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The Effects of Mother's Income Generation  
on Children's Nutritional Status and School Enrollment  
In Rural and Urban Guatemala

FINAL REPORT

(Revised)

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## EXECUTIVE SUMMARY

The effects of mothers' work for earnings on their under-four year old children's nutritional status, morbidity, and school enrollment was investigated in four rural villages in a Spanish-speaking Ladino part of Guatemala, and two adjacent peri-urban villages located within 15 miles of Guatemala City. Associations of work for earnings and patterns of breastfeeding, use of a feeding program, time use, and children's school enrollment were also investigated. Finally, the associations between measures of mothers' current abilities and the nutritional status of their children in the rural villages were examined.

### WOMEN'S WORK

Although most urban and rural mothers of young children work at many tasks, the focus of this investigation was women's work for earnings. Work was assessed in two ways. For the investigations of the effects of maternal work for earnings, it was measured with the woman's response to the question, "did you have an occupation" for various intervals between births of children. In the rural areas, the percent of women working was quite small, ranging from 6% of mothers of infants working to 13% of mothers of 4 year olds working. In the urban areas, the range was from 12% of mothers of infants to 25% of mothers of three-year olds who reported working for income.

The second method of assessing work for earnings was with the question, "do you work"? Thirty percent of the women who answered "no" to the first question indicated that they did work.

Major categories underreported in the first question were agricultural work and production of materials in the home. Among women with school-aged children, 50% of rural women reported that they worked, and 55% of urban women reported that they worked.

In both urban and rural areas, working was associated with unmarried status, but not with greater poverty. In the urban area, domestic work was associated with more poverty than other kinds of work. In the rural area, there were few domestic workers. Most women who reported an occupation were in the informal sector. We suggested that women work for two very different motivations; some are income-enhancers, whose work for earnings is a means for improving the living status of the family, whereas others are poverty-avoiders, whose income provides the basic means of support of the family. It was suggested that in the urban area, domestic workers tended to be poverty-avoiders, particularly those working when they had an infant.

#### MAJOR CONCLUSIONS

1. For children under one year of age, under some conditions mother's work for earnings is negatively related to nutritional status, controlling for differences in economic level, type of child care, and education of the mother. Those conditions were: in the urban villages, children of domestic workers, but not children of formal and informal workers, were shorter and somewhat lighter. In the rural villages, the longer the hours the mother worked, the lighter her infant, but no net effects of work were seen (see Sections II and III).

Policy implications. If there is one group of working mothers that should be targeted for intervention, it would be those who have an infant, particularly those involved in unskilled and poorly paid work as domestic workers living in their own homes.

2. Women's work for earnings is positively associated with children's weight for age after infancy. The results showed that urban workers, particularly informal and formal workers, had significantly heavier children at age 2 than non-workers, controlling for economic level, type of child care help, and mother's education. It was suggested that this difference could be due to availability of extra money to purchase high-quality weaning foods, which were more commonly reported to be purchased by the working mothers than the non-working mothers. In the rural areas, some positive associations of work for earnings at age 3 were seen, but this result could have been due to chance (see Sections II and III).

Policy implications. Under some circumstances, mothers should be encouraged to work for earnings, since their income may have a net positive effect on children. This positive effect appears to be stronger in an urban environment, perhaps because more food must be purchased, rather than grown, and for weaning-age children.

3. Duration of breastfeeding was unrelated to work for earnings in the rural villages. In the urban villages, formal and informal workers breastfed significantly fewer months than non-workers or domestic workers, but the shorter duration did not

appear to have a negative impact on children's nutritional status; on the average, all workers breastfed for at least 4-6 months (see Sections II and III).

Policy implications. Given a minimum amount of breastfeeding, the shorter period of breastfeeding that may occur for some workers may not have a negative impact on nutritional status. In this population, prolonged unsupplemented breastfeeding may also be a problem.

4. Receiving help in caretaking of children was more common for rural mothers than for urban mothers, and rural working mothers received more help in child caretaking from adults than rural non-working mothers. For urban mothers, caretaking help was received by less than half of the mothers, regardless of their work status, with one exception: working mothers with infants received significantly more help from adults than non-working mothers with infants. Only 15% of urban mothers reported that their older children helped in child caretaking, whereas 30% of rural mothers reported caretaking help from their children. No differences in caretaking help from siblings by work status of the mother were seen for urban or rural villages.

Child care by an older sibling was, at age 2-3, associated with lower nutritional status and less ingestion of supplemental food in the rural villages, controlling for extraneous variables including birth order. On the other hand, positive effects of care by an adult were seen for morbidity at ages 1-2 in the rural areas, and for height for age during infancy and the second year

in the urban villages ( the latter was a trend at the .10 level) (see Sections II and III).

Policy implications. Working mothers, particularly in the urban areas, may be in need of additional help in child care, especially if they are working outside the home. Further, this help probably will not come from older children, who provide much less help than in rural areas. Second, rural children might profit from the training of older siblings in feeding and child-rearing strategies, focussing on the second and third years of life.

5. Measures of women's current ability levels (modernity, literacy, and vocabulary) were more highly associated with children's nutritional status and morbidity than past achievement (years of school passed or history of employment) in two larger, more accessible rural villages, whereas this difference was not found in two smaller, more isolated rural villages (see Section IV).

Policy implications. Measures of mothers' current abilities, particularly literacy, should be assessed as well as educational attainment in predicting nutritional outcomes of children. Whether teaching literacy to mothers would have an impact on their children's welfare could be explored.

6. Mothers of young children (7 and younger in the rural villages, 3 and under in the urban villages) who work for earnings report many more hours (7 to 9) of activities other than child caretaking and food preparation than non-working women (3 to 4 hours). Working mothers were significantly less likely to

report a full day in child caretaking or food preparation than non-working mothers in both the urban and rural villages. However, women who worked for income reported spending less than a full day caretaking only when they spent more than 4 hours per day working (urban villages) or 6-7 hours per day in the rural villages. The further from home they worked, the less caretaking they reported doing. The only additional activity which rural working mothers reported performing less than non-working mothers was washing clothes. No differences by work status in amount of clinic attendance were seen.

Rural mothers reported slightly more help from other adults than urban mothers, but none reported more than half an hour per day of help received for activities other than child caretaking or food production. There was no association between the amount of help received and the amount of income that women earned (see Section V).

Policy implications. Women who work for earnings, and are mothers, have little free time for additional training or other activities, and relatively little help from other adults.

7. School enrollment of girls aged 7 to 14 was no more common among children of mothers who worked for income, whether or not there were young children in the home, than girls whose mothers did not work for income, although mothers' work status influenced their expectations for their daughter's future occupations. Rural working women were more likely to expect that their daughters would work than non-workers. In the urban areas, the type of work working women were involved in was associated with

the type of work they expected their daughters to do. However, all of the women, whether working or not, had more expectations for future economic assistance from their sons than from their daughters.

Both urban and rural girls were less likely to be enrolled when there was an infant in the home, and their mothers were working for earnings. This negative effect was limited in the urban area to children of domestic workers, and in the rural areas, to children of agricultural workers (see Section VI).

Policy implications. Girls' school enrollment needs to be encouraged, particularly among the children of domestic workers (urban) and agricultural workers (rural). Assuming that working mothers will be more likely to enroll their daughters in school does not seem justified. Incorporating schooling with infant care might be a solution. In these villages, care for preschool-aged children did not seem to limit girls' school enrollment.

## SECTION I

This section provides a brief overview of the activities of the grant period, and a description of the files constructed.

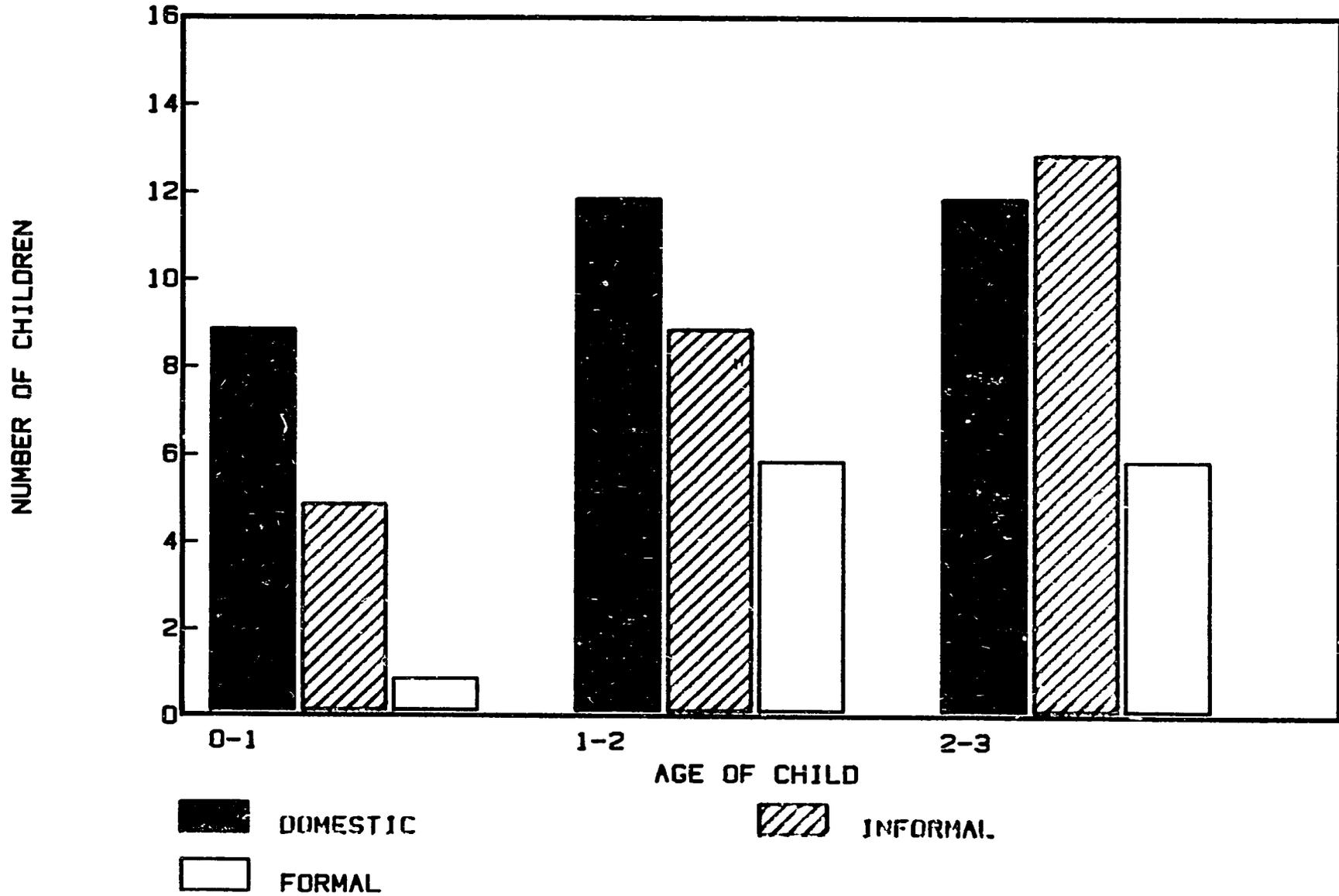
The first year of the project was spent in revising the initial proposal, increasing the level of detail in the proposed analyses, and constructing the initial data files. A major achievement was acquiring the nutritional status data from the urban villages in Guatemala, which previously had not been analyzed. In March, 1984, the investigators met with three of the consultants, Drs. Scrimshaw, DaVanzo, and Nerlove to review the increased specifications. The report of that meeting is available from the principal investigator. During the next year, input from all three of these consultants was continued on a regular basis, above and beyond the time for which they were actually paid. Dr. Balderston provided valuable insight at the end of the project, reading the two papers focussing on nutritional status for policy implications.

Following the recommendations from that meeting, an urban and a rural file based on the woman's retrospective life histories were created, and these files were merged with other files to construct working files for the analyses. Other files were constructed for the schooling analysis, and the time use analysis. Table 1 lists the 7 files eventually constructed, the sample size of each, and the specific instruments from which

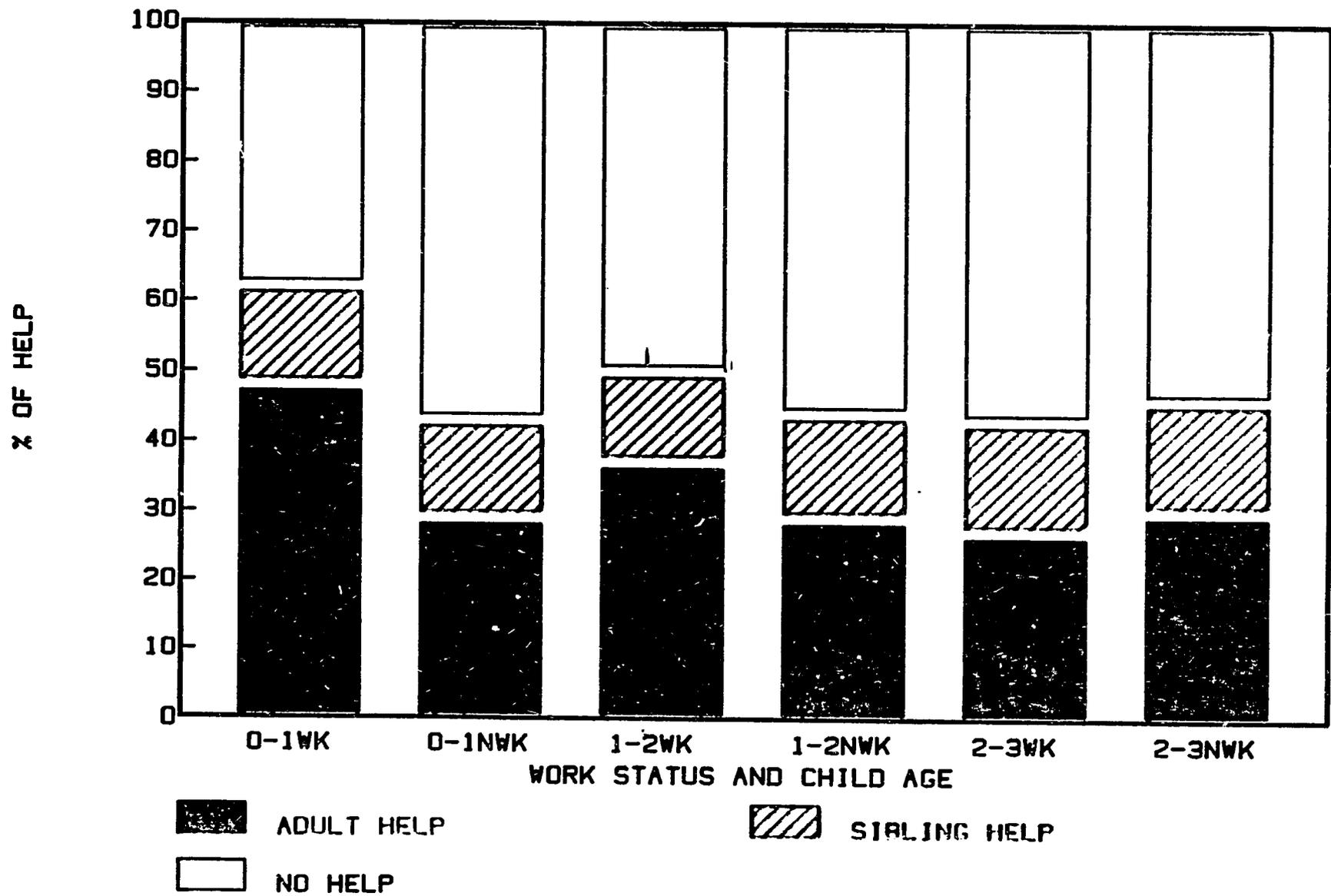
items were taken. The initial list of variables included in the rural and urban files used for the examination of effects of maternal work for earnings on nutritional status are shown in Appendix A.

Because publication of results is a critical issue, the sections of the report summarizing the findings are written as separate papers, each with a review of literature, methods and results section. Two of the papers have already been presented at conferences: the report of the effects of maternal work for earnings on school attendance, and the American Anthropological Association Meetings in 1985, and the nutritional status in the urban population, presented at the International Nutrition Meetings in Brighton, U. K., in 1985. They are both ready to be submitted to journals, as stipulated in the project proposal.

# URBAN

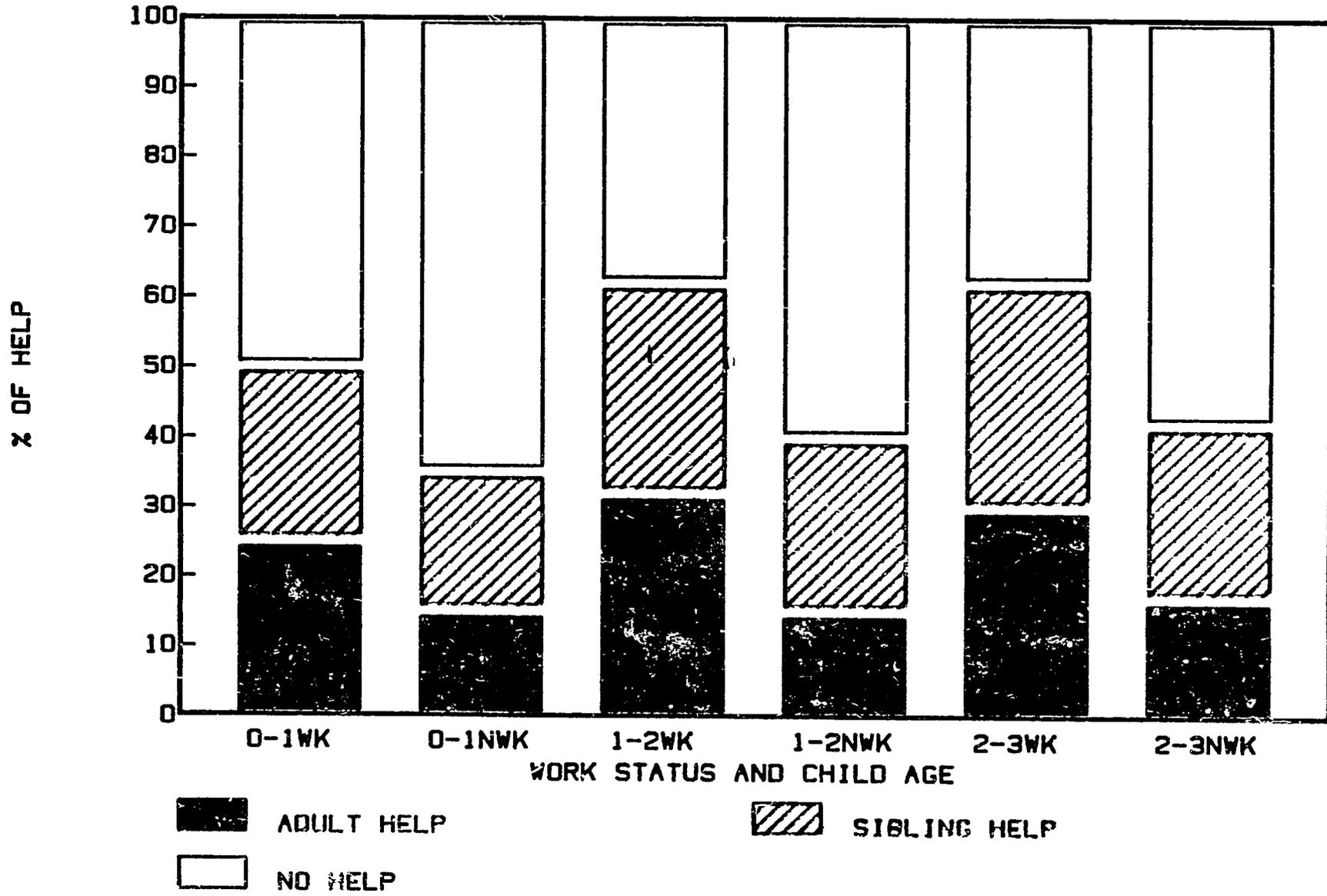


# URBAN: CHILD CARE HELP



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# RURAL: CHILD CARE HELP



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TABLE 1

<u>FILE</u>	<u>SOURCES</u>	<u>SAMPLE CHARACTERISTICS</u>	<u>SAMPLE SIZE</u>
Urban nutritional status	Retrospective	Living children from birth to three and their mothers	322
	Anthropometry		
	Income and Wealth		
Urban deceased	Same as above	Children who did not survive to age 4	12
Rural nutritional status	Retrospective	Children from birth to 4 and their mothers	926
	Anthropometry		
	Income and Wealth		
	Morbidity		
	Supplementation		
	Socioeconomic status		
	Attitudes and Expectations		
Rural deceased	Same as above	Children who did not Survive to age 4	18
School.Family	Attitudes and Expectations	All families with at least one child aged 7-14	Rural: 265 Urban: 140
	Income and Wealth		
School. Individual	Attitudes and Expectations	All children between ages 7 to 14 interviewed by parents	Rural: 673 Urban: 314
	Income and Wealth		
Time Use of Mothers	Time Budget Rounds 3 and 4	Rural: Pregnant women and mothers of children under 7	Round 3: 419 Round 4: 413
		Urban: Pregnant women and mothers of children under 3	Round 3: 313 Round 4: 461

## SECTION II

### MATERNAL WORK FOR EARNINGS AND CHILDREN'S NUTRITIONAL STATUS: URBAN

As the economic situation in many parts of the Third World become more difficult, parents must resort to new economic strategies to sustain their families. One of the changes that has occurred has been an increase in the number of women who are mothers engaged in wage-earning activities. The effects of maternal work for wages on the children of these mothers is of great concern to policy makers, people concerned for child and maternal health programs, developers of income-generation projects, and the mothers themselves. Although there is beginning to be a body of information about the effects of this changed role on children in industrialized countries, there is as yet little systematic information from non-industrial societies. The purpose of this section is to examine the effects of maternal work for earnings on children's nutritional status in two adjacent urbanizing communities in Guatemala, and four rural villages.

It is widely recognized that, in many parts of the world, women in traditional roles perform a tremendous amount of unpaid household work, child care, and small farming. However, concern about possible negative effects of maternal work for earnings on children has been directed toward women's wage-earning

activities. Therefore, this paper is addressed specifically to examining the effects of mother's work for income (sometimes called maternal employment, income-generation, or work for earnings) on the nutritional status of children.

In the last several years, a few studies specifically addressing the issue of the effects of maternal work for earnings on children's nutritional status have appeared. Some report positive effects; others find that the children of these mothers are less well off than a similar group of non-working mothers' children. Differences in the ages of the children, the type of work described, and the research strategies used prevent simple comparisons of findings. Because funding agencies are making recommendations based on the possible beneficial effects that money in the hands of the mother may have on children's nutritional status (e.g., UNICEF/WHO, USAID, 1982), more specific information is necessary: when, under what conditions, and for which children will these benefits or costs be seen.

Those who hypothesize that income to a mother will have a beneficial effect on children propose that mothers are more likely to use extra monies to purchase foods for children than are other family members (e.g., Engle, 1985; Rogers, 1984; Franklin, 1984; Dwyer, 1983). These foods might be particularly valuable if the child is of weaning age, when high caloric density foods are necessary. For example, mothers in rural Guatemala who wove mats in their homes reported that when they earned an extra 10 cents for their work, they would use it to purchase milk for their children (Mejia Piveral, 1972).

When food is purchased each day, the time at which cash is available may affect children's access to food. For instance, Tripp (1981) in Ghana, reported that the nutritional status of children of trading women was higher than that of non-traders in part because the latter group had to wait until the evening, when the husbands returned from work, for their daily money, which was too late for the purchase of foods for the children. In these conditions of marginality, the impact of relatively small amounts of money in the hands of the food purchasers could have a significant effect on children's nutritional status, particularly in the most vulnerable years of a child's life.

On the other hand, other researchers argue that the loss of the mother's time to provide care, feeding, and nurturance will have a more negative effect on the child than the positive effect derived from her additional income (e.g., Popkin, 1980). Popkin and Solon (1976), for instance, reported that children of working mothers were deficient in Vitamin A, presumably because the mothers did not have the time to prepare the vegetable soup necessary for the children's vitamin needs. Numerous other studies have found that mother's work for earnings is associated with lower nutritional status for children (e.g., Valverde, 1982; Powell and Grantham-McGregor, 1985). What these studies do not take into account is that these negative associations may be due to the poverty of the family rather than the mother's work.

The model which has formed the basis for much research on the effect of maternal employment on children is

shown in Figure 2.1.A. The effect of maternal work for earnings on nutritional status is hypothesized to be a trade-off between the positive effects of increased income in the hands of the mother, and the negative effects of reduced maternal time in child care and food production, on the child. This model, while conceptually simple, fails to take into account several key issues: that many women who work are also poorer than those who do not, that working conditions may vary considerably and have differing effects on children, that child care strategies may affect children's well-being, and that maternal work for earnings may have different effects for infants, toddlers, and preschoolers. Each point is addressed below, and the expanded model is shown in Figure 2.1.B.

Economic level of working mothers Women who work for earnings have been found to be on the average poorer and in less stable relationships than non-working women (Leslie, 1985). For example, in rural Guatemala, working women tended to be poorer than non-working women, and were less likely to be married (Engle, Yarbrough, and Klein, 1983). A negative association between maternal work for earnings and children's nutritional status could well be a function of the overall poverty of the household, rather than the mother's work. Analyses should include a control for this potentially confounding effect.

The present study controlled for the potentially confounding variables of family economic level when examining the effects of maternal work for earnings on children during the ages of one to three.

Work conditions. A few researchers have examined the effects that the conditions under which women work for earnings have on children, such as distance to work place, wage rate, or type of work (Soekerman, 1985; Popkin and Solon, 1976). Work that is "compatible with child care" is presumed to be less damaging to healthy development than incompatible work. Compatibility is often considered to be work in which the child can be present, such as work in the home or selling at a market place. This issue has not been adequately addressed. Work conditions examined here are hours per day of work, location, and type of work the woman is involved in (domestic, informal, or formal).

Child care strategies. The first model presented suggested that when mothers work for earnings outside the home, their time in child care is reduced, to the possible detriment of the child. However, as Levine (1980) observed, in many peasant societies after the first year or two, much child care is taken on by other family members, regardless of the mother's working status. In this study, whether the mother received help from others in child care was examined.

Age of the child. Finally, mothers' work for earnings may have very different effects depending on the age of the child. Haggerty (1981), for instance, studied door-step merchant women and their children in Haiti. She reported that until one year of age, the work of the mother had a negative effect on the child's nutritional status. On the other hand, after the first year, the effects of the mother's income appeared to be positive for the

child. Clark (1981) using other data from the Guatemalan study, found that during the first 6 months of a child's life, biomedical variables accounted for most of the variance in child's growth, whereas in the second six months of the child's life, environmental variables became more critical. Many investigations point to the weaning period as one of particularly high risk for children in marginal circumstances. In this study, effects of maternal work for earnings during each year in the first three years of a child's life were examined.

One reason for hypothesizing differences in nutritional status by age as a function of mother's work status is that children's nutritional needs differ substantially by age. During early infancy, income might have a relatively small impact on nutritional status, since breastfeeding is the most important nutrient source, whereas the mother's time availability would be more critical. However, during the period of supplementary feeding and weaning, mothers with some income could use it to purchase nutrient-rich foods. Thus as the child moves into the second and third year of her life, we might expect to see a larger effect of income, and a smaller effect of mother's time on the child's nutritional status.

In this section, the effects of maternal work for earnings on children's nutritional status in urban Guatemala are examined, and the effects of the intervening variables of income, marital status, mother's education, child care strategies, and breastfeeding patterns on the relationship are examined for infants, 2 year olds, and 3 year olds. Six questions are addressed:

1. What kinds of work and working conditions do women report?
2. Are the expected relationships between mother's work and the possibly confounding variables of income, marital status, education, child care help, and breastfeeding observed?
3. How are these possibly confounding variables associated with children's nutritional status?
4. Does the nutritional status of children of workers differ from those of non-workers? Is the type of work the mother is engaged in associated with the nutritional status of her children?
5. What is the net effect of maternal work for earnings, or the type of maternal work on nutritional status, controlling for the possibly confounding variables? Do these effects vary by age?
6. Do working conditions such as location of work or hours of work per day influence children's nutritional status?

(footnote:) Confounding variables, (i.e., variables which relate to both the independent variable (mother's employment in this case) and the dependent variable (nutritional status) and which are not the variables of interest), are often controlled for through regression analyses in which these variables are forced into a model predicting nutritional status. The net effect of the independent variable of interest, when all of the other variables are also taken into account, can then be seen. If the independent variable is associated with the dependent variable initially, and fails to be associated with the dependent variable when other variables are entered into the equation, then one should conclude that the initial association observed was to some extent a function of another variable which has been entered into the equation. In order to examine the independent effects of maternal work for earnings on children's nutritional status, it will be necessary to control for other variables which could also account for the relationship on theoretical grounds.

## METHODS

### Sample

The sample for the study was 322 children 3 years and under who were measured during 1975-76, and whose mothers were interviewed about their retrospective life histories as part of a study of women's fertility decisions conducted by INCAP. In these interviews, mothers reported life events occurring at various time periods associated with the birth of each child.

The anthropometric measurements were taken for all children in the villages who were brought to the center during a 20 month period from June, 1974 to January, 1976. These children were measured at birth, 15 days, and every three months until the age of 24 months, and finally at 30 and 36 months. Of the 322 children in the sample, 97 were measured twice, and both measurements were included. Of the 419 measurements, 121 were made at age 1, 165 were made at age 2, and 133 were made at at age three. The longitudinal sample of children of working mothers was too small to permit analyses of changes in nutritional status from one age to another.

More economic and work information was available for mothers than anthropometric information for children. For example, if a child were measured at age 3, most likely he would have no anthropometric measurement at age 2 or age 1, and would only be included in the analysis of 3 year olds. However, because the mother's report of her work and house quality was retrospective,

records on these variables for her would be available when her child was in the first or the second year of his life. Analysis that did not involve children's nutritional status were from the retrospective instrument. This procedure added 13 mothers in the first age period (from 15 to 28), added 11 at age 2 (27 to 38), and added only three at age 3 (33 to 36). An indication that the added sample is comparable is that the percentage of women involved in domestic work is approximately the same in the sample for which anthropometric data is available, and in the total sample (50% at age 1, 43% at age 2, and 39% at age 3).

These data were collected for purposes other than an investigation of women's work; the major focus of the data collection had been to examine the basis for women's fertility decisions. Therefore, working women were not selectively sampled, and women who were not living in their homes at the time of the study, such as domestic workers living in another person's home, were not interviewed.

#### Instruments and Procedure

Retrospective life history measures were collected on all mothers in their homes by trained Guatemalan interviewers. Information on past fertility history, work history, marital relations, and economic information was collected for each point in time.

A file of all children the mother reported, and life events during each interval or year in the child's life was constructed from the retrospective life history survey. For instance, this file would have a record of the birthdate, place of birth, and

siblings of a particular child, as well as the mother's marital status at the time of birth, her work status in the year following the birth, and the amount of household help that she had received during that year.

Anthropometric records for each child were matched with retrospective life history records on the basis of the child's identification code. Birth dates were checked to be sure that children were matched properly.

Anthropometric data were examined for out-of-range values and errors in measurement. Seven children's measurements were not used because they appeared to be more than three standard deviations from the NCHS average.

Most of the children were measured within 1 month of their birthdays. However, when data for the measurement nearest the birthday was missing, the measurement closest to, and prior to the birthday was used. For less than 10% of the children was the previous measure substituted. Because relatively few children required a substitution, and the scores were standardized by actual age in months, this replacement of data did not seem to be a large problem. No significant differences between the actual age in months of workers and non-workers' children were found at ages 1, 2, or 3.

A third set of data on income and wealth was collected for the period of March 1974 to March 1975 on the parents of 293 of the children. These data included measures such as the educational level of the parents, value of the family's land, and

measures constructed by Clark (1981) on total family income per person, agricultural production not sold, and income to each family member. Male heads of households were interviewed, unless no male head was present. The information these respondents provided on women's work suggested that only 5% of women were earning a wage. Since these data are so discrepant from the women's reports of their wage-earning, they were not used. However, family income measures were analyzed for descriptive purposes.

### Village Description

The women and children surveyed lived in two adjacent villages about 20 minutes by car from the major city in Guatemala, Guatemala City. Regular bus transportation connected the two villages with the urban center. These communities were seen by many residents as stepping-stone communities; new migrants arrived in these villages first, and then moved on to the city. Many residents worked in the capital, and cultural norms were similar to the urban center. Houses tended to be of more permanent construction than houses in rural villages, with plastered adobe walls and tile roofs. Slightly less than half of the houses had dirt floors. Over half had electricity and most had some kinds of sanitary facilities. There was considerable diversity in income level within these communities, with areas of dirt roads and very poor houses, and other areas of paved roads and reasonably good housing. This diversity is illustrated by the fact that the upper 20% of families received 32 percent of the income (Simonen, 1981).

