Parental Time, Role Strain, and Children's Fat Intake and Obesity-Related Outcomes

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Abstract

This study uses a unique dataset to examine parental influence on children's dietary intake and whether or not the children will become obese. The study shows that household income, parents' time spent with children, and parents' work experiences significantly affect children's energy and fat intake and obesity-related outcomes. For example, the more time mothers spent with their children, the lower the children's Body Mass Index (BMI) was. On the other hand, the more time fathers spent with their children, the higher the children's BMI was. And the more time both fathers and mothers spent with their children, the higher their children's fat intake (as a percentage of energy) was. In general, mothers tended to have a greater effect on their children's dietary intake than fathers did. Both parents seemed to influence children ages 9-11 more than they did children ages 13-15.

Keywords: Household production theory, collective household model, income pooling, working parents, parental time, parental income, work/home role strain, percentage energy from fat, percentage energy from saturated fat, waist circumference, BMI, children

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I. Executive Summary

A. Approach

The United States now leads the world in obesity rates and obesity is known to be related to many health problems. Of particular concern is the fact that the percentage of obese children in the United States has doubled over the last two decades. This study aims to examine the potential influence parents have on some important measures of children's nutrient intake and obesity measures.

It is widely believed that parents play a central role in their children's food choices and the resulting nutritional health experienced by those children. In order for children to consume healthy diets and achieve healthy outcomes as a result of that intake, parents, in general, and mothers, in particular, may have to devote sufficient income to food purchases and spend sufficient time with their children. Furthermore, much of the potential problem of insufficient attention to children may rest on parental work experiences, with parents under work pressures and with over-commitment to their work at the expense of their families.

In this report, we take an interdisciplinary approach in order to study the influence of parenting on children's dietary intakes and weight status**.** While our focus is empirical, our conceptual basis rests on the collective household production model (CHPM) coupled with role theory from sociology to explain these intakes and outcomes. This model allows preferences to differ by household member and assumes there are incentives for the household decision makers to allocate their income and time in an efficient manner. Role-strain theory can be seen as enhancing the CHPM by identifying behavioral expectations (and thus constraints) that affect the quality of role incumbents'

time, attention, and energy. Thus in addition to the limits imposed by income and time suggested by the CHPM, role theory focuses attention on commitments that employed household decision makers may make to their work, the ability of those persons to control the demands of their work, and the ability of those persons to prevent the demands and stresses of their work to spillover onto the operation of the household. Consistent with the CHPM is that household decision makers who possess more power and status are more likely to control decision making and thus are more likely to influence the outcomes in children. Finally, certain outcomes in children such as height and weight are in part the result of heredity. This too must be taken into account.

Existing research that integrates the economic and sociological perspectives is relatively sparse. Prior research has found relationships between parental income and both parental and children's outcomes such as percent energy from fat and obesity, but that research does not provide clear guidance regarding the direction of the income-children's outcome relationships. No studies have examined the relationship between the time parents spend with children and those children's dietary intake or obesity. Similarly, only a few studies have examined the link between employees' work experiences and their diet or nutrition. Generally, more stressful working conditions tend to lessen the probability that employees' diets are healthy or that their body mass index is within a healthy range. Almost none of the studies have looked at the consequences of parental work experiences for children's diet and nutrition. The present study examined working parents' experiences and how they affected selected aspects of children's diet and nutrition.

Our conjecture is that the more resources that parents devote to their children and the fewer distractions caused by parental work, the better the health outcomes in children. We would thus expect this to be the case for children's dietary intake and nutrition. In general we hypothesize that parents who have higher incomes, spend more time with their children, and experience less work/home strain will have children with healthier diets and be less likely to be obese. However, many reliable indicators of healthy diets and obesity involve ratios of variables. For example, percent energy from fat is formed by dividing energy from fat by total energy. A central theme of this report is that the analysis of variables that are ratios requires special consideration. As is demonstrated and explained in the report, because percentage energy from fat, percentage energy from saturated fat, and body mass index (BMI) scores are all ratios, it is difficult to form definitive conclusions regarding the effects of explanatory variables.

B. Data

This report draws on data from the "Parental Time, Role Strains, Coping, and Children's Diet and Nutrition" project. These data were drawn from mothers, fathers (where present), and children from over 300 households in the Houston, Texas MSA. Data from parents came from telephone interviews to obtain information about their work experiences and sociodemographic background and from self-administered questionnaires to obtain data on income and time use. Data from one child per household came from a personal at-home interview in order to obtain information about parenting, eating habits, dietary intake, and activity levels. Children also underwent a brief physical

exam for body composition measurements and maintained a two-day dietary and two-day activity record.

C. Findings

We estimate the separate effects of mothers' and fathers' time spent with children, income, and work/home role strains on children's percentage of energy from total fat and saturated fat as well as obesity related measures. The analysis is separated by age group (9-11 year old children and 13-15 year old children). Percentage of energy from fat and from saturated fat are similar for the 9-11 and 13-15 year olds; not surprisingly, waist circumference and BMI is higher in 13-15 year old children. Mothers spend more time with their children of the younger age group than fathers, while fathers spend more time with their children of the older age group than mothers.

To estimate effects of explanatory variables on dependent variables, a two-stage multivariate statistical modeling approach is implemented. For the dependent variables that are ratios (e.g., percentage of energy from fat), the procedure models the numerator and denominator of the ratio separately, which helps in explaining counterintuitive results. Only statistically significant results are discussed. It is recognized and should be kept in mind that statistical significance does not necessarily imply biological significance or causality.

1. Intakes for 9-11 Year Olds

For the intakes of the 9-11 year old children our statistically significant results indicate that:

- Fathers' and mothers' time spent with children are both positively related to children's percentage of energy intake from total fat and saturated fat. These findings result from the greater negative effect that mothers' and fathers' time has on children's energy intake relative to the effect that fathers' and mothers' time has on children's energy from fat and saturated fat;
- Fathers' and mothers' income has no effect on this age group's percentage of energy from fat and saturated fat. The fathers' findings result from offsetting positive effects of fathers' income on both energy from fats and energy intake of children. However, for mothers, the lack of effect of income results from offsetting negative effects on both energy intake from fats and total energy intake of their 9-11 year old children.

We also examined the effect of work/home role strain variables, finding:

- The greater the mothers' control over their work, the lower the percentage of energy intake from total fat in the 9-11 year old children. By contrast, the greater the fathers' control over their work, the greater the percentage of energy intake from fat in the 9-11 year old children.
- The greater the mothers' commitment to their work, the lower the percentage of energy from fat in the diets of their 9-11 year olds; a similar effect is found for fathers' work commitment. These results are due largely to the positive effect of both mothers' and fathers' work commitment on energy intake, the denominator in the percentage of energy from fat ratio. In addition, the greater the fathers' work commitment, the greater their 9-11 year olds' percentage of energy from saturated fat.

2. Outcomes for 9-11 Year Olds

Outcomes in this study include waist circumference and BMI. For the outcomes for the 9-11 year old children our results indicate that:

- Fathers' time with children is positively related to children's waist circumference and BMI while mothers' time with children is negatively related to children's waist circumference and BMI;
- Both mothers' and fathers' income have a positive effect on children's waist and BMI;
- Fathers' work flexibility has a positive effect on the BMIs of the children of this age group;
- Mothers' and fathers' spillover of work at home both positively affect BMI of 9-11 year olds; also, the greater the fathers' work spillover, the greater the children of this age group's waist circumferences.

3. Intakes for 13-15 Year Olds

- The effect of mothers' time with children is consistently negative on percentage of energy intake from both total fat and saturated fat for 13-15 year old children. The effect of fathers' time with children on the percentage of energy intake from total fat and saturated is positive for 13-15 year old children;
- Mothers' income has a negative relationship with children's percentage of energy intake from both total fat and saturated fat.
- The finding for the work/home role strain variables suggest that mothers' work flexibility is positively associated with these children's percentage of energy

from saturated fat; however, the greater mothers' control at work, the lower the children's percentage of energy intake from saturated fat. The greater fathers' control at work, the greater these children's percentage of energy from fat.

4. Outcomes for 13-15 Year Olds

- Mothers' income has a negative effect on waist and BMI measurements of 13-15 year old children;
- The greater mothers' work control, the lower the children of this age group's BMIs.

We thus have partial confirmation of our hypotheses that parental time, income, and work/home role strain have an effect on some aspects of children's dietary intake and risk of obesity. Mothers' time with children and income have greater effects than fathers' time with children and income. The effects of mothers' time with children and income are more consistent with our hypotheses than are fathers' time with children and income effects.

D. Conclusions

There are three main themes that emerge from these findings that are all very intuitive. First, mothers and fathers have different impacts on their children's nutrient intakes and outcomes. Second, it is not just the *quantity* of time and income that is allocated to children that is important, it is also the environment, as captured by work/home role strain variables, within which those resources are delivered. Stated more simply, the *quality* of time and income is also important. Third, mothers' and fathers'

impacts on their children's nutrient intakes and outcomes decline with the age of the child: there are more significant effects in the 9-11 age group than in the 13-15 age group. Looking only at the amount of resources allocated to a child, whether it be income or time, will not give a complete picture of the impact these allocations will have on children. The money and time allocations also influence the environment within which energy is consumed and expended.

The finding that mothers and fathers have different impacts on their children is consistent with the literature. Furthermore, the finding that a mother's (or father's) impact on their child's nutrient intake is different than their impact on the child's weight is also consistent with existing research, mainly because body weight and energy intake are frequently uncorrelated. These differences suggest new research should pursue two areas. First, and more fundamental than the research issue of interest here, is the apparent disconnect between intake and weight. It is well known that 24-hour recall data is fraught with measurement error and this is certainly part of the explanation, but untangling the effect of, say, mother's time on intake versus weight gain will ultimately require a better understanding of the relationship between intake and weight. Until the physiological connection between intake and weight gain is better understood, it will be difficult to understand why the same variable (e.g., mother's time with a child) can affect intake one way and weight another way. Second, while this research documents the differences of mother's and father's influences on a child, more research is needed to explore why these differences exist. For example, do fathers spend more time with children in sedentary activities than mothers? Do mothers cope differently with work

spillover than fathers? The dataset we have collected is rich enough to explore these types of questions and future work with this data will pursue these type questions.

II. Introduction and Objectives

The U.S. population now leads the world in obesity rates. The prevalence of obesity in the U.S. population has nearly doubled in the last 10 years, and today, an estimated 69 percent of American adults are classified as overweight or obese (Centers for Disease Control Diabetes Surveillance System 2004). Clinical research has long suggested a connection of obesity with a variety of diseases. For example, past studies have revealed a strong association between the prevalence of obesity and diabetes, hypertension, heart disease, and cancer (U.S. Department of Health and Human Services 2003). Being overweight has also been found to be correlated with increased morbidity and mortality (U.S. Department of Health and Human Services 2003). Hence, we now have overwhelming evidence that being obese has adverse effects on health and longevity.

As the prevalence of overweight and obesity have increased in the U.S., so have related health care costs. The overall cost of obesity, both direct (personal health care, hospital care, physician services, allied health services, and medications) and indirect costs (lost output as a result of a reduction or cessation of productivity due to morbidity or mortality), has been estimated to be as much as $123 billion annually (Wolf and Colditz 1998). A recent study estimated annual medical spending due to overweight and obesity to be as much as $92.6 billion in 2002 dollars (9.1 percent of U.S. health expenditures) (Finkelstein, Fiebelkorn, and Wang 2003). Americans also spend at least $33 billion annually on weight-loss products and services (Colditz 1992).

Obesity levels have increased in both males and females, by ethnicity, and in all socioeconomic groups, regardless of age in the last 30 years (Baskin et al. 2005).

However, obesity in children is especially alarming. Using the criterion of the 95th percentile of BMI data from the National Health and Nutrition and Examination Survey, the magnitude of the change in children (age 6 to 11) and adolescents' (age 12-19) obesity is shown in Table 1. Over the past three decades, the prevalence of obese children increased from 7 percent to 15.3 percent. Among adolescents, the prevalence of obesity increased from 5 percent to 15.5 percent during the same time period. This increased prevalence of childhood obesity partly reflects the declining quality of children's diet and is of major concern because it could affect children's quality of life as they grow older and may increase the health care cost in the future.

Table 1. Childhood Obesity: 95th Percentile of BMI

	Ages 6-11	Ages 12-19
1999-2000	15.3%	15.5%
1988-1994	11.0%	11.0%
1976-1980	7.0%	5.0%

Source: American Obesity Association (2004)

As the increase in the prevalence of obesity has happened so rapidly, this increase is likely the result of changes in the socioeconomic environment. These include rapid changes in women's labor force participation and number of hours worked and the effects of technological changes in food production and lifestyles (e.g., Chou, Grossman, and Saffer (2004); Cutler, Glaeser, and Shapiro (2003)).

The labor force argument is that women have traditionally shouldered most of the parenting and meal preparation duties in the household. As women enter the work force this decreases the amount of time that can be spent in meal preparation and in parenting. In some households, this suggests working women have tended to become more home

managers than home makers, whose attention must then be given to the nutritional quality of foods their children may obtain from school, day-care, after-school care, and other away-from-home sources. Furthermore, there tends not to be an equal compensatory increase in men's contribution to meal preparation and child care when their wives enter the labor force. These conditions in turn may lead to an increase in the demand for convenience foods that may be of lower nutritional quality, a decline in activities with children, and decline in learned healthy eating habits. Furthermore, as time becomes more of a constraining factor at home, this may also lead to conflicting demands of work and home, which can adversely affect children's eating habits and diets. The technology aspect of the argument is that technological changes in food preparation have decreased the cost of convenience foods leading to increased consumption of convenience foods and that technological changes–such as the internet–have led to more sedentary lifestyles.

