragement of research efforts to find a feasible means of allowing couples to choose the sex of their children. Our findings indicate quite definitely that in our study population such a technological innovation, if utilized, would have a substantial effect in reducing fertility.

Our study also revealed that our respondents relied very heavily on their sons for support in old age. A reduction in this dependence on sons through the introduction of a governmentally-sponsored old-age security system should help to reduce the high preference for sons and accordingly reduce fertility.

Chapter 11. Dissemination of Research Findings

The time interval between the receipt of data from Taiwan and the preparation of the final report has been so short that none of the research findings from Taiwan have been disseminated other than in this report.

On the other hand, the hypothese and design of the study and the methodological problems arising therefrom have been previously presented.

The hypotheses and study design were orally presented on the following occasions:

1. On August 25, 1969 at Institute of Public Health, National Taiwan University, Taipei, Taiwan.
2. On May 5, 1970 at Department of Anthropology, Columbia University, New York, N.Y.
3. On February 17, 1971 at the Conference on Infant and Child Mortality and Fertility Behavior at the Research Triangle Institute, Research Triangle Park, North Carolina.
4. On March 22, 1972 at the Department of Geography, Boston University, Boston, Mass.
5. On April 7, 1972 at the Population Panel Seminar of the Southeast Asia Development Advisory Group, Elkridge, Maryland.

Methodological aspects of the study were orally presented on February 17, 1972 at the Department of Sociology, University of Southern California, Los Angeles, California.

The only publication containing a discussion of the study is:

> "Discussant's Comments" by David M. Heer in A.S. David, editor, Conference on Infant and Child Mortality and Fertility Behavior (Research Trinagle Institute, April 1, 1971, Research Triangle Park,N.C.), pp. 27-29.

Appendix A. Operational Definitions of Indices used in the Multiple Classification Analyses

Birth-control Knowledge Index

The birth-control knowledge index was constructed from two items. The first item was the total number of birth-control methods that the respondent volunteered in answer to the question, "What methods of birth control used by ordinary couples do you know of." The second item was the number of birth-control methods out of a list of eleven and excluding the methods he had just volunteered that the respondent had heard of. The index was constructed by giving a weight of two to the number of methods volunteered and a weight of one to the additional methods of which the respondent had heard. A score of 0-5 was classed as low, 6 through 10 as intermediate, and 11 to 22 as high birth-control knowledge.

Educational Aspirations for Nephew

This index was derived from responses to the following two items: (1) "If you had a 15-year old nephew, would you be in favor of not letting him continue in school in order to help the family by earning money?" and (2) "If he were 18 instead of 15 would you be in favor of not letting him continue in school in order to help the family by earning money?"

Respondents who did not favor the 15-year old continuing in school were categorized as having low educational aspirations.

Respondents who favored the 15-year old continuing in school but did not favor 18-year-old continuing were placed in the medium category.

Respondents who favored both the 15-year-old and the 18-year-old to continue in school were placed in the high category.

All other respondents were placed in the N.A. category.

Educational Aspirations for Niece

This topic was derived from responses to the following two items: (1) "If you had a 12-year-old niece, would you favor not letting her continue in school in order to help the family by earning money or taking care of younger brothers and sisters?" and (2) "If she were 15 instead of 12, would you favor not letting her continue in school in order to help the family by earning money or caring for younger brothers or sisters?"

Respondents who did not favor the 12-year-old continuing in school were categorized as having low educational aspirations.

Respondents who favored the 12 year old continuing in school but did not favor the 15-year-old continuing were placed in the medium category.

Respondents who favored both the 12-year-old and the 15-year-old to continue in school were placed in the high category.

All other respondents were placed in the N.A. category.

Perception of Child Survival

The index of perception of child survival was constructed giving equal weight to the follwing three items:

Item 1. Respondents were asked: "If 20 children were born in this village, how many would you say would live to age 15 and how many would be lost? The answer was multiplied by five to obtain the score on item 1.

Item 2. Respondents were asked: "Among 100 (children born in this village), how many would live to age 15 and how many would be lost? The answer to this question was used directly to obtain the score on item 2.

Item 3. Respondents were first asked, "How many children do people around here generally have in a lifetime?" and a subsequently, "If a family had this number of children, how many would live to age 15?" The answer to the second question was divided by the answer to the first question and then multiplied by 100 to provide the score on item 3.

The average score for each respondent was obtained by summing the scores over the number of items which were not N.A. and dividing by the number of items which were not N.A.

Preference for Sons Index

The preference for sons index was constructed from eight items. These were as follows:

Item 1. This involved a comparison of two pictures one of which showed a family with one boy and four girls and the other a family with one girl and four boys. The respondent was assigned a score of 0 if he recommended that the family with one boy and four girls have another child but did not recommend that the family with one girl and four boys have another child. He was assigned a score of 1 if he recommended that both families have another child or that neither family have another child. He was assigned a score of 2 if he recommended that the family with one girl and four boys have another child but did not recommend that the family with one boy and four girls have another child.

Item 2. With reference to the same pictures as in item 1, the respondent was asked what should the family do if (1) the one boy in the first picture died and (2) the one girl in the second picture died. The respondent was assigned a score of 0 if he stated that if the one boy died the family should have another child but did not recommend another child if the one girl died. The respondent was assigned a score of 1 if he recommended neither family or both families to have another child. He was given a score of 2 if recommended only the one-girl family to have another child.

Itme 3. This involved a comparison of two pictures, one of which showed a family of four boys and the other a family of four girls. The respondent was assigned a score of 0 if he recommended that the family with four girls have another child but did not recommend the family with four boys to have another child. He was give a score of one if he recommended either that both families have another child or recommended that neither family have another child. He was given a score of 2 if he recommended only the all-boy family to have another child.

Item 4. THis involved a comparison of two pictures one of which showed a family of two boys and one girl and the other a family of two girls and one boy. The respondent was assigned a score of 0 if he recommended that the family with two girls and one boy have another child but did not recommend this for the family with two boys and one girl. He was assigned a score of 1 if he recommended that both families have another child or that neither family have another child. He was assigned a score of 2 if he recommended that the family with two boys and one girl have another child but did not recommend this for the family with two girls and one boy.

Item 5. This involved a comparison of what the respondent would advise in two situations (1) where the respondent's daughter (or son) had had the number of children that the respondent had advised but all of them were boys and (2) where the respondent's daughter (or son) had had the number of children that the respondent had advised but all of them were girls. The respondent was assigned a score of 0 if he advised another child to the family which had only girls but did not advise another child to the family which had only boys. He was assigned a score of 1 if he recommended that in neither or both situations should the daughter (or son) have another child. He was assigned a score of 2 if he recommended that the family with all boys but not the family with all girls have another child.

Item 6. The respondent was asked what he would advise if the respondent's daughter (or son) had had the number of children that the respondent had advised but all but one of them were girls. Respondents who advised another child were given a score of 0 and those not advising another child a score of 1.

Item 7. The respondent was asked whether a man's blessings were best appraised by the number of his sons or by how much money he had. Respondents answering "sons" were assigned a score of 0. Respondents not stating "sons" were assigned a score of 2.

Item 8. Respondents were asked to state the number of boys that would be desirable for a couple with one daughter and one son who wanted three more children. Respondents advising three boys were given a score of 0, those advising two boys a score of 1, and those advising less than two boys a score of 2.

To account for respondents who had missing values on one or more questions, the score was computed by taking the person's actual score as a percentage of the maximum possible score. Persons with a percentage of 50 or higher were assigned to the no preference category, persons with a percentage of 29 to 49 to the moderate preference category, and those with a percentage less than 29 percent to the high preference category.