## Variables

Dependent measures Nutritional status was assessed through weight for age, weight for height, and height for age at each of three intervals: ages one, two, and three. All measures were standardized using the National Center for Health Statistics standardization program, which transforms height and weight measures plus age in months into standardized scores compared to U.S. norms.

Women's work Women's work for earnings was defined by their self-report on the retrospective life history questionnaire. For each year, the woman was asked, "did you have an occupation?" If she answered in the affirmative, she was coded as working during that year. She was also asked the month in which she started to work, month in which she stopped work, type of work, her salary, location of work, and hours of work per week. A woman was considered to be a worker if she reported at least a month of work during the interval.

A woman's yearly income was calculated from her salary and the number of weeks during the year in which she worked. The year was defined by the birthdate of the target child; the first year, then, was the first year after his birth. Hours per week of work during the period in which she was working, location of work, and type of work were reported for almost all subjects in the sample.

Family economic level Family economic level was assessed from the quality of the house in which the family resided. A score from 3 to 16 was constructed from the sum of quality of

floor(e.g., dirt = 1 to wood=5), walls (1= cane to 7=tile or block), and roof (1=straw to 4=tile). This measure was assessed with the retrospective life history instrument; women were asked to describe their houses, and to report any changes of house during the past years. Thus the house quality measure referred to the same time period as the work indicator.

The more extensive income data from the income and wealth survey were used to compare working and non-working mothers' families, but are not used in the key regression analyses because they refer to a single year, rather than to the particular interval in which the mother was working. However, because the total interval of the study was quite short, and overlapped slightly the time of the income and wealth questionnaire, the data are valuable for descriptive purposes.

Child Care Strategies Mothers were asked, in the retrospective life history questionnaire, who helped them regularly to care for their children. They were asked who does the caretaking, and how frequently the care occurred. Since most mothers who reported a caretaker also reported help daily or several times a week, frequency was not coded. Whether the caretaker was a sibling or an adult (relative, employee, or institution) was also coded for each child and for each age level of the child.

The two measures used, then, were Adult Help and Sibling Help (0 or 1). Because a child without an older sibling could not have received sibling help, and because a child without an older sibling may have better nutritional status than a later-born

child, birth order is a potentially confounding variable to the relationship between sibling help and nutritional status. Therefore it was controlled for in multiple regression analyses.

Marital Status The woman's report of her marital status was coded on a three-point scale: unmarried (separated, divorced, widowed, or permanently separated), in a consensual union, or legally married. If her status had changed during the year, the status at the beginning of the interval was used.

Length of lactation and age of weaning These two measures were also derived from women's responses on the retrospective questionnaire. Length of lactation was the woman's response to the question, "how much time did you give the breast (dio a mamar)" or "at what age did you stop breastfeeding?". Her response was coded to the month and day of the child's age. If a woman responded with a six-month interval (an indication of overgeneralization) she was probed for more specificity with the question, "are you sure that it wasn't a little more or a little less?"

The measure does not distinguish full and partial breastfeeding. Age of weaning was determined by the woman's response to the question, "at what age did you begin to wean \_\_\_\_\_ (name of target child)?" One could conclude that full breastfeeding occurred until the beginning of weaning; therefore, the "age of weaning" measure could be considered as the length of full breastfeeding. Because that interpretation of the question is tentative, where possible both of these measures are used, and

reservations about the meanings of each should be kept in mind.

Mother's education Mothers' education was her report of the number of years of school she passed on the retrospective life history questionnaire.

Birth order The birth order code was assigned as a part of an ongoing census effort in the villages. The higher the number, the later in the family the child was born.

Sex The sex of the child was coded from the mother's report.

#### Statistical analysis

Data were analyzed by independent measures t-tests and with ordinary least squares (OLS) regression methods. Data were examined for problems of multicollinearity among error terms in the equations, and for intercorrelation of measures included. While there appear to be no highly correlated measures, problems of multicollinearity cannot be entirely ruled out.

## RESULTS

Women's Work Table 2.1 shows the actual type of work the mothers reported by the age of the child. These work descriptions were categorized into domestic, informal (merchant, home crafts) and formal (day laborer, specialized labor such as being a seamstress, blue collar, and factory laborer). This categorization was similar to standard labor force categorizations. The one agricultural laborer (the renting farmer) was included with the domestic workers.

Fifteen, or 12% of the mothers of infants (aged 0 to one year) were working, 16% (n=27) of mothers of children between 1 and 2 were working, and 25% (33) of mothers of children between 2 and 3 were working. As these data suggest, the older the children, the higher the percent of mothers who report working at an occupation.

Mothers of older children also tended to work at different kinds of occupations than mothers of infants. Many more mothers of infants worked as domestics than other categories of work (60%). In contrast, 45% of mothers of two's, and 36% of mothers of 3's worked as domestics. The percent of informal workers was similar at all three ages, but the relative percent of working mothers who worked in the formal sector was greater at older ages of the child than younger. Only one working mother of an infant was a formal sector worker, whereas almost 25% of employed mothers of two's and three's were formal sector employees.

Wage-earning rather than subsistence farming was the major source of support in this area, although there was some agricultural production sold. Eighty-two percent (82%) of the households existed primarily from wage labor, but about 1/4 of the household income during the time of the survey did come from agricultural production rather than wages. The most common occupations for men were laborer, construction worker, or other form of day labor which was non-agricultural. About 70 percent of women worked at some point in their lives earning income, although the number who worked when their children were young was much smaller (12-25%). Income data from the retrospective life

history form were missing for 10 percent of the mothers at any one interval, and some of the values were so extreme as to be highly questionable. Therefore, these data were used only in an exploratory way. In-kind income was also asked, but almost no women reported in-kind recompense.

Women's work and demographic characteristics Over half of the mothers whose children were in the sample had another child within the three-year period, although very few had more than one child in the total sample. No mother had more than one child at any age level. Mothers who worked for earnings were slightly but not significantly less likely to have had another child in the three-year period than non-workers. Length of time to next birth was unrelated to nutritional status. Therefore, it was not used in subsequent analyses.

Birth order of the target child, number of children and number of dead children did not differ by working status.

Characteristics of work and her education. Characteristics of women's work - duration, income, and hours per week by type of work are shown in Table 2.2. Education is also shown. The average working mother works only about 6 months per year. When women reported working, however, they tended to work many hours per week; the modal response was 60 hours per week of work. These long hours of work occurred even when the child was an infant; in fact, domestics worked longer hours when they had infants than when their children were older.

The mother's income varied considerably by type of work. The domestic workers earned the least, and the formal workers earned the most per year. Differences between the formal workers income and the other two groups (informal and domestic) were significant at all three ages using the Duncan Multiple Range test.

Informal workers were more likely to be employed in the home, formal workers in the city, and domestic workers in either home or community.

Working women did not differ from non-workers in the number of years of school passed; however, years of education differed significantly by work type (one-way analysis of variance, Table 2.2). Domestic workers' were significantly less educated than formal and informal workers using the Duncan multiple range test.

#### Women's work and family economic variables

Workers and non-workers did not differ significantly for spouse's income, net income per person, or house quality. However, as Table 2.3 shows, one-way analyses of variance of mother's type of work revealed significant differences for spouse's income, house quality and net income/person. Duncan multiple range tests indicated that for both spouse's income and net income per person, the formal workers' families earned significantly more than families of informal and domestic workers. The domestic workers lived in significantly poorer houses than the formal and informal workers (Duncan multiple range test) when the overall F was significant. This finding is illustrated in Figure 2.2 for 2-year-old children.

Mother's work and marital status. A significant association between mother's work status and marital status was observed at all three age levels ( $X^2=27.2$ ,  $df=3$ ,  $p<.01$ ;  $X^2=15.7$ ,  $df=3$ ,  $p<.01$ ;  $X^2=11.0$ ,  $df=3$ ,  $p<.01$ ). The biggest difference between workers and non-workers appeared to be in the unmarried group. Whereas only 6% of non-workers were unmarried at all 3 age levels, the percent of unmarried workers was 40% for mothers of infants, 36% for mothers of 2 year olds, and 22% for mothers of 3 year olds. No significant differences in marital status by type of work were found.

Maternal work and caretaking help The amount of sibling help did not differ as a function of maternal work status; at all ages, about 15 percent of mothers reported help by siblings. Adult help did vary by work status of the mother, but only during the first year of the child's life. Of the workers, 48% reported help by an adult, whereas for the non-workers, only 29% reported help. The difference was significant ( $X^2=3.77$ ,  $df=1$ ,  $p<.05$ ). Two mothers hired a caretaker, who was counted as an adult, but none used institutional care. No consistent differences in adult help were found by type of work ( $X^2=5.9$ ,  $df=3$ ,  $p=.12$ ).

#### Intervening variables and nutritional status

The third question of the study was whether the potentially confounding variables of house quality, mother's education, marital status, and child care would be related to the nutritional status of children.

House quality and mother's education were both significantly

positively correlated with nutritional status measures (see Table 2.4) at ages 2 and 3, but not at age 1. Marital status was unrelated to nutritional status of children at ages 1 and 2, but was significantly associated with height for age at age 3.

Pearson correlations between adult help and sibling help indicated that adult help had a significant positive association with nutritional status at age 2 only. Sibling help, on the other hand, was negatively associated with nutritional status at older ages (see Table 2.4).

#### Breastfeeding, Maternal work, and Nutritional status

The months of breastfeeding, and the age of the child at the initiation of weaning are shown in Figure 2.3. T-tests between children of working and non-working mothers indicated that working mothers breastfed for 11 months, on the average 2.5 months less than non-working mothers ( $t=2.11$ ,  $p<.05$ ) and weaned their children at 7.2 months, 1.6 months earlier ( $t=1.97$ ,  $p<.05$ ) than non-working mothers. These two measures were highly correlated ( $r=.63$ ,  $df=309$ ,  $p<.001$ ).

Domestic workers breastfed significantly longer than either formal or informal workers (Duncan multiple range test performed on a one-way analysis of variance,  $F=2.26$ ,  $p<.05$ ), but no differences in weaning behavior were found, as Figure 2.3 illustrates.

Long duration of breastfeeding was negatively associated with weight for age ( $r=-.24$ ,  $p<.01$ ). The correlation with height for age was not significant, nor was the correlation of age at weaning with either anthropometric measure.

These findings suggest that economic and educational differences among working women may be as great or greater than the difference between workers and non-workers. In order to equalize sample sizes, the formal and informal workers were combined for the regression analysis, and domestic workers were kept separate.

#### Effects on nutritional status

The central question for this study was whether children's nutritional status would differ by maternal employment. Table 2.5 shows the means, standard deviations, and sample sizes for the height for age, weight for height, and weight for age measures of children of working and non-working mothers. T-tests comparing working mothers' children with non-working mothers' children on these measures are also shown. Pooled or separate variance estimates were used as appropriate. Figure 2.4 presents these differences graphically.

As predicted, these effects varied by age. At age 1, working mothers had significantly lighter babies. During the second year of life, children whose mothers worked were significantly heavier than children whose mothers did not work. By age 3, no differences in nutritional status as a function of work role were found.

No significant differences in height for age by working status of the mother were found. That differences were seen in weight for age but not height for age, suggesting that these were short-term rather than longer-term effects since weight measures reflect short-term nutritional status. However, there

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was also a trend for infants of working mothers (p<.10).

Effects of type of work on nutritional status were separated into groups as a function of type of work, and compared with children whose mothers were not working. It appears that the negative effect associated with maternal work for infants was less (t=1.84, p<.10), (see also for children were aged 2, children of informal workers were significantly heavier than children of non-workers (t=2.15, df=152, p<.01) but children of domestic workers. Groups did not differ from each other at three years of age.

Net effects of maternal employment controlling for other variables.

The fourth question was whether there was an effect of maternal work for earnings on children's nutritional status after controlling for potential confounding variables. Regression analyses were performed for each child's height for age and weight for age z-scores. The results are not reported here because they were not significant for age scores. The independent variables included economic level (house quality), child care variables (child care and sibling help), marital status, birth order, education, child's sex and age at weaning. In the described findings, domestic workers were separated into two groups: those who were employed for less than 10 hours per week and those who were employed for 10 or more hours per week.

of the workers, and a dummy variable was entered for domestic work and for formal or informal work. Table 2.7 shows the OLS regression coefficients, and percent of variance accounted for in each equation.

Controlling for confounding variables, the regression analyses show a net negative effect of domestic work at age 1 for height for age, a net positive effect for formal and informal work at age 2 for weight for age, and no effects of maternal work for earnings at age 3. These results are consistent with those from the t-tests, when other variables were not controlled, except that the negative associations of domestic work with nutritional status during the first year are with height rather than weight. The b values for domestic work on weight for age were suggestive ( $b = -.70$ ,  $p < .10$ ).

In the first year of the child's life, these variables predicted relatively little of the variance (about 13%). By the second year, the variables account for 20%, and by the third year, over 30% of the variance in nutritional status can be accounted for by these variables. The b values suggest that the family economic variables and mother's education accounted for more variance at older ages.

Characteristics of work The sixth question was to identify characteristics of the working situation that could have positive or negative effects on children. Small sample sizes prevented use of a regression analysis. Instead, correlations of predictive variables with nutritional status measures are shown in Table 2.8 for workers only. The results suggested that the

socioeconomic variables of house quality and father's income and income per family member were more highly related to nutritional status variables than work location (home, village, or city) , or hours per week of work. Mother's income was unrelated to height and weight.

### Further analyses

To investigate mechanisms that might account for the two major findings of the investigation, that the effects of maternal work for earnings for formal and informal workers is positive from age 1 to 2; and that the net effect of maternal work for earnings is negative for domestic workers prior to one year of age, controlling for confounding variables, several questions were examined. These were: a) could the 2-year results be explained by a few extremely high nutritional status measurements; b) could these differences be a function of higher rates of mortality of children of working mothers in the first year of life; and 3) are there differences in weaning practices that could account for the findings?

First, the possibility of a few extreme values in the second year of life were examined, but none were found; the data seemed to be consistently high.

Second, to examine the mortality rates of working and non-working mothers, all children who subsequently died, and for whom anthropometric data were available were examined (N=12). These are children who reached at least 3 months of age. Twenty-five percent of the deceased children's mothers were working,

which is slightly higher than the percent of mothers of living children who worked. However, of the children who did not survive, only one mother reported working when her child was under 1, and that child survived until he was over 3. Thus including children who subsequently died would not have changed these findings.

Third, weaning practices were examined. Shorter breast-feeding duration is probably not a factor because the domestic workers breastfed longer than other workers, and did not wean any earlier than other workers or non-workers, yet their children were shorter at one year.

It was hypothesized that the positive association of maternal work in formal and informal jobs to nutritional status was due to an increase in working women's ability and choice to purchase high-quality weaning foods. To explore this hypothesis, women's responses to the question of what food they began to wean their children with were examined. Of the list of foods mentioned, two represent high-nutrient foods that were marketed as high quality for children. These were INCAPARINA, a fortified high protein supplement, and canned milk. Sixty-seven percent of formal and informal working mothers of infants named these foods spontaneously, compared to 36% of non-workers and 21% of domestic workers, and this association was significant at the .05 level ( $\chi^2=7.18$ ,  $df=2$ )

## DISCUSSION

Children of working mothers appeared to be lighter during the first year of their lives, and heavier during the second year than children of non-working mothers. No differences were found in the third year. The negative year one effects were found to occur primarily with children of domestic workers. The positive effects during year two were seen for children of formal and informal workers, but not domestic workers. Controlling for confounding variables of family economic level, maternal education, child care assistance, and biomedical variables of lactation, birth order, and sex did not change the pattern of results.

Most of the differences in nutritional status, with the exception of the infancy data for domestic workers, were seen in weight rather than height for age. This finding is quite consistent with other studies which have used both height and weight measures. When differences were found, they were in weight (a shorter-term measure) rather than height (Popkin, 1983; Tripp, 1981; Marchione, 1980; Wolfe and Behrman, 1982). This pattern would be consistent with the hypothesis that the positive effects of maternal work for earnings might be due to purchase of higher-quality foods that would have greater short-term effects.

Positive effects of work on nutritional status were seen for children during the weaning age period. Nutritionally, this is one of the highest-risk periods. One explanation for the positive effect could be the purchase of appropriate weaning

foods; the extra income working mothers might earn could be used to purchase nutrient-rich weaning foods. Formal and informal working mothers reported weaning children with the nutrient-rich purchased foods of INCAPARINA and canned milk significantly more often than non-working mothers.

Differential effects of maternal employment by age of the child have not been addressed by many studies. Haggerty (1981) measured the height for age and weight for age of children of doorstep merchants in urban Haiti. She found that children of women who worked at home were the least malnourished at 1 to 11 months, but were the most malnourished from 12 to 23 months. Children of women working outside the home were better nourished than children of women who worked at home, and non-workers during the 12-23 age period. She concludes that as children get older, the income effect of working outside the home outweighs the greater child care time mothers can provide by being at home. These findings are consistent with those reported here.

Characteristics of the woman's work for earnings, such as hours a week of work, income, and location, were not related to nutritional status. However, the type of work she was engaged in was related to nutritional status. Whereas income-earning mothers were not significantly poorer than non-working mothers, family income levels differed considerably by type of work. Domestic workers lived in significantly poorer families than formal and informal workers. These domestic workers tended to be less well educated than other workers. No differences in marital

status by type of work, however, were found; all workers were less likely to be married than non-workers.

These results indicating that both age of the child, and type of work need to be considered in predicting the effects of maternal work for earnings on children's nutritional status, are consistent with recent research. If women's work for earnings is considered as a dichotomous variable, some studies find negative effects of work for earnings (Powell and Grantham-McGregor, 1985), others find no effect (Greiner and Latham, 1981; Popkin, 1983; Zeitlan, Masangkay, Consolacion, and Nass, 1978), and some see positive effects (Kumar, 1977; Bailey, 1981). Those studies which have disaggregated work-type have found significant differences in children's nutritional status by type of work. Wolfe and Behrman (1982) found that informal sector workers had better nourished children than formal and domestic workers. Kumar (1977) found significant differences between children of casual laborers and those employed in household industries. Similar patterns were observed here. Whether the critical factors differentiating type of work are wage rate, work qualifications, or some other factor will be important to examine.

In this sample, workers in general were not poorer than non-workers, although certain types of workers were. Two studies in Latin America (Danes, Winter, and Whiteford, 1985, and Rosenberg, 1985) reported that in families with both husband and wife present, women's work was associated with higher levels of living, rather than poverty. It is likely that, in Third World

countries as in this country, there might be two groups of workers: poverty-avoiders, who have no other source of support, and income-enhancers, who are working to improve the family's economic condition. Poverty-avoiders would be more likely to work under difficult circumstances, such as when they have an infant, when the work is poorly paid, or when there is no adequate child care. Because they are unable to choose the type and conditions of work, these women are more likely to be found in unskilled or domestic work, and may be less educated. The income-enhancers, on the other hand, would tend to delay work until children are somewhat older, might work at better-paid jobs or work less time, and might work only when alternative sources of child care are available or in the home. For policy makers concerned about children's welfare, these poverty-avoiders who must work when their children are infants should be a source of particular concern. Given that these women must work for earnings, how can child welfare be conserved and promoted?

The finding that working conditions were not associated with nutritional status, whereas the type of work that women were involved in was associated with children's weight for age is a key finding of this investigation. It is possible that the domestic workers are more likely to be "poverty-avoiders", and the formal and informal workers more likely to be "income-enhancers."

Several reasons for this hypothesis can be advanced. First, despite the cultural ideal of being at home with an infant,

"poverty-avoiders" are more likely to work during the infancy of their children, and that is the pattern observed with domestic workers. Second, the domestic workers had a significantly lower income per family member. Their families' average income was Q 160 per year per person, compared to Q 210 per person per year for the average family from all sources, including transfers, agricultural production raised and not sold, and agricultural production sold. A rough estimate of the average food basket per person per year might be Q 118, based on Balderston et. al. (1981)'s calculation of the average rural food basket at Q 45.00/person/year (equivalent to \$45.00/person/year). Some estimates of the difference between urban and rural costs suggest that urban food baskets will cost 250% of a rural basket (Montiero, 1985). If so, then Q 112/person/year would be a minimum level of income necessary for food adequacy, if all income were spent on food. The domestic workers incomes were approximately Q160/person/year, placing their families at a near-poverty level.

Further evidence that the domestic workers represent a distinct group lies in the greater disparity of family incomes and education levels between domestic workers and other workers when there is an infant in the home and when the child is 2 or 3. For example, the education level of the formal workers with infants was 2 grade levels higher than the education level of formal workers with children 2 and 3. Less well educated women were entering the formal labor market when they had older children. On the other hand, the domestic workers were equally

uneducated at all age intervals. Women who work when their children are infants may have different characteristics from those who work later in the child's life. These different characteristics may not be totally captured in the confounding variables used in the regression equation. The negative effects of work during infancy may be a function of the the marginal circumstances of these workers rather than more commonly measured variables of income, location, and hours of work. Dixon (1982), in a study of malnourished children in Kenya, found that all children who had had an episode of severe malnutrition were in some way marginal to the family. Some were stepchildren, others were illegitimate, or unwanted. -

Shorter duration of breastfeeding and earlier weaning were associated with some types of maternal work for earnings, but not others. Domestic workers did not breastfeed any less than non-workers, whereas formal and informal workers breastfed significantly less time. A number of other studies have found that working mothers do not necessarily breastfeed less. In a summary of 16 studies examining the associations between work and breastfeeding duration, Leslie (1985) concludes that "it is clear that no overwhelming pattern of a negative relationship between women's work and breastfeeding emerges." (p. 6). Several studies indicate that mothers who work outside the home do not cease breastfeeding, but initiate mixed (breast and bottle) feeding earlier (Akin, Griffin, Guilkey, and Popkin, 1984; Soekirman, 1985). Three other studies suggest that the type of work women

are engaged in is associated with length of breastfeeding. Longer duration of breastfeeding has been found for agricultural workers (Pathmanathan, 1985; Butz, Habicht, and DaVanzo, 1981; Knodel and Debavalya, 1980) and self-employed women (Balkaran and Smith, 1984). Balkaran and Smith, using data from the World Fertility Survey, found that breastfeeding tended to be shorter among other occupational groups, as observed here.

In this study, in those occupational groups in which breastfeeding was less (formal and informal workers), no negative effect of maternal work was found on nutritional status. Thus it appears that the shorter breastfeeding of working mothers was not an explanation for lower nutritional levels within this population. In fact, longer breastfeeding duration was negatively associated with weight for age, suggesting that prolonged breastfeeding, possibly without sufficient supplementary food, may not be optimal for weight gain. Prolonged breastfeeding may occur when the family is too poor to purchase other foods, as O'Gara and Martorell (1984) have suggested in Honduras.

Questions about the quality of mother's reports of their work over the past 3 to 4 years could be raised. The validity of retrospective data has been questioned by a number of investigators (see Butz, 1981). A recent analysis of a questionnaire similar to this one, applied to a population of mothers in Malaysia, suggested that for births, infant deaths, education, and housing, retrospective information was quite adequate, particularly in the recent past (Haaga, 1982).

Validity data were not available for women's work in Haaga's study. However, it appears reasonable to use the retrospective data in this sample because the only data used were those covering the most recent few years.

Haaga (1982) found that in Malaysia length of lactation estimates were "peaked" ; women tended to report terminating breastfeeding at 6, 12, 18, and 24 months far more frequently than at other periods. However, Butz (1981) observed that despite these presumed errors in retrospective reporting, results using these measures were similar to results derived from clinical studies using observational data. Thus in this analysis length of lactation may provide a reasonable estimate of breastfeeding behavior.

The kind of help that mothers received did appear to influence children's nutritional status. Sibling help was negatively associated with nutritional status, whereas adult help during the second year of the child's life was positively associated with nutritional status (height). A similar association was noted by Shah, Walimbe, and Dhole (1979) in India: the older the caretaker, the better the child's nutritional status. Other investigators have hypothesized that the quality of alternative care is important to consider (Smith, Paulsen, Fougere, and Richey, 1983, Franklin, 1979), but relatively little data on this issue is available.

As predicted from the model of cross-cultural child care patterns by Levine (1980), the extent of help for the mother in

child care was not closely associated with maternal working status. Only during the child's infancy was there an association of adult help and maternal wage-earning.

These results represent findings from a small population in an urbanizing region of Guatemala. Generalizations should be made with great caution. Further, additional data are needed in order to substantiate some of the points proposed here. For example, morbidity, which often plays a major role in determining nutritional status, was not assessed. Future research in other areas is necessary in order to determine whether these findings are generalizable to other cultures.

These results suggest that women's work for earnings per se in this population, was not as critical a variable as the type of work the woman was engaged in for explaining the nutritional status of her children. The type of work probably reflects marginality of the conditions of the family, such as marital status, lack of education, or poverty. Second, the results indicate that, particularly during the weaning period, women's formal and informal work was positively associated with nutritional status. Further studies of women's purchasing patterns, feeding behavior, and more detailed descriptions of alternate caretakers' behavior during this crucial period of development are needed.

TABLE 2.1

Types of Work for Earnings Reported by Urban Guatemalan Mothers in Response to the Question: "Do You Have An Occupation?"

	Age of Child					
	0-1		1-2		2-3	
	N	%	N	%	N	%
<u>Domestic</u>						
Renting Farmer	1	6.6%	1	3.7%		
Domestic	8	53.3	11	40.7	12	36.4
<u>Informal</u>						
Manufacturing, Home					1	3.0
Merchant in Community	5	33.3	9	33.3	12	36.4
<u>Formal</u>						
Blue Collar, Office Work	1	6.6	1	3.7	1	3.0
Factory Worker			3	11.1	2	6.1
Day Laborer Outside Community			2	7.4	3	9.1
N of Workers	15		27		33	
% of Total Sample Working	12%		16%		25%	

TABLE 2.2  
 Characteristics of Women's Work  
 and Education By Type of Work: Urban

Variable	Child Aged 0-1			Child Aged 1-2			Child Aged 2-3		
	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N
Women's Work									
Hours/Week									
Domestic	65.90	44.10	14	46.31	46.31	16	37.29	40.92	14
Informal	62.40	44.30	11	63.61	43.27	13	60.73	45.01	15
Formal	60.00	11.00	4	48.89	19.14	9	48.75	22.32	8
F	.04			.71			1.26		
Mother's Income (in dollars/year)									
Domestic	131.14	136.58	13	95.43	119.76	15	87.19	118.21	14
Informal	108.22	82.89	9	149.42	187.28	11	103.36	164.70	15
Formal	308.17	219.73	4	242.45	179.59	8	297.40	219.26	8
F	3.27*			2.25			6.13**		
Education of Woman (grades)									
Domestic	1.31	1.55	13	1.28	1.59	14	1.23	1.17	13
Informal	3.80	3.79	10	3.41	3.55	12	2.71	2.61	14
Formal	6.33	2.52	3	4.50	3.85	8	3.71	4.27	7
F	5.13**			3.36*			2.51		
Yearly Duration of Work (months)									
Domestic	7.30	4.60	14	6.50	4.60	16	5.60	3.90	14
Informal	6.30	4.30	11	5.50	4.50	13	5.00	4.60	15
Formal	7.00	4.40	4	6.20	4.00	9	8.40	3.60	8
F	.16			.17			1.96		

\*  $p < .05$

\*\*  $p < .01$

Note: F values for one-way analysis of variance.

TABLE 2.3

Economic Characteristics of Families  
of Working Mothers by Type of Work: Urban

Variable	Child Aged 0-1			Child Aged 1-2			Child Aged 2-3		
	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N
Family Economic Level:									
Spouse's Income (Q)									
Domestic	484.60	478.40	12	366.40	416.80	14	515.80	384.40	14
Informal	462.20	594.50	10	627.80	606.70	12	761.60	608.20	14
Formal	2340.00	1879.30	3	1242.10	1462.50	8	1152.00	1581.50	7
F	5.55**			2.12		34	1.39		34
Net Income/Person (Q)									
Domestic	176.70	217.40	12	162.30	203.70	14	123.80	78.00	14
Informal	233.30	176.20	10	306.50	230.60	12	277.10	225.50	14
Formal	747.30	410.70	3	487.00	368.90	8	401.60	398.70	7
F	5.32**			2.84*			3.69*		
House Quality									
Domestic	6.86	2.93	14	6.50	2.63	16	6.57	2.17	14
Informal	9.64	1.20	11	9.54	1.76	13	9.13	2.10	15
Formal	9.75	2.06	4	9.11	2.32	9	8.38	2.77	8
F	5.35**			7.31**			4.70**		

\* p &lt; .05

\*\* p &lt; .01

Note: F values for one-way analysis of variance.