While the above argument is intuitive and compelling, it has been difficult to investigate empirically because of the lack of the appropriate data. National datasets that collect information on children's health status (e.g., NHANES), or nutrient intake of households (e.g., CFSII) do not have corresponding detailed data on time allocations of household members. Alternatively, datasets on time allocation (e.g., Robinson and Godbey 1997) have not collected any information on children's health status or nutrient intake. Though the new American Time Use Survey (Herz 2004), conducted by the Bureau of Labor and Statistics is laudable in its efforts to collect time use data, it is only collecting data for one day for one individual and does not collect any information on child nutrient intake or health outcomes that can be tied to this data. As Haveman and Wolfe (1995) have stated in their review article of children's attainments (p. 1874),

"Although substantial progress has been made in extending the richness of information collected on both parents and children there is still a serious problem of 'variable scarcity'." Haveman and Wolfe go on to provide a list of "pressing data needs in this area" (p. 1874), with the most relevant for this research being "parental time spent with children for both mother and father [and] the health status of both parents and children" (p. 1875). This research is a first step in trying to fill this data need.

To fill this void, the objective of our study was to collect a rich data set that would allow us to investigate many issues related to parental income constraints, time constraints, role strains, coping mechanisms, and their effects on child nutrient intake and health outcomes. We collected data from 300 families, including mothers, fathers (where present), and one child. Data were collected from each parent on several measures of income and how time was allocated over a two day period. In addition information was gathered on work experiences, the style of feeding they engaged in with the corresponding child in the study, family meal rituals, and personal health habits including efforts to lose weight, exercise patterns, and nutritional supplement use, and sociodemographic background. From each participating child, data were collected on all nutrient intake over a three day period and anthropometric measures such as waist circumference, weight, and height. Furthermore, information was also collected on the child's perception of their mothers' and fathers' parenting style (including warmth, involvement, rule setting, use of punishment, and so on), food behaviors such as frequency of obtaining food from fast food restaurants, eating dinner with their families, and eating breakfast, health habits such as weight loss efforts, exercise, use of nutritional supplements, and watching television, family meal rituals, and sociodemographic

background. The final dataset consists of over 2000 variables for each family and needless to say a comprehensive analysis of all this data is beyond the scope of any single study.

For this report, we focus on analyzing the variables listed in Table 2. As Table 2 indicates, this report focuses on two child intake variables (percentage of energy from fat and percentage of energy from saturated fat) and two child outcome variables (waist circumference and BMI). These variables are associated with maternal and paternal measures related to income, time spent with children, work/home role strains, status/hereditary, and control variables. We focus on these intake and outcome variables for the following reasons. Research data indicates that saturated fat is directly related to the development of coronary heart disease. Dietary fat in general, i.e., total fat, represents a rich source of energy. However, high energy intake without high energy output results in weight gain and the development of obesity, which is associated with hypertension, type 2 diabetes mellitus, elevated blood lipids, certain types of cancer, gallbladder disease, and other problems (e.g., National Research Council 1989, Bray, Paeratakul, and Popkin 2004). We focus on analyzing the percent energy from fat and percent energy from saturated fat (ratios) because research indicates that measurement error may be mitigated using ratios rather than levels (e.g., Kipnis, et al. 2003; Schatzkin, et al. 2003). Waist circumference provides an indication as to the distribution of body fat. In adults, research has shown that the presence of excessive amounts of body fat in the abdominal area is a risk factor for type 2 diabetes, hypertension, and heart disease. There is a precedent from previous research for considering waist circumference in adolescents (Fujioka, et al. 1987; Bjorntorp 1988; Fernandez et al. 2004; Ford, Mokdad,

and Ajani 2004). Body mass index (BMI) is selected as an indicator for overweight because of its relationship between body fat. Unlike adults, however, where overweight or obesity is based on a defined BMI score, childhood overweight is identified by one's BMI in relation to age and gender (Cole, et al. 2000).

Table 2. Variable Summary of Report

Dependent Variables of Interest
Percentage of energy from fat
Percentage of energy from saturated fat
Waist circumference
Body Mass Index (BMI)
Independent Variables
Father's income
Mother's income
Time father spends with child
Time mother spends with child
Four measures of work/home role strain for father
Four measures of work/home role strain for mother
Four status and hereditary measures
Child demographics
Partitions of Analysis
9-11 year old children
13-15 year old children

The next two sections review the economic and sociological theories of household allocations and child energy intakes and outcomes, followed by a discussion of a desirable interdisciplinary empirical model for child energy intakes and outcomes. The next section provides information regarding our methodological approach: survey sampling, measurements of the variables of interest, and the statistical model. The last

two sections of the report discuss the results and conclusions of the study. The Appendix includes details about data collection procedures, factor analysis, and survey instruments used in the study.

Before proceeding, the reader should know that this report is written from a multi-disciplinary perspective across economics, sociology, and nutrition. As such, methodological norms that are not common across these disciplines, such as sophisticated mathematical representations of theoretical models, are not implemented whereas methodological norms that are common across these disciplines are implemented, such as multivariate statistical analysis

III. Literature Review

Energy intake and risk of obesity are determined by a myriad of factors. While nutritionists, sociologists, and economists have all been studying dietary determinants, each discipline has focused on those factors of direct interest to their discipline. These disciplinary factors do overlap to some degree (e.g., income, job status, time constraint), as sociologists have considered income and job status and economists have considered time constraints, but each discipline also brings to the analysis a unique set of factors that may not overlap with those considered by the other disciplines. These non-overlapping factors across disciplines may interact in important, complex, and perhaps subtle ways in determining energy intake and the risk of obesity. As a result, any analytical framework that does not bring together these three areas is likely to generate only a partial explanation of diet quality and health outcomes (Berman, Kendall, and Bhattacharyya 1994). Though certainly desirable, at this point there simply is no "unified field" theory of dietary intake.[1]

Given the lack of a unified theory of dietary intake, and the unique and rich nature of the data we have collected, we pursue an empirical approach guided by theoretical and empirical aspects from each discipline. Specifically, we use the extant economic and sociological literature to suggest possible reduced form and partial reduced form empirical specifications that incorporate factors from both disciplines without worrying at this stage about imposing a rigid underlying structural form.[2] To that end, this section

[1] Haveman and Wolfe (1995 Section 3) make a similar argument with respect to the closely related research of children's attainments.

[2] You develops a formal theoretical model based on a collective household model

reviews the theories and factors that have been identified in the economics and sociology literature as important determinants of nutrient intake and therefore determinants of dietary outcomes, such as weight.

A. Economic Theories of Household Allocations, Child Intakes, and Child Outcomes

The review of the economic theories of household allocations and child intakes and outcomes is organized based on whether the model treats the household as a single unit with a single set of preferences (i.e., a unitary model) or treats the household as consisting of many members with possibly different preferences (i.e., non-unitary models). Under each subsection we focus on how time use, nutrient demand, and child outcomes have been modeled.

1. The Unitary Household Production Model

The standard economic framework for analyzing the issues of time allocation, energy/nutrient intake, and child outcomes has been some version of Becker's (1965) household production model (HPM). The basic components of the model are a household utility function $U(Z_1,\ldots,Z_m;\mu)$, household production function(s) $Z_i = f_i(X_i,T_i)$, a budget constraint $\sum_j P_j X_j = Y$, and a time constraint $\sum_k T_k = T$. The utility function is assumed to be quasi-concave over commodities (Z_i). In the present context of nutrient demand, the Zs could be considered different nutrients produced by purchasing and consuming other goods (X_i, which could be a vector) combined with other inputs (T_i),

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for the parents with a principal agent framework for the kids in her American Association of Agricultural Economics award winning dissertation entitled "Parental Time and Children's Obesity Measures: A Theoretical and Empirical Analysis." Her formal theoretical framework leads to empirical models very similar to the ones implemented in this study.

such as labor, associated with the ith commodity. Households are differentiated by μ, which is a vector of household-specific characteristics, such as sociodemographic variables. This model is extremely general and can subsume many issues of specific interest, such as labor/leisure decisions. The budget constraint is defined as usual where wage income (wT_w) and non-wage income (Y) is to be allocated across all goods including labor and leisure. In this context, one of the goods is time allocated to labor ($T_w = X_n$) and its price is the wage rate ($w = P_n$). In addition, by simply labeling a commodity as a time input, $T_j = Z_j$, the utility function can also be made a function of time (e.g., labor or leisure). Each good has a price P_i. Because labor and leisure can be written in terms of hours, they tie together the budget and time constraint, where the total amount of available time (T) is to be optimally allocated across activities. The household decision maker's problem is then to choose the Xs and Ts that maximize $U = U(Z_1,\ldots,Z_m;\mu)$ subject to $Z_i = Z_i(X_i, T_i)$, $\sum_j P_j X_j = Y$, and $\sum_k T_k = T$.

The solution to this problem leads to the unconditional demand functions for the Xs and Ts of the general form

(1) $X_i = X_i(P_1,\ldots,P_n, Y, T, \mu)$

(2) $T_i = T_i(P_1,\ldots,P_n, Y, T, \mu)$,

which when substituted into the production functions gives the unconditional or reduced form for the commodity demand (e.g. nutrients) as

(3) $Z_i = Z_i(P_1,\ldots,P_n, Y, T, \mu)$. $i = 1,2,\ldots,m.$

Thus, from an economic perspective, the demand for nutrients depends on the prices of the goods which include the cost of time, non-wage income, total amount of time available, and many sociodemographic variables. It is important to note in the unitary

HPM that it is household income and time that are important. The distribution of income and time is irrelevant in the unitary HPM.

Because of its generality, the HPM has been adapted to modeling and explaining a wide variety of phenomena (see Gronau 1986, 1997 for surveys) and various combinations of equations (1) through (3) have been estimated in the literature. The predominant single aggregate time use category that has been analyzed is labor supply (e.g., Hersch and Stratton 1997) or the relationship between consumption expenditures and labor supply (e.g., Browning and Mehgir 1991; Nicol and Nakamura 1994). Very few studies have appeared in the mainstream economic journals analyzing actual time use data disaggregated by activity. Juster and Stafford (1991) provide a good summary of the literature through the late 1980s. A few of the more prominent time use studies based on the HPM in economics that consider more than one category of time use are Bhargava 1997; Bryant and Zick 1996; Gawn et al. 1993; Graham and Green 1984; Kooreman and Kapteyn 1987; Williams and Donath 1994; and Yamada, Yamada, and Kang 1999.

Much more analysis of disaggregate time allocation has appeared in the sociology literature. However, from this rather diverse literature a clear pattern seems to emerge. Though women have increased their time in the market work place, men have not shared the implied decrease in time working in the home. Rather, women continue to do most of the work at home and allocate more of their resources (money and time) than men to "gender role" activities such as health care, child-care, and meals (Jacobs and Gerson 2004; Presser 2003).

With respect to nutrient intake and outcomes for adults, the HPM has served as the theoretical basis for numerous studies. While not the focus, several studies have

estimated the relationship between income and nutrient intake levels (e.g., Brown and Shrader 1990; Carlson and Gould 1994; Gawn et al.1993; Kim, Nayga, and Capps 2000; Park and Davis 2001; Variyam, Blaylock, and Smallwood 1996; Variyam, Blaylock, and Smallwood 1998; Variyam, Blaylock, Smallwood, and Basiotis 1998). The general finding is that as family income increases, adult intake of fat and saturated fat tends to increase. However, in terms of the percentage of energy from fat and percentage of energy from saturated fat, Popkin, Zizza, and Siega-Riz (2003) found adults with greater incomes consumed a lower percentage of energy from fat, but a higher percentage of energy from saturated fat.

In studies of obesity in adults, income tends to be negatively associated with obesity, although some studies found this to be true for women but not for men (Robert and Reither 2004). Lin, Huang, and French (2004) found a negative relationship between family income and mothers' BMI.

In terms of child intakes and outcomes, the studies cited above have not tried to relate family income or time spent with children to child outcomes, such as weight or educational attainment. This is due to existing data limitations, not conceptual limitations. Child intakes and outcomes are easily modeled within the HPM framework. In the simplest model, which only seeks to determine the child's consumption, the child's consumption (and utility) enters the optimization problem of the household decision maker as a choice variable. In more complicated models where the "commodities" of the utility function are desired outcomes of household members, such as some measure of the child's health state (e.g., nutrient intake, weight), then a production function for this outcome would be included (e.g., Amuwo et al. 2004). In this context, the production

function may have a sub-production function(s) embedded in it, $Z_i = Z_i(z_i(x_i,t_i), X_{-i}, T_{-i}) = Z_i(X_i,T_i)$. In this framework, Z_i would be some outcome variable, such as weight, and $z_i(x_i,t_i)$ would represent nutrient intake, which depends on the market inputs x_i (e.g., purchased food) and time inputs t_i (e.g., related to converting purchased food to edible food). Of course, this outcome may depend on other market inputs and other time (e.g., exercise equipment and time spent exercising), represented by the vectors X_{-i} and T_{-i}. This embedding procedure can extend to multiple levels, depending on the ultimate outcome of interest and the ultimate choice variable. It should also be noted that the household is modeled as a single optimizing agent.

In the child attainment (i.e. outcome) literature, a key input that is a choice variable for the parent is investment in the child and of course a key investment is quality and quantity of time spent with the child (see Haveman and Wolfe 1995 Figure 1).[3] Though conceptually appealing, the quantity, not to mention quality, of time spent in child care is difficult to measure without time use data (see Haveman and Wolfe 1995, extensive footnotes 1 and 2).

There have been some studies looking at the relationship between family income and children's intake and outcomes. Drawing on data from the National Food Consumption Survey, Johnson et al. (1992) found family income had no effect on children's percentage of energy from fat and percentage of energy from saturated fat. Lin, Huang, and French (2004) and Storey et al. (2003) report a negative relationship between family income and children's obesity. Gable and Lutz (2000) found that for every $5,000 decrease in family income, the odds of a child being obese increased by .78.

[3] The term 'attainment' in this literature refers to "...outcomes in young adulthood with important implications for ultimate economic success" (Haveman and Wolfe footnote 18). Attainment is a subset of outcomes.

Anderson, Butcher, and Levine (2003) observed that among mothers of higher socioeconomic background, children of working mothers were at greater risk of overweight.

The key point with respect to the HPM literature is that the child's intake and outcome is determined by the choices made by a single decision maker but existing data limitations have made it difficult to accurately associate time spent with children with intakes and outcomes. See Becker (1991) and Haveman and Wolfe (1995) for further discussion.

2. The Non-Unitary Models

The version of the HPM given above is known as the neoclassical or unitary HPM. The unitary label comes from the fact that the entire household is modeled as being represented by a single set of preferences. As indicated, an important implication of this model is that income from all sources is pooled in the household and then allocated out in an optimal fashion *regardless* of who contributed the money. This is referred to as the *income-pooling hypothesis*. Many empirical studies have found this to be false and several extensions to the unitary HPM have been developed to explain this phenomenon. The alternatives are of three types:

(i) the bargaining framework (e.g., McElroy 1990; Lundberg and Pollak 1993),

(ii) the Pareto efficient outcome framework (e.g., Apps and Reese 1997; Browning et al. 1994; Chiappori 1988a,1988b, 1997),

(iii) the parental preferences framework (Behrman, Pollak, and Taubman 1982).

The key difference between these non-unitary models and the unitary model is that preferences are allowed to differ by household member and there are incentives for household members *not* to pool their income but rather to allocate income that they have control over towards the goods they prefer.[4] The implication then is that the system of unconditional demand equations for Xs and Ts become $X_i = X_i(P_1,\ldots,P_n, Y_m, Y_f, T, \mu)$ and $T_i = T_i(P_1,\ldots,P_n, Y_m, Y_f, T, \mu)$, which when substituted into the production function would give the unconditional or reduced form for the demand for nutrients as

(4) $Z_i = Z_i(P_1,\ldots,P_n, Y_m, Y_f, T, \mu)$

In this model, Y_m is income contributed by the male spouse and Y_f is the income contributed by the female spouse. This allows the effects on the Z_is to differ depending on the source of the income. Stated alternatively, the intrahousehold *distribution* of income is important.

The main empirical focus of the non-unitary models is on testing the income-pooling hypothesis and investigating the differential impacts that male and female incomes have on consumption expenditures (Bourguignon et al. 1993; Browning, et al. 1994; Hoddinott and Haddad 1995; Phipps and Burton 1998; Thomas 1993). A rather robust finding across these studies is that the unitary model is rejected and there is a "gender role" or "gender biasing" effect: relative to men, women spend a larger portion of their money on home-related items (e.g., food, clothing, children). Not surprisingly, the non-unitary models have been extended into many of the same arenas that the HPM has dominated. For example, Aronsson, Daunfeldt, and Wilkstrom (2001) use a non-unitary theoretical framework to analyze household work and leisure and Behrman,

[4] Non-unitary models are also called collective household models.

Pollak, and Taubman (1982) consider a child's earning attainment within a non-unitary framework. Apps and Rees (1997) and Chiappori (1997) introduce household production into their non-unitary models (i.e., Collective Pareto-efficient models), which may be called the collective household production model (CHPM). Newman (2002) uses a non-unitary model to look at labor supply allocations in the cut flower industry in Ecuador.

Of direct interest with respect to this project are the papers by Thomas (1990) and Haddad and Hoddinott (1994). Thomas (1990) implements a non-unitary model framework to determine the differential impact of mothers' and father's unearned income on six variables from a large survey conducted in Brazil in 1974-75. The six variables investigated are per capita energy and protein intake, number of children ever born, survival rate of children, weight of children, and height of children. Of particular interest are the results for per capita energy and protein intake, weight of children, and height of children. For the intake equations, Thomas (1990) rejects the income pooling hypothesis and finds that the effect of maternal income on per capita nutrient demand is four to seven times larger than income in the hands of fathers. For the child anthropometric outcomes, only children less than 8 years old are considered and weight is measured in terms of weight for height and height in terms of height for age. In these anthropometric outcomes, maternal unearned income positively affects weight and height and paternal income is associated with taller children. The income pooling hypothesis is not rejected for the height regression but is rejected for the weight regression. Thomas (1990) also finds significant differences by gender. Mothers' unearned income has a larger effect on the daughter's weight than the son's weight. Though not significant, the mothers' unearned income also has a larger effect on the daughter's height than son's. The

opposite results hold for fathers' unearned income. However, in terms of *both* daughters and sons, the maternal income effects are four to eight times larger than the paternal effects.

Haddad and Hoddinott (1994) analyze the effects of the intrahousehold distribution of income on children's anthropometric status using data from a 1986-97 survey in Côte d'Ivoire focusing on gender effects. Their analysis is similar to Thomas (1990) in that they focus on pre-school children but their panel estimation technique does not allow for a direct examination of the household distribution of income on overall anthropometric status (Haddad and Hoddinott 1994). Rather, they can only examine the gender neutrality of the mothers' income share variable on the anthropometric outcome. Contrary to the results of Thomas (1990), they find that the maternal income effect is (statistically) greater on the son's height relative to the daughter's but there is no statistical difference by gender for weight. It should be noted that while the research of Haddad and Hoddinott (1994) and Thomas (1990) is most closely related to the research of interest here, the role of time allocated to children was not of interest and data limitations precluded it from being included.

In summary, the theoretical and empirical models briefly summarized here provide a rich but incomplete framework for conceptualizing the determinants of nutrient intake and outcomes for children. The general focus of the unitary models has been either on the demand for nutrients and child outcomes *or* on the allocation of time, specifically to labor. The focus of the empirical non-unitary model literature has been on testing and quantifying the income-pooling hypothesis. The most important determinants coming out of these models are wages and income for the individuals in the household

and not just total wages and income. This supports the non-unitary extension in this literature emphasizing the intrahousehold distributional impacts of these variables. However, again lack of sufficient data on time allocated to children has prevented any analysis associating child intakes and outcomes with time allocated to children. Furthermore, sociology has identified other determinants that may be important for child nutrient intake and outcomes in addition to these economic determinants. The next section provides a short review of the related sociology literature.

B. Sociological Theories of Child Intakes and Outcomes

As mentioned above the economic model overlooks certain household characteristics that may be important in the household production model. Role theory and related perspectives drawn from sociology can be used to complement the economic model. Elements from these theories can be conceptualized in a broad sense as reflecting quality measures of inputs or as affecting the economic environment in which economic decisions are made within in the household production model. They also add a behavioral economics flavor to the traditional household production model.

1. Role Theory

We begin with role theory which posits that individuals inhabit a series of socially prescribed roles; for adults these roles include employee, parent, and spouse. Each role carries with it behavioral prescriptions and proscriptions that are generally oriented towards others filling complementary roles: the employee role is oriented towards other employees as well as employers; the parent role is oriented towards the incumbent's children; the spousal role towards a second person filling such a role. Prescriptions and

proscriptions guide behavior and are often bolstered by socially-approved sanctions. Thus it is generally thought appropriate for employers to sanction employees for failure to live up to their obligations as employees. Furthermore, role incumbents potentially have access to resources that enable them to perform in their roles as expected. Perhaps the most universal resource associated with roles is time. Role incumbents must allocate their time across their various roles in order to insure that they meet the obligations of those roles. Finally, roles represent a major source of personal identity or how people define themselves as human beings. Thus, individuals have a personal stake in successfully performing the roles they fill.

Roles tend to make heavy time demands and time is a finite resource. In addition, individuals may perceive greater personal rewards in performing some versus other roles they play. Time, other resource constraints, and role priorities set the stage for competition between roles and role obligations for role incumbent time, energy, and commitment. This competition has been described in various ways. Role strain or role overload suggests that role obligations exceed time and energy resources, inter-role conflict (the demands of one role conflict with those of other roles), and conflict between roles in role-sets (e.g., husband-wife; supervisor-employee conflicts) (Pearlin 1989). Role overload and role conflict have been theorized as significant sources of stress, and research has linked these stressors with emotional and physical disturbances such as anxiety, depression, diabetes, and heart disease (Cohen and Williamson 1991; Lin, Dean, and Ensel 1993).

2. Work Stress, Work Spillover onto Family, and Work Commitment

Work as a source of stress has received particular attention and the "job demands – job control" perspective has driven much of the research on work stress. Such stress is said to occur when the worker experiences overload or multiple, conflicting tasks and time demands. Workers may "complain that their work demands are unpredictable, onerous, and beyond their control" (Reifman, Biernat and Lang 1991:433). It is important to observe that work demands are not in and of themselves stressful; employees frequently welcome responsibilities that make their work interesting and meaningful. Work demands become stressful when the demands exceed the resources the employee has at hand. Control or decision making latitude is also an important feature of work stress; those with such latitude experience far less stress than those who lack control over the pace of their work and the order in which work tasks are performed. A related issue is control over work schedules. Workers with greater flexibility in choice of work hours and work days perceive a greater sense of control than those without such flexible choices. In addition, required overtime taxes workers' physical and emotional energies, and are thus sources of stress. Work stressors of these sorts have negative emotional and physical consequences (e.g., anger, unhappiness, anxiety, depression; difficulties relaxing and sleeping, high blood pressure, diabetes, heart disease, obesity) (Baker 1985; Karlsson, Knuttson, and Lindahl 2001; Menaghan 1991; Rau and Triemer 2004). In addition, work stress leads to tensions between parents and children and has negative consequences for spousal relationships in the family (Bumpus, Crouter, and McHale 1999; Coverman 1989; Crouter and Bumpus 2001; Kinnunen, Geurts, and Mauno 2004; Small and Riley 1990).

Furthermore, overload and role conflict associated with one role may spillover onto another role/role set. The most frequently studied spillover is that from work to family; in this instance the effects of work and work stress carry over into spousal and parental roles. Here the individual is less able to perform such roles because of emotional problems, physical exhaustion, and distraction or the inability to set aside problems from work. Similarly, individuals who are highly committed to their work roles may continue to think about their work while at home because of the rewards they get from their work.

In addition, researchers have found that work schedules have a significant impact on work stress and health-consequences of work (Fenwick and Tausig 2004; Presser 2003). Workers may be forced to work 'non-standard' hours or days of the week, where standard means either 8am – 5pm or Monday through Friday work schedules; in addition some workers have rotating or irregular work schedules. Non-standard and rotating work schedules are associated with less time spent in family activities, work stress, marital conflict, and lessened satisfaction with family life (Fenwick and Tausig 2004; Presser 2003). Also, the household division of labor is affected by such work. Presser (2003) hypothesized that men who had more available time for housework because of non-standard work schedules will perform more 'traditionally women's household chores (which include grocery shopping and cooking). In dual-earner households, men tend to do more traditionally women's type housework if the husbands' work hours do not coincide or overlap with those of their wives: in other words the husband is at home while the wife is at work.

Moreover, those who are highly committed to their work may devote less time, energy, and attention to other family members. Work commitment tends to increase

marital conflict and decrease marital satisfaction (Laedwig and McGee 1986); in addition committed workers appear to pay less attention to their children (Walters, Tasker, and Bichard 2001).

Finally, those who are able to exercise control over the rate at which they work and who have more say in the hours and days a week they work tend to experience less stress and less work spillover onto their families (Fenwick and Tausig 2004). Some have found that greater control over work is associated with working parents granting more autonomy or decision-making power to their children (Grimm-Thomas and Perry-Jenkins 1994); greater autonomy for children is associated with greater self control and responsible behavior in children (Baumrind 1991; Cooksey, Menaghan, and Jekielek 1997; Whitbeck et al. 1997).

3. The Impact of Work Stress, Spillover, Work Control, and Work Commitment on Family Eating Habits

Devine et al. (2003) report that women who characterized their work as very demanding (long hours, overtime, shift work, inflexible work schedule) and as causing work-to-family spillover (no energy, no time for family, poor mother-role performance) tended to deal with these stressors by skipping meals, eating out, and bringing home what they described as "junk food." By contrast women with less stressful working conditions and greater control over their work schedules reported planning ahead, cooking meals ahead, and making multiple meals at one time. Crepinsek and Burstein (2004) found 27.7 percent of the children of mothers who worked full time were likely to skip breakfast compared with 23.4 percent for children whose mothers were full time homemakers. No significant difference was observed for skipping dinner. Turning to eating meals away

from home, 27 percent of children's eating occasions took place away from home for children whose mothers worked full time compared to less than 24 percent for those children whose mothers kept house full time.