TABLE 2.4

Correlations of Marital Status, House Quality, Mother's Education, and Caretaking Help to Nutritional Status

Variable:	Age of Child		
	0-1	1-2	2-3
<u>Height for Age</u>			
Marital Status (1-3)	.17	.12	.28*
House Quality	.08	.23*	.49*
Mother's Education (Grades)	.18	.32**	.38**
Adult Help (0,1)	.10	.19*	.12
Sibling Help (0,1)	.03	-.18	-.31*
<u>Weight for Age</u>			
Marital Status (1-3)	.12	.03	.21
House Quality	.17	.16	.46**
Mother's Education	.15	.35**	.35**
Adult Help (0,1)	.01	.19*	.06
Sibling Help (0,1)	.08	-.21	-.26*
N	110	153	124

\*p < .05  
 \*\*p < .01

TABLE 2.5

Nutritional Status as a Function of Mother's Income-Generation Status  
Means, Standard Deviations, and T-Tests: Urban

Variable	Age of Child								
	0-1			1-2			2-3		
	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N
	Z-Scores								
Height for Age	<hr/>								
No work	-1.88	.92	106	-2.50	1.06	138	-2.03	1.10	100
Work	-2.31	.73	15	-2.34	1.19	27	-2.25	1.28	33
t	1.71			-.70			.95		
Weight for Height									
No work	-.01	.90	106	-.40	.90	138	-.25	.68	100
Work	-.33	.90	15	.06	1.03	27	-.34	.74	33
t	1.30			-2.41**			.67		
Weight for Age Z Score									
No work	-1.37	1.05	106	-1.74	1.05	138	-1.43	.94	100
Work	-1.93	.91	15	-1.23	1.21	27	-1.62	1.07	33
t	1.96*			-2.25*			1.00		

\* p &lt; .05

\*\* p &lt; .01

TABLE 2.6

Mean Nutritional Status of Children of Working  
and Non-Working Mothers by Type of Work: t-tests

Variable	Age of Child								
	0-1			1-2			2-3		
	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N
<u>Domestic Work vs. Non-Workers</u>				<u>Z Scores</u>					
Height for Age									
No work	-1.89	.91	107	-2.50	1.05	139	-2.03	1.10	100
Work	-2.50	.84	8	-2.78	1.41	11	-2.73	1.52	12
t	1.84 a			.82			1.55		
Weight for Height									
No work	-.03	.91	107	-.41	.90	139	-.25	.68	100
Work	-.32	1.11	8	-.27	1.02	11	-.25	.73	12
t	.85			-.50			-.00		
Weight for Age									
No work	-1.38	1.05	107	-1.75	1.05	139	-1.42	.94	100
Work	-2.05	1.10	8	-1.69	1.37	11	-1.80	1.10	12
t	1.74 a			-.17			1.28		
<u>Formal and Informal Work vs. Non-Workers</u>									
Height for Age									
No work	-1.89	.91	107	-2.50	1.05	139	-2.03	1.10	100
Work	-2.09	.61	6	-2.05	.99	15	-1.97	1.06	21
t	.52			-1.57			.50		
Weight for Height									
No work	-.03	.91	107	-.41	.90	139	-.25	.68	100
Work	-.13	.37	6	.42	.91	15	-.39	.77	21
t	.60			-3.40**			.20		
Weight for Age									
No work	-1.38	1.05	107	-1.75	1.05	139	-1.43	.94	100
Work	-1.62	.60	6	-.84	1.00	15	-1.52	1.08	21
t	.56			-3.20**			.40		

a p &lt; .10

\* p &lt; .05

\*\* p &lt; .01

TABLE 2.7

Variables Predicting Height for Age and Weight for Age  
By Age of the Child: Means, Standard Deviations and b Values: Urban

Variable	Age of Child		
	0-1	1-2	2-3
	b	b	b
<u>Height for Age:</u>			
Formal & Informal Work (0,1)	-.29	.12	.12
Domestic Work (0,1)	-.74*	.07	.03
House Quality (0-16)	-.004	.04	.15**
Sibling Help (0,1)	.30	-.20	-.38
Adult Help (0,1)	.32 a	.31 a	.13
Marital Status (1,2,3)	.26	.15	.30*
Mother's Education (grades)	.04	.08**	.07*
Weaning Age (months passed)	.001	-.0004	.0008
Birth Order	-.02	.02	-.23
Sex (1=male;2=female)	.10	-.21	-.20
F	1.51	2.53**	6.24**
2			
R	.13	.15	.36
N	110	153	124
<u>Weight for Age:</u>			
Formal & Informal Work (0,1)	-.34	.62*	-.15
Domestic Work (0,1)	-.70 a	.31	.14
House Quality (0-16)	-.04	-.004	.14***
Sibling Help (0,1)	.36	-.46 a	-.36
Adult Help (0,1)	.14	.18	.01
Marital Status (1,2,3)	.17	.03	.12
Mother's Education (grades)	.04	.10**	.07*
Weaning Age (months)	-.0008	-.0010	.0008
Birth Order	.02	.05	.005
Sex (1=male;2=female)	.21	-.09	-.17 a
F	1.22	3.20**	4.37**
2			
R	.11	.18	.30
N	110	153	124

a p < .10  
\* p < .05  
\*\* p < .01

TABLE 2.8

Correlations of Work Characteristics and Economic Values  
With Nutritional Status measures: Workers Only

Variables	Child 0-1			Child 1-2			Child 2-3		
	Ht/Age	Wt/Age	N	Ht/Age	Wt/Age	N	Ht/Age	Wt/Age	N
<b>Economic:</b>									
House Quality	.42	.37	15	.81**	.68**	27	.59**	.42**	33
Mother's Inc. (a)	.28	-.14	12	-.05	-.04	23	.10	-.01	31
Father's Inc.	.39	.61**	14	.18	.22	25	.47**	.39**	31
Inc. Per Member	.37	.46*	14	.56**	.54**	25	.41**	.29	31
<b>Child Care:</b>									
Adult	.13	-.08	15	.04	.16	27	-.35*	-.40**	33
Siblings	.21	.19	15	-.13	-.25	27	-.01	-.00	33
Marital Status	.51*	.38	15	.33*	.32*	27	.58**	.47**	33
Mother's Education	.20	.32	14	.39*	.48**	24	.23	.18	30
Mother's Age	.43	.27	15	-.12	-.20	27	.11	.27	33
Length of Lactation	-.18	-.12	14	-.54**	-.73**	27	.03	.12	32
Weaning Age	.35	-.44*	15	-.20	-.44**	27	.17	.38**	33
Short Birth Interval	.16	.18	15	.13	.19	27	.10	-.02	33
Sex	NS	NS	15	.24	.32*	27	.09	.00	33
<b>Work:</b>									
Location	-.11	-.25	15	-.01	-.26	27	-.18	-.17	33
Hours	.18	.03	15	.05	.04	27	.26	.25	33
Income (b)	-.17	-.23	12	.24	.14	23	.09	-.10	30

a From Income and Wealth Questionnaire

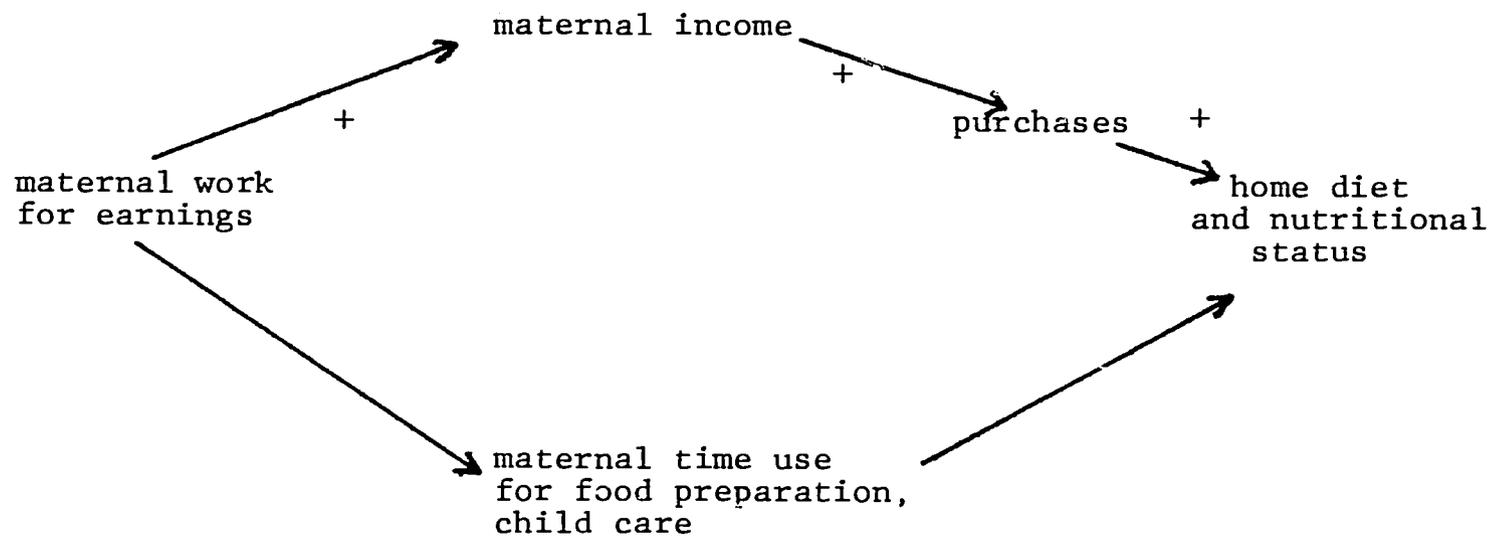
b From Retrospective Life History

\* p < .05

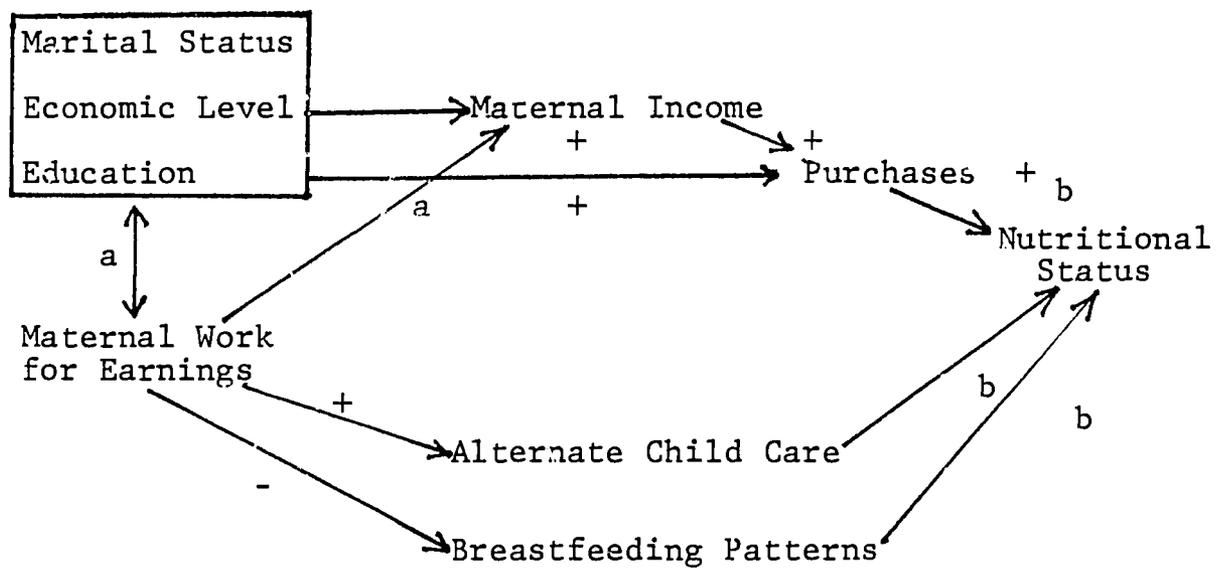
\*\* p < .01

FIGURE 2.1 Relations among maternal work for earnings, nutritional status of children and associated variables.

A. Previously hypothesized relationships



## B. Expanded Model



a Depends on type of work

b Depends on age of child

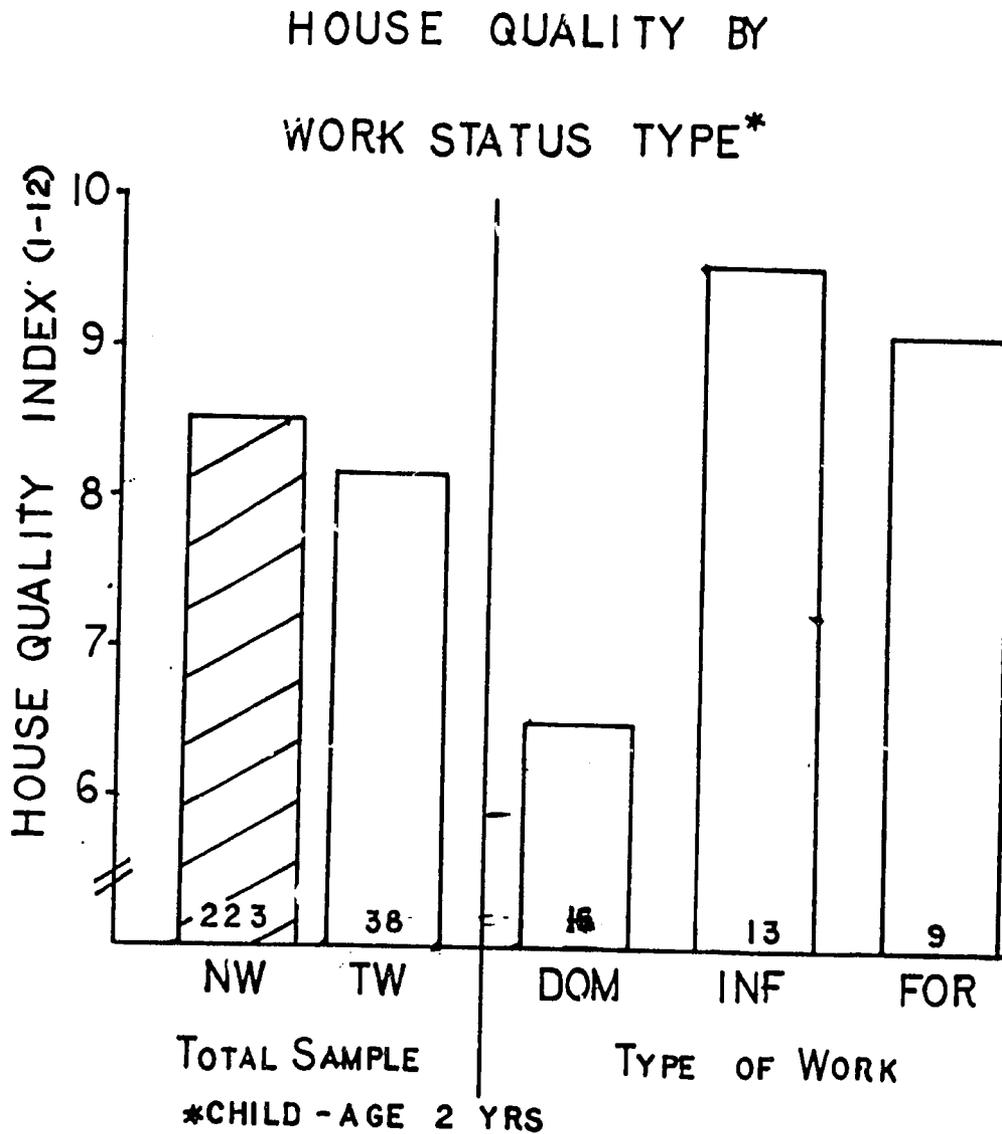
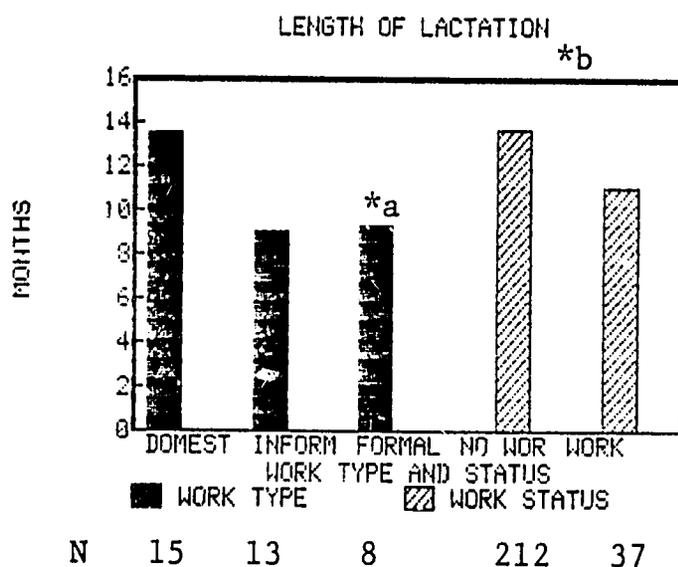


Figure 2.2

Mean Index of Mothers' House Quality  
by Work Status and Type of Work: Urban Sample



\*aF = 2.26,  $p < .05$

\*bt = 2.11,  $p < .05$

\*ct = 1.97,  $p < .05$

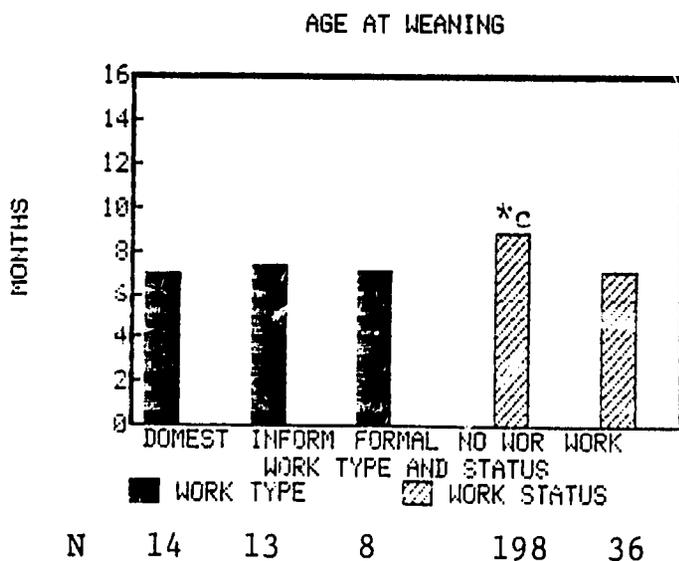
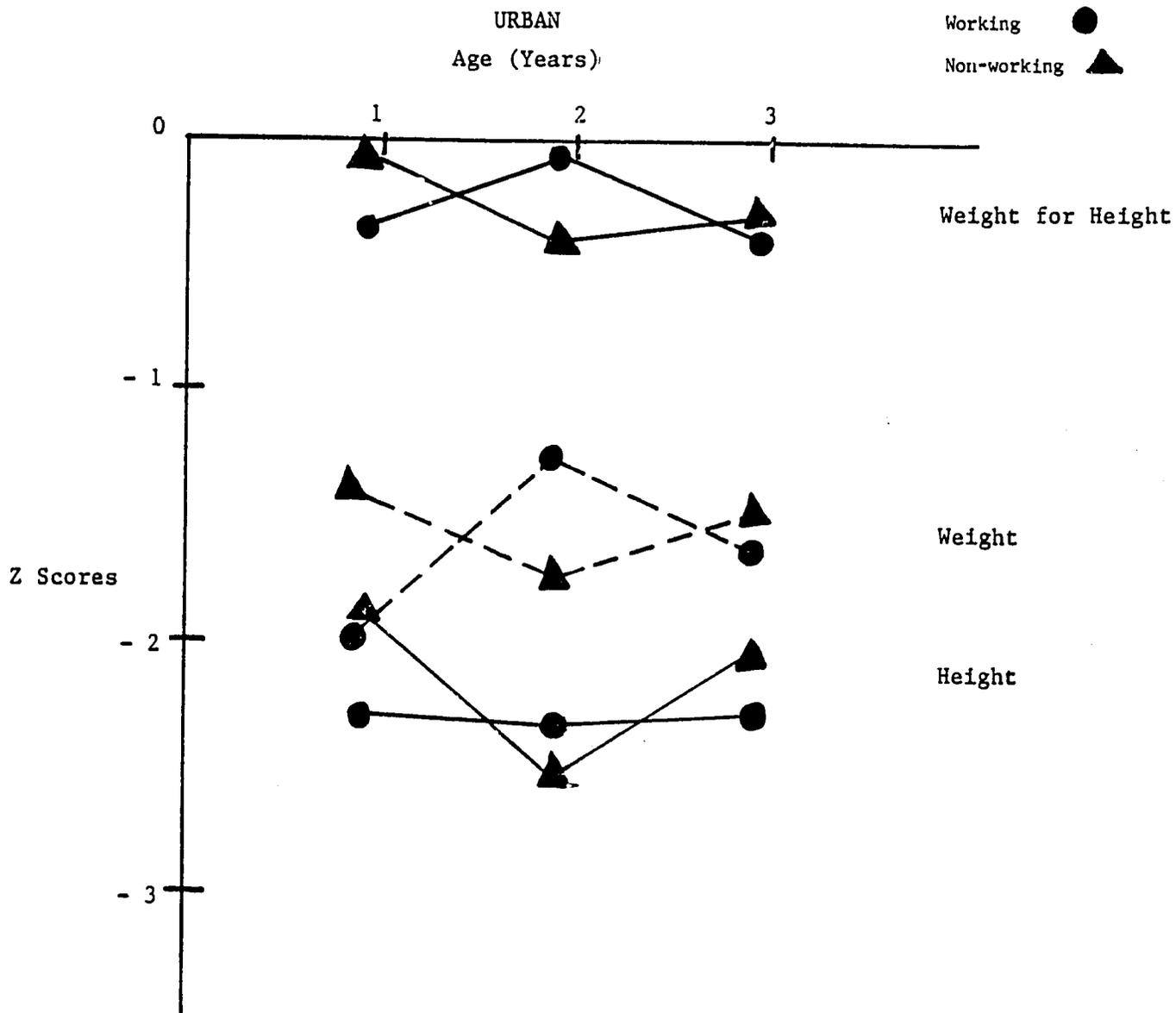


Figure 2.3

Months of Breastfeeding and Age at Weaning Initiation  
as a Function of Mother's Work Status and Work Type:  
Urban, 2 Year Olds



Sample Size	W (●)	NW (▲)
15	106	
27	138	
33	100	

Figure 2.4  
Anthropometry Z Scores in Urban  
Guatemalan Children By Work Status

### SECTION III: MATERNAL WORK FOR EARNINGS AND NUTRITIONAL STATUS: RURAL

This study is an exploration of the effects of maternal work for earnings in a rural area of Guatemala on a number of measures associated with children's duration of breastfeeding, incidence of morbidity, and nutritional status from age 1 to age 4. The relationship of each of these variables with maternal work for earnings is explored in the current study.

The four villages in this sample were part of a longitudinal investigation of the effects of supplementary feeding on the nutritional status and mental development of children from birth through age 7, conducted by INCAP. In two of the villages (ATOLE), children were provided a high-protein, high-calorie supplement, whereas in the other two, a medium-calorie supplement (FRESCO), with no protein, was provided.

Some effort was required of the family for children to receive the supplement; the participant had to attend a supplementation center to receive the supplement. For very young children, someone had to be available to take the child to the center. Whether a woman's work for earnings would reduce the amount of time her child attended the supplement center can be examined here.

The current study then, allows us to investigate the association of program participation and women's work for earnings. Some investigators argue that women who work for income

would be less likely to use such a program. Golpadas (1975), for instance, found that women who worked for earnings were unable to take their children to utilize public services. (get ref) If this relationship were found here, any associations seen with nutritional status and work for earnings could be confounded by the use of a service program, attending a supplement center. Specifically, any negative effects of maternal work could be a function of less supplement ingestion. Therefore the first question concerns the association of these two variables.

As in the urban study, the relationship of work for earnings with length of lactation and nutritional status of young children will be investigated. In addition, data were available for morbidity for most of the sample children. Therefore, in the rural sample, it is possible to examine the relationship between work for earnings and days ill for children, both in a simple correlation and using a regression model. Data were available for 4 year old children also, so that age effects can be examined for one more year.

## METHOD

### Sample

The sample is 926 children measured as a part of a longitudinal study of malnutrition and mental development. These children were included in the study because information on them was available from two sources: anthropometric data from the longitudinal study, and the retrospective life history from the a cross-sectional study of women's fertility decisions. About half

of the children were from the experimental (Atole) villages, and half were from the control (Fresco) villages. Most children were measured at more than one age; a total of 2057 measurements were made. Analyses were performed within age groups, so that each child at each age was an independent observation. Although the overall sample size was large, the percent of mothers who reported working was less than 10%. Longitudinal analyses were not reasonable, as sample sizes became quite limited across ages.

### Study design

The four rural villages in the investigation were initially selected to be part of a longitudinal study of the effects of malnutrition on mental development. In 1969, four villages from an eastern, Spanish-speaking section of Guatemala, where moderate protein-calorie malnutrition is endemic, were matched on a number of demographic, social, and economic characteristics. The intervention involved differential supplemental feeding of children in the four villages. Two of the villages were larger, with populations of about 1200, and two were smaller, with about 800 residents. One large and one small village was assigned to the protein and calorie treatment, called ATOLE after the common name for the supplement provided, and the other two villages were provided a calorie-only supplement, called FRESCO after the name of a similar drink of fruit juice common in the villages.

From 1969 to 1977, data on health, home environment, food consumption, morbidity, and nutritional status were collected on about 1,800 children. A study of fertility behavior using the same families was conducted in 1975. Three measurements made

during the latter cross-sectional study are used here: a retrospective life history of the mother's births, marital and working history; an assessment of income and wealth of the family in 1974; and an assessment of attitudes about family planning and work role for women. In the current study, data from both the longitudinal study and the cross-sectional study are used.

#### Village description

Most families in the four villages were engaged in some subsistence agriculture, although 17% of the families assessed in the 1974 income and wealth survey were involved in no agricultural activity. According to analyses by Balderston, Wilson, Freire, and Simonen (1981), of the farming families, only 17.3% depended entirely on farming income. Seventy percent of the farming families complemented their income with salaried work. They found that wages accounted for 40% of the total income of farmers. The Balderston et. al. (1981) report includes extensive information on the agricultural production of the families in the four villages.

The pervasive poverty of these communities is conveyed by the median family income; in 1975, it was approximately \$500 per year (expressed in Quetzales, which were equivalent to the dollar). Most families lived in two-room houses constructed of local materials, mainly adobe. One room served as the kitchen and the other as sleeping quarters for the whole family, and there were few houses with sanitary facilities. The median number of living children per family was four, with a maximum of

15. Many children did not survive; 46% of the mothers reported having at least one child die. Of those children who did not survive, 85% were reported as living less than a week. During the period of the nutritional intervention, infant mortality rates dropped dramatically.

### Instruments

Retrospective life history information was collected on 462 women in 1975. Women were asked to recall each birth, and relate it to other events that had occurred in her life between pregnancies, such as changes in living situation or wage-earning activities. Income and wealth in 1974 was assessed through interviews with the male head of household, when present. Measurements of nutritional status, morbidity, and nutritional supplementation ingested are described in detail in other publications by INCAP, and are described in more detail in the previous section.

Children's nutritional status was measured at a regular series of intervals: every three months during the first two years of the child's life, every six months from 2 years to 4 years, and annually until seven years. This file was constructed as a series of intervals or years since the child's birth. For each interval, events during the year, such as the mother's work status, her house quality, months of lactation, and the child's number of days ill, were coded, along with the child's nutritional status at the end of the year. The file contained data from the first four years of the child's life.

The nutritional assessment used was taken at 12, 24, 36, and 48 months unless that particular measurement were missing. In that case, the most recent assessment was used. Most of the nutritional status assessments were taken at the child's birthday: at 12 months, 92% were on the birthday, at 24 months, 91.6% were at the expected time, and at ages 3 and 4, 99% of the measurements were taken on the child's birthday. Examination of the actual ages of the children at the assessment indicated that there were no significant differences between the actual ages of the children of the working mothers and the non-working mothers at the time of the assessment. All analyses were performed with the age-standardized z-score derived from the NCHS norms, so the slight range of actual ages assessed was not judged to be a problem.

Variables Most of the variables were identical to those in the previous section. These were: women's work, house quality, length of lactation in months, adult help in child care, sibling help in child care, marital status, birth order, sex of the child, maternal education (years of school passed), and nutritional status. In this section, three other measures were used: whether or not the child is the natural child of the father, morbidity and nutritional supplementation.

Morbidity was defined as the percent of days per year that the mother reported that her child had diarrhea, anorexia, or was ill in bed, multiplied by 1000. These counts were based on the mother's report of her child's illnesses assessed every two weeks.

Nutritional supplementation was the number of kilocalories per day over the period of a year of supplemental food ingested by the child. Each type of supplement contained calories, so that both FRESCO and ATOLE children ingested extra calories. In addition, because each cup of ATOLE contained both calories and proteins, within the ATOLE villages the more calories were ingested, the more protein the child had. Therefore, all analyses involving nutritional supplementation were performed within village types; i.e., within ATOLE or FRESCO village types.

The nutritional supplement was available to families two times a day in a central area. Those who wished the supplement had to visit the center, and sit at tables in the center drinking the supplement. The amount that they drank was recorded by two observers, who counted the number of cups per person, and deducted the amount of the supplement remaining in the cup after the individual finished. Although there was a range in the number of cups ingested per visit, the correlation between supplement ingested and number of days of attendance at the center is so high that these two measures have been used interchangeably.

Analytic strategies Although the data were longitudinal, the sample size of women who reported working for earnings was so small that longitudinal analyses were not considered possible. Comparisons between children of income-earning and non-income-earning mothers were made using t-tests and regression analyses.

## RESULTS

### Associations with women's work

Relatively few women in these four rural villages report having an occupation. When children were less than 1 year, 6% of mothers reported working, when children were between 1 and 2, 3% worked. At age 3, 9% worked, and at age 4, 13%. The number of children with anthropometric information is 26 at age 1, 58 at age 2, 63 at age 3, and 81 at age 4.

The specific question used to assess work made a difference in the percent of women who reported working. When women were asked "do you work", 42% of women responded in the affirmative on the attitudes and expectations survey. The latter group included women with older children. After selecting a sample of women who answered both questions, an examination of the two responses revealed that 65% responded the same to both questions, but over 30% of women who responded affirmatively to "do you work" did not consider that they had an occupation. Unfortunately, the broader definition of work could not be used because it was assessed for one year only, and the sample of children whose nutritional status was measured for that year included no infants (no new infants were enrolled after 1973) and the same number of children of working mothers at ages 2, 3 and 4 as the previous question which covered a wider time span. We decided to use the former question "do you have an occupation" because we felt that it would select those women who defined themselves clearly as workers, and because the time during which they worked could be linked to the age of the child.

Figure 3.1 shows the relative proportions of children at each age whose mothers reported a particular type of work. Since most workers were informal workers, all were combined for analysis.

Women who reported working at an occupation did not differ substantially from non-workers in economic indicators of house quality, net income per person, spouse's income, or value of crops sold, as shown in Table 3.1. The exception was that working mothers reported significantly less income from their children than non-working women. It is possible that one of the factors that determines rural women's working is whether or not she has a child who can contribute to the family income. If not, then she must work.

Table 3.2 presents mean grades of school passed by the mothers, number of living and number of deceased children for working and non-working mothers. Working mothers passed significantly more grades of school than non-working mothers, although the number of years of school passed by mothers was less than 2 years. Mothers who worked for income had fewer children alive than non-workers. No differences in numbers of deceased children were found, nor did the birth order of the target children differ by the work status of their mothers.

As Table 3.3 shows, children of working mothers were less likely to have legally married parents, and more children of working mothers were cared for in the household by adult family members than children of non-working mothers, significantly at

ages 2, 3 and 4. No association between work status of the mother, and amount of sibling help with child care was found.

#### Supplementation.

T-tests comparing the amount of supplement ingested by children of working mothers and non-working mothers showed no significant differences at any age level tested (from age 1 to age 4). Thus supplement ingestion did not appear to differ as a function of mother's work status.

Multiple regressions on amount of supplement ingested as a function of mother's work status showed a negative association of maternal work for earnings on supplement ingestion at age 4, but not at ages 1 to 3 controlling for family economic level, sibling and adult help, length of lactation, birth order, sex, mother's education, and village membership (Table 3.4) for each age level child. Supplement ingestion appeared to be greater for poorer families. Three-year olds ingested less supplement if they were being taken care of by a sibling, even controlling for birth order.

#### Length of lactation

Comparisons between working and non-working mothers' length of lactation were insignificant; maternal work for earnings was not associated with length of lactation in this population. Working mothers breastfed an average of 16.5 months (SD=5.11), and non-working mothers breastfed 16.7 months average (SD=5.91). A multiple regression predicting length of lactation as a dependent variable, using the same variables as the previous analysis, indicated that lactation was unrelated to work for

earnings, even controlling for potentially confounding variables (Table 3.5). It must be remembered that many of these women worked in the home, and that the measure of lactation included partial as well as full breastfeeding. Length of lactation was significantly shorter when the child attended the supplementation center.

### Morbidity

Working mothers reported significantly fewer days ill for their children than non-working mothers at ages 2 and 3, and slightly fewer at age 4 (Figure 3.2). The average prevalence of days ill from diarrhea, days in bed, or days with anorexia and apathy ranged from a high of 25% for 2-year old children of non-workers to 8% for 4 year old children of workers.

When other variables were controlled for, the net effect of maternal work for earnings on morbidity was not significant, although a non-significant trend for children of working mothers to be healthier was seen at age 3 ( $p < .10$ ) (Table 3.6) other predictive variables of good health were adult help at age 2, which was associated with better health, mother's education (ages 2 and 4) and marital status (age 1).

Regressions predicting morbidity from characteristics of work (hours of work per week, woman's income, and location of her work (home, community, or out of the community) and house quality were not significant. The variance in morbidity that was accounted for by any of these measures was small, suggesting that the specific conditions of work are less important than the presence or absence of work in predicting morbidity.

### Nutritional status

Comparisons of height for age, weight for height, and weight for age of children of working mothers and non-working mothers showed no significant differences at any age, for any measure. Figure 3.3 illustrates the lack of effect quite clearly.

Because the supplementation provided in the Atole villages affected nutritional status, analyses of the net effect of maternal work on nutritional status were performed within village type, and supplement ingested was included as a variable to be controlled for. Multiple regressions of maternal work for earnings and other possible explanatory variables are shown in Table 3.7.

Maternal work for earnings was not associated with children's nutritional status, with one exception: a significant positive association of work with height for age in Fresco villages, at age 3. One significant association in 16 regressions (two village types, two measures, and 4 ages) is not substantially different from chance (if no associations existed, 1 in 20 or 6% of the regressions would have had significant b values for mother's working by random chance alone), and probably should not be weighted too heavily.

Other variables were significantly associated with nutritional status: length of lactation, house quality at older ages, mother's education, and (in the Fresco villages) whether or not the child was the child of the male head of household. Supplement ingestion was significantly associated with nutritional status for both village types from age 2 on.

Associations of work characteristics and nutritional status among working women were examined (Table 3.8). These regressions indicated that, controlling for supplement ingestion, more hours per week of work was associated with lower nutritional status for infants (ages 0 to 1), and that mothers working outside of the home, in the local community, had children with better nutritional status than those working in their homes.

#### DISCUSSION

Women in this sample who were categorized as working for income were similar economically to the non-working women; net income per person, house quality, and income to spouse (set at 0 if no spouse was present), and value of crops grown but not sold did not differ between groups. However, working women received significantly less income from their children than non-working women, had fewer children overall, and were more educated. They were equally likely to be in a union, either married or common law, as non-working women.

Women who were involved in income-generating activities were no less likely to bring their children to the supplement center, as measured by the number of calories of supplement ingested, than non-working women. However, when economic level and education were controlled for, at one age (age 4) children of working mothers ingested less supplement than those of non-working mothers and, therefore, attended the supplement center fewer times. Whether mothers might need assistance to make use of a program of this kind may deserve consideration.

The absence of an association between length of lactation and work status may suggest that in this traditional rural setting, work that women perform is relatively compatible with continued breastfeeding. Breastfeeding tends to continue well into the second year, and may also be relatively minimal by that time.

The protein-high calorie nutritional intervention (Atole), on the other hand, was highly associated, negatively, with length of lactation. The more supplement the children received, the shorter their period of breastfeeding. Thus prolonged breastfeeding may be a function of an absence of substitute food. However, the causality of the relationships is not possible to determine. It may be that children who were breastfed were less likely to be taken to the supplement center.

Length of lactation was positively associated with nutritional status of children in Fresco villages, and at some ages, Atole villages controlling for the amount of supplementation.