Finally, some investigators have examined physiological consequences of work and work stress. Karlsson, Knuttson, and Lindahl (2001) found much higher prevalence of obesity among shift workers of all ages and increased triglycerides and lower HDL concentrations in some age-groups of workers. Stress caused by task demands and work to family spillover was found to be associated with increases in workers' body mass index scores (Grywacz 2000; Netterstrom et al. 1991; Schnall, et al. 1990). Hellerstedt and Jeffry (1997) found lessened physical activity and greater chance of obesity among those with job stress. Finally, greater perceived work stress was associated with increases in caloric and fat intake and greater percentages of calories from fat (McCann, Warnick and Knopp 1990). Most of the literature on the physiological effects of work concentrates on the workers themselves, rather than members of the workers' families. Nevertheless, we hypothesize those aspects of work such as job stress and work to family spillover that have negative impacts on workers' health (e.g., increasing their chances of obesity; eating less healthy diets) will also have negative effects on their children's diet and nutrition.

Devine et al.'s (2003) study suggests that family meals may be more irregular, rely more on take out and fast food fare and increase the likelihood of meal skipping in families in which the mother experiences both work stress and work to family spillover. The Devine et al. (2003) study also suggests that lack of control over work away from home has a negative impact on meal scheduling and increases the likelihood of meal skipping.

4. Status and Heredity

Generally, better educated parents are less likely to be obese (Lin, Huang, and French 2004) and more likely to have children who eat healthier diets and who have lower BMIs (Xie et al. 2003). Dietary fat intake decreased in adolescents with increased levels of parental education (Xie et al. 2003). Children of older mothers tend to have higher BMIs (Lin, Huang, and French 2004). Age, education, and income variables are considered status variables by sociologists. The greater each of these is, the greater the individual's status. The greater the difference in these, the greater the status difference between the parents. Blood and Wolf (1965) argued these differences result in a power differential favoring the person with the higher status. How would a power differential affect children? A power difference in favor of the father means that the fathers' spending priorities are emphasized; this has generally meant that less money is spent on food, less money invested in the children. Blumberg (1988) has found that the mothers who have more status within families tend to spend more money on children's needs. In addition, Blood and Wolfe (1965) found that the greater the status differences between husbands and wives, the less husbands participated in household tasks. More recently Presser (2003) examined the ratio of husbands' to wives' incomes and husbands' to wives' ages. In both cases, as husbands' income or age increased relative to wives', the fewer traditionally-female household tasks husbands helped with. We suggest that the greater the power differences between husbands and wives, the greater the likelihood of negative outcomes in the children.

Heredity plays an important role in children's intakes and outcomes. An increasing number of studies link children's body mass index with parental body mass

index (Agras et al. 2004; Laitinen, Power, and Jarvelein 2001; Salbe et al. 2002). Those studies find, not surprisingly, that the greater the parental BMI, the greater the child's BMI.

In summary, the economics and sociological literatures indicate important variables in studying children's nutrition and outcomes include parents' incomes, the amount of time parents spend with their children, parental work variables such as work stress, work to family spillover, work autonomy, work commitment, and work flexibility, parental status and heredity factors, and children's age, gender, ethnicity, pubertal stage, and activity level. We will focus on children's nutrition and outcomes that are considered strongly related to obesity in children, namely, percent energy from fat, percent energy from saturated fat, BMI, and waist circumference. At present there are no studies in the literature that take into account the range of economic, sociological, and control variables that the present study does.

IV. An Interdisciplinary Empirical Model of Child Intakes and Outcomes

Based on the review of the economics and sociology literature of nutrient intake and child outcomes, a desirable empirical model would combine determinants from the two disciplines. A major advantage of this approach would be to determine the joint impact of economic and sociological variables and also determine if one set is more important than the other.

Based on the literature review, this section first describes the child intakes, outcomes, and explanatory variables of interest for this report. Next, the hypothesized relationships between these variables as measured by marginal effects are described.

A. The Child Intakes, Outcomes, and Explanatory Variables of Interest

The main question of interest in this report is:

> How are specific energy intakes and outcomes of children related to economic and sociological variables?

For this report, we focus on two child energy intake variables and two child outcome variables as the dependent variables to be modeled.

The two intake variables of focus are

1. percentage of energy from fat (y_1)
2. percentage of energy from saturated fat (y_2).

The percentage of energy from fat is the total energy intake from fat divided by total energy intake. The percentage of energy from saturated fat is the total energy intake from saturated fat divided by total energy intake.

The two outcome variables of interest are

1. waist circumference (y_3)
2. body mass index (BMI) (y_4).

Waist circumference is directly measured, so it is not constructed from other variables. Body mass index is the ratio of weight in kilograms to height in meters squared.

From the literature review, there are two categories of explanatory variables from economics and sociology that are desired for a more complete empirical model: *economic/resource determinants* (income and time), *sociological determinants* (work/home role strain and status/heredity). We consider four income and time explanatory variables in the economic/resource category:

1. Father's income (x_2),
2. Mother's income (x_3),
3. Father's time spent with the child (x_4),
4. Mother's time spent with the child (x_5).

We consider eight work/home role strain explanatory variables in the sociological category:

1. Father's spillover of work to home (x_6),
2. Mother's spillover of work to home (x_7),
3. Father's commitment to work (x_8),
4. Mother's commitment to work (x_9),
5. Father's level of control at work (x_{10}),
6. Mother's level of control at work (x_{11}),

7. Father's work flexibility (x_{12}),

8. Mother's work flexibility (x_{13}).

We also consider two status and hereditary determinants:

1. Father's less Mother's age (x_{14})

2. Father's less Mother's education level (x_{15})

3. Father's body mass index (x_{16})

4. Mother's body mass index (x_{17})

Finally, we consider five *control* variables

1. Child's gender (x_{18})

2. Child's race (x_{19})

3. Child's ethnicity (x_{20})

4. Child's puberty stage (x_{21})

5. Child's activity level (x_{22}).

For convenience, all variables are listed in Table 3.

B. Marginal Effects and Ratios

The ultimate purpose of the statistical modeling is to answer questions such as, how is the child's weight associated with the time the mother spends with the child? Stated more generally, the question is, how do child intakes and outcomes change as some explanatory variable or determinant changes? This question can be answered by calculating the marginal effect of a determinant on the child outcome.

A marginal effect measures the change in one variable for a one unit change in another variable. In this report, the hypotheses about the relationship between

explanatory variables and dependent variables will be measured by marginal effects. Mathematically, the marginal effect of a determinant on the child outcome is just the partial derivative of the equation for the child outcome with respect to the determinant of interest. However, when the dependent variable of interest is a ratio of two variables, such as percentage of energy from fat, then the marginal effect calculation becomes more complicated.

Three of the four variables of interest are ratios: percentage of energy from fat, percentage of energy from saturated fat, and BMI. Waist circumference is not a ratio. There is a long and substantial literature on the potential pitfalls of the statistical analysis of variables that are ratios (e.g., Aldrich 1995, Kronmal 1993, Schuessler 1974, and Yule 1910). The general conclusion from this literature is that it is important to model the components of the ratio in order to avoid spurious results (Farris, Perry, and Ailawadi 1992). For example, suppose an increase in the time a mother spends with a child decreases total fat intake *and* total energy intake by the same amount. Now because the percentage of energy intake from fat is just the ratio of these two variables, and both variables decrease by the same amount, then the ratio does not change. While it is true that the ratio did not change, it would be incorrect to conclude that mother's time had no effect on the ratio components – the effects were just offsetting.

Consider the more general representation of the problem. Let the numerator of a ratio of interest be denoted by N and the denominator by D. The ratio is then $R = \text{N/D}$. Suppose there exist a set of explanatory variables $x_1, x_2 \ldots, x_k$ that are hypothesized as affecting the numerator and denominator. In mathematical notation these relationships would be written as

(5) $N = N(x_1, x_2, ..., x_k)$

(6) $D = D(x_1, x_2, ..., x_k)$.

The marginal effect (holding all other variables constant) of one variable, say x_1, on the numerator is measured by the partial derivative or

(7) $$\frac{\partial N}{\partial x_1} = \frac{\partial N(x_1, x_2, ..., x_k)}{\partial x_1} = N_1.$$

Similarly for the denominator the marginal effect is

(8) $$\frac{\partial D}{\partial x_1} = \frac{\partial D(x_1, x_2, ..., x_k)}{\partial x_1} = D_1.$$

Now by definition, the ratio is R = N/D. By the quotient rule of calculus, the marginal effect of x_1 on the *ratio* is

(9) $$\frac{\partial R}{\partial x_1} = \frac{\partial (N/D)}{\partial x_1} = \frac{\left(\frac{\partial N}{\partial x_1}\right) D - \left(\frac{\partial D}{\partial x_1}\right) N}{D^2}$$

$$= \frac{N_1}{D} - \frac{D_1 N}{D^2}.$$

Though somewhat unwieldy, equation (9) shows how a ratio responds to the change in an explanatory variable will depend on the numerator effect (first term) and the denominator effect (the second term). Equation (9) is important because the numerator and denominator of a ratio variable, like percentage of energy from saturated fat, can be affected differently by the same explanatory variable. Consequently, counterintuitive results can occur.

Consider again the example above with respect to mother's time spent with a child. Suppose as a mother spends more time with a child, the child's total energy intake

and intake of saturated fat both decrease, *but not necessarily by the same amount*. Equation (9) then indicates that it may be the case that as a mother spends more time with the child the child's percentage of energy from saturated fat may actually *increase*. This result is completely consistent with equation (9) and implies that the mother's time has a larger impact on total energy intake (i.e., the denominator) than intake of saturated fat (i.e., the numerator). Thus, as mother's time with the child increases, the denominator is decreasing faster than the numerator, so the ratio increases and hence the positive relationship with the ratio. Equation (9) can be extremely useful for explaining initially counterintuitive results.

Equation (9) is also important in terms of guiding the development of hypotheses about the effect of explanatory variables on ratios. Note an important corollary to equation (9) is

> *A hypothesis about the components of a ratio does not necessarily carry over to the ratio unless the magnitudes of the component effects are stated as well.*

So for example, even if we hypothesize that the time spent with a child decreases energy intake and fat intake, we *cannot* infer from the hypothesis that time spent with a child will decrease the percentage of energy from fat, unless we are willing to hypothesize that the effect on fat intake is greater than the effect on total energy. To conserve space, we will use the term *ratio effect* to refer to effects that can be explained by appealing to equation (9) or its corollary.

C. Intuitive Hypotheses

In this section we give our hypotheses about the relationship between the explanatory variables and the four dependent variables of interest: percentage of energy from fat,

percentage of energy from saturated fat, waist circumference, and BMI. The hypotheses are summarized in Table 4. For all of these variables we are unable to state the directional impact of most explanatory variables for two reasons. First, the literature review reveals that while there are numerous studies about related issues (e.g., adult nutrient intake or obesity as a function of household income and no time allocations), none of the literature includes all of the aspects we are considering in our analysis. Consequently, it is difficult to form strong hypotheses within our framework based on this literature's empirical findings. We can use these studies to draw some possible intuitive implications and state these in hypothesis form, but some of these hypotheses will not be based directly on any empirical findings. Second, and more importantly, as indicated in the previous section, the *ratio effect* argument makes it difficult to state a priori what will be the impact of an explanatory variable on the ratio even if we are willing to hypothesize the component effects. With the exception of waist circumference, the dependent variables of interest are all ratios and the ratio effect indicates we can not draw any conclusions about the effect of most explanatory variables. We will state intermediate hypotheses about the components of the ratios, but these are not the focus of this report and do not lead to any definitive hypotheses about the ratio variables of interest because of the ratio effect.

1. Hypotheses about Income

The empirical results from the literature review suggest that energy intake, fat intake, and saturated fat intake all increase with household income (i.e., are all normal goods), for adults based on household income. However, even if we assume food is a normal good, this does not imply conceptually that energy intake, fat intake, and

saturated fat intake also will be normal goods. The reason is that energy intake, fat intake, and saturated fat are obtained from linear transformations of *all* foods consumed, such as $N_i = \sum_j \lambda_{ij} q_j(p,m)$, where N_i is the amount of the ith nutrient, λ_{ij} is a conversion coefficient that converts one unit of the quantity of good j into λ_{ij} units of the ith nutrient, and $q_j(p, m)$ is the demand function for the jth good as a function of prices p and income m. The summation ranges over all foods. Now simple calculus will reveal that even if we assume that food is a normal good, such that,

$$(10) \quad \frac{\partial Food}{\partial m} = \sum_j \frac{\partial q_j(p,m)}{\partial m} > 0,$$

it does not follow that a specific nutrient is normal or inferior because of the weights λ_{ij}. That is, even if (10) is positive,

$$(11) \quad \frac{\partial N_i}{\partial m} = \sum_j \lambda_{ij} \frac{\partial q_j(p,m)}{\partial m}$$

(11) could be positive or negative. As equations (10) and (11) suggest, the real issue is how a change in income is allocated between goods. If a normal (inferior) good has a small weight in (11) then it will not contribute much to the sign of (11). Stated alternatively, the issue is how the distribution of goods and nutrients changes as income changes.

The signing of a relationship like (11) is further complicated by the fact that in our analysis there is not a single household income term but one for the mother and one for the father. Based on this background we hypothesize in a developed country such as the United States and for our sample, where food security is not a real issue, that as income increases the parents will attempt to reallocate their food purchases to items that may be less dense in energy, fat, and saturated fat. Similarly, it seems again reasonable

based on the literature review to hypothesize that fathers and mothers may use their income in ways that would reduce children's waist circumference and weight. These intermediate hypotheses lead to the following hypotheses about the four variables of interest:

H_1: As fathers' and mothers' income increases, the changes in children's percentage of energy intake from fat, percentage of energy from saturated fat, and BMI are indeterminate due to the ratio effect.

H_2: As fathers' and mothers' income increases, children's waist circumference is expected to decrease.

2. Hypotheses about Time Spent with Children

As indicated in the literature review, most of the work on the impact of parental time allocated to children has been done in sociology. The general finding is that the more time that parents spend with children, the more positive the outcome in children, including self-esteem and academic achievement (e.g., Russell and Russell 1987; Yeung et al. 2001). Within the present context, parents who spend more time with their children are in a better position to monitor food intake and physical activity. The hypothesis here is that such parents attempt to prevent their children from excessive levels of food intake and excessive levels of inactivity. This intermediate principle leads to the following hypotheses about time.

H_3: As fathers' and mothers' time with children increases, the changes in children's percentage of energy intake from fat, percentage of energy from saturated fat, and BMI are indeterminate due to the ratio effect.

H_4: As fathers' and mothers' time with children increases, children's waist circumference will decrease.

3. Hypotheses about Work Stress, Work Commitment, Work Control, and Job Flexibility

As indicated, the bulk of studies on children's diet and nutrition report no adverse effects of mothers' employment status on children's diet and nutrition (e.g., Johnson, Smicklas-Wright and Couter 1992), though there is some literature that indicates work stress and work spillover onto family has negative consequences for family members including children. Much of this research focuses on negative emotional (e.g., anger) and physical (e.g., high blood pressure) consequences of work stress for the workers themselves (Baker 1985; Menaghan 1991; Rau and Triemer 2004). Other research finds that work stress and work spillover into family life have negative consequences for marital satisfaction and the quality of the workers' relationship with their children (Bumpus, Crouter and McHale 1999; Coverman 1989; Kinnunen, Geurts, and Mauno 2004; Small and Riley 1990) and tensions between working parents and their adolescent children (Crouter and Bumpus 2001; Walters, Tasker, and Bichard 2001). Recent research has begun to explore the impacts of work stress and work to family spillover on the food habits and nutrition of family members. This research finds that those who experience greater work stress and greater work to family spillover tend to practice poor dietary habits, including skipping meals and bringing home what they consider to be 'junk food' for their families to consume (Devine et al. 2003). Finally, work stress increases the likelihood of obesity in workers (Karlsson, Knuttson and Lindahl 2001), which in term may increase the likelihood of obesity in children of the workers. This research generally

finds a variety of negative effects of parental work experiences on families and children. In this study, we focus on work spillover to family as our indicator of work related stress. Based on this literature we have the following intermediate hypotheses: As fathers and mothers experience more work to family spillover, children's intakes of total energy, energy from fat, and saturated fat, and children's waist circumference, and weight will be higher. These intermediate hypotheses then lead to the following hypotheses about the variables of interest.

H_5: As fathers and mothers experience more work to family spillover, the changes in children's percentage of energy from fat, percentage of energy from saturated fat, and BMI are indeterminate due to the ratio effect.

H_6: As fathers and mothers experience more work to family spillover, the children's waist circumference is expected to be higher.

Work commitment is conceptualized as the importance workers place on their jobs relative to other roles such as those they hold as family members. Generally, work commitment is negatively associated with marital satisfaction and positively associated with marital conflict in workers (Laedwig and McGee 1986), and there is some evidence that work commitment may lead to less attentiveness by parents of their children (Dowswell and Hewison 1992; Walters, Tasker, and Bichard 2001). While one study found that parental work commitment was a barrier to physical activity as an aspect of family life (MacDonald et al. 2004), this research has not focused on eating habits or nutritional outcomes in family members. Given the expected negative effects of inattentiveness by parents leads to the following intermediate hypotheses about work commitment: As fathers' and mothers' commitment to work increases, children's intake

of total energy, energy from fat, saturated fat, waist circumference, and weight all will be higher. These intermediate hypotheses then imply the following hypotheses about the four variables of interest:

H_7: As fathers' and mothers' commitment to work increases, the changes in children's percentage of energy from fat, percentage of energy from saturated fat, and BMI are indeterminate due to the ratio effect.

H_8: As fathers' and mothers' commitment to work increases, the children's waist circumference will be higher.

Control over work (or work autonomy as it sometimes in called in the literature) is generally perceived as having positive consequences for workers and for their families. Workers who exercise greater self-supervision tend to have higher self-esteem and are more willing to permit greater autonomy in their children (Grimm-Thomas and Perry-Jenkins 1994). Greater autonomy in children has been found to be associated with greater self-control and responsible behavior in children (Baumrind 1991; Cooksey, Menaghan, and Jekielek 1997; Whitbeck et al. 1997). These results would imply the intermediate hypotheses that as fathers' and mothers' control at work increases, children's intake of total energy, energy from fat, saturated fat, waist circumference, and weight all will be lower. This in turn implies the following hypotheses about the variables of interest.

H_9: As fathers' and mothers' control at work increases, the changes in children's percentage of energy from fat, percentage of energy from saturated fat, and BMI are indeterminate due to the ratio effect.

H_{10}: As fathers' and mothers' control at work increases, children's waist circumference will be lower.

Related to control over tasks at work is control over work schedule: the days and hours the employee works. Such flexibility permits workers to conduct family business, care for sick family members, and be more involved in children's school activities. Research demonstrates such flexibility reduces work to family spillover, increases satisfaction with work and with life in general, and improves health status (Fenwick and Tausig 2004). These findings suggests the intermediate hypotheses that as fathers' and mothers' work flexibility increases, children's intake of total energy, energy from fat, saturated fat, waist circumference, and weight all will be lower. This in turn implies the following hypotheses about the variables of interest.

H_{11}: As fathers' and mothers' work flexibility increases, the changes in children's percentage of energy from fat, percentage of energy from saturated fat, and BMI are indeterminate due to the ratio effect.

H_{12}: As fathers' and mothers' work flexibility increases, children's waist circumference will be lower.

4. Hypotheses about Status and Hereditary Variables

As discussed earlier, while parental education has been found to be positively related to healthy outcomes in children (healthier diets; lower BMIs) (Lin, Huang, and French 2004; Xie et al. 2003), differences in parents' age and education reflect potential status and power differences in the family (Blood and Wolfe 1965), which have a different relationship with outcomes in children. This coupled with the hypothesis that mothers who have more status and power relative to fathers are more likely to make

spending decisions that favor children's health and well-being (Blumberg 1988) suggests the intermediate hypotheses that as the difference in fathers' and mothers' age and education increases, children's intake of total energy, energy from fat, saturated fat, waist circumference, and weight all will be higher. These intermediate hypotheses in turn suggests the following hypotheses about the variables of interest

H_{13}: As the difference in fathers' and mothers' age and education increases, the changes in children's percentage of energy from fat, percentage of energy from saturated fat, and BMI are indeterminate due to the ratio effect.

H_{14}: As the difference in fathers' and mothers' age and education increases, the children's waist circumference will be higher.

The literature is clear regarding the relationship between parental BMI and children's BMI: they are positively related (Agras et al. 2004; Laitinen, Power, and Jarvelin 2001; Salbe et al. 2002). We therefore have the following hypotheses about parents' BMI.

H_{15}: As fathers' and mothers' BMIs increase, the changes in children's percentage of energy from fat and percentage of energy from saturated fat are indeterminate due to the ratio effect.

H_{16}: As fathers' and mothers' BMIs increase, the children's waist circumference and BMI are expected to increase.

5. Control Variables

In order to obtain accurate estimates of the marginal effects given as hypotheses above, it is important to control for possible differences due to gender, race, and ethnicity in addition to sexual development and activity levels in the child. Because these variables

are viewed merely as control variables, we do not state any formal hypotheses about the relationship between these variables and the dependent variables of interest.

V. Survey Methodology and Data Collection

As indicated by the above review of the economic and sociological literature, to implement an interdisciplinary model requires data on all the variables listed in Table 3. Unfortunately, no existing data set has the required degree of richness to directly associate all these variables at the individual level. As seen from Table 3, we need the following data from each of three individuals in a household:

1. Father – income (x_2), time spent with child (x_4), spillover of work to home (x_6), commitment to work (x_8), level of control at work (x_{10}), work flexibility (x_{12}), age (x_{14}), education (x_{15}), and body mass index (BMI) (x_{16}).
2. Mother – income (x_3), time spent with child (x_5), spillover of work to home (x_7), commitment to work (x_9), level of control at work (x_{11}), work flexibility (x_{13}), age (x_{14}), education (x_{15}), and body mass index (x_{17}).
3. Child – percentage of energy intake from fat (y_1), percentage of energy intake from saturated fat (y_2), waist circumference (y_3), and body mass index (y_4), gender (x_{18}), race (x_{19}) , ethnicity (x_{20}), puberty stage (x_{21}), and activity level (x_{22}).

This section outlines how these data were collected.

A. Survey and Sampling

The data and results presented in this report derive from the "Parental Time, Role Strains, Coping, and Children's Diet and Nutrition" project. The data were collected between July, 2001 and June, 2002. The goal was to obtain data from one child between the ages of 9-11 or 13-15 and from both of that child's parents in dual headed households or from one child (same age categories as above) and from that child's mother (female

headed households). It was decided that male-headed households are still too few to be of the same relevance as either dual headed or female-headed households.

The project aims to examine the potential influence parents have on children's diets and health outcomes. However, studying children under the age of 9 using complex survey instruments is problematic in terms of a child providing detailed data about themselves (Crocket and Peterson 1993). In addition, as children progress through adolescence, parental influence begins to wane as peers become an increasingly important source of influence (Crocket and Peterson 1993). Finally, we opted to exclude 12-year olds because this is the age at which many children undergo puberty; we desired a sample of pre-pubertal and post-pubertal children.

Random digit dialing was used to generate a sample of approximately 300 households in the Houston Metropolitan Statistical Area (MSA). A minimum of 212 households were needed in order to obtain statistical power of 90 percent at the .05 level (one-tailed tests) in bivariate analyses (Kraemer and Thielman 1987). Because we planned to test hypotheses using multivariate analysis techniques, a sample larger than 212 was necessary. In addition, we anticipated that given the amount of respondent burden required of study participants that a number of members of the participating households would not fully complete all parts of the data collection phases. Finally an effort was made at over-sampling female-headed households.

The Houston MSA was selected because of its high concentration of ethnic groups and range of incomes. The city of Houston is the fourth largest in the country. Appendix A gives more information on the sample.

B. Respondent Burden and Overview of Survey Instruments

The study required a complex set of data requirements from *each* participating household member. Six survey instruments were used in the collection of data. These can be grouped under three general headings:

(1) Parent's telephone interview,

(2) Parent's self-administered questionnaire with time diary,

(3) Children's questionnaire, 24-hour dietary recall, 2-day diet record, and activity record.

This section describes the purpose of these instruments and how they were implemented. Appendix E contains the actual survey instruments.

1. Parent's Telephone Interview

Each parent was asked to participate in their own telephone interview separate from their spouse. Each parent's telephone interview lasted about 45 minutes and was designed to gather information about the employment status of the parent, parenting style, parental control over food and expenditures, parental feeding style, parental concern about children's eating habits, parental self-reported health and health behavior and children's health and family sociodemographics.

The parents were asked a standard battery of questions regarding employment that followed those used by the General Social Survey by Davis and Smith (1995). These questions were used to determine if the parent works, the type of work they do, and the work schedule they have. The telephone interview also included questions regarding the importance of the parent's work to them and their work commitment. The parents were asked about the degree of flexibility or flextime available to them and the amount of

overtime they worked. Parents were also asked about whether they experienced job stress and/or work-family role conflict.

The parent telephone interview also included standard questions used for obtaining information about who in the household was more responsible for household tasks such as grocery shopping, meal preparation and cleanup, childcare and other household tasks.

2. Parent's Self-administered Questionnaire with Time Diary

Each parent was asked to complete a self-administered questionnaire and time diary separate from their spouse. The questionnaire and time diary were reviewed with the parents in the home by the field interviewer, who interviewed the child. The survey instrument was left with the parents to be mailed back after completion.

The parent's self-administered questionnaire was designed to obtain both sociological and economic information from the household. With regard to the sociological aspects of the self-administered questionnaire, we asked the parents to tell us how they dealt with the discipline of their children. They were given specific violations or rules and asked to circle which of the discipline methods provided were used for each of the cases mentioned. With regard to the economic aspect of the self-administered questionnaire, we asked parents about their sources of income. We asked parents to provide information about their sources of earned income such as wages, salaries, commissions etc., as well as their sources of unearned income such as investment incomes, rental income, interest, et cetera. Parents were encouraged to consult financial records (e.g., tax returns, receipts, checkbook records, etc…) in completing the financial aspects of the questionnaire. The self-administered questionnaire also contained a section

that asked questions about the type of family financial structure of the household. The type of family financial structure has been found by both the sociological and economic literature to have different effects on household purchases (e.g., Pahl 1989). Different financial structures have been found to lead to different degrees of autonomy in purchasing decisions. Parents were also asked about the household's expenditure patterns. Parents were not only asked about the monthly expenditures in a variety of different categories, but also who is in charge of making the monthly expenditure in each of the expenditure categories.