No significant differences between the nutritional status of children of working mothers and children of non-working mothers were found. Controlling for possible confounding variables, including supplementation and mother's education, a positive association of work for earnings and height for age at age 3 in the Fresco villages, and a slight negative association of work for earnings and height for age at age 1 in the Atole villages was found. These results are similar to the findings from the

urban sample presented in Section II; infancy appeared to be the time of possible risk to children of mother's work, whereas when children are older, maternal work for earnings may have a net positive effect on a measure of nutritional status, although slight.

The study reported here suffers from the limitations of secondary research. Principally, the small percent of women in the working sample raises questions about the representativeness of the sample. Absence of data on purchasing or allocation of income prevents a more careful analysis of the morbidity-work association. On the other hand, the failure to find negative associations of work for earnings with supplementation center attendance up to age 3, length of lactation, and nutritional status among toddlers and preschoolers suggests that in this rural population, maternal work for earnings was not detrimental for children. In fact, as the nutritional status and morbidity associations indicate, there may be positive effects of maternal work on children's welfare after the first year of the child's life, a result similar to that found by Haggerty (1981) in Haiti.

TABLE 3.1  
Household Characteristics of Working  
and Non-Working Women

Variable	Work Status of Mother	Age of Child (Years)							
		0-1		1-2		2-3		3-4	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
House Quality:	No	5.68(876) <sup>c</sup>	1.96	6.14(843)	2.13	6.17(778)	2.13	6.23(652)	2.11
	Yes	5.59(47)	1.93	5.75(77)	2.48	5.88(75)	2.31	6.01(96)	2.33
	t	.28		1.56		-.12		.86	
Net income per person Q/Year	No	82.4(855)	86.7	81.82(821)	87.1	82.17(776)	80.9	80.5(650)	80.9
	Yes	96.2(45)	58.6	96.82(76)	67.0	87.73(79)	62.1	85.8(101)	61.7
	t	-1.50		-1.81		-.74		-.76	
Husb. Income Q/Year	No	177.5(855)	306.9	177.3(821)	307.0	178.7(776)	311.0	178.4(650)	316.3
	Yes	213.5(45)	350.4	204.9(76)	337.1	194.6(73)	322.6	172.4(101)	309.0
	t	-.76		-.69		-.43		.18	
Wife Income Q/Year	No	4.68(855)	29.5	4.60(821)	31.5	3.57(776)	25.7	3.42(650)	24.7
	Yes	28.91(45)	85.5	20.06(76)	58.7	32.0079	81.5	24.54(101)	74.1
	t	-1.89		-2.27*		-3.08**		-2.84**	
Child Income Q/Year	No	63.78(855)	222.2	64.50(821)	225.2	68.13(776)	231.4	71.46(650)	241.1
	Yes	23.84(45)	68.4	24.01(76)	76.5	20.59(79)	65.8	20.74(101)	63.6
	t	3.14**		3.44**		4.27**		4.46**	
Other's Income Q/Year	No	.78(855)	9.66	.69(821)	9.17	.73(776)	9.43	.77(650)	8.79
	Yes	.96(45)	6.41	1.93(76)	12.85	1.86(79)	12.60	.43(101)	4.28
	t	-.17		-.82		-.98		.63	
Value of crops Q/Year	No	129.3(855)	109.4	130.7(821)	109.2	132.2(776)	108.9	136.2(650)	109.1
	Yes	134.9(45)	143.6	114.4(76)	131.0	110.3(79)	133.3	116.4(101)	128.6
	t	-.26		1.05		1.41		1.47	

Note: One Quetzal was equivalent to one dollar.

b Separate or pooled variance estimates used, as appropriate

c N is in parentheses

\* p < .05

\*\* p < .01

TABLE 3.2  
 Mean Grades Passed, Number of Living and Deceased  
 Children by Work Status of Mother

Variable	Work Status of Mother	Age of Child (Years)							
		0-1		1-2		2-3		3-4	
		$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Education of Mother (Grades compltd)	No	1.02(840)	1.39	1.00(805)	1.38	.99(763)	1.39	.99(638)	1.39
	Yes	1.65(43)	1.81	1.61(75)	1.72	1.45(75)	1.65	1.31(96)	1.59
	t	-2.26*		-3.02*		-2.35*		-1.88*	
Number of Living Children	No	5.25(876)	2.26	5.29(843)	2.24	5.37(793)	2.22	5.52(663)	2.18
	Yes	4.45(47)	1.73	4.31(77)	2.07	4.46(81)	2.13	4.78(103)	2.09
	t	3.07**		3.76**		3.52**		3.22**	
Number of Dead Children	No	1.22(876)	1.56	1.22(843)	1.56	1.23(793)	1.53	1.25(663)	1.53
	Yes	.93(47)	1.34	.91(77)	1.47	1.18(81)	1.88	1.30(103)	1.87
	t	1.20		1.70*		.21		-.27	

b Separate or pooled variance estimates used, as appropriate

c N is in parentheses

\*  $p < .05$

\*\*  $p < .01$

TABLE 3.3

Frequencies of Family Characteristics by Mother's  
Work Status: Marital Status and Child Care: Rural

Variable	Age of Child (Years)							
	0-1		1-2		2-3		3-4	
	No Work	Work	No Work	Work	No Work	Work	No Work	Work
<b>Marital Status:</b>								
Single	3.8%	10.6%	3.4%	18.2%	3.2%	18.5%	2.7%	16.5%
Union	56.3	61.7	54.7	57.1	54.1	56.8	53.7	56.3
Legal	40.0	27.7	41.9	24.7	42.7	24.7	43.6	27.2
N <sup>2</sup>	85	47	843	77	793	81	663	103
$\chi^2$	7.06*		38.04**		43.8**		43.01**	
<b>Adult Help</b>								
None	84.1	74.5	84.2	66.2	82.8	66.7	84.3	70.9
Some	15.9	25.5	15.8	33.8	17.2	33.3	15.7	29.1
N <sup>2</sup>	876	47	843	77	793	81	663	103
$\chi^2$	2.38		14.7**		11.64**		10.24**	
<b>Sibling Help</b>								
None	79.1	74.5	76.2	71.4	71.9	67.9	64.9	66.0
Some	20.9	25.5	23.8	28.6	28.1	32.1	35.1	34.0
N <sup>2</sup>	876	47	843	77	793	81	663	103
$\chi^2$	.33		.62		.39		.01	

Note: All analyses were performed on actual frequencies. Percentages are presented here for clarity.

\* p < .05

\*\* p < .01

TABLE 3.4  
 Supplement Ingestion (K cal/day/yr) as a Function of  
 Work and Economic Variables: b Values From  
 Multiple Regression

Variables	Age of Child (Years)			
	0-1	1-2	2-3	3-4
	b	b	b	b
Mother's Work (0,1)	37.11	-22.60	-36.10	-98.40*
Economic: House Quality (3-16)	-6.98	-15.65*	-26.35**	-15.60
Length of Lactation (months)	-.54*	-1.25**	-.58*	-.72*
Child Care:				
Adult (0,1)	-3.40	-20.10	-69.90	-7.55
Sitting (0,1)	34.90	-26.80	-82.10**	-90.60
Father Role:				
Marital Status (1,2,3)	22.10	-10.50	-41.20	-45.50
Natural Child	-103.60	-46.40	70.30	293.30
Birth Order	5.20	5.16	8.06	11.77*
Sex (1=male; 2=female)	-5.06	3.40	2.45	37.50
Mother's Education (# grades)	.21	13.20	5.17	-1.09
Morbidity	1.00	-.003	.04	-.02
Village 03 (0,1)	-209.40**	-402.90**	-536.30**	-331.90**
Village 06 (0,1)	102.50*	26.60	-86.20	23.26
Village 08 (0,1)	-221.90**	-454.80**	-589.30**	-349.30**
N	296	394	427	402
F <sub>2</sub>	13.53**	25.69**	22.35**	10.99**
R	.40	.49	.43	.28

\* p < .05  
 \*\* p < .01

TABLE 3.5

Length of Lactation as a Function of Mother's Work Status,  
Economic, Caretaking, Village, and Supplement/Variables  
b Values from Regression on 2 Year Olds

Variables	Child Age 2
	b
Mother's Work (0,1)	3.43
House Quality	.61
Child Care: Adult (0,1)	-5.04
Sibling (0,1)	-8.63
Marital Status (1-3)	-9.02
Birth Order	6.07**
Sex (1=male;2=female)	-1.45
Mother's Education (grades passed)	-.47
Morbidity (days ill x 1000)	-.02
Village 03 (Fresco) (0,1)	.99
Village 08 (Fresco) (0,1)	9.74
Village 06 (Atole) (0,1)	-6.54
Supplement (K cal/day/year)	-.05**
N	394
F	6.65**
Lactation: $\bar{X}$ (months)	16.49
SD	5.65

\* p < .05  
\*\* p < .01

TABLE 3.6

Morbidity as a Function of Mothers' Work S  
Caretaking, Economic Variables and Villa  
b Values from OLS Regression

Variable	Age of Child (Ye	
	0-1	1-2
	b	b
Mother's Work	42.84	-9.91
House Quality	.17	-3.46
Length lactation (mo)	2.00	-1.80
Child care:		
Adult (0,1)	-4.43	-57.80**
Sibling (0,1)	9.27	-20.90
Marital Status (1,2,3)	-63.10**	-7.58
Natural Child	80.57	58.62
Birth Order	2.69	3.18
Sex (1=male;2=female)	-26.30	-14.40
Mother's Education (grades passed)	-9.46	-13.20*
Village 03	5.97	24.05
Village 06	-32.10	-41.30
Village 08	-32.30	-39.90
Supplement (K/cal/day/yr)	.06	-.002
F	1.74*	1.81*
2		
R	.08	.062
N	296	394

Note: Morbidity is defined as percent of days ill x 1000.

\* p < .05

\*\* p < .01

TABLE 3.7

Nutritional Status as a Function of Mother's Work,  
House Quality, Education and Family Variables: b Values

## Height for Age

Variables	Age of Child (Years)							
	1		2		3		4	
	FRESCO b	ATOLE b	FRESCO b	ATOLE b	FRESCO b	ATOLE b	FRESCO b	ATOLE b
Mother's Work (0,1)	.30	-.61	.17	-.14	.40*	-.21	.18	.04
House Quality (0-16)	.04	.03	.06	.07	.02	.11*	.06	.10*
Length of lactation (mos)	.002	.001	.005**	.003*	.003*	.002*	.003*	.003
Child care:								
Adult (0,1)	-.01	.03	.15	.11	-.09	.06	-.35*	-.05
Sibling (0,1)	-.42	-.09	-.22	-.16	-.36**	.01	-.40**	-.15
Marital Status (1-3)	-.17	.32*	-.17	.06	-.13	-.08	-.19	.06
Natural Child (0,1)	2.00**	-.57	2.15**	-.23	2.07**	-.87	1.63**	-.81
Birth Order	-.04	-.007	-.03	.02	-.02	.00	-.03	.001
Sex (1=male;2=female)	.11	.07	-.23	-.20	-.38**	-.16	-.54	-.15
Mother's Education	-.004	.05	.08	.01	.08	.07	.10*	.06
Supplement (K cal/day/yr)	-.001	.004	.002	.0006**	.002**	.0008**	.002**	.0006**
N	205	237	248	273	257	300	251	286
F <sub>2</sub>	3.07**	1.33	4.00**	1.82*	4.65**	4.67**	4.68**	2.86**
R	.15	.06	.16	.07	.17	.15	.18	.10

## Weight for Age

Variables	Age of Child (Years)							
	1		2		3		4	
	FRESCO b	ATOLE b	FRESCO b	ATOLE b	FRESCO b	ATOLE b	FRESCO b	ATOLE b
Mother's Work	.18	-.11	.12	-.05	.14	-.01	.02	.16
House Quality	.04	.03	.04	.03	.01	.04	.05*	.03
Length of lactation	.003	.0004	.004**	.0005	.002	.001	.002	.001
Child care: Adult	.09	.04	.12	.08	-.12	-.02	-.17	-.04
Sibling	-.29	.02	-.05	-.11	-.06	-.02	-.11	-.49
Marital Status	-.10	.24*	-1.00	-.03	-.06	.08	-.07	.08
Natural Child	1.97**	-.61	2.03**	-.86	.99*	-1.47**	.25	-.90
Birth Order	-.02	-.01	-.0004	.04	-.03	.02	-.002	.005
Sex	.11	.18	-1.00	.07	-.34**	-.16	-.14	-.04
Mother's Education	.04	.03	.06	.08*	.06*	.06*	.05	.05
Supplement	.005	-.0003	.003	.0006**	.001**	.0004**	.001**	.0004**
N	205	237	248	273	257	300	251	286
F <sub>2</sub>	2.23**	1.32	3.56**	2.46*	3.80**	2.87**	3.32**	1.81*
R	.11	.06	.14	.09	.15	.10	.13	.07

\* p &lt; .05

\*\* p &lt; .01

TABLE 3.8  
 Effects of Work Conditions on Nutritional  
 Status: Rural Workers Only:  
 b Values from Multiple Regression

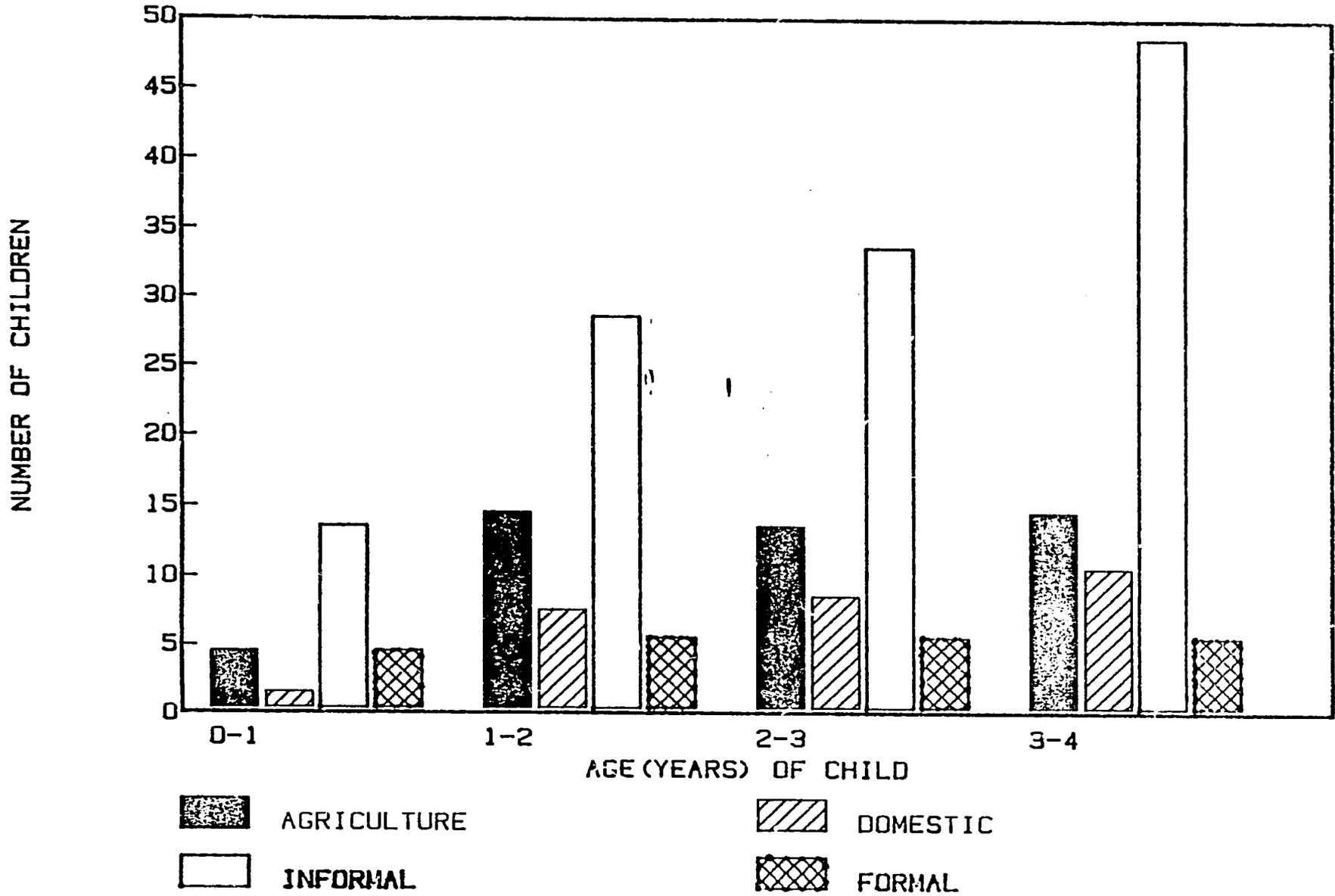
<u>Work Characteristics</u>	Child Age 0-1			Child Age 1-2		
	Ht/Age	Wt/Ht	Wt/Age	Ht/Age	Wt/Ht	Wt/Age
	b	b	b	b	b	b
Hours/Week	-.002	-.02*	-.02*	-.003	-.004	-.004
Log Income of Mother	-.14	.09	-.03	-.008	.02	.03
Work at Home	.14	-.18	-.02	-.05	.25	.15
Work in City	.97	-.20	-.58	.57	.15	.71*
House Quality	.23	.20	.32*	.06	.08	.11
Supplement	-.002	-.001	-.002	.0004	.0002	.0002
N	25	25	25	58	58	58
F	1.17	1.73	2.06	.96	1.78	1.99
R2	.27	.30	.39	.10	.16	.19
	Child Age 2-3			Child Age 3-4		
	Ht/Age	Wt/Ht	Wt/Age	Ht/Age	Wt/Ht	Wt/Age
	b	b	b	b	b	b
Hours/Week	-.003	-.001	-.002	-.005	-.0005	-.002
Log Income of Mother	.09	.03	.06	.10	.02	.07
Work at Home	.42	-.03	.20	.66**	-.28	.16
Work in City	.56	.56	.72*	.71**	-.009	.37
House Quality	.02	.05	.04	.08	.03	.04
Supplement	.0009*	.0002	.0007	.002	.0006	.001**
N	63	63	63	81	81	81
F	1.55	1.36	1.84	6.45**	1.73	5.03
R2	.14	.12	.16	.34	.12	.29

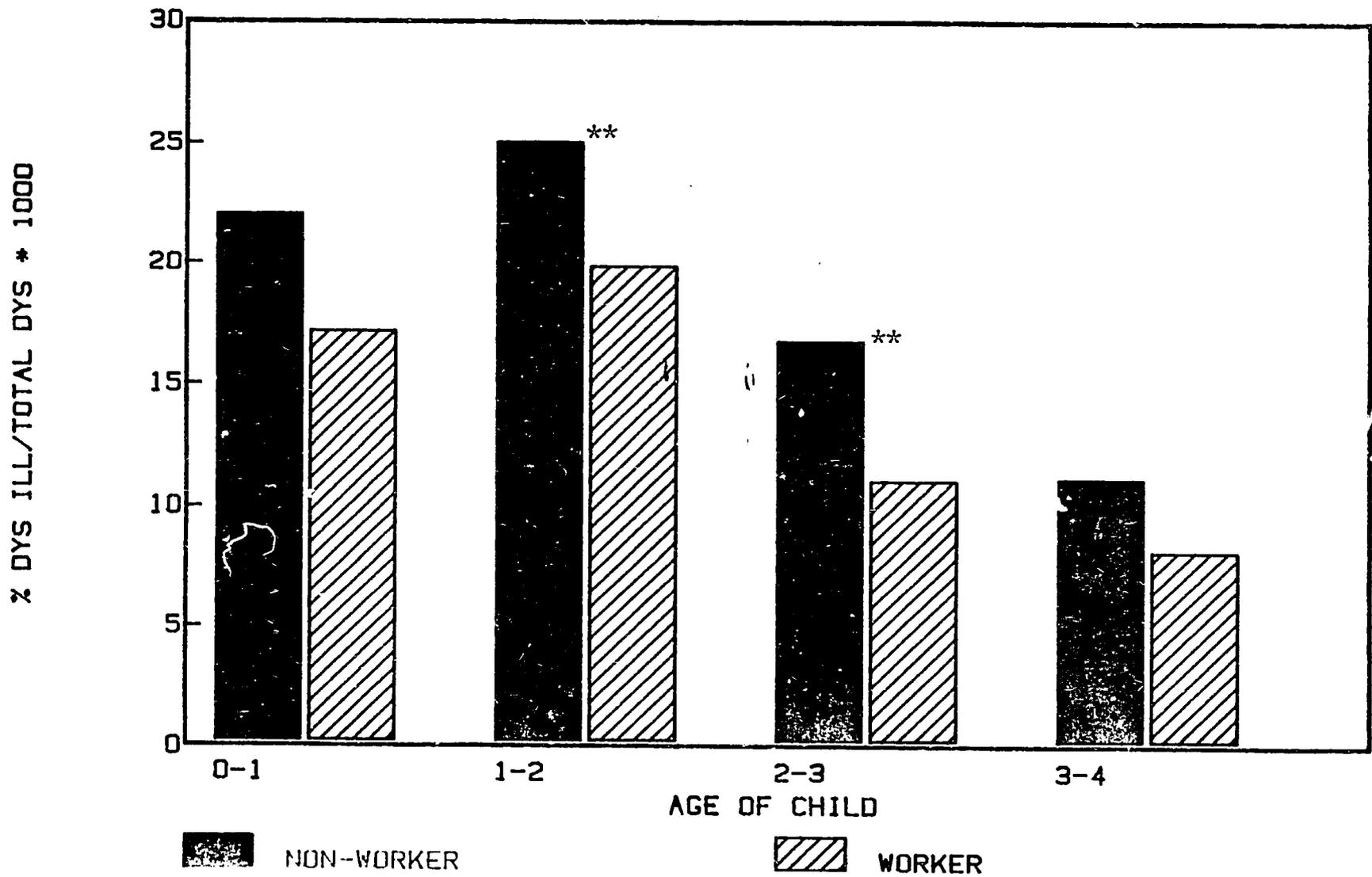
\* p < .05

\*\* p < .01

Figure 3.1

Sample Sizes of Children With Anthropometry  
Data by Work Type of Mothers: Rural

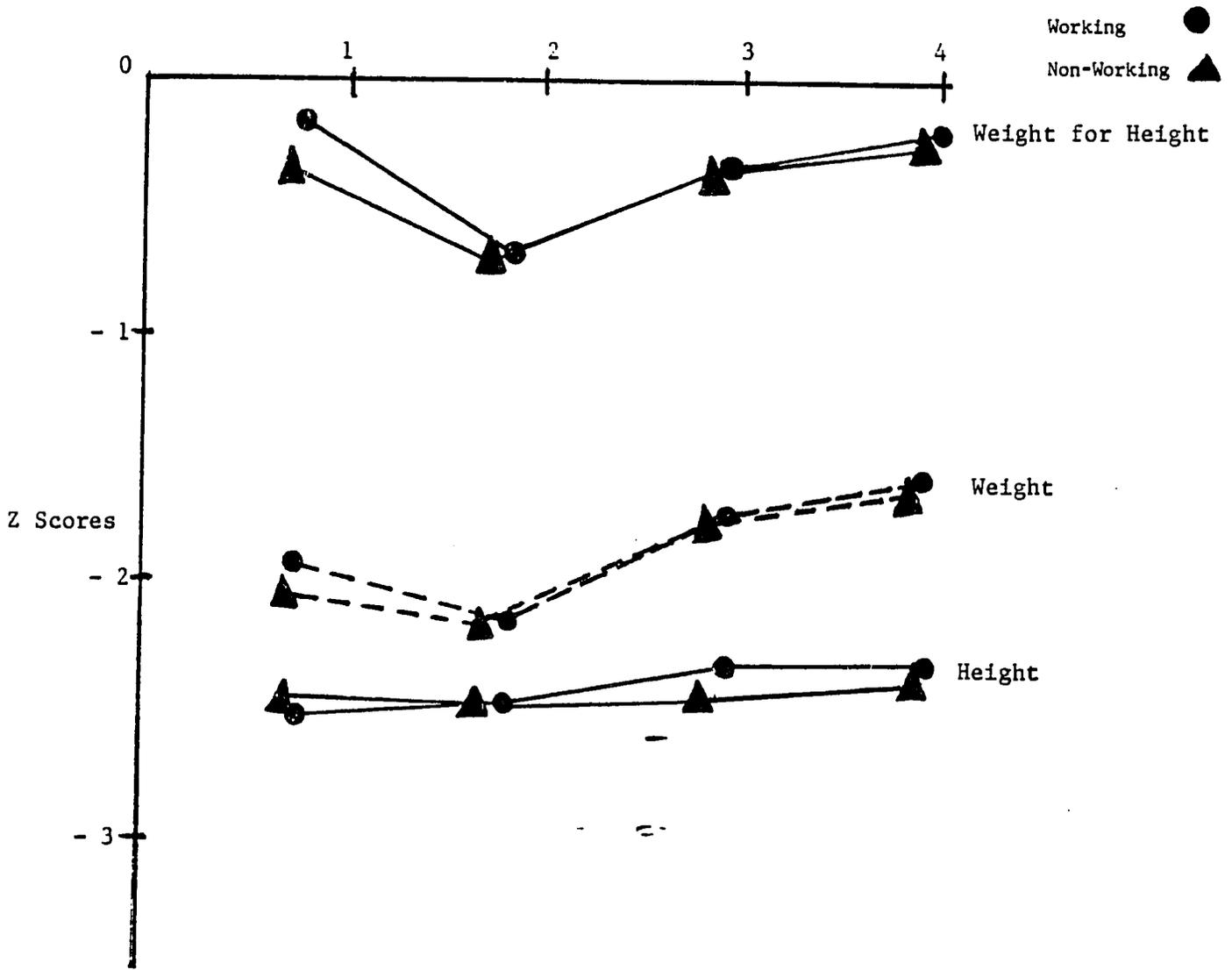




\* p < .05  
 \*\* p < .01

Figure 3.2

Morbidity of Children as a Function of Work Status



Sample Size	W (●)	26	58	63	81
	NW (▲)	441	497	529	490

Figure 3.3

Anthropometry Z Scores in Rural Guatemalan Children as a Function of Work Status of Mother

## SECTION IV

### MATERNAL CHARACTERISTICS AND NUTRITIONAL STATUS OF CHILDREN

The fourth hypothesis of the investigation was that measures of maternal characteristics reflecting current functioning might be better predictors of children's well-being than measures of schooling which are traditionally used.

Many investigators have proposed measuring characteristics of women which seem to be associated with better outcomes for children (eg. Zeitlan, 1985). These qualities have been labelled maternal success, enthusiasm, or maternal swiftness (Scrimshaw and Scrimshaw, 1980). In this section, data from the rural villages were examined to determine whether current measures of mother's capabilities were as predictive of nutritional status or morbidity of children at each age level as her years of school passed.

Data were analyzed within village in order to replicate the findings. Two of the four villages were larger, and closer to the city; the others were smaller, and almost twice as far from the main city (2 hours). One of each was a Fresco, or calorie-supplemented village, and the other was a protein-supplemented village.

## METHODS

The sample consisted of preschool aged children whose mothers had been interviewed to determine the quality of the home stimulation as a part of the INCAP longitudinal study. The interviews took place in 1975, and were performed in the home by trained Guatemalan women interviewers. Sample sizes of children ranged from 100 to 150 for the larger village, and 99 to 140 for the smaller village, with the exception of the measure of morbidity, which had 20 fewer subjects in each village.

The measures used were:

Vocabulary, the number of items women could correctly identify according to the scoring criteria of the WISC Scale for children and adolescents. Words were taken directly from the Spanish language version of the test, which has been standardized for the Guatemalan population. Total number of correct responses was used.

Modernity, total number of "modern" responses on Inkeles' scale of modernity.

Literacy, a score from 1 to 4 indicating the woman's ability to read, based on a simple test in which she was asked to read a passage from a newspaper. Her score ranged from 1 (illiterate) to 4 (could read comfortably).

Work prior to marriage and childbearing, a 0/1 score indicating whether the woman reported working for income prior to the birth of her first child;

Draw/read, a measure of the amount of visual and verbal stimulation in the home, including a measure of the number of books the mother had in the home.

These measures were compared with mother's highest grade passed, and her age.

## RESULTS

Table 4.1 shows the intercorrelations of the measures for each of the two Yresco villages, and Table 4.2 for the two Atole villages. Vocabulary, modernity, and literacy appear to be highly intercorrelated. Mother's age and work prior to childbearing are less highly related to these three. In all villages, years of schooling were associated with vocabulary, modernity, and literacy, but negatively associated with age of the mother. Work prior to marriage or childbearing was unrelated to the maternal quality variables in one village, and positively related to them in the other village.

Both years of schooling and literacy of the mother were assessed two times in this sample, and the comparison of the two reports provides some interesting reliability of reporting estimates. Schooling estimates ranged from  $r=.71$  ( $p<.05$ ) in two villages to  $r=.44$  in the smaller Atole village. Literacy was more reliably reported, with correlations ranging from  $r=.58$  to  $r=.83$ . One estimate was obtained from the mother herself, the other from her husband's report, so that the relative lack of reliability is not surprising. The mother's report was used here.

Table 4.3 and 4.4 show correlations of these maternal quality variables with height and weight for age at ages 1, 2, and 3, with morbidity prevalence at those three ages, and with work during that time period. These results are shown for each village.

Results appeared to differ by village size. In the larger villages, literacy was the most important predictor of nutritional status and the correlations were larger at older ages. Of 12 correlation coefficients (2 villages by 3 ages by 2 nutritional status measures), 11 were significant (91% of the correlations). The next best predictor was the environmental stimulation measure, Draw/read, which was significantly associated with nutritional status in 75% of the 12 possible correlations, followed by modernity (67% of the correlations). Grades of school passed was associated with nutritional status in 5 of the 12 correlations, or 41%.

In contrast, in the smaller villages, the best predictor was work prior to childbearing, which was significantly associated with nutritional status in 33% of the 12 correlations. The measures of literacy, modernity, and schooling were significantly associated with nutritional status in less than 25% of the correlations in the smaller villages.

Morbidity was related to years of mother's schooling in both large and small villages, as well as with the age of the mother, but correlations were low.

Work for earnings after childbearing appeared to have different associations in the four villages; in the larger Fresco

village, work was highly associated with higher vocabulary and modernity scores, whereas in the other three, no associations were found. In the smaller Fresco village, a large proportion of women worked in a cottage industry in their homes making hats and mats from reeds. These activities did not require any particular school-related abilities. Probably the lack of significant correlation between work and maternal qualities reflects the type of work performed.

#### DISCUSSION

The hypothesis that current measures of ability would be more predictive of child outcomes than level of education was supported only in the larger, more accessible villages. In the smaller villages, prior work was more highly related to child health and nutritional status. The villages in which literacy was highly predictive of nutritional status (the larger villages) were closer to the main city than the other villages, and therefore access to the city was greater. Thus in these villages the capabilities of the mothers may have played a larger role in adequacy of food acquisition than in the more isolated villages. Further work to determine the ecological basis for the apparent interaction of village location and maternal capabilities would be recommended.

The interaction of environmental variables and psychological qualities have often been found to be better predictors of outcomes than individual characteristics only (Bronfenbreuner, 1984; Crockenberg, 1985). However, this issue has not been

addressed in studies relating maternal characteristics to child outcomes.

It is also important to note that the reliability of years of school passed by the mother was relatively low, when assessed by the mother and father. On the other hand, literacy was more reliable.

TABLE 4.1  
Intercorrelation of SES Variables Within FRESCO Villages

FRESCO VILLAGE 1 (Near Large City)

Mother's:	Vocab	Modernity	Literacy	Mother's Age	Draw/Rd	Schooling
Vocabulary						
Modernity	.70**					
Literacy	.25**	.75**				
Age	.18**	.10	.01			
Draw/Read	.26**	.30**	.11*	.31**		
Schooling (a)	.23**	.50**	.41**	-.28**	.10	
Prior Work	-.03	.04	.10	.08	.06	.12

FRESCO VILLAGE 2 (Far From City)

Vocabulary						
Modernity	.73**					
Literacy	.41**					
Age	.23**	.12	.09			
Draw/Read	.33**	.32**	.30*	.47**		
Schooling (a)	.28**	.61**	.24**	-.23**	-.04	
Prior Work	.12*	.19**	.15*	.08	.15*	.05

Note: All N's are 60 or over, approximately 100

a = grades passed if attended

\* p < .05  
\*\* p < .01

TABLE 4.2

## Intercorrelations of SES Variables Within Atole Villages

## Atole Village 1 (Larger and Nearer City)

Mother's:	Vocabulary	Modernity	Literacy	Mother's Age	Draw/Read	Schooling
Vocabulary						
Modernity	.60**					
Literacy	.10	.72**				
Age	-.03	-.07	-.05**			
Draw/Read	.53**	.47**	.12*	.09		
Schooling	.30*	.60**	.33**	-.16*	.35**	
Prior Work	.20	.20	-.02	-.13	.22	.17

## Atole Village 2 (Smaller, Farther From City)

Vocabulary						
Modernity	.63**					
Literacy	.14	.74**				
Age	-.08	-.08	-.13			
Draw/Read	-.07	.01	-.08	.34**		
Schooling	.23*	.52**	.23**	-.08	-.28**	
Prior Work	-.09	.12	.05	-.16	-.02	.30*

Note: All sample sizes are at lease 60, most over 100.