The last section of the self-administered questionnaire was the time diary. The time diary was designed to measure how the individual parents used time in a given day. One of the theses of the project is that as parents' lives become more hectic, they look for ways to save time, especially for time consuming activities, such as meal preparation and clean up and child care. In theory, there are three ways in which a parent can save time. First, there is multitasking whereby someone does more than one job at a time. Second, in a household with many members, household members can work together to get a job done in less time. Third, time can essentially be bought which means that resources can be used to purchase goods and services in the market to reduce the amount of time it takes to carry out household chores. We asked each parent in a household to keep his/her own time diary because of the substitution possibilities of time between household members. Parents were asked to keep track of all of their activities during a 48-hour period corresponding to their children's dietary and activity recall. They were provided with an example of how to fill out the time diary. They were asked to enter the first thing they did each day, the beginning and ending times of the activity, whether or not they

were doing something else at the same time, where the activity took place and whether or not someone helped them. The parents were asked to repeat this process for all of their activities during a day until they completed their last activity of the day.

Each individual recorded what he or she did throughout the day and each entry was coded as one primary activity per row in the data set. Occasionally, the individual might report doing two or more activities at the same time, such as cooking while listening to music. In this case, the primary activity was considered to be the one that engaged the most attention and the others were recorded as secondary activities in the same row. Therefore, for the one-day time diary record, each individual had the same number of rows of time diary records in the data set as the number of primary activities he or she participated in throughout the day. All activities were assigned codes and there are a total of 208 activities for fathers and 224 for mothers. These activities were then grouped into 18 major categories: work, travel, food consumption at home, food consumption away from home, food preparation, other food related activities (such as grocery shopping), care for household member other than child, personal care, shopping, education, voluntary or other unpaid work, entertainment, exercise, hobby, media (listening to music), talk, party, cleaning. In our sample, there were only four fathers and eight mothers who completed only one-day of the time diary, all others provided complete two-day records.

3. Children's Questionnaire, 24-hour Dietary Recall, 2-day Diet and Activity Record

Children between age 9-11 and 13-15 were used in this study because research in the nutrition literature suggests that, on average, age 12 is a time of great change because of puberty. The participating child in each family went through a personal interview, a 24-hour food recall, a 24-hour activity recall, anthropometric measurements such as sub-scapular and triceps skinfold thicknesses, waist and hip circumference, height, weight and a self-assessment of the Tanner scale. The children were also instructed on how to fill out food and activity diaries for two days.

The children's interview took place at the child's home or in rare cases at a public facility or private home of the parents' choosing. The child interview took anywhere from 45 minutes to 1 hour and 45 minutes. The time depended on the child's age, concentration and level of maturity. The longest interviews were those of 9-year-old boys. The child questionnaire mimicked the parent's telephone interview in many respects and included sections on relationships with parents, parenting styles, the children's health behavior, perceptions of body satisfaction and self-esteem, family meal rituals, parental criticism of children's weight and exercise, children's work for pay and expenditures, sociodemographics and children's dietary behavior.

Children's dietary behavior was an important area of concentration. The children's questionnaire included questions about the frequency that children/adolescents reported skipping meals, how often they ate dinner with at least one parent, and how often they ate in restaurants, fast food restaurants, at school or in another child-care setting. The children's questionnaire also included a 30-item scale developed by

Devereux, Broffenbrenner, and Suci (1962) that was used to measure the dimension of parental warmth and involvement that parents have in their children's life, the presence of clear behavioral standards and child involvement in decisions that affect him/her. The questions utilized a Likert 5-point scale.

The purpose of the 24-hour diet recall was to ascertain the nutrient intake of the child in the previous 24-hour period. Dietary intake was measured using the multipass 24-hour recall. With the 24-recall method, participants first provided a free-recall list of all foods consumed within the 24-hour period prior to the appointment. This was followed by structured prompts from the field interviewer regarding food descriptions and amounts and a final review of the recall information to obtain any changes/additions the child might want to make.

During the 24-hour recall, intake data collection was aided by a food model book, (adapted from Hess, 1997) measurement cups and a ruler, and the child was asked to indicate the amount of food or drink he/she consumed. The child was then asked where they consumed the food or drink. The child was asked to indicate if anyone was with them when they consumed the food or drink and finally they were asked whether they consider the food or drink consumed to be a meal or a snack. This process was repeated for all of the food or drinks consumed during the 24-hour period.

The 24-hour dietary recall was supplemented by a 2-day food record. One weekday and one weekend were randomly selected during either the summer or school year depending on when the interview was collected. The two days selected for keeping the food records were selected based on the date of the interview. The day after the final food record day, an interviewer called the participating child by telephone and asked the

child to read his/her record entries. In cases in which the food items or amounts eaten were unclear, the interviewer probed for more details (see Casey et al. 1999). Data from the 24-hour dietary recall and 2-day food records were entered into a software program called Food Processor for conversion into nutrient intake values (ESHA Research 2000-2003).

The Tanner scale was used to determine the growth and sexual development of the child interviewed. According to Daniels et al. (1999) sexual maturity is a more important determinant of body fat than age. The amount of vitamins and minerals needed by children and adolescents depends, in part, on their stage of growth and sexual development or puberty. The Tanner scale was composed of a series of drawings of children at various stages of puberty. The female drawings show different degrees of breast development and pubic hair growth. In order to reduce embarrassment for the participating children, they were given an envelope containing the sex-appropriate Tanner drawings and were asked to go to another room in order to circle the appropriate level of development represented by the various choices offered. Once they had completed this task, they returned the envelope (with the drawings placed inside) to the interviewer.

The purpose of the 24-hour activity record was to ascertain the amount of inactivity of children. The 24-hour activity record provided information about the activities undertaken by a child in the previous 24-hour period. The child first told the interviewer at what time the child went to bed the previous day, where the child went to bed, was anyone with the child when he/she went to bed and for how long they slept. The child was then asked at what time they woke up, where they were, was any one with

them, and how long it took them to wake up. The process then continued by asking the child at what time the next activity took place, what was their next activity, was anyone with them while they performed this activity, and how long the activity lasted. This process was repeated until the child reported going to sleep.

Height, weight, waist and hip circumferences, and triceps and subscapular skinfolds were obtained by the interviewers in accordance with procedures provided by Lohman, Roche, and Martorell (1988). Before the interviewers were allowed into the field, they trained to be able to take three measures that did not differ by more than one-centimeter. In the field, participating children were asked to wear lightweight and loose-fitting clothing for their physical examination. The children's shoes were removed prior to measuring their heights. BMI was calculated from the children's weights and heights.

Height was measured to the nearest 1/8 inch using a non-stretchable metal tape measure and a metal triangle while the subject was wearing lightweight clothing, no shoes, and standing on a non-carpeted surface. Weight was measured to the nearest .5 pound using a 12" by 12" 500 pound parcel scale (Scales Plus, Collierville, TN).

Waist circumference was measured to the nearest 0.1 cm at the narrowest area below the rib cage and above the navel (or at the navel if there was no narrow section) using a flexible nylon tape measure. Hip (buttocks) circumference was measured around only the undergarment layer while the child was standing. The waist-to-hip ratio is a measure of fat deposition; a higher ratio is associated with greater central adiposity and possibly greater visceral adiposity.

Triceps and subscapular skinfold measurements were taken on the right hand side and were done in triplicate to the nearest millimeter using a Lange Skinfold Caliper

(Cambridge Scientific Instruments, Cambridge, MD). The three measures were then averaged.

Finally, all questionnaires were also translated into Spanish for those who preferred to be interviewed in Spanish.

4. Respondent Incentives and Compensation

Based on our pilot study experiences, we found that in order to maximize a completed study of each household, the mother, father, and child must participate in the study. Without an incentive paid to each participant the likelihood of losing one or more household members was high. The use of incentives in household studies in which the respondent burden is high has precedent; the Iowa Youth and Family Study required that each sampled household must contain a mother, father, and two children who were willing to participate before the household was deemed eligible to participate (Conger and Elder, 1994). In that study, the participating subjects each received $20 per hour of participation. Based on differential respondent burden (based on the number of questions asked and the amount of time on average to participate in the study), we paid each participating child $25; each mother $20; each father $15. We also held a lottery at the end of the data collection period in which two participating household were selected at random to receive $250 each. Each household also received a summary report of the child's nutrient intake.

C. Measurements of Variables of Interest for This Report

The data collection process described in the previous section resulted in an extensive and very rich dataset whose complete analysis is far beyond the scope of any

single report. For this report, we focus on the variables described earlier and listed in Table 3. Table 5 gives all the variable names, the units, and their definition that will be the focus of this report. This section describes how these variables were constructed.

Nutrient Intake and Anthropometric Outcome Data: As indicated, dietary intake was obtained through collection of food intake data over a three-day period. A multiple-pass 24-hour recall for the day prior to the interview was obtained using a 2-dimensional booklet of food models to assist in estimating portion sizes. The booklet consisted of photographs of representative foods, drawn from Portion Photos of Popular Foods (Hess 1997) and used by permission of the *American Dietetic Association* (ADA). These booklets were left with the respondents to refer to as they filled out their 2-day dietary records. Data from these records were obtained over the phone. This procedure was designed to not only increase compliance, but also to increase accuracy and completeness, for the interviewer could probe for additional detail as the child recounted her/his food intake. The intake data were analyzed using the Food Processor program (ESHA 2002-2003). The Food Processor program converted food intakes into nutrient intake equivalents for each day. The three day averages were used in the analysis for total energy intake, total fat intake, and saturated fat intake, which were then used to calculate the percentage of energy from fat (y_1) and the percentage of energy from saturated fat (y_2).

The anthropometric outcome data came from the physical exam conducted by the interviewer: waist circumference (y_3), and weight and height were used to construct the body mass index (y_4).

Income and Time Allocation Variables: Each parent's income and time variables came from the parent's self-administered survey. For this study, we generated a variable that represents the average time per day a mother and father each spent with the child in direct activities. This measure is the total available time in a day minus the sum of all time spent on primary activities *not* spent with the child. Consequently, this represents the average amount of time per day the parent spends with the child as a primary activity. Note this measure does not distinguish between time spent in energy consuming activities (e.g., eating at home or away from home) and energy expending activities (e.g., playing soccer or watching television). Nor does this measure include time spent in indirect activities – activities performed in the presence of the child, but not directly involving the child. We will discuss the possible implications of this in the conclusions.

Work/Home Role Strain Variables: Attention and psychological energy represent additional factors in caring for children. These were reflected in the degree to which parents found that their work demands spilled over onto the family, the degree to which their work was stressful, and the degree to which they were committed to their work. Work spillover was measured in the parents' telephone interview surveys by a series of questionnaire items based on earlier work by Simon (1992). Each employed parent responded to these items. For each working parent, these items were subjected to a principal factors factor analysis, the results of which are presented in Appendix B (Tables B.1 and B.2) (Cliff 1987). For each parent, a single factor resulted from this analysis. Loadings on these factors were moderately high and positive. The factor for the fathers and the factor the mothers should be interpreted as follows: a high score on a

work to family spillover factor means that the parent in question is more likely to experience work to family spillover.

Distractions generated by employment came not only in the form of spillover and stress, but also by the commitment the individual had to her/his job. Work commitment was measured using standard scales (see Knoke and Woods 1986; Porter et al. 1974). Analyses of mothers' and fathers' responses to items that reflected job commitment or loyalty produced one factor for mothers and one factor for fathers (Tables B.3 and B.4). Moderate-sized loadings were observed for each factor; some of these loadings were positive but others were negative. An examination of these signs indicates that a high score on the factors indicates that the parent in question has *low* commitment to her/his work. In addition, conditions at work have been found to affect parent-child relations (Parcel and Menaghan 1994). In particular, the less control the individual had over what she/he did at work, the more rigid the parent was in dealing with her/his child. Job control was measured using a standard scale of 5 items; these items underwent a principal factors factor analysis (Tables B.5 and B.6). A single factor was produced for each parent; loadings on each factor were moderate to high in magnitude. A parent with a high score on the work control factor will be more likely to perceive that she/he exercises *little* control over her/his work. Finally, parents may be able to carve out additional time from their work days by bringing work home with them. A two-item scale called "work flexibility" was formed. Because there were only two items used in creating these scales, the items were not subjected to principal factors factor analysis.

Parental Status, **BMIs, and Control Variables**: The parents' status and BMI variables were constructed from the telephone interview data. The status variables are

represented by father's less mother's age and father's less mother's education level. Also, each parent's BMI is calculated and included: father's BMI and mother's BMI. For the child, the data for the control variables was constructed from the child interview data, with the exception of child puberty stage: gender, race, ethnicity, and activity. The puberty stage was constructed from the Tanner development stage data. If the reported Tanner development stage data was greater than one, then a dummy variable for puberty was coded as one and zero otherwise. Activity was a dummy variable coded as one if the child participated in active exercise in at least 3 to 5 days in the last 14 days and zero if not.

D. Sample Studied in this Report

The project includes families in which both parents work (76.3 percent of the two-parent families in our sample), one parent works while the other stays at home, and female-headed households (17.5 percent). However, the present study deals only with those families in which both parents are present and both are currently employed. This decision was made because we were interested in examining the effects of parental work on children's outcomes when both parents are working. Furthermore, the number of dual-parent present, one-parent working households in our sample is too small for reliable multivariate analysis. Similarly, while we managed to obtain an over-sampling of female-headed households, a significant number of the children in those households did not complete the study, making multivariate analysis across those households infeasible. Finally, we would have liked to compare outcomes in children participating in child feeding programs such as the School Lunch Program with children who were not

participating in such programs, but none of the children in our sample were participating in child feeding programs.

VI. Descriptive Statistics and Bivariate Correlations

This section first reports in Tables 6 and 7 the descriptive statistics by age group for the variables given. Means, standard deviations, and coefficients of variation are discussed. Different sample sizes for different variables reflect different response rates. This section also gives the bivariate correlations between the four dependent variables by age group in Tables 8 and 9. The within gender (fathers or mothers) and across gender (across fathers and mothers) bivariate correlations between the explanatory variables are also given by age group in Tables 10-15. We *do not* present bivariate correlations between explanatory variables and the response or dependent variables because such correlations can be misleading. Bivariate correlations do not control for multivariate effects (i.e., they do not hold other variables constant). For example, it is well known that income and age are highly correlated. A bivariate relationship between income and BMI does not control for the effects of age on the relationship. The more sophisticated multivariate models we estimate later are designed for that purpose, so we postpone until then discussions of relationships between response variables and explanatory variables.

A. Descriptive Statistics

We present means, standard deviations, coefficients of variation, and sample sizes for each relevant variable. The coefficient of variation represents the amount of variability around the mean of a given variable divided by that variable's mean. It is particularly useful for comparing the variation of two variables across subpopulations. The descriptive statistics for 9-11 year old children are exhibited in Table 6 and those for 13-15 year old children in Table 7. On average for the younger age group, about 33

percent of total energy is from fat and about 12 percent is from saturated fat. These numbers exceed current recommendations (USDA, 2000) but are similar to the results reported by Paeratakul et al. (2003). Similarly, for the older group, about 32 percent of total energy comes from fat and about 12 percent from saturated fat. The standard deviations and ranges of the variables are also very similar.

For the 9-11 year olds, waist circumference averages about 655 mm with a coefficient of variation of .17; for 13-15 years olds waist circumference averages approximately 731 with a coefficient of variation of .55. There is much more variability in the waist circumference measure for the older age group. The average BMI for the 9-11 year old sample is about 19 with a coefficient of variation of .22. Though not shown in the Table 6, over 19 percent of the younger children in the sample have BMIs at or above the 85th percentile (but below the 95th percentile), based on Centers for Disease Control and Prevention percentile data. These children are considered at risk of overweight. An additional 19 percent have BMIs at or above the 95th percentile. For the 13-15 year olds, BMI averaged 22 with a coefficient of variation .24. Children at or above this percentile are considered at risk of obesity. Thus BMI was greater for the older age group, but the amount of variation in the two samples is similar.

Though not shown in Table 7, 18 percent of the 13-15 year olds had BMIs between the 85th and 95th percentiles; 17 percent had BMIs greater than the 95th percentile.

Turning to the independent variables in the 9-11 year old sample and starting with the control variables, 51 percent of the 9-11 year olds (and the 13-15 year olds) are male, 72 percent are Non-Hispanic white, and 14 percent are Hispanic. Similarly, 70 percent of

the 13-15 year olds are Non-Hispanic white while 11 percent are Hispanic. Among the 9-11 year olds, fathers are on average 2.3 years older than mothers and average less than a category difference in education level (.13); among the 13-15 year olds, the father-mother age difference is 2.3, while fathers and mothers have essentially the same education level (.01). The average BMI for fathers in the 9-11 year old sample is about 27 with a coefficient of variation of .15, whereas the average BMI for mothers in the sample is about 26 with a coefficient of variation of .24, indicating more variability among mothers than fathers. Similarly, fathers' BMIs among the older sample averages about 28 with a coefficient of variation of .15; for mothers, BMI averages about 26 with a coefficient of variation of .21, indicating more variability among mothers than fathers.

Among the younger age group, fathers' income in the sample averages $86,377 while mothers' income averages about $26,678. Not too surprisingly, the coefficient of variation for fathers' income is lower at .63, compared to mothers' at 1.09. Similarly among the older age group, fathers' income was $79,632, while mothers' income averaged about $34,231. Again there was less variability in fathers' income (coefficient of variation=.69) compared with mothers' (coefficient of variation=1.04).

The average amount of time fathers spend daily with their 9-11 year old child in activities that directly involve the child in the sample is about one hour and twenty minutes (80 minutes) with a coefficient of variation of .86. Fathers spend more time with older children, an average of about one and one half hours (95 minutes) with a coefficient of variation of 1.62, indicating considerable variability. The average amount of time that mothers spend daily with their 9-11 year old child, doing activities that directly involve the child, is about two hours and five minutes (125 minutes) with a coefficient of

variation of .79. In the younger sample, mothers spend more time with the child and that time varies less than the time fathers spend with the child. Turning to the older age group of children, mothers spend less time than the fathers do with these children, an average of approximately an hour and 15 minutes (87 minutes) with a coefficient of variation of 1.10. Again the variability of time spent with children of the 13-15 year olds was lower for mothers than for fathers.

Finally as indicated earlier, the work/home role strain variables are factors from factor analyses. As a result, the units of these variables are difficult to interpret. In general, as these variables increase then this would indicate only an ordinal – as opposed to cardinal – change in the factors these variables are designed to measure.

B. Bivariate Correlations

There were no significant correlations between the intake variables (percentage of energy from fat and percentage of energy from saturated fat) and the outcome variables (waist circumference and BMI) for the 9-11 year old age group (see Table 8). However, percentage of energy from fat and percentage of energy from saturated fat were highly (and positively correlated), as might be expected. Similarly, children with larger waist circumferences tend to have higher BMIs. Turning to the 13-15 year olds, the greater their percentage of energy from fat, the greater their percentage of energy from saturated fat; the greater their waist circumference, the greater their BMIs (see Table 9). Unlike the younger age group, 13-15 year olds who consumed a greater percentage of their energy from saturated fat tended to have smaller waist circumferences and BMIs. This counter-intuitive finding may be partially explained by the higher percentage of current dieters

among the 13-15 year olds with higher waist circumferences and BMIs (Yeley 2003), but more importantly this bivariate correlation does not control for other variables.

Turning to the explanatory variables, fathers who earn more income spend more time with their 9-11 year old children, enjoy greater work flexibility, and experience greater control over their work (Table 10). Fathers who spend more time with these children have greater work flexibility and fathers with greater work flexibility exercise greater control over their work and are more committed to their work. Mothers who earn more income have greater work flexibility and more control over their work, but experience greater work to family spillover (Table 11). However, mothers who experience greater work to family spillover spend more time with their children. Mothers who experience greater work flexibility tend to experience greater work control and greater commitment to their work. Finally, mothers with greater work control experience less work to family spillover and greater commitment to their work.

There are few across gender effects of mothers' work on fathers' work variables. In families in which the father experiences work spillover onto the family, mothers spend more time with their children (Table 12). Mothers with more work flexibility, but less control over their work, are associated with fathers who are more committed to their work.

Turning to the older age group, the greater the fathers' income the more work flexibility and job control they enjoy (Table 13). However, fathers with greater work flexibility actually spend less time with their children; fathers spend more time with children if their work spills over onto their families. Fathers with more work flexibility are also more likely to control their work; fathers who control their work experience more

work to family spillover. Mothers' income is negatively associated with the time they spend with their children; higher income mothers tend to have greater work flexibility, exercise greater control over their work, and experience greater work to home spillover (Table 14). Mothers with greater work flexibility are in greater control over their work and experience greater work to family spillover.

The less mothers control their work the more time fathers spend with their children (Table 15). Mothers spend more time with their children if their husbands experience both greater work flexibility and work control. Greater mothers' work flexibility is associated with greater fathers' work flexibility. The greater the mothers' work flexibility is, the greater the fathers' work control. The less control mothers exercise over their work, the greater the spillover of fathers' work onto the family. The greater the fathers' work commitment, the greater the mothers' work spillover.

C. Summary Observations on Bivariate Correlations

So, are there any general patterns in these correlations? Yes. The insignificant correlations between the intake and outcome variables are not too surprising. As indicated earlier, there is now evidence that there is little relation between nutrient intake data and weight measures (Drewnoski, et al.). This is perhaps not surprising as 24-hour recall nutrient intake data, even with multiple passes, are notoriously noisy and represent flow variables, whereas the waist circumference and BMI are relatively speaking more accurate and represent stock variables. More enlightening are the general patterns that emerge when looking across the correlation tables regarding the explanatory variables of income, time, and work/home role strain.

The general idea is that income, time with a child, and work/home role strain are all interrelated or dependent. By definition a correlation is a measure of (linear) dependence. Consequently, an insignificant correlation suggests lack of dependence or independence. Note then, across age groups and mothers and fathers, the variable that has the greatest number of significant within gender correlations is income. This indicates that most of the dependency of these variables, or internal conflict, is between money and the other variables. Also, across age groups and across mothers and fathers there are three within gender correlations that are significant and of the same sign: income and work flexibility (positive), income and control over work (negative), and work flexibility and control over work (negative), suggesting these relationships are independent of age group or parent gender. While the total number of significant within gender correlations across age groups for mothers and fathers are comparable (i.e., mothers = 14, fathers = 12), there are more than twice as many across gender correlations for the older age group (7) compared to the younger age group (3). This suggests that mothers and fathers with older children have more conflict between their income, time spent with child, and work/home role than those with younger children.

VII. Multivariate Statistical Modeling Procedures

As indicated earlier, hypotheses about the relationship between explanatory variables (e.g., mother's time spent with the child) and dependent variables (e.g., percentage of energy from fat) are examined with estimates of the marginal effects. There are three issues to be considered in obtaining good estimates of the marginal effects. One is conceptual and two are statistical.

First, it is important to remember that three of the four dependent variables of interest are actually ratios of variables: percentage of energy from fat, percentage of energy from saturated fat, and the body mass index. In order to understand how the explanatory variables are affecting these ratios, the effect of an explanatory variable on the numerator must be allowed to be different from the effect of an explanatory variable on the denominator. Second, statistical precision of a marginal effect estimate can be improved by using all possible information about the structure of the estimation problem. The structure of the estimation problem indicates a nonlinear seemingly unrelated regression (NLSUR) system will be shown to be advantageous for several reasons. Third, as factors, the sociological variables are imprecise measurements of underlying factors that may overlap to a large extent (e.g., work stress, work spillover). Consequently, in order to conserve degrees of freedom and increase estimation precision, in estimation we use a two-stage procedure. In the first stage, the Bayesian information criterion (BIC) is used to identify the most relevant sociological factors. In the second stage, the NLSUR system estimation technique is used.

This section first derives the specific form of the marginal effect for the ratios using equation (9) as indicated by the specific functional forms we will be using in the

empirical analysis. Next, the statistical advantages and disadvantages of the NLSUR approach are discussed. Finally, the two-stage model estimation procedures are explained.

A. Marginal Effects for Ratios of Variables

As discussed earlier, modeling of variables that are ratios of other variables should be based on results from initial modeling of each component of the ratio. Thus, the modeling framework needs to be flexible enough so that the dependent variables that form the numerator and denominator of a ratio can respond differently to an economic, sociological, or control variable. The following linear and nonlinear models provide this flexibility.

Without a loss in generality, consider modeling the percentage of intake from fat (y_3). Let the denominator, children's total energy intake (z_1), and the numerator, children's total intake from fat (z_2), be expressed as separate linear functions of the explanatory variables

(12) $z_1 = \beta_{11} + \sum_{j=2}^{5} x_j \beta_{1j} + \sum_{j=6}^{17} x_j \beta_{1j} + \sum_{j=18}^{23} x_j \beta_{1j}$: Total energy intake, and

(13) $z_2 = \beta_{21} + \sum_{j=2}^{5} x_j \beta_{2j} + \sum_{j=6}^{17} x_j \beta_{2j} + \sum_{j=18}^{23} x_j \beta_{2j}$: Total energy from fat intake

Now because these equations are linear, the marginal effects corresponding to the equations (12) and (13) are

(14) $\frac{\partial z_1}{\partial x_2} = \beta_{12}$: Marginal effect of father's income on total energy intake, and

(15) $\frac{\partial z_2}{\partial x_2} = \beta_{22}$: Marginal effect of father's income on total energy from fat intake.

There is no restriction that $\beta_{12} = \beta_{22}$.