\* p < .05  
 \*\* p < .01

TABLE 4.3

Correlations of Maternal Qualities With Nutritional Status and  
Morbidity by Age of Child and FRESCO Village (Rural)

FRESCO VILLAGE 1  
(Large, Near City)

Mother's:	Age of Child (Years)											
	0-1				1-2				2-3			
	Ht/Age	Wt/Age	Morb.	Work	Ht/Age	Wt/Age	Morb.	Work	Ht/Age	Wt/Age	Morb.	Work
Vocabulary	-.07	-.05	.06	.21**	.04	.14	-.04	.29**	.12	.15*	.02	.28**
Modernity	-.04	.09	.04	.17**	.13	.28**	-.06	.30**	.14*	.25**	.04	.25**
Literacy	.18*	.31**	-.02	.19**	.26**	.34**	-.11	.25**	.20**	.30**	.04	.22**
Age	-.09	-.00	.12	.23*	.06	.11	.08	.14*	.01	.08	.06	.16*
Draw/Read	.01	.05	.16	.04	.12	.19*	-.06	.09	.19**	.17**	-.04	.09
Schooling b	-.00	.02	.07	-.06	-.06	-.03	.22*	.15*	.01	-.04	-.00	.3
Work Prior to Marriage (0,1)	.06	.08	.06	.02	.10	.09	-.03	-.07	.18**	.16**	.09	-.01

FRESCO VILLAGE 2  
(Small, Farther From City)

Mother's	Age of Child (Years)											
	0-1				1-2				2-3			
	Ht/Age	Wt/Age	Morb.	Work	Ht/Age	Wt/Age	Morb.	Work	Ht/Age	Wt/Age	Morb.	Work
Vocabulary	-.16	-.26**	-.15	-.08	.03	-.10	-.02	.12	.06	-.07	-.09	.20**
Modernity	-.11	-.11	-.21	.12	.14	-.04	-.12	.14	.12	.02	-.21*	.16
Literacy	-.09	-.02	-.29**	.08	.13	.04	-.12	.11	.13	.04	-.16	.10
Age	-.16	-.16	-.03	-.04	-.01	.00	.03	-.11	.01	-.07	.20*	-.09
Draw/Read	-.03	-.01	-.24*	-.02	.13	.10	-.20	-.06	.09	.06	-.08	.03
Schooling b	-.14	-.04	-.12	-.02	-.03	-.13	-.32**	.01	-.13	.02	-.30**	.06
Work Prior to Marriage (0,1)	.08	.15	-.03	.07	.17*	.22**	-.16	.04	.23**	.28**	-.11	.05

b = Number of grades passed.

Note: All sample sizes are at least 60; most are over 100

\*  $p < .05$   
\*\*  $p < .01$

TABLE 4.4

Correlations of Maternal Qualities with Nutritional Status, Morbidity,  
and Work by Age of Child and Atole Village (Rural)

## Atole Village 1 (Larger, Near City)

## Age of Child

	0-1				1-2				2-3			
	Ht/Age	Wt/Age	Morb	Work	Ht/Age	Wt/Age	Morb	Work	Ht/Age	Wt/Age	Morb	Work
Mother's:												
Vocabulary	.29**	.16*	-.03	.07	.32**	.19*	-.06	.02	.36**	.21**	-.03	.04
Modernity	.23**	.03	-.05	.16*	.21*	.17*	-.00	.08	.27**	.20*	.05	.08
Literacy	.15*	.02	-.09	.07	.14*	.18*	-.07	.07	.16*	.17*	.03	.08
Age	.02	-.05	.20*	-.07	.02	.01	.00	-.09	-.01	-.01	.09	-.05
Draw/Read	.18*	.20*	.03	.02	.24**	.17**	-.01	-.01	.28**	.23**	-.05	-.02
Schooling (a)	.15	.04	-.09	.26*	.17	.14	-.27	.20	.28**	.30**	-.23*	.13
Work Prior to Marriage	-.01	-.02	.17	.06	-.03	-.02	.27**	-.02	-.02	-.04	.20	-.05

## Atole Village 2 (Smaller, Farther From City)

Mother's:												
Vocabulary	.17	.20*	-.04	.01	.14	.12	.03	.01	.06	.07	-.02	-.19
Modernity	.08	.26*	-.26	.02	.14	.24*	-.21	.04	.08	.14	-.09	-.14
Literacy	-.02	.26*	-.18	.05	.08	.23*	-.23*	.05	.05	.10	-.07	-.06
Age	-.00	-.16	.00	-.16*	-.03	-.06	.06	-.18	-.09	-.03	-.06	-.18
Draw and Read	.07	-.04	-.09	-.07	.02	-.08	.01	-.07	-.05	-.09	-.01	-.20
School Grades (a)	.07	.26*	-.12	.02	.14	.23*	.14	.03	.13	.33**	.35**	-.02
Work Prior to Marriage	.09	.18	.101	.15	.03	.15	.07	.25	.08	.16	.13	.07

\* p &lt; .05

\*\* p &lt; .01

Note: All sample sizes are at least 60; most are over 100.

(a) School grades passed if attended school.

## SECTION V

### EFFECTS OF WOMEN'S WORK STATUS ON TIME USE

A fourth area of investigation was the association of women's income-earning status and patterns of time use in child caretaking and home production activities. It has frequently been assumed that the more women work for earnings, the more they must rely on alternative systems of child care for their young children, and reduce time spent in leisure activities. Four specific questions were addressed:

-What amount of hours per day do urban and rural women report in each activity, and how reasonable or valid are these estimates of time use?

-How does women's wage-earning work affect time in food preparation, child care, time spent in other activities, and help received from other family members?

-When women work in income-earning activities, do they receive more help in food preparation and child care from adults?

-What is the effect of distance to work on child caretaking patterns?

### METHOD

Sample.- The sample for the time use investigation consisted of mothers interviewed during 1975 concerning their activities on the previous day in both the rural and the urban villages.

Interviews of the previous day's activities occurred every three months for four rounds. Only the third and fourth rounds are used here because the data for the first two rounds appeared to be more questionable due to a lack of training of the interviewers and difficulties with the form used. However, descriptive statistics for work activities are shown for all four rounds to illustrate seasonality.

In the rural villages, all pregnant women and women with a child under 7 were sampled. In the urban villages, the sample was restricted to all pregnant women and women with children under three. Thus these sample criteria are similar to those reported in the analysis of nutritional status and women's work, with the exception that in the previous section, data were presented for rural children only through age 4.

Although many of the mothers were the same in each round, they were not identical. Data from each round were analyzed separately. In the rural villages, 419 women were interviewed in round 3, and 413 in round 4. In the urban villages, the third round contained 343 women, the fourth 461 women.

Description of the villages.- The villages have been described in some detail in Sections II and III, the effects of women's work on children's nutritional status.

Time use estimates will be influenced by agricultural patterns. Mejia Piveral (1972) observed that dates of planting and harvesting were extremely important and usually consistent from year to year, except for variations due to weather conditions. The four rounds of data collection were roughly

during the periods of slack, planting, weeding, and late harvest for the majority of the crops, respectively.. Thus rounds three and four were in periods of heavier agricultural activity, and during round 4 children were not in school.

#### Data collection procedures

Time use information was collected through the mother's 24 hour recall of activities performed the previous day and the previous week. For each activity, the mother was asked whether she performed it, when she performed it (morning, afternoon, or all day), where it was performed (in the community, outskirts of the community, or outside of the community), distance she travelled (which was coded by the interviewer in terms of blocks), hours and minutes (to 10-minute intervals) she performed the task, and number of days the previous week (two weeks for round 3) she performed the activity. If the activity involved income-earning, she was asked how much she had earned the previous day. For activities that took her outside the home, she was asked whether she had taken any children 6 years or under with her, and whether she had received any help from an adult. Finally, she was asked about the activities that each of her children over 7 years of age had performed, where he or she performed the activity, time spent, and distance to the activity. The exceptions to this procedure were the activities of food preparation and child care. It was decided that because these activities occurred concurrent with other activities, mothers would not be able to estimate the time spent in each accurately.

Therefore, these two activities were coded simply as occurring in the morning, the afternoon, all day, or not at all.

Fifteen activities were coded. The activities were much more appropriate to the rural than to the urban areas, which is reflected in the low frequencies of many of the activities in the urban areas. Unfortunately, no additional activities were added for the urban survey. The activities were:

prepare food for the family

watch children

make purchases; at the store, in the village, in Guatemala City, or go to the mill to grind corn;

bring water from the well or outside fountain;

gather firewood;

wash clothes outside the home;

take lunch to the husband working in the field;

agricultural work; plant, take grain off corn, watch animals, etc.

sell products; food, animals, etc.

paid work outside the home; wash clothes, deliver water, etc.

paid work inside the home; have a store, make hats

other activities inside the home; mend, iron

other activities outside the home; visit parents

attend school or training;

visit health clinic or INCAP center.

The interviewer had the responsibility for coding a particular activity into the appropriate category. The only

activities for which income earned was recorded were selling products, work inside the home, and work outside the home.

The interviewers were all Guatemalan women who were trained to administer this questionnaire and were responsible for asking the mothers about their children's illness every two weeks. Therefore, they were quite familiar to the mothers, particularly in the rural villages, where the study had been underway for 5 years prior to the administration of this questionnaire.

### Variables

The variables used in these analyses were whether or not each activity occurred, and, if the activity occurred, the following:

when it occurred (morning, afternoon, or all day);

length of time in minutes;

distance from home where it occurred;

minutes of help provided by other adults;

amount of income earned;

whether a child under 6 accompanied the mother.

Four summary measures of work were also created: the total time she spent working at income-producing activities or in agricultural work( which included food processing), her total income for the day, the total amount of time accounted for, which did not include child caretaking and food preparation, and the total distance travelled in the previous day.

## RESULTS

### Description of time use.

Seasonality Estimates of the frequency of work activities for each of the four rounds are illustrated in Figure 5.1. About 10% of the women reported doing an income-earning activity on the previous day, with work inside the home the most common. The frequencies of income-earning work did not vary by season, nor did they vary by rural/urban residence. On the other hand, agricultural work varied considerably by season in both the rural and urban villages, with 70% of women reporting at least some agricultural activities during the peak season in the rural villages.

Time use patterns In all seasons, and in both urban and rural villages, approximately 85% of mothers reported doing child caretaking and food preparation for a full day (these are women with young children).

In addition to child caretaking and food preparation, the average women reported four hours a day in the 13 other activities listed on the response form. Table 5.1 shows the total amount of time per day in activities that was reported, the amount of time the women received help from an adult, and the amount of time spent in working for income or in an agricultural activity for all women (see Figure 5.2 also). As the Figure suggests, about 4 1/2 hours of rural women's time, and 3 1/2 hours of urban women's time are accounted for, although child caretaking and food preparation, which probably require large

amounts of time, have not been included in the total sum. More time is accounted for in the rural than the urban areas, either because time requirements are greater, or the categories of activities were more appropriate for that group. In this analysis, help from older children is not included due to limitations of time and expense and complexity of data analysis of the latter data set.

Women's work For those women who reported either paid work or agricultural work, the amount of time per day spent on each activity is illustrated in Figure 5.3 for rounds 3 and 4. For those women who did report working for earnings, particularly in the urban villages, days of 8 to 9 hours of work are average. These urban work hours are quite high considering that the sample was restricted to women who were pregnant or mothers of children under 3. The variability of all estimates is quite high.

Table 5.2 presents correlations of the amount of money earned per day with time spent wage-earning and in agricultural work, and distance to work. These correlations are all in the expected direction, and significant, supporting to some extent the validity of the data.

Effects of women's income-earning work on her other activities.

Child caretaking and food preparation In examining these patterns, agricultural work was not included, because it could include standard domestic chores that could be performed in the home. The relationship of women's work for earnings and amount of child caretaking or food preparation reported is shown in Table 5.3 and in Figure 5.4. Women who worked for income were

significantly less likely to report spending all day in child caretaking for both rounds and village types, and food preparation in all but Round 4, rural villages.

Clinic attendance.- Table 5.3 also shows that women's income earning was not associated with likelihood of taking a child to the clinic - either the supplementation center in the rural villages, or the health clinic in the urban villages.

Other household activities.-Table 5.4 and Figure 5.5 present comparisons of time women reported performing other household activities and the minutes of help they received from adults as a function of whether or not they were engaged in income-generating activities. Women working reported significantly longer time use than non-working women; urban women who worked for earnings reported about 6 hours more of activities than non-working women, and rural women reported 4 hours more of activities.

Because actual child caretaking and food preparation time were not estimated, it is not possible to determine how much less time working mothers are spending on those activities. When the amount of time women reported working is subtracted from their total time reported, as Figure 5.5 shows, working mothers seem to be spending less time at other activities than are non-working mothers. Rural working mothers spend significantly less time washing clothes at round 4 than non-working mothers. No differences were seen for urban women.

Help received.- Whether women who worked received more help from adults than those who did not is also illustrated in Table

5.4 and Figure 5.5. Approximately half an hour per day of help from adults was reported for all mothers. Rural mothers reported significantly more help if they worked in round 4, but significantly less help if they worked in round 3. It is not clear how to interpret these results. No significant differences were seen for urban women.

Table 5.5 summarizes the number of mothers who report adult help by type of activity that they performed. These rates of help are very low for both urban and rural women. The most commonly assisted activity is child care, about 20% of both workers and non-workers received help. During round 4, rural mothers working at income-earning activities received significantly more adult help in getting water and washing clothes than non income-earners.

The amount of help that the mother received from adults was positively associated with her income ( $r=.13$ ,  $p<.01$ ), and with the amount of time she worked ( $r=.17$ ,  $p<.01$ ) for one round (3) in the urban villages. In the same round and village type, the more help she received, the less likely she was to report full-day child caretaking ( $r=-.12$ ,  $p<.01$ ). None of these associations were significant in round 4, or in the rural villages.

Child caretaking and food preparation Does the amount of time per day that the mother works relate to her child caretaking and food preparation time? Figure 5.6 present the percent of mothers who report full-day child caretaking and full-day food preparation as a function of the number of hours a day they are involved in work. Agricultural work was included in this

analysis, since it requires women to be engaged in other activities. As both figures indicate, in the rural areas, only women who report more than 5 to 6 hours of work per day indicate that they are less likely to perform child caretaking or food preparation all day than are women who report no work activity. In fact, those who report from 1 to 4 hours per day of work are more likely to be involved in full-day caretaking than those who report no economic or agricultural activity. Mothers are probably finding a way of either working at home, or taking children with them for their work.

In order to check this impression, a non-parametric correlation of hours per day of income-earning or agricultural work, and whether or not the woman reported full-day child caretaking was calculated. In the rural area, the only significant correlation was for round 4, food preparation: the more hours a day the woman worked, the more time she spent in food preparation ( $\tau_b = .12, p < .01$ ). Perhaps women were working in food preparation.

In the urban areas, the non-parametric association of hours of work and percent of mothers reporting full-day child caretaking and food preparation are consistently negative and significant. Women appear to report less full-day child caretaking when they work 4 or more hours a day, and report full-day food preparation when they work more than 6 hours a day. It is important to recall that the mothers in the urban sample have children 3 and under, whereas the rural mothers have children

under 7, which includes mothers who have children that require much less intensive watching than do toddlers.

Distance and child care.- The final question was whether mothers were more likely to report less full-day child caretaking if they worked further from their homes. Table 5.6 presents the Chi-square analysis of distance of work from home by amount of child caretaking mothers report. These are reported for agricultural work, selling products, and work outside the home. Only women who reported work are included in that analysis. Small sample sizes make some of the analyses tenuous.

Associations of distance to work and amount of child caretaking the mother reported are significant for agricultural work for both urban and rural villages; the closer the work to the home, the more likely the mother is to report full-day child care. (See Fig. 5.7.1 to 5.7.3) It is important to remember that some of the activities included in agricultural work can, and traditionally are, performed in the home, such as taking the corn kernels off the ears. For the other two types of work coded, selling products and work outside the home, again significant associations between distance to work and amount of child caretaking performed are seen.

Finally, whether or not the mother reports full-day child caretaking is negatively associated with the distance she went from home that day, for work or any purpose. This was found in both the rural villages (Tau b=-.34, p<.01 for round 3, Tau b = -.26, p<.01 for round 4) and the urban villages (Tau b=-.43, p<.01 round 3, Tau b=-.36, p<.01, round 4).

## DISCUSSION

Women who work for earnings reported significantly more time used than women who did not report economic activity in both rural and urban villages. Mothers who were wage-earners spent only slightly less time in other home production activities than non-workers. The rural women who worked for earnings spent significantly less time in washing clothes than the non-income earners. Urban women who worked for income did not differ significantly from non-workers on any specific activity, although they showed a tendency for less visiting. Neither rural nor urban women differed in clinic attendance as a function of women's work.

Fewer working mothers in both rural and urban areas reported spending full days in child caretaking or food preparation than non-working mothers, as one might expect. However, in the rural areas, this reduction in child caretaking was minimal. There was no correlation between the number of hours per day of income-earning work and amount of child caretaking. Further, rural women reported spending less time in child caretaking and food preparation only when they worked 6-7 hours or more per day.

Other researchers have also found that women who work for earnings reduce their leisure time before cutting into home production or child caretaking times, consistent with the findings here (DaVanzo and Lee, 1983; Evanson and King, 1983).

In the urban areas, women who worked 4 or more hours per day reported less full-day child caretaking and full-day food preparation, and the more hours per day they worked, the less

time they spent in child caretaking and food preparation. These urban-rural differences could be due to two factors: sample characteristics and work/child caretaking incompatibility. In the rural villages, women with children 4-6 years of age were included, whereas they were not included in the urban villages. This older age group of children require much less intensive caretaking than a younger group. Women who work for earnings may also tend to have no young (below 4) children in the home. Analyses in section VI on schooling indicated that in rural areas, women are less likely to work for earnings if there is a child 3 or under in the home, whereas this pattern was not seen in the urban villages.

Second, income-earning work and child caretaking may be more incompatible in the urban areas than the rural villages. In the rural areas, the further from home the woman worked, the less likely she was to report all-day child caretaking, and the association was significant at or beyond the .01 level. In the rural areas, the negative relationship between distance from home working and full-day child caretaking was significant only for one type of job (selling products) and one round (3).

Previous researchers have suggested that in extended families, a working mother might receive help in domestic tasks from other adults, particularly in rural areas, where extended families are more prevalent (see Engle, 1986, for summary). Here, relatively little help was received from persons other than older children, regardless of the women's working status. This was

also the case in a variety of studies summarized by Engle (1986). In the rural villages, working mothers received more help only in washing clothes and drawing water than non-income-earning mothers. This finding is consistent with the previous observation that the only activity that rural working mothers were significantly less often engaged in was washing clothes, and this is one of the activities in which significantly more help was received. In several of these villages, washing clothes was a full-day job, involving a hike to a nearby river, time spent on the bank of the river washing, drying clothes, and socializing. Further, the correlation of both amount earned and time in income-earning activities (plus agricultural work) with hours of help received was insignificant, with the exception of the third round of the urban data. These results are also consistent with the findings on child caretaking in Sections II and III: mothers reports of child caretaking help provided by other family suggested few significant differences in help received by work status of the mother. Less than half of the mothers reported help by anyone.

It is possible that considerable help was provided by the older children, which was not analyzed in this section. However, Clark (1979) analyzed the children's activities in great detail, and concluded that relatively little work was reported for all categories with the exception of washing out of the home, an activity reported for 10% of rural girls. This is the activity that was significantly lower for working mothers than non-working mothers in the rural area. Time in child caretaking and food

preparation was not coded in hours and minutes for older children, as it had not been for the mothers. Thus it appears that the older siblings did not provide a tremendous amount of help in activities other than food preparation and child care-taking, whether or not the mother was working. On the other hand, as analyses in section III indicated, children helped in other ways; rural mothers were less likely to work if they were receiving income from their children.

The picture that emerges from this analysis is that women who work for income work longer hours, but they do not substantially reduce other activities, nor do they receive much additional help from adults. They reduce their time in child caretaking and food preparation as the number of hours of work increases, particularly in the urban areas. The specific details of that decrease cannot be determined from this data set. The further away their work, the more likely they are to decrease time in child care. Further, for the rural families, the threshold when a substantial proportion of mothers do not report doing full-day child minding is at 6-7 hours per day of work, compared to 4 hours per day for urban families. These data, then, provide us with a picture of doubleday phenomenon for women who work for earnings.

A number of caveats must be made concerning the quality of the data. First, for a variety of reasons, the total time accounted for is only 1/4 of a woman's average day, leading one to suspect that many activities were not included. Many of the

categories of activities were vague, and prone to misinterpretation and misclassification. The categories were much more appropriate for rural than urban women, resulting in low rates of response for urban women and a low overall total time accounted for. Although child caretaking and food preparation are difficult to assess, the absence of time measures on these two key measures makes quantitative conclusions more difficult.

High-quality time use data are difficult to collect in industrialized countries, and are even more suspect in developing countries. Further, the method of activity-based recall used here is probably more subject to omission of critical events than is serial recall of all activities in order of occurrence. A more complete analysis of the problems facing different forms of time use estimates can be found in Engle and Butz (1983).

Clark (1979), in her Ph.D. dissertation, used the children's time use estimates to determine the effects of their work activities on their school attendance. From an intensive examination of the data in Guatemala, she mentioned several problems: failure to collect time estimates for child care and food preparation; inappropriateness of many of the activity categories, particularly for the urban area; questions about the ability of people, particularly rural people, to estimate time accurately; and "concern on the part of interviewers and field supervisors (that) indicated a good deal of skepticism about the ability of respondents to estimate accurately the time devoted to activities, especially in the rural areas." (Clark, 1979, p. 146). She concluded, however, that these data can be used for

descriptive purposes, to provide a normative picture of time use patterns. Considerable efforts were made to help respondents focus on time of day, tying activities to events that occurred, such as lunch. She concludes further that there is "some indication that women can recall primary activities fairly well." (p. 147)

The instrument was pretested in a neighboring community not in the study. An observer sat in the homes of six women and observed the woman's time use pattern for a period of 4 to 6 hours. On the following day, she was asked to recall her activities and those of her children. Women were able to recall 60 percent of their activities. They tended to forget activities such as talking to a child, or parts of a larger activity, but rarely reported activities which had not occurred. Clark(1979) concluded that the data could be used to describe aggregate behavior and could provide a "fairly good qualitative idea of norms about activities"(p. 148). Following these recommendations, time use data were presented here primarily in a descriptive form, although some individual-level analyses of time use by the mother were also presented.

In sum, these data suggest that women who work for earnings are working more hours overall than those who do not, that work for earnings and child caretaking tend to be negatively associated, especially in the urban villages and when the work is far from home, and that relatively little help is received from adult household members.

One policy implication of these findings is that the absence of help for child caretaking could lead to child neglect, particularly in urban villages. In a recent study of working women in Lima, Peru, Bunster and Chaney (1985) indicated that the most pressing issue the women mentioned was child care. The matrifocal households with mother, grandmother, and sisters described as new domestic urban forms (e.g., Keller, 1983) were not seen here. Second, working mothers seem to have little free time. Further work is needed to determine the effects of ages of children on working patterns, and to improve the data collection methods, particularly in the urban villages.

TABLE 5.1

Average Number of Hours Per Day (a) Reportedly  
Spent by Mothers by Round and Village Type

	Rural				Urban			
	Round 3 (N=419)		Round 4 (N=413)		Round 3 (N=343)		Round 4 (N=461)	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Total Time (a) (hrs/day)	4.52	3.56	4.28	3.48	3.85	4.54	3.13	3.90
Amount of Help Received From Adults (hrs/day)	0.53	2.70	0.19	0.88	0.11	0.69	0.13	0.78
Average Time Working (Workers Only) (N in parentheses)								
Agricultural Work (hrs/day)	0.91 (245)	1.68	1.01 (289)	1.51	0.47 (58)	0.88	0.54 (198)	1.09
Selling Products (hrs/day)	3.13 (29)	4.3	2.62 (10)	4.45	4.94 (16)	4.00	5.42 (23)	4.35
Other Work Outside Home	6.75 (8)	3.22	7.58 (13)	4.29	9.02 (32)	5.09	8.74 (26)	4.39
Other Work In Home	4.35 (53)	3.32	4.26 (58)	3.40	7.68 (26)	5.68	7.35 (45)	4.79

a = Total time in addition to food preparation and child care.

Note: The columns will not sum to the total time reported because time in other household activities is not shown.

\*  $p < .05$

\*\*  $p < .01$

TABLE 5.2  
 Correlations of Amount Earned With Total  
 Time Spent Wage-Earning and Distance to Work

	Rural		Urban	
	Round 3	Round 4	Round 3	Round 4
	r	r	r	r
Time Spent Wage-Earning	.50**	.44**	.27**	.34**
Distance	.52**	.17**	.33**	.17**

Note: Sample sizes are about 400 per round.

\*  $p < .05$   
 \*\*  $p < .01$

TABLE 5.3

Percent of Mothers Who Reported Spending Morning, Afternoon, All Day, or No Time in Food Preparation, Child Caretaking, or Clinic, by Work Status of Mother: Chi Square Analysis

Mother's Work Status:	Rural				Urban			
	Round 3		Round 4		Round 3		Round 4	
	No Work	Work	No Work	Work	No Work	Work	No Work	Work
<b>Food Preparation</b>								
Not Done	8% <sup>b</sup>	20%	10%	11%	13%	36%	3%	22%
AM Only	2	5	1	0	2	6	2	3
PM Only	.5	3	2	1	.5	4	1	3
All Day	89	72	87	87	86	54	93	72
N	331	88	334	79	272	71	368	93
$\chi^2$	17.9**		1.55		37.4**		40.9**	
<b>Child Caretaking</b>								
Not Done	10	16	10	11	10	34	6	23
AM Only	.6	2	2	2	1	6	1	5
PM Only	1	9	1	10	1	8	2	3
All Day	88	73	87	77	88	52	91	69
N	331	88	334	79	272	71	368	93
$\chi^2$	23.3**		15.0**		47.8**		32.9**	
<b>Attend Clinic</b>								
Not Done	38	49	53	61	90	97	98	98
AM Only	17	11	14	10	5	0	1	2
PM Only	12	15	8	9	3	0	.8	0
All Day	33	25	25	20	2	3	.3	0
N	331	88	334	79	272	71	368	93
$\chi^2$	5.82		1.91		6.61		1.31	

Note: analyses performed on raw data.

a = income-earning work only.

b column sums to 100%; it indicates what % of mothers, within this work status, were performing the activity in the morning, in the afternoon, all day, or not at all.

\* p < .05

\*\* p < .01

TABLE 5.4

Average Hours/Day Spent in Household Activities as a Function  
of Mother's Income-Earning Work by Village Type and Round

Mother's Work Status:		Rural				Urban			
		Round 3		Round 4		Round 3		Round 4	
		No Work	Work	No Work	Work	No Work	Work	No Work	Work
Total Time (hrs/day)	$\bar{X}$	3.79	7.26	3.67	6.88	2.48	9.10	1.82	8.32
	SD	3.15	3.67	3.13	3.70	2.72	4.76	2.38	4.39
	N	331	88	334	79	272	71	368	93
	t	-8.88**		7.14**		-11.27**		-13.78**	
Amount of Help Received From Others (b)	$\bar{X}$	0.63	0.21	0.11	0.51	0.04	0.36	0.08	0.31
	SD	2.35	0.96	0.60	1.55	0.28	1.39	0.51	1.40
	N	331	88	334	79	272	71	368	93
	t	2.42*		-2.25*		-1.95		-1.57	
Time Shopping	$\bar{X}$	1.08	1.24	0.88	0.69	1.55	1.31	0.78	0.77
	SD	2.01	1.42	1.29	0.51	1.85	1.31	1.14	0.93
	N	198	57	189	50	206	29	252	44
	t	-0.64		1.64		0.65		0.06	
Time Getting Water	$\bar{X}$	0.75	0.74	0.69	0.76	0.61	0.25	0.66	0.58
	SD	0.54	0.47	0.48	0.66	0.52	0	0.37	0.24
	N	221	44	210	36	22	1	35	4
	t	0.20		-0.61		0.68		0.40	
Time Getting Wood	$\bar{X}$	1.99	2.75	2.55	1.15	2.67	0	2.18	3.08
	SD	1.34	1.53	1.51	0.86	0.92	0	1.43	1.41
	N	14	3	26	5	6	0	10	2
	t	-0.27		1.99		0		-0.81	
Time Washing Clothes	$\bar{X}$	3.32	2.76	4.30	1.83	2.58	0	3.33	1.42
	SD	2.70	2.72	3.60	0.86	0.71	0	2.02	0.58
	N	50	15	52	10	2	0	5	
	t	0.71		4.34**		0		1.56	
Bring Food	$\bar{X}$	1.87	1.08	1.80	1.64	2.67	0	2.26	0
	SD	1.10	0.71	0.98	1.26	1.32	0	1.27	0
	N	10	2	10	3	6	0	11	0
	t	0.95		0.24		0		0	
Agricultural Work	$\bar{X}$	0.90	0.95	1.06	0.78	0.48	0.28	0.56	0.40
	SD	1.68	1.74	1.60	0.93	0.92	0.18	1.17	0.36
	N	204	41	239	50	53	5	169	29
	t	-0.15		1.64		1.34		1.48	
Social Activities Outside House	$\bar{X}$	2.14	2.09	1.89	1.25	5.09	3.99	3.38	2.12
	SD	2.89	3.42	2.86	0.86	5.81	2.96	3.81	1.78
	N	126	27	122	14	53	6	89	12
	t	0.07		1.84		0.76		1.92	
Visit Clinic	$\bar{X}$	0.96	0.85	0.79	0.79	3.48	7.58	1.87	3.58
	SD	0.97	0.82	0.73	0.51	4.60	0.71	1.85	2.12
	N	207	45	156	31	28	2	9	2
	t	0.69		-0.03		-1.24		-1.17	

Note: t-test compares time spent by "workers" and "non-workers."

N = Numbers of participants in a given activity.

b = time spent by other adults.

\* p < .05

\*\* p < .01

TABLE 5.5

Percent of Activities in Which Mother Received  
Help From Adults by Mother's Income-Earning Status

Mother's Status	Rural				Urban			
	Round 3		Round 4		Round 3		Round 4	
Activity	No Work	Work	No Work	Work	No Work	Work	No Work	Work
Food Preparation	14%	7	9	15	12%	15	21	20
	$\chi^2$				$\chi^2$			
	3.39		6.92		1.46		2.35	
	N		371		283		429	
Child Care	21%	22	21	26	20	27	23	29
	$\chi^2$				$\chi^2$			
	1.42		1.53		3.6		1.24	
	N		370		292		417	
Purchases	10	18	7	14	5	10	6	5
	$\chi^2$				$\chi^2$			
	3.73		3.15		.41		.56	
	N		235		296		296	
Get Water	7	11	4	14	0	0	6	0
	$\chi^2$				$\chi^2$			
	.33		9.52**		-		-	
	N		273		23		39	
Get Wood	0	0	0		0	0	10	
	$\chi^2$				$\chi^2$			
	- <sup>c</sup>				-		-	
	N		17		6		12	
Wash Clothes Out of House	0	0	6	10	0	0	0	
	$\chi^2$				$\chi^2$			
	-		5.79*		-		-	
	N		65		2		7	
Take Food to Milpa	0	0	0		0	0	0	
	$\chi^2$				$\chi^2$			
	-				-		-	
	N		12		6		11	
Other Activity In House	2	5	3	0	3	3	13	8
	$\chi^2$				$\chi^2$			
	1.67		0		1.87		1.02	
	N		125		227		310	
Other Activity Out of House	2	4	2	0	2	0	4	8
	$\chi^2$				$\chi^2$			
	0		-		0		7.97*	
	N		153		59		101	
Agricultural Work	9	2	4	2	4	0	2	3
	$\chi^2$				$\chi^2$			
	2.39		.03		-		-	
	N		245		58		198	
Sell Products	-	0	-	0	0	0	-	4
	$\chi^2$				$\chi^2$			
	-				-		-	
	N		29		16		23	
Work Outside Home	-	0	-	0	0	0	0	0
	$\chi^2$				$\chi^2$			
	-				-		-	
	N		8		32		26	
Work Inside Home	-	6	-	10	-	15	-	11
	$\chi^2$				$\chi^2$			
	-				-		-	
	N		53		26		45	

a Work refers to income-earnings only

b Sample size is based on the number of women who reported doing the activity.

c dash means "not appropriate".

Note:  $\chi^2$  analyses performed on raw data.

\* p < .05

\*\* p < .01

TABLE 5.6

Percent of Working Mothers Reporting Doing Child Caretaking  
Part or All Day, By Work Location for Each Type of Work  
(Agricultural, Selling Products, and Working Outside the Home):  
Chi-Square Analysis

	Rural				Urban			
	Round 3		Round 4		Round 3		Round 4	
	Not All Day	All Day						
Child Care by Mother								
Agricultural Work								
Community	75%	96%	70%	97%	100%	98%	83%	99%
Surrounding Area	25	4	27	3	0	2	8	1
Outside Community	0	1	3	.4	-	-	8	0
$\chi^2$	18.5**		32.39**		0		19.70**	
N	24	221	30	259	5	53	12	186
Sell Products								
Community	42	88	67	86	12	0	10	56
Surrounding Area	-	-	-	-	25	50	14	18
Outside Community	58	12	33	14	50	25	86	25
$\chi^2$	5.11*		.81		2.67		8.12*	
N	12	17	3	7	8	8	7	16
Work Outside Home								
Community	50	100	44	75	21	88	22	38
Surrounding Area	17	0	0	25	54	12	50	12
Outside Community	33	0	56	0	25	0	28	0
$\chi^2$	1.6		4.95		11.49**		9.82**	
N	6	2	9	4	24	8	18	8

Note: Within each work category, the column for working mothers sums to 100%, as does the sum for non working mothers.

Note: analyses performed on raw data.

\* p < .05

\*\* p < .01

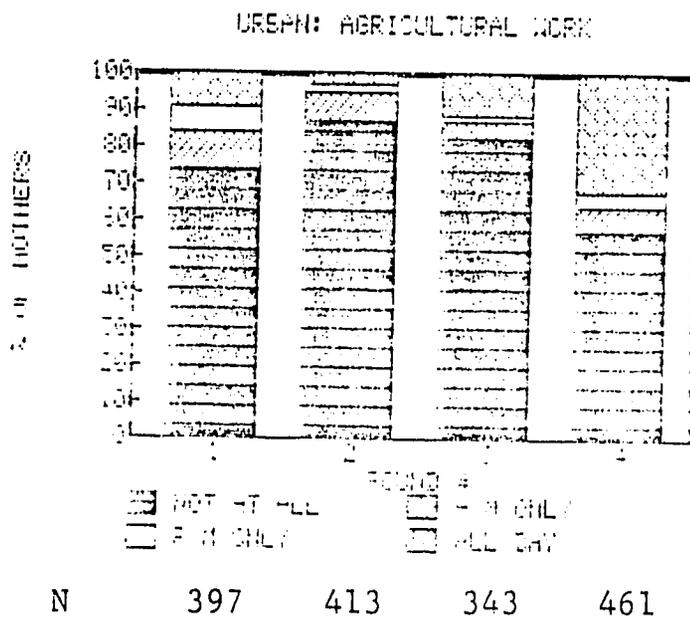
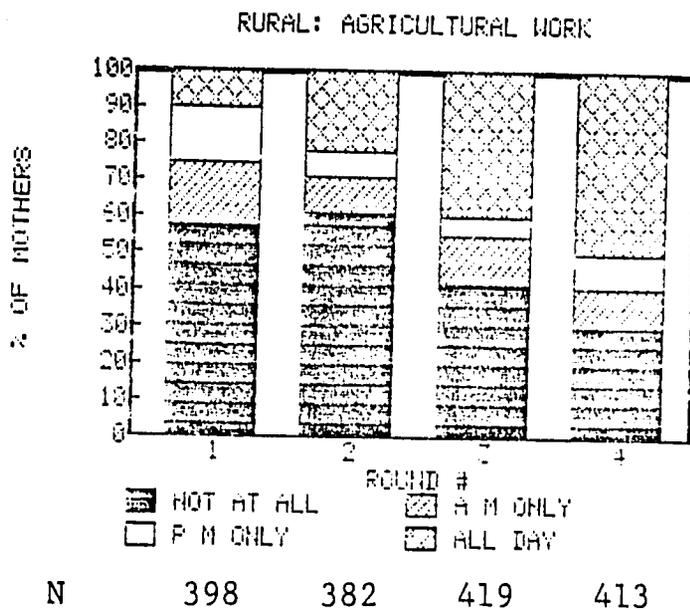


Figure 5.1.1

Percent of Mothers Reporting Agricultural Work by Round and by Village Type (Sample Sizes Below)

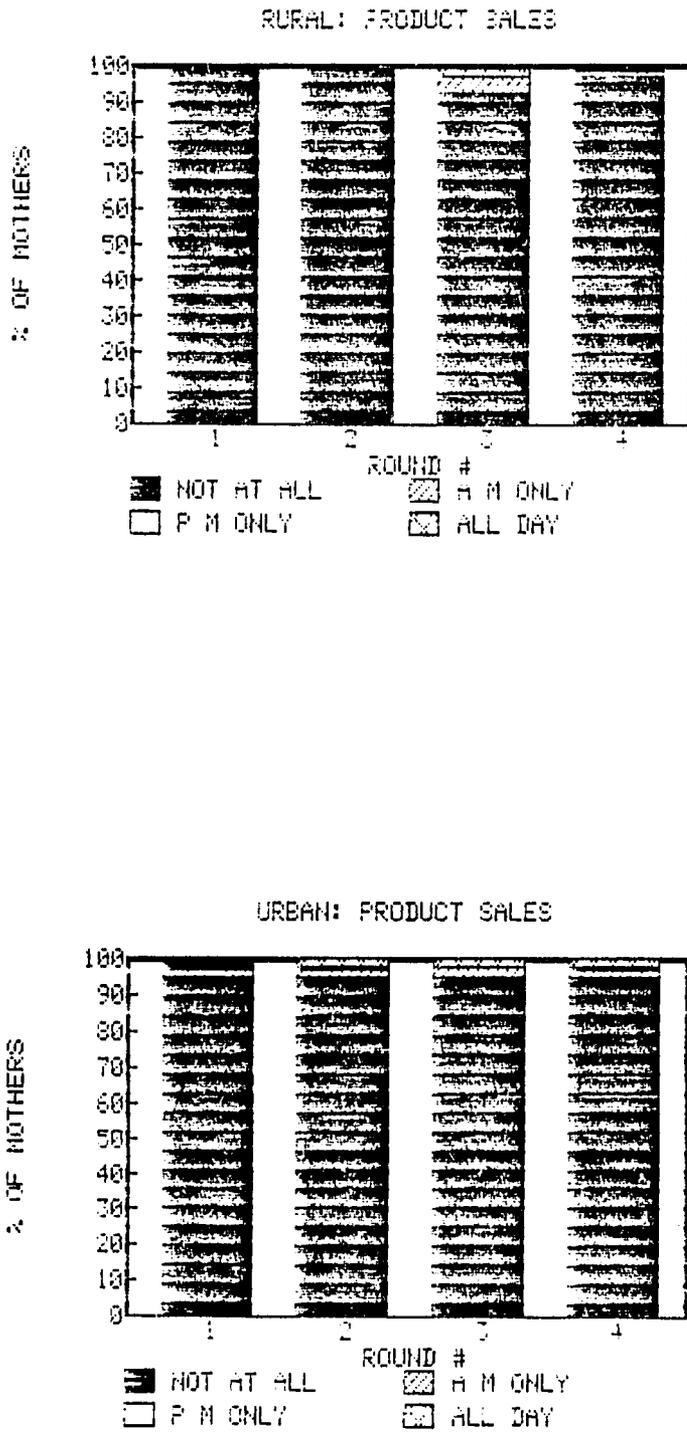


Figure 5.1.2

Percent of Women Reporting Product Sales by Round and Village Type (Sample Sizes in Fig. 5.1.1)

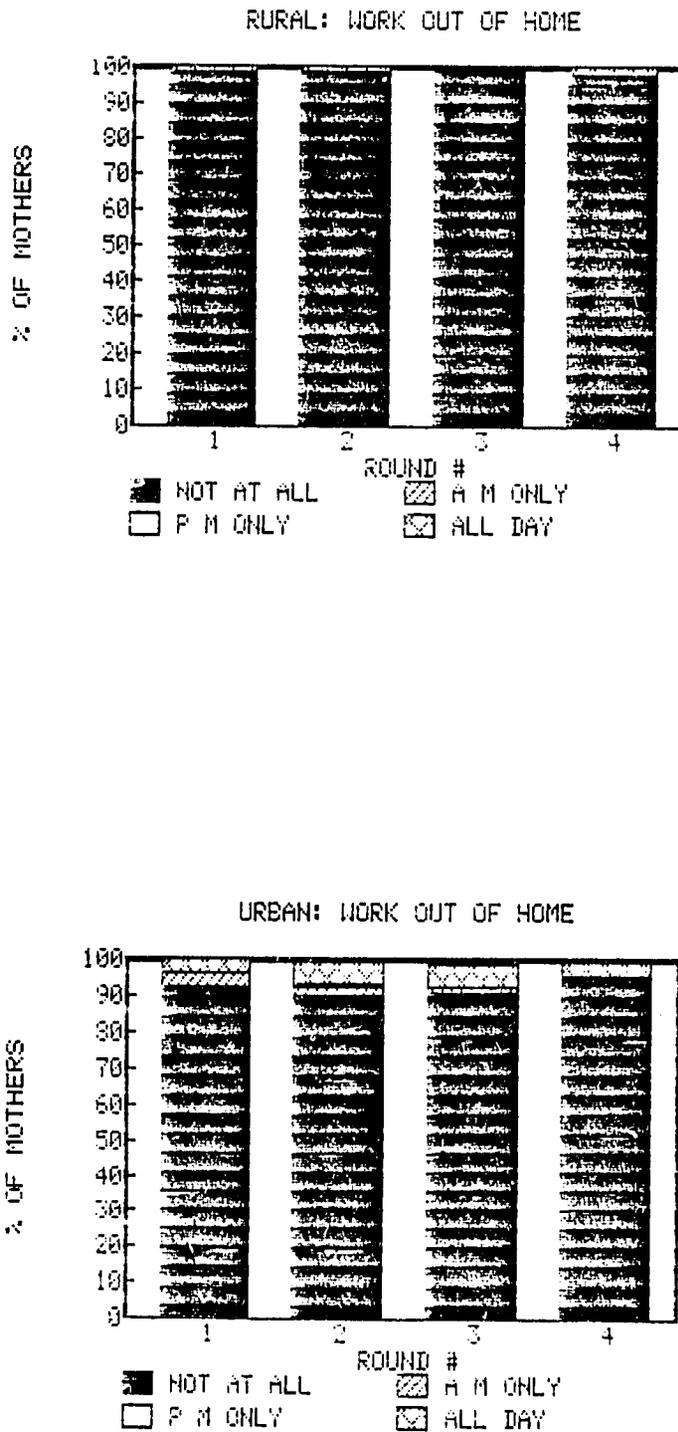


Figure 5.1.3

Percent of Women Reporting Paid Work Outside the Home by Round and Village Type (Sample Sizes in Fig. 5.1.1)

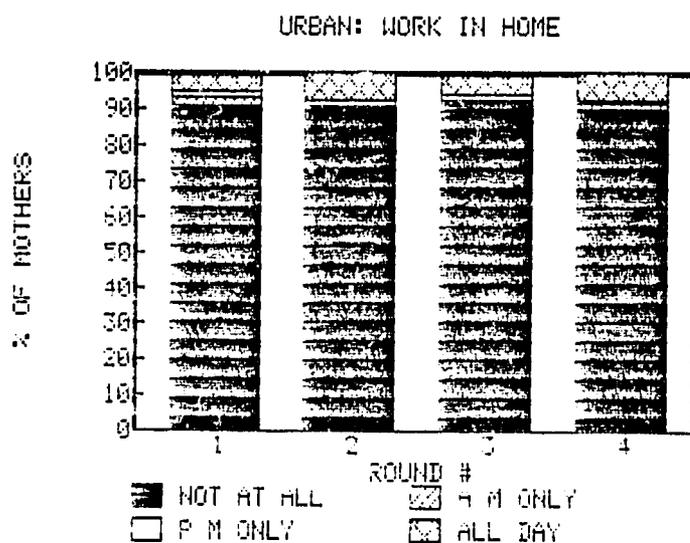
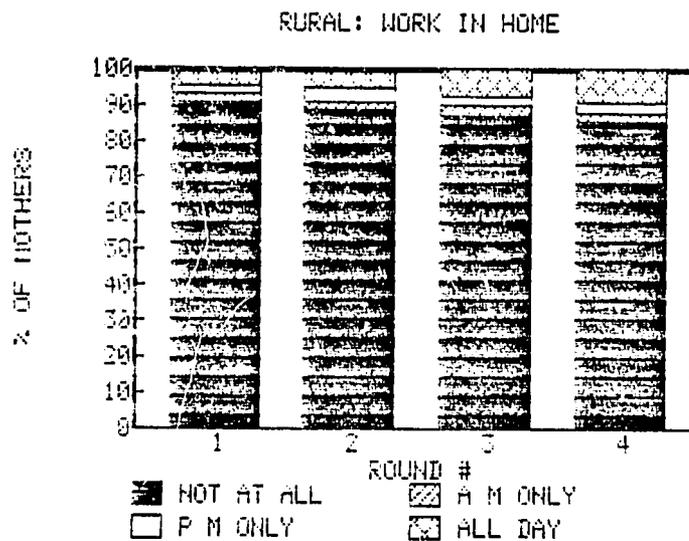


Figure 5.1.4

Percent of Women Reporting Paid Work in Home  
by Round and Village Type (Sample Sizes in Fig. 5.1.1)

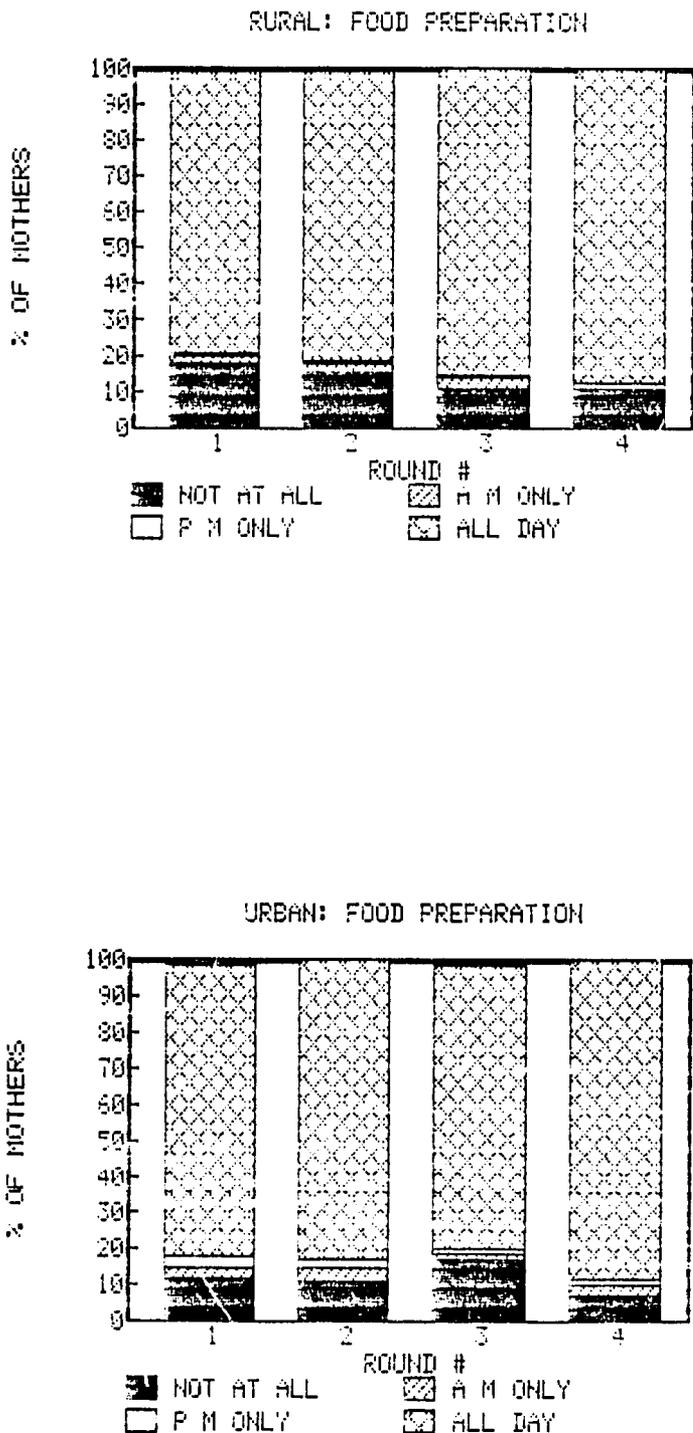


Figure 5.1.5

Percent of Women Reporting Food Preparation by Round and Village Type (Sample Sizes in Fig. 5.1.1)

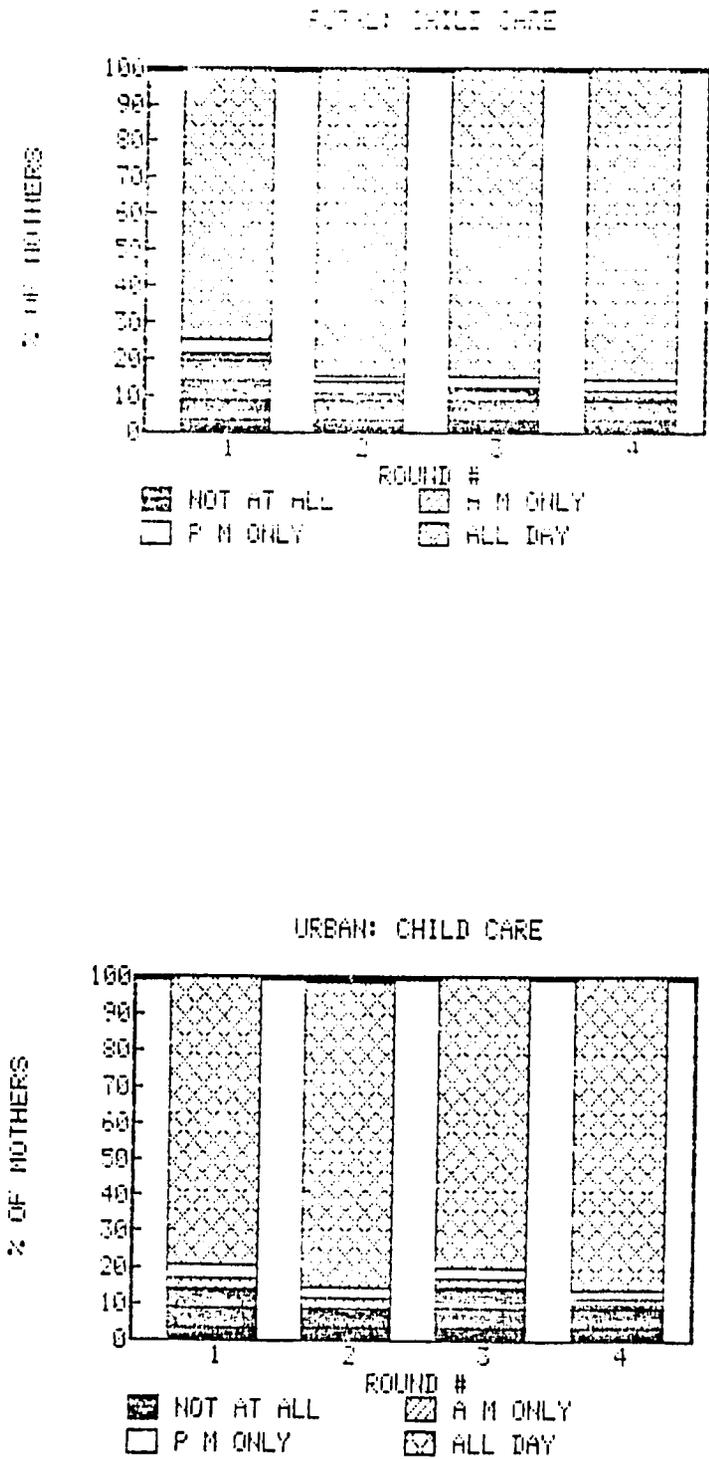


Figure 5.1.6

Percent of Mothers Reporting Taking Care of Children by Round and Village Type (Sample Size in Fig. 5.1.1)

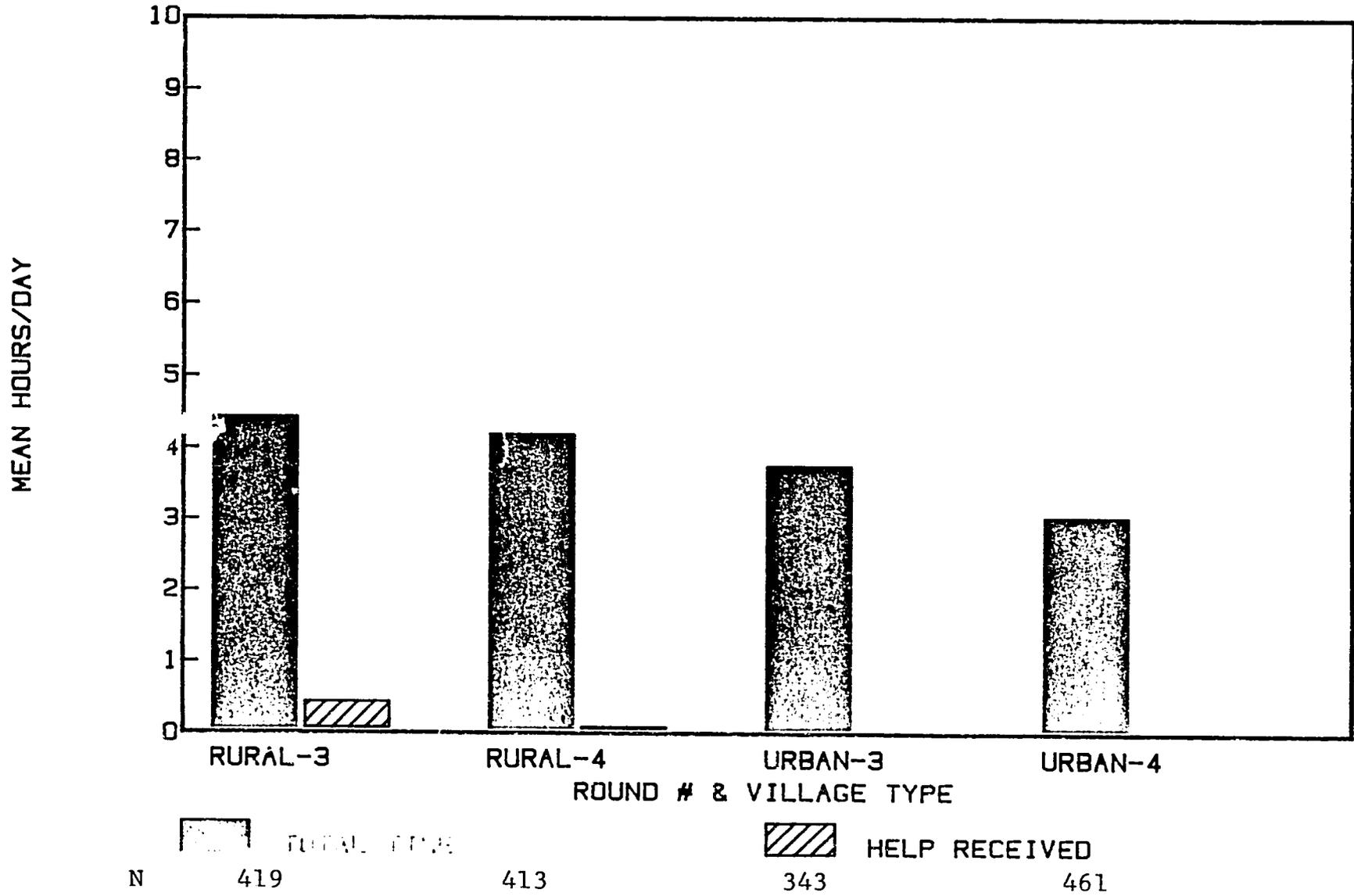


Figure 5.2

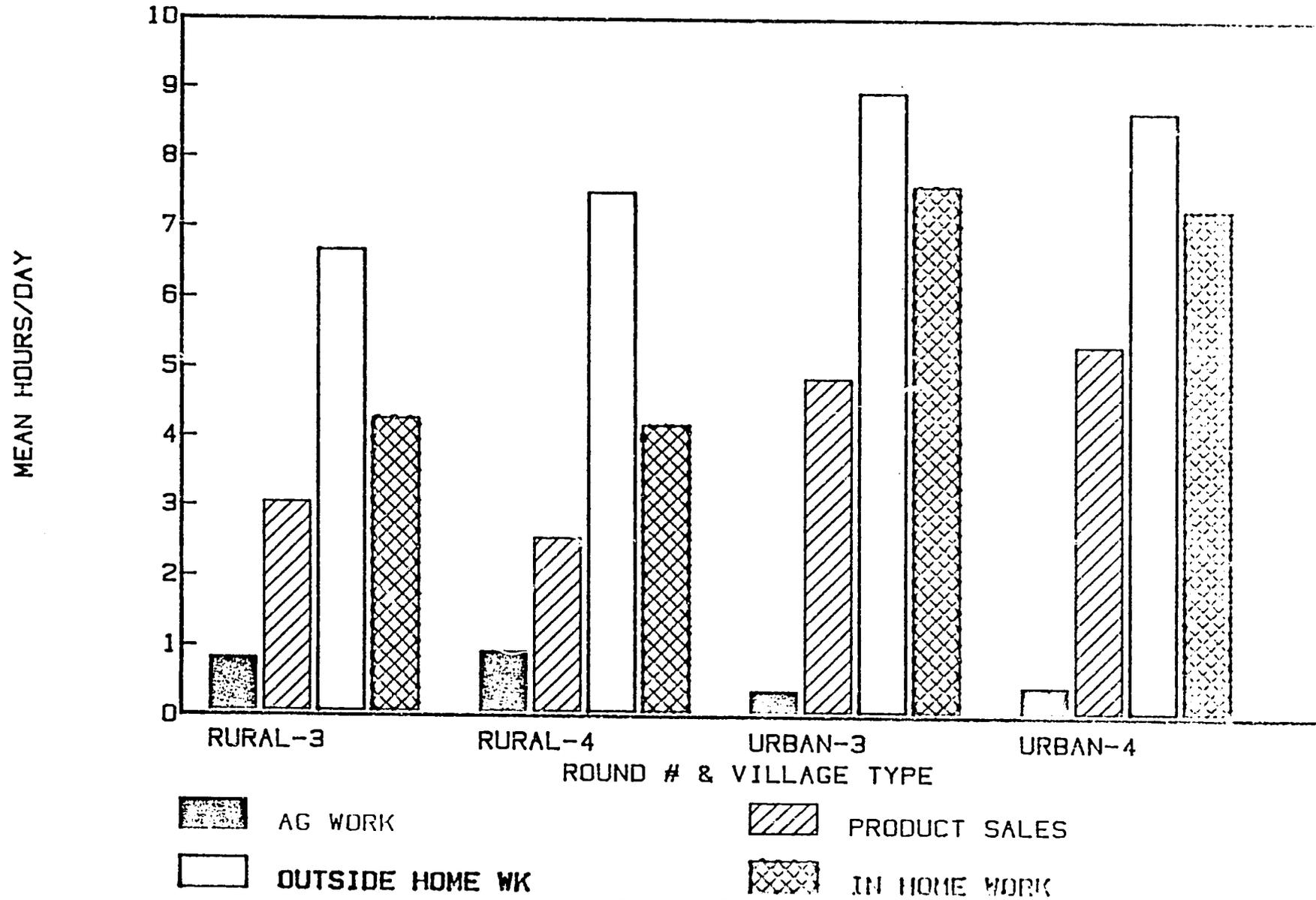


Figure 5.3

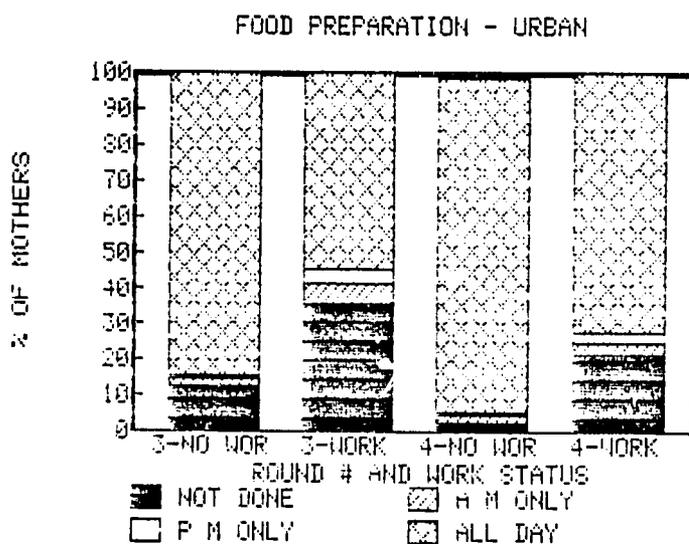
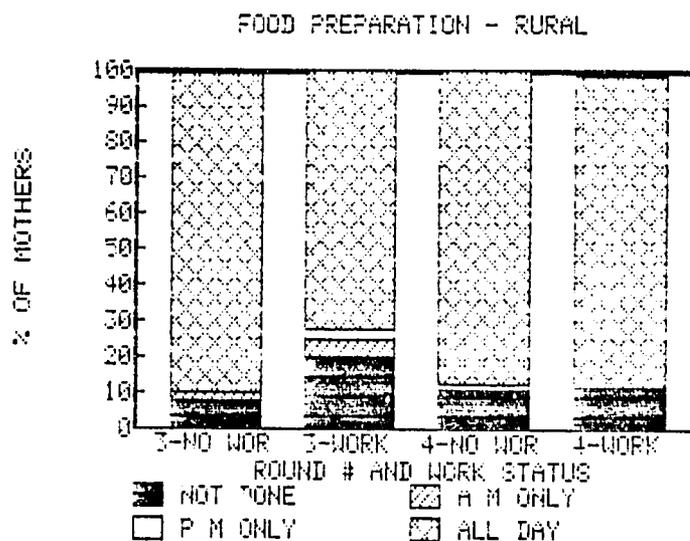


Figure 5.4.1.

Percent of Mothers Reporting Morning, Afternoon, All Day, or No Time in Food Preparation by Round, Mother's Work Status, and Village Type (Sample Sizes and Statistics Tests in Table 5.3)

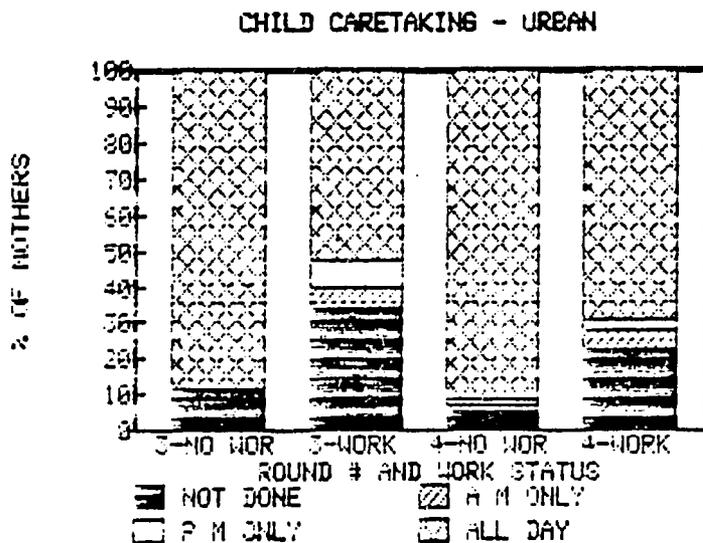
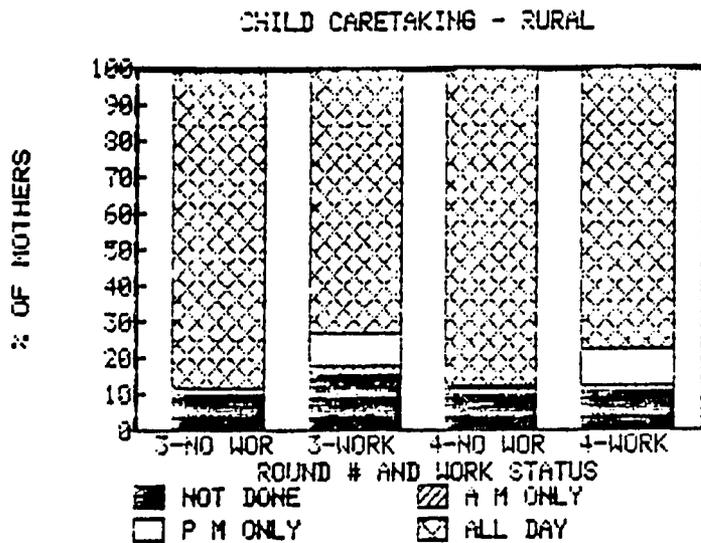


Figure 5.4.2  
 Percent of Mothers Reporting Morning, Afternoon,  
 All Day or No Time in Child Caretaking by Round,  
 Mother's Work Status, and Village Type  
 (Sample Sizes and Statistics in Table 5.3)

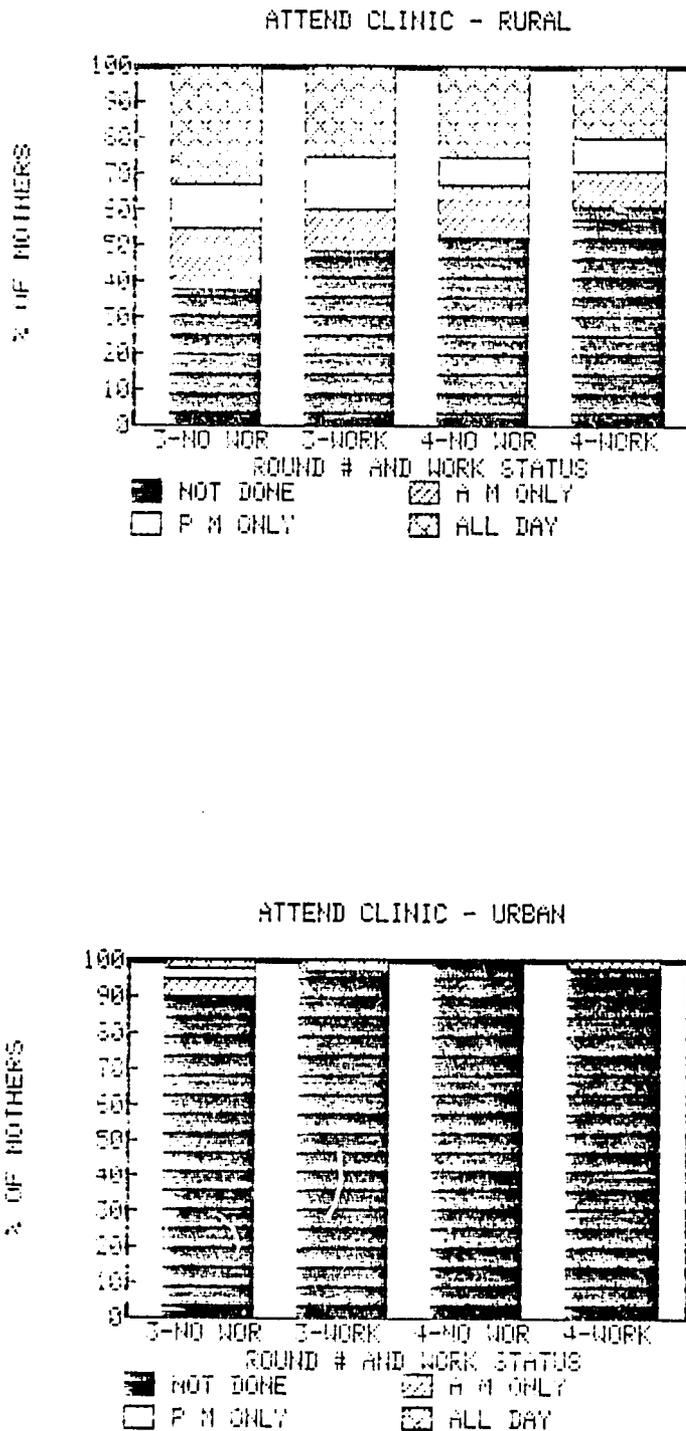


Figure 5.4.3

Percent of Mothers Reporting Morning, Afternoon, All Day, or No Time Attending a Clinic as a Function of Round, Mother's Work Status, and Village Type (Sample Sizes and Statistics in Table 5.3)

Figure 5.5  
 Comparison of Workers' and Non-Workers' Time Use

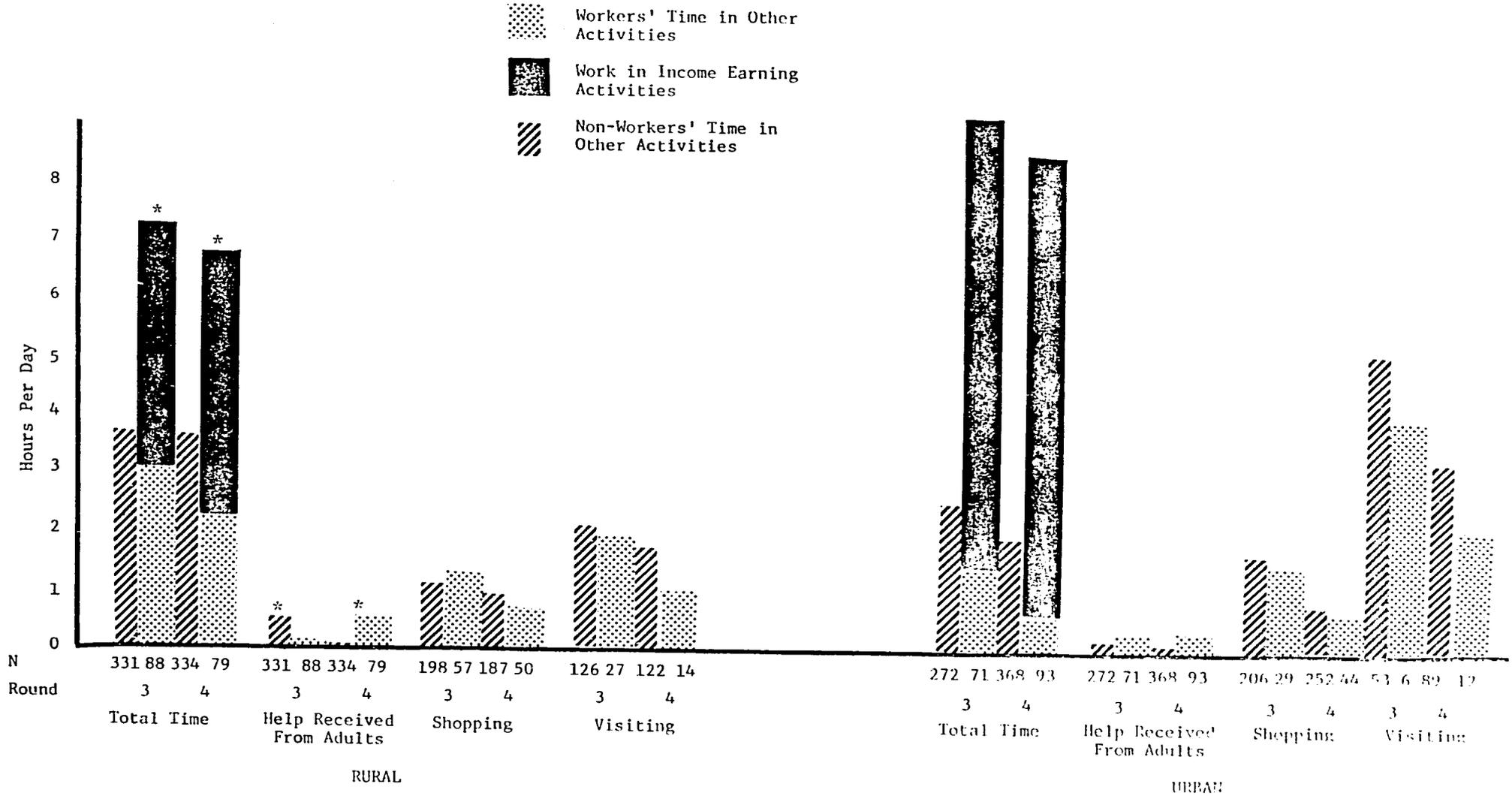
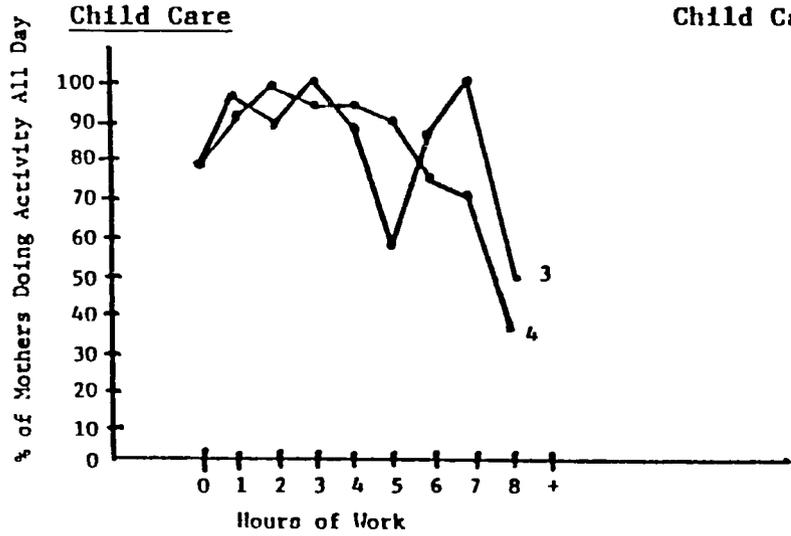
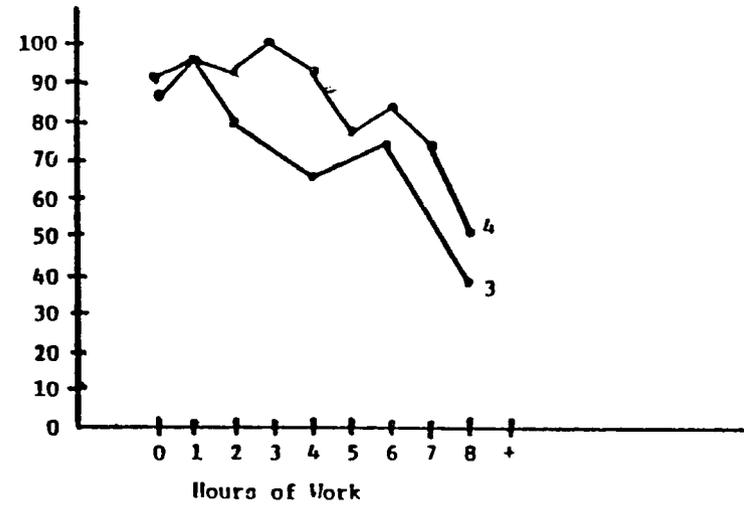


Figure 5.6

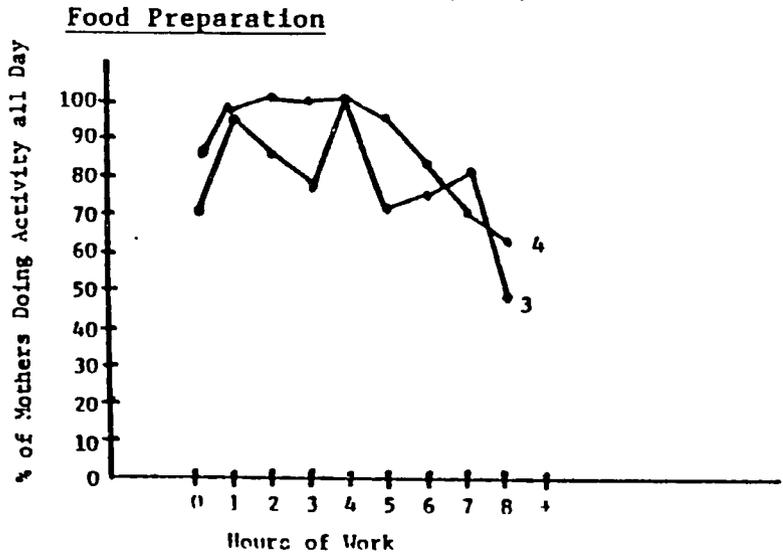
Relationship of Hours/Day of Income-Earning "Work" and Percent of Mothers Reporting Full-Day Child Caretaking or Food Preparation



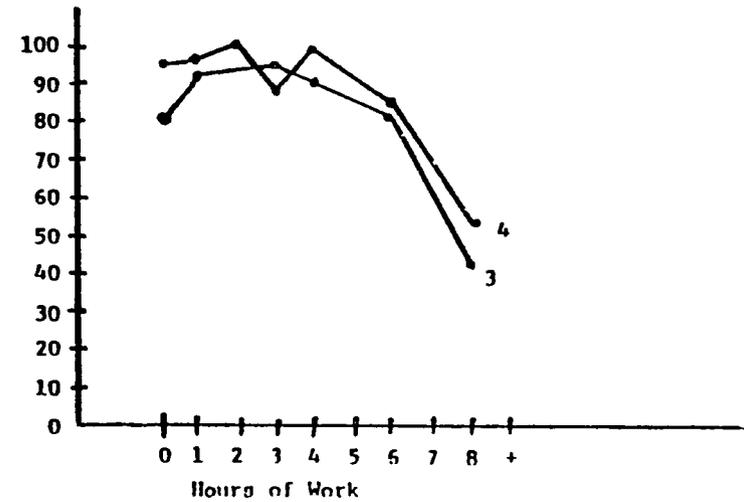
Round 3:  $Tau \beta = -.07$   
 Round 4:  $Tau \beta = -.04$



Round 3:  $Tau \beta = -.22^{**}$   
 Round 4:  $Tau \beta = -.15^{**}$



Round 3:  $Tau \beta = -.02$   
 Round 4:  $Tau \beta = .12^{***}$



Round 3:  $Tau \beta = -.15^{***}$   
 Round 4:  $Tau \beta = -.17^{***}$

\*  $p < .05$   
 \*\*  $p < .01$   
 \*\*\*  $p < .001$



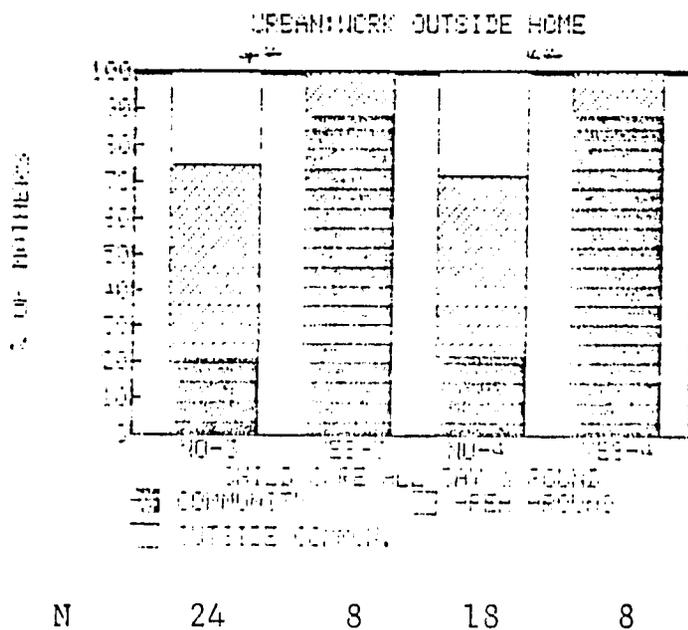
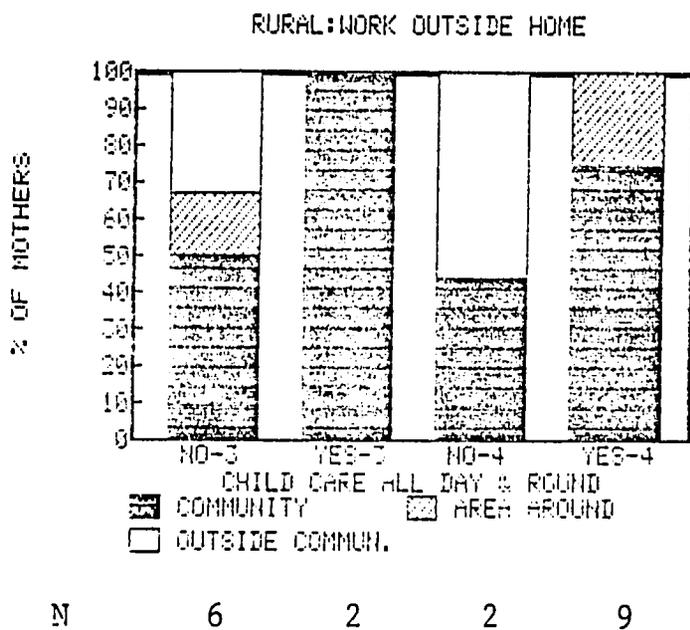


Figure 5.7.2  
Percent of Mothers Who Report Child Caretaking  
All Day or Less Than All Day by Location of Work

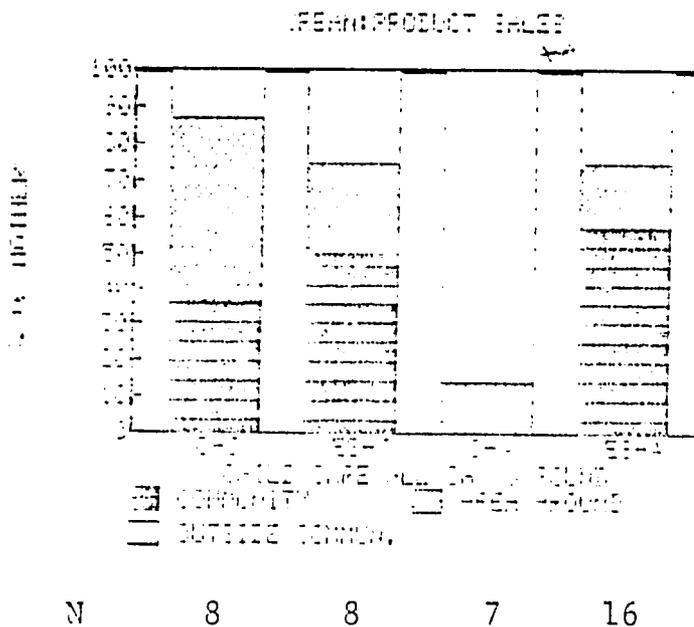
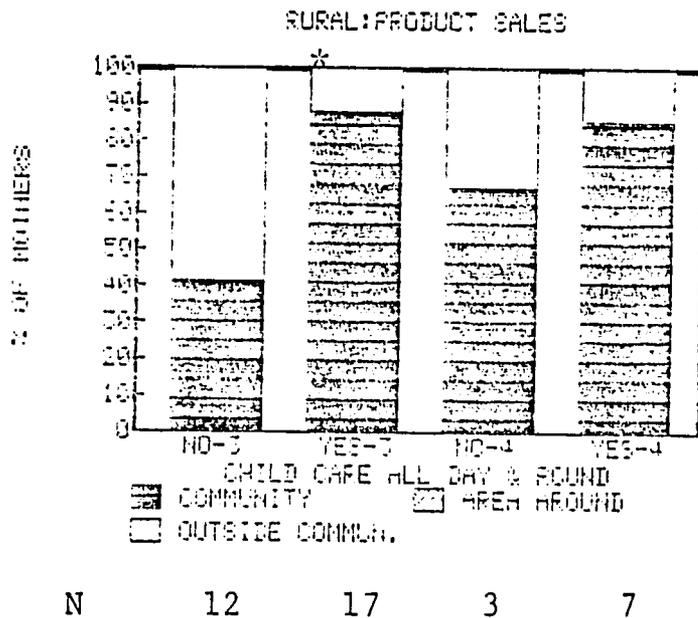


Figure 5.7.3  
 Percent of Mothers Who Report Child Caretaking  
 All Day or Less Than All Day by Location of Work

## SECTION VI

### EFFECTS OF MATERNAL WORK FOR EARNINGS ON CHILDREN'S SCHOOL ENROLLMENT

The extent to which children's economic and household task assignments interfere with their school enrollment has been a concern of development planners and researchers for some period. Those concerned with access to education for girls worry that child care responsibilities may prevent girls from attending school. If mothers are engaged in work activities other than household production, either in or outside the home, one could predict that girls would be even more in demand for child care and home production, and that their education would be still more restricted. On the other hand, a mother's work could facilitate school enrollment for girls if, for instance, a working mother perceived that education was an avenue to better work opportunities for her daughters, and so encouraged her, or if her additional income helped pay the school costs of books, uniforms, or school fees. This proposed positive effect would be more likely to be seen if no young child were present in the home.

In this paper, the possible positive and negative effects of maternal employment on school enrollment for boys and girls in rural and urbanizing Guatemala are examined. Since the relationship of maternal work for earnings to children's access to schooling was presumed to depend on a number of factors, such

as the number of hours per day that the mother works, the type of work she is engaged in, presence of alternative caretakers, or the economic level of the family, these factors were either examined separately or controlled for by regression analyses. It was hypothesized that:

1. if there is a young child in the home, girls whose mothers work for earnings will be less likely to be enrolled in school, controlling for economic and demographic factors, than those whose mothers do not work for earnings; and

2. if there is no young child in the home, girls whose mothers work for earnings will be more likely to attend school than girls whose mothers do not work, controlling for economic and demographic factors.

The relationship between boys' school enrollment and mother's work for earnings was also examined. For boys, it was predicted that economic factors would be more highly associated with school enrollment than maternal work for earnings or the presence of a young child in the home.

The hypothesis that a mother who works for earnings would encourage their daughters' school enrollment was based on several assumptions which could be tested here. First, a woman who works for earnings should be more likely to expect that her daughters' will be income-earners in the future than a woman who does not work for earnings. If she is involved in work that requires educational credentials, she might be more likely to expect a similar choice for her daughter. Second, a woman who works for earnings might be more likely to perceive that her daughter will

be economically useful to her than a woman who does not work for earnings. Third, a woman who works for earnings may be more likely to have a daughter who works for income during her school years than a mother who does not work for earnings and encourage school.

The hypothesized negative effects of having a young child in the home will be explored further by examining the influence of the presence of children of varying ages (infants, toddlers, or preschoolers (3-5), on school enrollment). These patterns will be examined within rural and urbanizing villages.

#### METHOD

Sample. The subjects were families from 4 rural eastern and 2 adjacent urbanizing villages in Guatemala. Data from a large number of families (847) had been gathered as part of a larger study of the factors related to fertility decline, and those families with at least one school-aged child (ages 7 through 14) were included (265 rural families and 140 urban families). From these families, the sample contained 336 rural girls, 337 rural boys, 166 urban girls, and 146 urban boys between the ages of 7 and 14.

Village Description. The rural villages are all Ladino (Spanish-speaking). Residents of the rural villages were primarily rural farmers, although 30% of the population is landless. The two urban villages are next to each other; one part is older, the other is a newer community. They are referred to in this report as a single village. The population is comprised of both

long-term residents and new migrants from rural areas. These communities are often called stepping-stone or peri-urban villages. Although many roads are paved, and electricity is available, there are areas of dirt roads and some houses that have earthen floors. In the rural villages, all roads are of dirt and most houses have dirt floors and tile roofs. In the urbanizing villages, there are a wide range of opportunities for both husband and wife's employment, whereas in the rural areas, fewer opportunities exist. In one rural village, however, a nearby factory has provided a regular source of wage-labor jobs. In another, a large percent of the women are engaged in weaving hats to sell from locally growing reeds.

Instruments. Data for the current project was collected with two survey instruments, the Attitudes and Expectations Questionnaire and an Income and Wealth Questionnaire. In the former questionnaire, each mother was asked a number of questions about the school enrollment, work activities, and future expectations she has of each school-aged child. She was also questioned on her attitudes toward the future utility of boys and girls in general. In the latter, family-level data on farming, income-generation activities, parent's occupation and house quality were collected from the head of household (usually the male).

Procedure. Mothers were interviewed in their homes by trained Guatemalan interviewers who had extensive experience in interviewing for the Attitudes and Expectations survey. Male

interviewers administered the Income and Wealth questionnaire to the male heads of household, again in the interviewee's home. These interviews were conducted in 1975.

Variables - Women's work. Women's work was assessed by asking them the question, "do you work?" (Trabaja Ud?). The effects of the question asked on women's responses about employment has been discussed for this sample (Engle, 1983 a and b) and by Youssef and Helter (1983).

The type of work that they reported doing was categorized into four types: agricultural work, including work on own farm or on the farm of another, domestic work, including cleaning or other domestic tasks, informal work, including cottage industries or petty trading, and formal work, including non-agricultural day labor and specialized labor, such as being a seamstress.

School enrollment was the mother's report as to whether the child was or had been enrolled in school.

Demographic variables that were constructed were the number of older sisters from 7 to 14 in the home, the number of older brothers from 7 to 14 in the home, the number of younger children from 0 to 1, the number of younger siblings from 1 to 3, and the number of younger siblings from 3 to 5.

Marital status was coded on a 3-point scale based on the mother's report: not currently in a union, living in a consensual union, or legally married.

Economic variables. The value of the land that the family owned was constructed from the Income and Wealth questionnaire by Clark (1981). House quality was a summary score based on the

quality of the roof, the floor, and the walls. It ranged from 3 to 16.

Mother's education. The mother's education was her report of the number of years of school that she passed.

Analytic strategy. The basic questions were addressed with a combination of chi-square analyses exploring the association of two variables, and multiple linear regressions on the school enrollment variable. Log-linear analyses were also performed on the school enrollment data in order to check the validity of the findings.

## RESULTS

### School enrollment

School enrolled children were defined as those enrolled at the time of the survey, according to the mother's report.

### Women's work

Table 6.1 presents the number of children whose mothers reported working by sex of child and village type (rural or urban). Frequencies are also shown for each type of work. About half of each group had mothers involved in some form of work.

Slightly more were agricultural workers in the rural area than in the urban area and there were more of the higher skill level workers in the urban villages. In the urban villages, women worked on the average 37 hours/week and earned Q.30/hour (in Quetzales, which were at that time equivalent to a dollar), and in the rural villages, women worked 32 hours per week, for an average wage rate of Q.22 per hour.

### School enrollment by village type

School enrollment was unrelated to sex within village type (Table 6.2); boys and girls were equally likely to attend in both rural and urban villages. Both boys and girls were more likely to go to school if they lived in the urban area than the rural, as Table 6.3 shows.

Maternal work for earnings and school enrollment. None of the chi-square analyses of mother's work by school enrollment within village type reached significance (Table 6.4).

Mothers were also asked whether their school enrollees actually attended school regularly and, if not, what the reasons were for the irregular attendance. Answers are shown in Table 6.5 and Figure 6.1. In the urban area, school attendance was regular for about 70% of all students, male and female, working and non-working mothers. For the rural children, there was a tendency for both male and female enrollees to be less likely to attend regularly if their mothers worked (for boys, 63% of non-workers' children attended school, 49% of workers' children, Chi square=3.45,  $p < .10$ ; for girls, 63% of non-workers children, 50% of workers' children, Chi square=3.01,  $p < .10$ ) These attendance rates, particularly in the rural areas, are very low. Table 6.5 lists the reasons offered for non-regular attendance by work status of the mother. In the urban areas, few children are kept out of school for work or help at home. In the rural areas, on the other hand, male children of workers are more likely to be kept out of school to help at the worksite than sons of non-workers. Over 20% of the rural girls enrolled in school were

kept out in order to help at home, whether or not their mothers worked. Daughters of working mothers were more likely to be kept out of school for illness than daughters of non-working women.

Effects of maternal work for earnings controlling for economic and demographic variables. OLS regressions similar to those in the previous section were performed to examine combined effects of mother's work, economic variables, family composition (number of older sisters, number of siblings 0-1, number of siblings 1-3) and the interaction of work and presence of a child under 3 in the home. The dependent measure was a dichotomous variable indicating whether the mother had enrolled the child. Normally, least squares regressions provide a reasonable estimate of parameters with a dichotomous dependent measure.

Table 6.6 summarizes the b coefficients, F test on the entire regression, and percent of variance accounted for in 4 separate regressions, each with a different sample. Age effects had initially been controlled for in previous analyses, but as the significance levels of the coefficients were no different in those analyses from these, the age of the children is not included in these regressions.

The first column shows the b values for the four work type dummy variables, and the economic and demographic variables for the entire sample. These analyses were performed for each gender and village-type group. Controlling for other variables, only two associations of work and school attendance are significant. Urban girls are less likely to attend school if their mother is

involved in domestic work, and rural boys are less likely to attend school if their mothers are involved in day labor or formal labor. No significant positive associations were seen.

Neither the presence of an infant nor a 1-3 year old in the home were related to school enrollment for boys or for girls, nor was the interaction term indicating both work and presence of a young child significant. However, in the second column of the table, children who have an infant sibling are examined separately. In this subsample, urban girls are less likely to be enrolled if their mothers are domestic workers, and rural girls are less likely to be enrolled if their mothers are agricultural workers. In addition, rural girls are less likely to be enrolled if there is a 1-3 year old in the home. No effects of mother's work was seen for boys.

The third column of the table shows the same regression model for children who do not have a infant sibling. In this case, no negative effects of mother's work is seen for girls, but no positive associations are seen either. Rural boys whose mothers are involved in day labor are less likely to be enrolled, and urban boys whose mothers are involved in domestic work are slightly more likely to be enrolled ( $p=.10$ ).

The last column in Table 6.6 shows the regression coefficients for the subsample of children of workers only. In this analysis, the presence of a infant is negatively associated with school enrollment for both urban and rural girls, but not for boys. Regression coefficients are not significant for work type or for presence of children aged 1-3 at home. Thus,

although the interaction term of work and presence of young children was not significant in the first analysis, there is evidence that the combination of a young child in the home, and some kinds of work is associated with less school enrollment for girls, but not for boys. This result was seen in both the rural and the urban areas. It is possible that the difference between the regressions is due to the differential effects of work type; only some kinds of work for earnings were negatively associated with school enrollment. Percent of children enrolled in school for each subsample are shown in Figure 6.2.

Hours of mothers' work per week were unrelated to school enrollment for girls, but mother's income was negatively associated with school enrollment for urban girls only. In other words, for the urban girls, controlling for house quality and land value, the more income the mother earned, the less likely that her daughters would be in school.

Other factors predicting school enrollment. The most consistent other factor relating to school enrollment was mother's education for urban girls and rural boys.

Log-linear analyses. Log-linear analyses were performed to examine the interactions among these variables. Three interactions were found to be significant: school enrollment by village type, land value, and mother's education.

#### Effects of mothers' work on expectations for children

Whether mothers who worked would have different expectations for their children was examined using three measures of

expectation: grade level to be achieved, future occupation expected, and general beliefs about the usefulness of boys and girls. Finally, actual work reported by boys and girls was compared.

Grade expectations. All mothers were also asked how many grades of school they expected each of their children currently in school to pass. In the urban areas, the average expectation was 8.4 years for boys, and 7.4 for girls. In the rural areas, the modal response was 6th grade, but the mean was 5.8 for boys, and 5.6 for girls. Given the skewed distribution of the response variable, these results should be interpreted with caution. None of the work variables were significantly associated with grade expectations.

Expectations for future occupations. Figure 6.3 shows the percent of children that mothers expected to achieve each of five occupations: agricultural work, day labor, domestic work (or homemaking), informal work, and formal work (teaching, seamstress, etc.) by work status of mother. Chi square analyses of work status of mother by occupational expectation were significant only for rural girls (Chi square=13.4, df=4,  $p < .001$ ). The major difference between the working and non-working mothers' expectations were that working mothers expected more informal work, and less homemaking from their daughters than non-working mothers.

A significant correlation (Kendall's tau) between the type of work the mother was doing, and type of work expected for her daughter was seen for the urban girls, but not the rural girls (Kendall's tau=.42,  $n=165$ ,  $p < .001$  for the urban sample; Kendall's

tau=-.01, n=320) for the rural sample. Thus in both the urban and rural samples, the work status of the mother was associated with her expectations for her daughters.

Perceived economic utility. The hypothesized positive association of maternal work and girls' school enrollment was based on the assumption that working mothers would perceive that girls are better economic investments than would non-working mothers; they would expect more eventual economic gain from their daughters than mothers who do not work. Thus a third measure of possible support of girls' education was the mother's evaluations of the utility of girls to them, both as children and as adults. These judgements were not linked to a particular child, but were the mother's overall opinion. These figures are in Table 6.7. Perceived utility of boys is shown also.

In both the rural and urban areas, women's work had no relationship with her perceptions of the utility of boys or girls as young children or as adults. Girls tended to be perceived as more useful when young, and boys were perceived as more useful when older for both workers and nonworkers.

When asked what satisfactions the mother expects from her male children and her female children when they are older, again no differences are found as a function of her working status. In fact, in the urban villages, a higher percent of working women are concerned that their daughters are "well married" (24%) than non-working women (13%). Careers are rarely expected of either boys or girls in either village type. The highest percent of

career expectation occurred among the urban working women; 12% wanted their sons to have some kind of career. Thus it appears that work status of the mother is unrelated to her overall perception of the economic value of her daughters, or to the future career aspirations she has for them. Urban-rural differences are substantial, however; 20% of urban mothers expect their daughters to be the Guatemalan equivalent of housewives compared to 50% of rural mothers.

Working women do differ from non-workers about what makes a woman a "good woman" (see Table 6.8), at least in the rural area. Rural working women are significantly more likely to value being hard-working, whereas non-working women value satisfying husband and being home more often. Among the urban sample, the pattern was similar, but differences were not significant.

Work activities of children. Mothers' reports of their children's after school and vacation time activities for school enrollees were compared by the work status of the mother. These results for non-school days are shown in Figure 6.4.

For after-school activities, no significant differences were found by work status of mothers, but urban and rural boys' and girls' activities are quite different. The range is enormous; 61% of urban boys with non-working mothers play after school, whereas only 10% of rural girls, regardless of their mother's work status, play after school. On non-school days, 48% of urban boys with non-working mothers play, whereas only 2% of rural girls whose mothers work play after school. The other groups fall in between.

In the rural areas, girls whose mothers work are significantly more likely to earn an income than daughters of non-workers, but both groups are equally unlikely to play (Chi-square=11.8, df=5,  $p<.005$ ). Girls not working for income, or to help the family's work are expected to help at home. Sons of workers are also more likely to earn an income on non-school days than are sons of non-working women (40% vs. 11%) (Chi-square=18.0, df=3,  $p<.004$ ).

Many more rural boys worked for income or to help the family than any other group; 50% were working, compared to 13% for rural girls, 15% for urban boys, and only 5% for urban girls. The economic contribution of boys is clearly much more common in the rural areas than of girls.

### CONCLUSIONS

Primary school enrollment rates in Latin America generally do not show the dramatically higher rates of school enrollment for boys than girls that are found in other parts of the world. Here, both boys and girls were much more likely to attend in the urban area. A similar difference between urban and rural school enrollment rates for boys and girls was also reported in Malaysia (King and Lillard, 1983). Thus, although the overall pattern in Latin America is equal enrollment rates for boys and girls, rural/urban differences may be important to examine.

The hypothesis that daughters of working mothers would be less likely to be enrolled in school when a young child was present was supported in both the urban and rural areas. No

association of presence of a young child and boys' school enrollment was seen. On the other hand, the hypothesis that when no young child was present, girls would be more likely to enroll in school if their mothers worked was not supported. In fact, daughters of urban domestic workers, and rural agricultural workers were less likely to be enrolled in school than comparable daughters of non-workers.

A negative association of mother's income and girls' school enrollment, after controlling for mother's level of education, is of more concern. If women who earn more are less likely to encourage their daughters to attend school, a pattern for uneducated women to turn to unskilled work like domestic work for income may be passed on to the next generation.

How can these results be explained? One of the underlying hypotheses had been that a woman who works for an income would realize that income can be earned by women. The woman might, then, expect more economic support from her daughter in the long run than would a non-working woman. It had further been assumed that a mother would invest in her daughter by sending her to school in order to help her get better-paid employment when she is older. Further, if the mother's work requires education or abilities, she might model effective school-enrollment behaviors of hard work and cleverness. Prior work in the rural villages suggested that girls' mental test scores increased because role models of working women were available to the children (Engle, Yarbrough, and Klein, 1983).

Some of these assumptions were tested. Mothers did not appear to expect any more future economic assistance from their daughters if they worked than if they didn't work. Second, when mothers were asked about their attitudes about children's future occupations in general (not tied to a particular child), there did not appear to be much expectation of either boys' or girls' achieving high levels of education in either village type. In fact, among urban working mothers, there was a greater desire to have daughters well married than among non-working mothers. However, in the urban villages, when working mothers were asked about specific children's future occupations, there was a strong correlation between the type of occupation the mother was involved in and the occupation that she desired for her daughter.

Rural working mothers also showed a few attitudes that would support daughter's future work, although not necessarily education as the road to that future work. Rural workers valued hard-working qualities in themselves more than non-workers. They were significantly more likely to expect that, when asked about individual children, their daughters would be involved in some kind of economic activity than non-workers. From examining their responses, it appears that they were more likely to expect that their daughters would be involved in the informal market sector.

Thus, the earlier finding that, if the mother is working, the daughter will be more likely to be kept home for child care, and will be no more likely to attend school when there is no infant in the home is a reasonable investment strategy if they expect sons to provide them with more long-term support. A woman

who is working is less likely to be married, and may feel the need to rely on another source of income. Much as been written about the mother-son bond in Latin cultures. Moses (1976) suggests that especially when the father is not an adequate provider, the mother's relationship with the son becomes very strong. Therefore she would naturally encourage his school enrollment, perhaps to the detriment of her daughter's school performance.

This perception by mothers that sons will provide more economic help is supported in the rural area by mother's reports of children's work patterns. Working mothers receive more financial support from school-aged sons and daughters than non-working mothers. However, the number of sons who provide economic help is four times the number of daughters who are able to help economically. Daughters are perceived as helping more than sons when they are young, but this help is in home production, not economic help, so the long-term expectation is different. Little economic help was received by either sons or daughters in the urban areas.

Some research relevant to these questions comes from the U.S., but the dependent variable is school achievement rather than enrollment, since schooling is essentially universal. These studies examine the positive effects of increased income due to maternal work compared with the negative effects of reduced parental time with children to help with schoolwork on achievement. In addition, type of work and family economic levels are examined.

In the U.S., the effects of maternal work on school achievement depends on both the mother's type of work and the socioeconomic status of the family. Milne et. al. (1983), in a nationally representative database of students from grades 1 to 6, found that children of working mothers in two-parent homes have lower achievement levels than children of non-working mothers, and that the magnitude of the effect is directly related to the amount of time worked. However, for black children, and for single-parent homes, the net effect was positive. Apparently the negative effect of loss of maternal time was offset by the positive effects of increased income, although a number of other factors might also be operating. In that population, working mothers may be brighter than non-working mothers, or day care may have a relatively more positive effect on school achievement than in wealthier homes.

Piotrkowski, Katz, and Mitchell (1982) reported that the type of work in which the mother was involved differentially affected the children's achievement. If the mother's work required a degree of autonomy and skill utilization, her children's achievement was higher than if her work were routine. The sample was predominately lower SES black women and their children. The authors hypothesized that the women in the higher-skill jobs were modelling achievement-facilitating behavior for their children. Thus the authors hypothesize that maternal work may positively affect children's school achievement through role modelling. This effect might be stronger for girls, because children tend to model the same-sex parent.

Other studies in the U.S. have reported no effects of maternal work on children's school achievement (Rosenthal and Hansen, 1981; Zimmerman and Bernstein, 1983; Hayes and Kammerman, 1984), but these studies used a wider range of social classes than the prior two. In sum, positive effects of maternal work may be greater in the lower economic level families. Also, characteristics of the work may be positively related to schooling outcomes.

The presence of an infant in the home was associated with less school enrollment for both urban and rural girls whose mothers were working. This association was limited to domestic or agricultural work. There is some evidence from the literature that children's work responsibilities do interfere with school enrollment. Clark (1981) analyzed time use data from rural Guatemala (using the same rural villages as this study) to determine if girls who reported more time in child care were less likely to attend school. She found that girls who were attending school reported significantly less time in child care than those in school. No other differences in tasks performed by school attenders and non-school attenders were found. School attenders were, for instance, as likely to fetch wood as non-attenders. However, Clark could not conclude that need for child care was the only factor influencing low school enrollment for girls, because 22% of the girls in the villages were, according to their mothers' reports, not going to school nor involved in any child care or other household activities.

Other factors related to more frequent school enrollment for urban girls were home quality, education of the mother and urban

village residence. Rural girls' school attendance was unrelated to economic variables. Urban boys' school attendance did not appear to be affected by the variables measured, and rural boys' schooling was associated with economic factors. Thus economic variables influencing school enrollment varied by the village type and sex of the child. One might suggest that if priorities are given to boys' school attendance, and if school attendance is considered more likely in the urban areas, that when school attendance is marginal, economic factors will play a larger role in who goes to school. Thus both urban girls, and rural boys' school enrollment would be influenced by economic factors.

In the same rural villages as this study, Irwin, Engle, et. al. (1978) examined family and child characteristics affecting school enrollment for boys and for girls. For girls, school enrollment appeared to be associated primarily with their mental ability at age 7, prior to school enrollment, whereas for boys, school enrollment was more highly related to the economic level of the family. The authors hypothesized that parents would decide whether or not to send a son depending on their resources, whereas a daughter's school enrollment might depend on her perceived brightness. These findings are consistent with the ones reported here. The clearest policy implications from this investigation are that daughters of working mothers, particularly domestic workers, are at risk of not completing school or not attending regularly, and second, that the type of work the mother is engaged in may relate to her encouraging her daughter to be involved in the same kind of work.

TABLE 6.1

Maternal Work Type, Economic Variables, Mother's Years  
of School Passed, and Demographic Variables by Sex  
and Village Type: Means and Standard Deviations

Variable	Urban Boys		Urban Girls		Rural Boys		Rural Girls	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Mother's:								
Agricultural Work	4.0%	(20)	3.0%	(17)	10.0%	(30.59)	8.40%	(27.76)
Domestic Work	10	(31)	12	(33)	1.58	(12.48)	3.42	(18.19)
Informal Work	33	(47)	26	(44)	30.60	(46.16)	31.37	(16.47)
Formal Work	8	(28)	14	(35)	7.26	(25.98)	6.21	(24.17)
Value of Land (Q)	362.21	(2837.8)	403.76	(2790.24)	569.76	(889.20)	501.96	(762.35)
House Quality (3-16)	9.63	(2.62)	9.44	(2.71)	6.35	(2.19)	6.16	(2.24)
Marital Status (1=single; 2=unlon;3=married)	2.48	.57	2.50	(.55)	2.41	(.61)	2.37	(.61)
Number of Older Sisters	1.02	(1.28)	.73	(.96)	1.22	1.27	1.20	(1.26)
Number of Children 0-1	.17	(.38)	.16	(.37)	.15	(.36)	.14	(.36)
Number of Children 1-3	.44	(.50)	.44	(.51)	.42	(.53)	.48	(.57)
Mother's Education (years passed)	2.43	(2.75)	2.35	(2.47)	1.11	(1.42)	.99	(1.38)
N	145		165		317		322	

TABLE 6.2

Comparison of Percent of Boys and Girls Enrolled  
in School Within Village Type: Chi-Square Analysis

	School	Male		Female		$\chi^2$	Total N
		N	%	N	%		
Rural:	No	125	(37%)	128	(38%)	.03	673
	Yes	212	(63)	208	(62)		
Urban:	No	37	(25)	37	(22)	.24	314
	Yes	110	(75)	130	(78)		

\* p < .05  
\*\* p < .01

TABLE 6.3  
 Comparison of School Attendance  
 By Village Type for Boys and for Girls

<u>All Subjects</u>		Urban		Rural		Total N
School	N	%	N	%		
<b>Males:</b>						
No	37	(25%) <sup>a</sup>	125	(37%)	6.01**	484
Yes	110	(75)	212	(63)		
<b>Females:</b>						
No	37	(22)	128	(38)	12.15**	503
Yes	130	(78)	208	(62)		

a = column percent

\* p < .05  
 \*\* p < .01

TABLE 6.4

Comparison of Percent of Girls and Boys Enrolled in School  
by Work Status of the Mother by Village Type( $\chi^2$ )

School Enrollment:	Urban						Rural					
	No	Boys Yes	N	No	Girls Yes	N	No	Boys Yes	N	No	Girls Yes	N
Mother's Work:												
No	32%	68%	69	22%	78%	76	35%	65%	164	36%	64%	169
Yes	20	80	77	22	78	90	40	61	173	40	60	169
$\chi^2$	2.34			0			.56			.80		

TABLE 6.5

Reasons Mothers Provided to Explain Children's Absences from School by Mother's Work Status

Work Status of Mother	Urban				Rural			
	Boys		Girls		Boys		Girls	
	Non-Wk.	Work	Non-Wk.	Work	Non-Wk.	Work	Non-Wk.	Work
Help at Home	0%	2	2	2	8	4	21	24
Help at Work	0	3	0	0	11	18	1	2
Work Alone	0	0	2	0	4	2	0	1
Migration	0	0	0	0	0	2	0	0
Family Problems	0	0	2	0	0	3	0	4
Illness	24	7	14	18	10	14	7	14
Lack of Interest	4	8	0	3	2	3	5	2
Lack of Money	0	0	0	0	1	4	3	0
Problems in School	0	0	0	0	1	1	0	1
Physical Problems	0	0	0	0	0	1	0	0
Other	2	1	5	0	0	1	0	1
No Absence	70	80	73	77	63	50	63	50
N	45	61	57	65	106	103	108	98

Summary of Reasons for Absences  
By Mother's Work Status

<u>Reason for Absence</u>	Urban				Rural			
	Boys		Girls		Boys		Girls	
	Non-Wk.	Work	Non-Wk.	Work	Non-Wk.	Work	Non-Wk.	Work
Work at Home	0	5%	4	1	23%	23	22	24
Personal Difficulties	31	13	16	22	14	27	15	26
Other			7	0				
No Absences	70	80	73	77	63	49	63	50
$\chi^2$	6.66a		5.67		2.97		4.46	
N	45	61	56	65	106	103	108	98

a < .10

\*\* p < .05

\*\*\* p < .01

TABLE 6.6

School Attendance as a Function of Mother's Type of Work, Economic Variables, Demographic Characteristics, and Presence of Infants by Sex, Village Type and Presence of an Infant

## URBAN

	Boys				Girls			
	All b	With Infant b	Without Infant b	Children of Workers Only b	All b	With Infant b	Without Infant b	Children of Workers Only b
Agricultural Work of Mother	-.08	-.74	.01	-.18	-.10		-.06	-.14
Domestic Work of Mother	.13	-.51	.24 <sup>a</sup>	-.09	-.24*	-.87**	-.01	-.24
Formal Work of Mother	.05		.05	.002	.05		.11	
Informal Work of Mother	.16	.39	.08		.05	-.20	.13	.08
Home Quality	.006	.02	.02	-.007	.02*	-.002	.04**	.04*
Value of Land	.00001	.001	-.0002	.00004	.00001	-.00009	.00001	-.001*
Number of Older Sisters	-.03	.04	-.04	-.11	.04	.13	.05	.03
Number of Siblings (1-3 yrs)	-.03	.12	-.04	-.11	-.05	-.06	-.03	-.03
Mother's Education	.03	.04	.02	-.004	.04**	.02	.03*	.05**
Marital Status (1-3)	.09	.26	.07	.10	.006	-.13	-.02	.11
Work x Young	-.05			-.08	.06			.12
Number of Infants (0-1 yr)	-.07			.004	-.15			-.42**
Hours/Week of Work				-.0004				.003
Mother's Income				.0009				-.0003*
F	1.71	2.14	1.56	.50	3.00**	1.86	2.52**	3.48**
N	145	25	72	165	27	138	86	
R2	.13	.56	.13	.10	.19	.45	.17	.38
% Enrolled	74%	68%	75%	80%	77%	63%	80%	77%

## RURAL

Agricultural Work of Mother	-.05	.02	-.06		-.12	-.43*	-.06	.06
Domestic Work of Mother	-.06		-.07	.21	-.25	-.14	-.18	DNE
Formal Work of Mother	-.38**		-.38**	-.27	-.11		-.11	.13
Informal Work of Mother	.07	.34	.06	.03	-.004	-.001	.002	.13
Home Quality	.04**	.09	.04*	.002	.02	.10**	.01	.02
Value of Land	.000005	-.0002	.00002	.00003	.0001	-.0001	.0003	.0004
Number of Older Sisters	-.05	-.03	-.05*	-.08**	-.03	-.0008	-.04	-.06
Number of Siblings (1-3 yrs)	-.05	-.008	-.05	.04	-.08	-.53**	-.04	-.10
Mother's Education	.06**	.08	.06**	.07*	.01	.05	.008	-.01
Marital Status (1-3)	.002	.02	-.003	-.10	.11*	.21	.11*	-.009
Work x Young	.02			-.03	-.008			.04
Number of Infants (0-1 yr)	.05			.08	-.08			-.34*
Hours/Week of Work				.0007				.001
Mother's Income				.00003	.0002			
Village 06				-.35*				-.07
F	2.89**	.80	3.03**	2.94**	1.94**	3.71**	1.42	1.41
N	317	46	271	157	322	45	277	158
R2	.10	.15	.10	.23	.07	.49	.05	.12
% Enrolled	65%	67%	64%	64%	63%	53%	64%	60%

a p &lt; .10

\*p &lt; .05

\*\*p &lt; .01

TABLE 6.7

Expected Utility of Boys and Girls as a Function of Mother's  
Work Status in Rural and Urban Samples

	RURAL				URBAN			
	Males	Females	Same	$\chi^2$	Males	Females	Same	$\chi^2$
Who is more helpful as a young child?								
Not Work	9%	31	60	1.97 (NS)	8	58	34	1.46 (NS)
Work	11	35	54		12	52	36	
	N = 578				N = 264			
Who is more helpful as an older child?								
Not Work	48%	6	46	2.47 (NS)	56	12	31	.08 (NS)
Work	49	9	42		55	13	33	
	N = 578				N = 264			
What satisfactions do you expect from your child when he/she is older? <sup>a</sup>	MALE		FEMALE		MALE		FEMALE	
	Non Wrkrs	Wrkrs	Non Wrkrs	Wrkrs	Non Wrkrs	Wrkrs	Non Wrkrs	Wrkrs
Don't Know	5%	4%	6%	5%	4%	7%	4%	6%
Well Married	1	.5	11	8	3	2	13	24
Respectful	1	0	0	0	.8	.9	0	1
Loving	5	5	5	5	7	5	8	7
Honorable	3	4	1	2	6	3	0	2
No Vices	3	2	7	5	3	5	8	4
Career	3	3	1	.5	8	12	6	7
Good Worker	32	34	24	22	19	22	14	11
Economic Help	33	36	22	30	24	23	20	14
Educated	6	4	3	1	8	4	5	2
Study	4	4	4	4	15	16	13	14
Nothing	5	2	4	7	2	0	4	2
Know Housework	-	-	8	8	-	-	2	2
	N = 489		N = 485		N = 231		N = 214	

a = None of the  $\chi^2$  analyses of satisfaction by working status were significant.

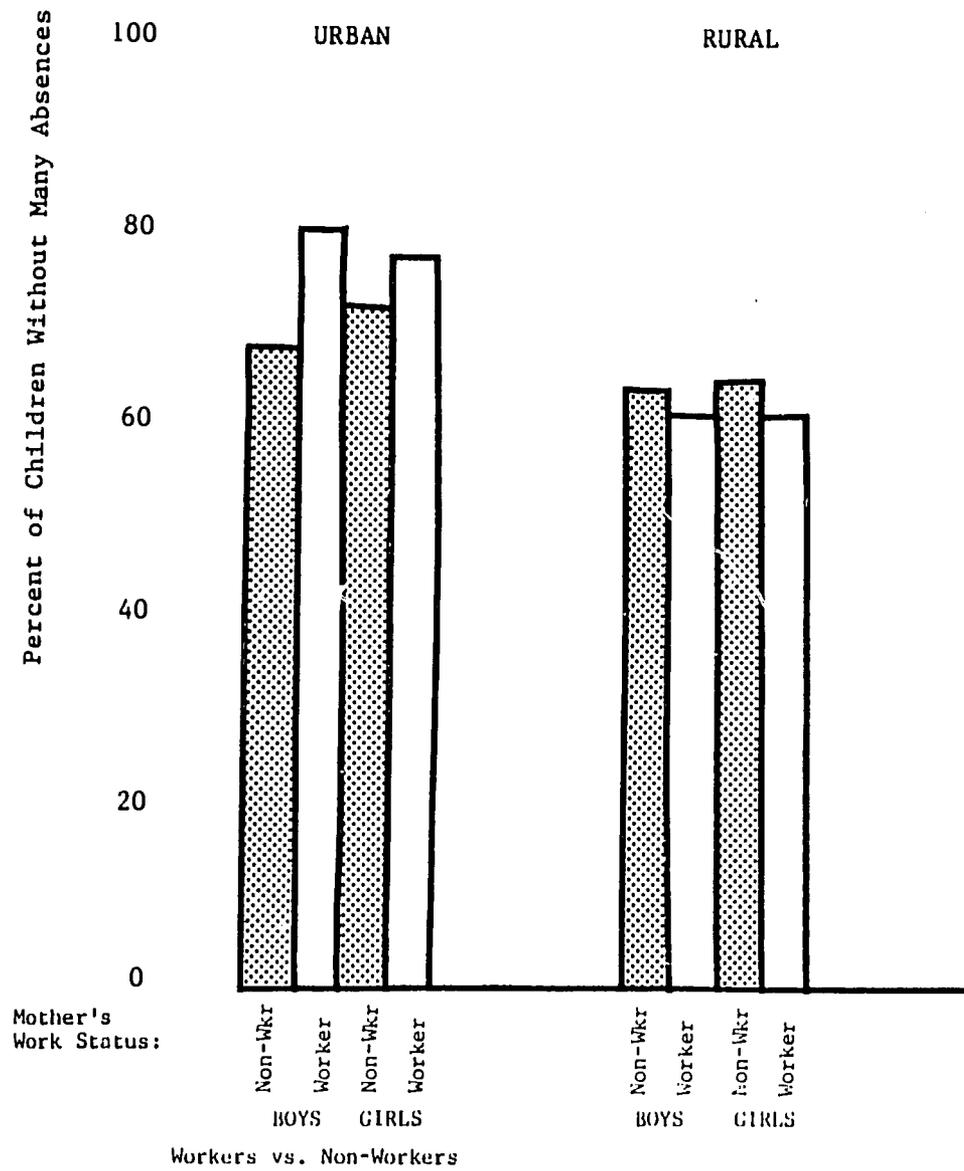
\* p < .05

\*\* p < .01

TABLE 6.8  
 Relationship of Work Status to Woman's Definition  
 of a Good Woman

	RURAL		URBAN	
	Nonwork	Work	Nonwork	Work
Hard-Working	5%	13	5	11
Satisfy Husband	13	8	14	13
Help Husband	3	5	8	5
Honorable	17	16	11	13
Good Neighbor	26	30	25	23
Take Care of Kids	7	8	10	6
Educate Kids	.6	.4	1	3
Being Home	14	11	14	14
Don't Know, Other	12	8	10	10
	$\chi^2 = 17.8$	$p < .05$	$\chi^2 = 8.4$	(NS)
	N = 140 Mothers		N = 265 Mothers	

Figure 6.1  
 Absence From School by Mother's  
 Work Status by Sex and Village Type  
 Percent of Children



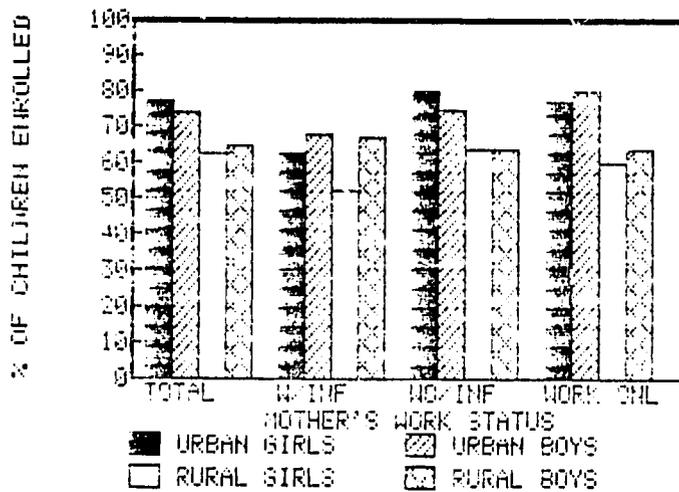


Figure 6.2

Percent of Children in School as a Function  
of Presence/Absence of an Infant and  
Work Status of Mother

Total = Total sample  
W/Inf = Families with a child 0-1 at home  
WO/Inf = Families with no child 0-1 at home  
Work Onl = Families with a working mother

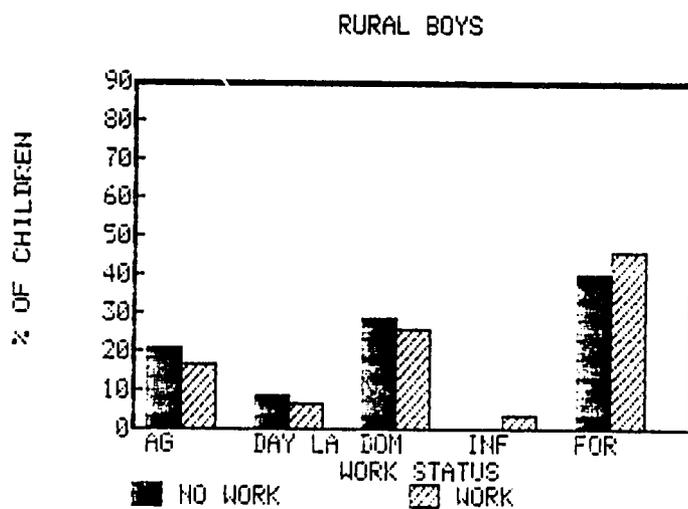
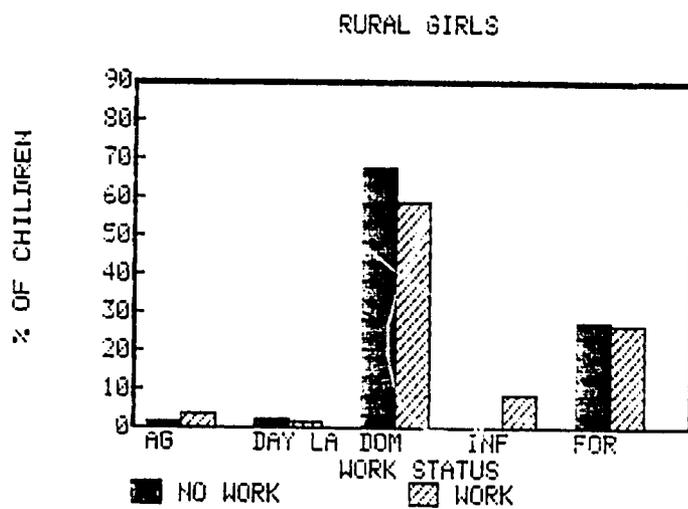


Figure 6.3.1  
 Mother's Expectations for Children's Future  
 Occupations by Her Work Status

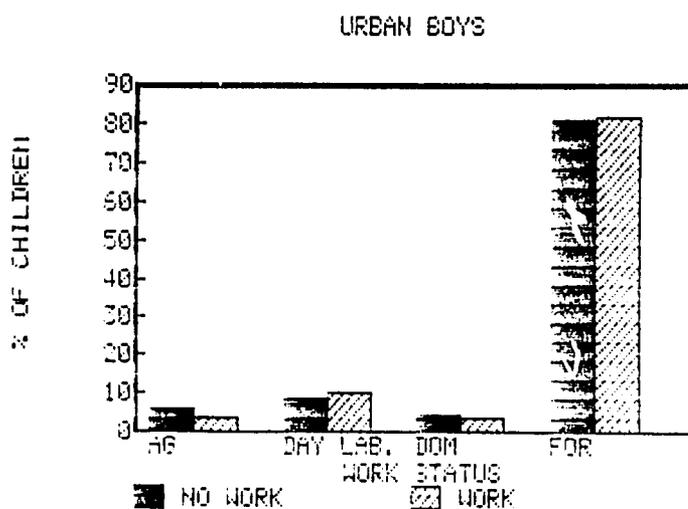
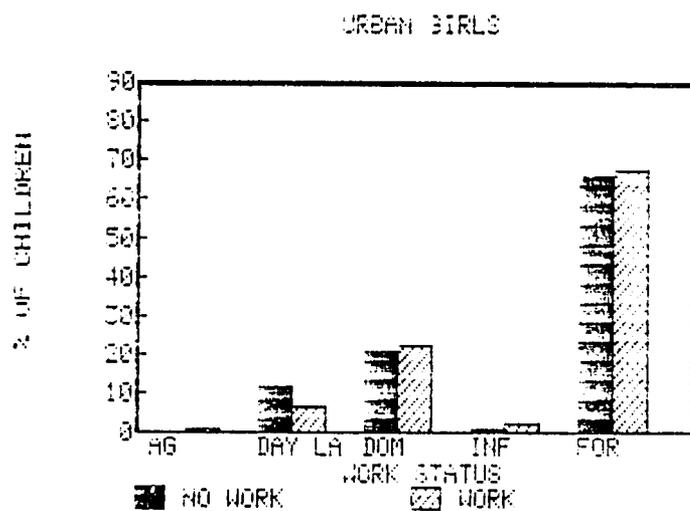
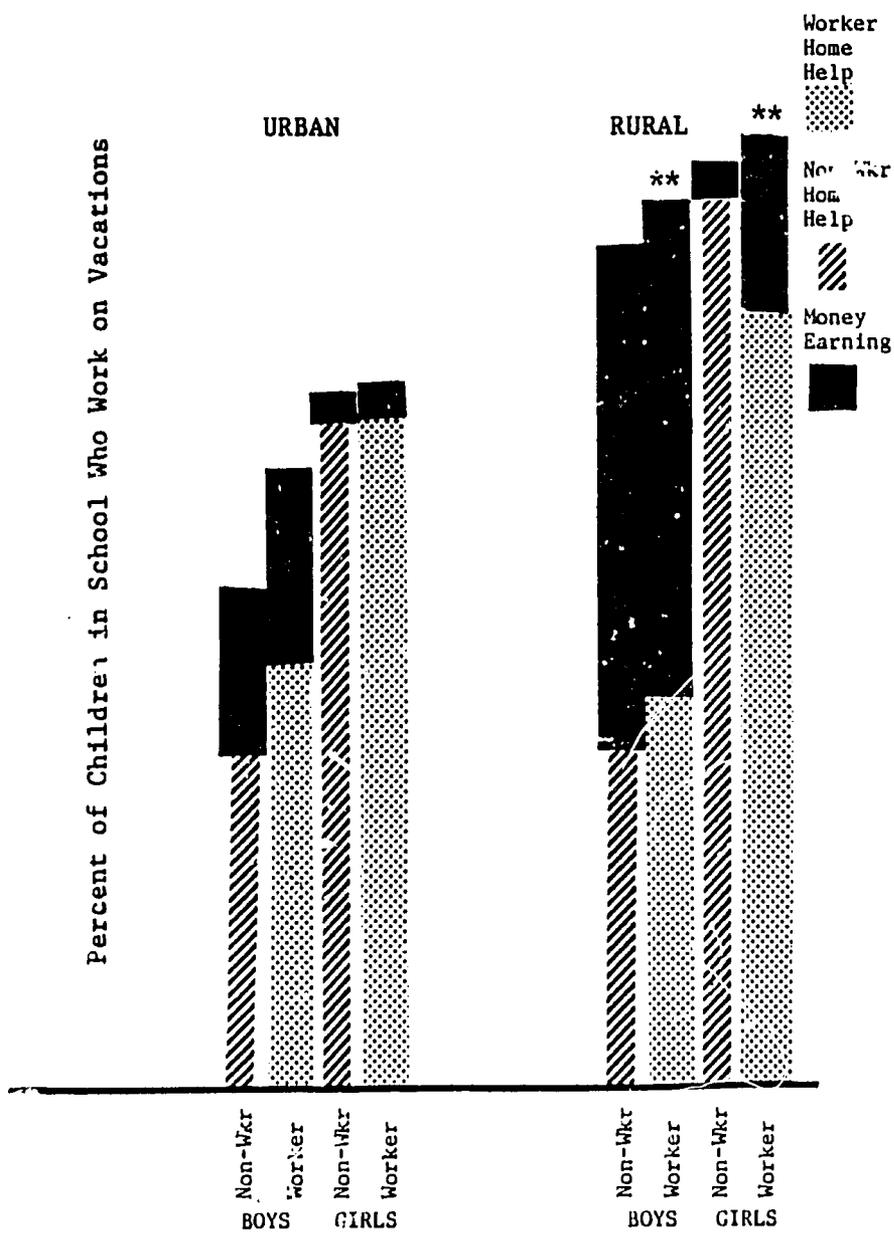


Figure 6.3.2  
 Mother's Expectations for Children's Future  
 Occupations by Her Work Status

Figure 6.4  
 Activities During Vacations  
 Of School-Attenders



\* p < .05  
 \*\* p < .01

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