Equations (12) and (13) imply that the model for percentage of energy from fat will then be a nonlinear model of the form

$$(16) \quad y_1 = \left[\frac{z_2}{z_1} \right] = \frac{\beta_{21} + \sum_{j=2}^{5} x_j \beta_{2j} + \sum_{j=6}^{17} x_j \beta_{2j} + \sum_{j=18}^{23} x_j \beta_{2j}}{\beta_{11} + \sum_{j=2}^{5} x_j \beta_{1j} + \sum_{j=6}^{17} x_j \beta_{1j} + \sum_{j=18}^{23} x_j \beta_{1j}} \quad \text{:Percentage of energy from fat} \cdot$$

The marginal effect corresponding to equation (9) presented earlier is then

$$(17) \quad \frac{\partial (z_2 / z_1)}{\partial x_2} = \frac{\beta_{22} z_1 - \beta_{12} z_2}{z_1^2} \ ,$$

which is the marginal effect of father's income on percentage of energy from fat. Other marginal effects can be calculated in a similar fashion.

B. The Nonlinear Seemingly Unrelated Regression System Approach

Because the variables percentage energy from fat (y_1), percentage energy from saturated fat (y_2), and BMI (y_4) are all, by construction, ratios of other variables, more precise marginal effect estimates can be obtained by incorporating this fact into the model via a nonlinear seemingly unrelated regression (NLSUR) system.

The source of the increased precision in estimation from a NLSUR system comes from two sources: (i) correlated errors and (ii) across equation restrictions on the parameters. These concepts can be more easily understood by writing out the systems. The two systems we estimate for each age group are:

Intake System

(18.1) $z_1 = \beta_{11} + \boldsymbol{X}_E\boldsymbol{\beta}_{1E} + \boldsymbol{X}_S\boldsymbol{\beta}_{1S} + \boldsymbol{X}_{1C}\boldsymbol{\beta}_{1C} + \boldsymbol{\varepsilon}_1$:Total Energy Intake

(18.2) $z_2 = \beta_{21} + \boldsymbol{X}_E\boldsymbol{\beta}_{2E} + \boldsymbol{X}_S\boldsymbol{\beta}_{2S} + \boldsymbol{X}_{2C}\boldsymbol{\beta}_{2C} + \boldsymbol{\varepsilon}_2$:Energy Intake from Fat

(18.3) $z_3 = \beta_{31} + \boldsymbol{X}_E\boldsymbol{\beta}_{3E} + \boldsymbol{X}_S\boldsymbol{\beta}_{3S} + \boldsymbol{X}_{3C}\boldsymbol{\beta}_{3C} + \boldsymbol{\varepsilon}_3$:Energy Intake from Saturated Fat

(18.4) $y_1 = \left[\frac{z_2}{z_1}\right] = \frac{\beta_{21} + \boldsymbol{X}_E\boldsymbol{\beta}_{2E} + \boldsymbol{X}_S\boldsymbol{\beta}_{2S} + \boldsymbol{X}_{2C}\boldsymbol{\beta}_{2C}}{\beta_{11} + \boldsymbol{X}_E\boldsymbol{\beta}_{1E} + \boldsymbol{X}_S\boldsymbol{\beta}_{1S} + \boldsymbol{X}_{1C}\boldsymbol{\beta}_{1C}} + \boldsymbol{\nu}_1$:Percent Energy from Fat

(18.5) $y_2 = \left[\frac{z_3}{z_1}\right] = \frac{\beta_{31} + \boldsymbol{X}_E\boldsymbol{\beta}_{3E} + \boldsymbol{X}_S\boldsymbol{\beta}_{3S} + \boldsymbol{X}_{3C}\boldsymbol{\beta}_{3C}}{\beta_{11} + \boldsymbol{X}_E\boldsymbol{\beta}_{1E} + \boldsymbol{X}_S\boldsymbol{\beta}_{1S} + \boldsymbol{X}_{1C}\boldsymbol{\beta}_{1C}} + \boldsymbol{\nu}_2$:Percent Energy from Saturated Fat.

Outcome System

(19.1) $y_3 = z_4 = \beta_{41} + \boldsymbol{X}_E\boldsymbol{\beta}_{4E} + \boldsymbol{X}_S\boldsymbol{\beta}_{4S} + \boldsymbol{X}_{1C}\boldsymbol{\beta}_{4C} + \boldsymbol{\varepsilon}_4$:Waist Circumference

(19.2) $z_5 = \beta_{51} + \boldsymbol{X}_E\boldsymbol{\beta}_{5E} + \boldsymbol{X}_S\boldsymbol{\beta}_{5S} + \boldsymbol{X}_{5C}\boldsymbol{\beta}_{5C} + \boldsymbol{\varepsilon}_5$:Subscapular Skinfold

(19.3) $z_6 = \beta_{61} + \boldsymbol{X}_E\boldsymbol{\beta}_{6E} + \boldsymbol{X}_S\boldsymbol{\beta}_{6S} + \boldsymbol{X}_{6C}\boldsymbol{\beta}_{6C} + \boldsymbol{\varepsilon}_6$:Tricep Skinfold

(19.4) $z_7 = \beta_{71} + \boldsymbol{X}_E\boldsymbol{\beta}_{7E} + \boldsymbol{X}_S\boldsymbol{\beta}_{7S} + \boldsymbol{X}_{7C}\boldsymbol{\beta}_{7C} + \boldsymbol{\varepsilon}_7$:Body Weight

(19.5) $z_8 = \beta_{81} + \boldsymbol{X}_E\boldsymbol{\beta}_{8E} + \boldsymbol{X}_S\boldsymbol{\beta}_{8S} + \boldsymbol{X}_{8C}\boldsymbol{\beta}_{8C} + \boldsymbol{\varepsilon}_8$:Height (squared)

(19.6) $y_4 = \left[\frac{z_7}{z_8}\right] = \frac{\beta_{71} + \boldsymbol{X}_E\boldsymbol{\beta}_{7E} + \boldsymbol{X}_S\boldsymbol{\beta}_{7S} + \boldsymbol{X}_{7C}\boldsymbol{\beta}_{7C}}{\beta_{81} + \boldsymbol{X}_E\boldsymbol{\beta}_{8E} + \boldsymbol{X}_S\boldsymbol{\beta}_{8S} + \boldsymbol{X}_{8C}\boldsymbol{\beta}_{8C}} + \nu_6$:Body Mass Index.

Notationally, the models are expressed in matrix notation. Dependent variables are denoted by the $\boldsymbol{z}_i$ and $\boldsymbol{y}_i$ $n \times 1$ vectors, $\boldsymbol{X}_E$, $\boldsymbol{X}_S$, and $\boldsymbol{X}_C$ are $n \times 4$, $n \times 12$, and $n \times 5$ matrices of variables on economic (income and time), sociological (work/home role strain, status, hereditary) and control variables as listed in Table 5, respectively. The $\boldsymbol{\beta}$s are conformable parameter vectors to be estimated, $\boldsymbol{\varepsilon}_i$ and $\boldsymbol{\nu}_i$ are $n \times 1$ vectors of random error terms, and n denotes the sample size.

The first major insight of the NLSUR approach is that whatever random factors affect one of these equations are also likely to affect all of the other equations, though perhaps not in the same way. So for example, whatever random factor(s) – as captured by the error term – affects the intake of total energy is also expected to influence the intake of fat and saturated fat. This implies that though the models for the dependent variables are "seemingly unrelated", they are related through the error terms (i.e., the error terms are correlated).

The second major insight of the NLSUR approach is that separate equations contain the same parameters to be estimated, so in estimating these parameters two or more equations are better than a single equation. In the present context this comes about by recognizing that the numerator and denominator in an equation like (18.4) may be affected differently by the same regressor, as implied by equations (18.1) and (18.2), so there are gains in efficiency by imposing the across equation constraints on the parameters.

In terms of disadvantages, if one of the equations in a system is misspecified, then that misspecification affects the entire system and not just the single equation that is misspecified. The effects of this misspecification are that the parameter estimates are inconsistent and inferences drawn from the estimates can be misleading. See Greene (2003) for more discussion of seemingly unrelated regression estimation.

There may be some question as to why we do not estimate all the equations as one entire system and why there are some additional variables (subscapular skinfold and triceps skinfold) in the outcome system. The decision to estimate two systems is an attempt to reach a middle ground between the advantages and disadvantages of the

systems estimator. The variables in the Intake System all relate to nutrient intake and so are likely to be affected by the same variables – included and excluded (i.e., error terms) from the model. Similarly, the variables in the Outcome System are all related to anthropometric measures. Including equations for subscapular skinfold measures (z_5) and triceps skinfold (z_6) adds additional information that will increase estimation efficiency. However, the variables in the Outcome system are likely to be affected by different random factors than those in the Intake System. The bivariate correlations between the intake and outcome variables given earlier provide some support for this statement. Consequently, estimating two systems is an attempt to gain as much efficiency as possible while also attempting to minimize cross system contamination.

C. A Two Stage Estimation Procedure

Our approach to the statistical modeling proceeds in two stages. First, we use an information theoretic approach in choosing which variables to include in the *individual* models. Second, we estimate systems of equations to improve efficiency and impose internal consistency between individual models and the models that are functions of the individual dependent variables. Each of these stages is discussed below.

1. Stage I – Model Selection

In social sciences there are no controlled experiments, so there is always uncertainty as to what process actually generated the data. This non-experimental fact of life complicates the statistical modeling process because the researcher is never sure exactly what variables should be included in the model. This problem is often called the variable selection problem, or more generally, the model selection problem. In general,

there are two ways to solve the model selection problem. One is the 'test, test, test' approach, whereby subjective significance levels and statistical tests are chosen as guidelines for choosing and respecifying a model until a final model is reached. The second is the information criterion based approach, whereby the researcher explores the entire chosen model space looking for the model that minimizes an information criterion, such as Schwarz's Bayesian information criterion (BIC).

Granger, King, and White (1995) and Hansen (1999) provide compelling arguments for why the BIC should be used for winnowing down the model space, rather than statistical tests. Some of the major reasons are (i) models selected based on the BIC are model consistent (i.e., as the sample size increases, models chosen with the BIC will converge to the 'true' model), (ii) subjective choices regarding significance levels, number of specification tests to conduct, how many tests must be passed, et cetera become irrelevant and (iii) if two modelers explore the same model space then they will converge on the same model using the BIC. As Granger, King, and White (1995) point out, once the model space has been winnowed down to a feasible set based on the BIC, other tests can be conducted. That is the approach followed here.

The model space considered by the BIC is defined as follows. From Table 5, there are four income and time variables, eight work/home role strain variables, four status and hereditary variables, and five control variables. The income, time, status, hereditary, and control variables are relatively more easily quantified than the role strain variables. The parental role strain variables provide different measures of the impact of work on child intakes and outcomes and it is not clear that all should be included in every model. Consequently, we treat the full set of income, time, status, hereditary, and control

variables as core variables to be included in every model. We use the BIC to select which role strain variables should enter each model.

The four role strain variables for each parent are treated as four variables by requiring that the role strain variables only enter as complete pairs. For example, we do not allow mothers' commitment to work to enter the model without fathers' commitment to work also entering the model and vice-versa. We then consider all possible models containing the role strain variables or $\sum_{i=0}^{4}\binom{4}{i}=16$ models for each dependent variable, where $\binom{4}{i}$ denotes the number of combinations with i role strain variables. Table 16 gives these 16 possible combinations. From the 16 models, the model with the smallest BIC value is selected as the best model. This procedure is repeated for each of the eight variables (z_1, z_2, …, z_8). Using the model numbers from Table 16, Table 17 shows the corresponding model with the lowest BIC for each dependent variable.

2. Stage II – Systems Estimation

In stage I we use OLS because there is no concern about significance testing of parameters. The model specifications that have the smallest BIC in stage I (see Table 17) are then used in stage II. In stage II, we use a non-linear seemingly unrelated regression estimator and test for heteroskedasticity using White's test. The marginal effects on the ratios of variables (y_1, y_2, y_4) are calculated by substituting the parameter estimates into equation (17) and evaluating the equation at the mean of the variables ($1/ z_j$) and (z_i / z_j^2). The marginal effect on waist circumference (y_3) is just the parameter estimate from the model.

As is always the case in this type of analysis, there may be concern that some of the regressors are endogenous and need to be instrumented. We do not address this issue at this point because we feel the cure may be worse than the problem. As several authors have demonstrated theoretically and empirically, when instruments are weak, the advantages of using an instrumental variables (IV) estimator are severely compromised (e.g., Bound, Jaeger, and Baker (1995), Buse (1992), and Nakamura and Nakamura (1998)). Park and Davis (2001) show in cross-sectional data sets of the type used here that the assumptions underlying IV estimation are often not satisfied. If not, the IV estimates may be worse in terms of bias and especially efficiency when compared to OLS. They find that OLS outperforms the IV estimator in out-of-sample comparisons.

VIII. 9-11 Years Old Results

As discussed in the previous section, we estimate two different systems for each age group: (1) Intake System, and (2) Outcome System. The marginal effects of the independent variables for percentage of energy from fat and saturated fat were calculated from the Intake System. The marginal effects for waist circumference and BMI were calculated from the Outcome System. We separated the analysis for children 9-11 years old and for children 13-15 years old. The marginal effects along with the p-values are exhibited in Tables 18-20. The system results are provided in Appendix D.

In presenting the results, we limit the discussion to the statistically significant variables at the 0.10 level, recognizing that statistical significance does not imply biological significance. The estimated change in the dependent variable for a one unit change in the independent variable, *ceteris paribus* (i.e., holding all else constant or controlling for other effects). To avoid redundancy, we will ***not*** attach the *ceteris paribus* phrase to each interpretation.

A. Intake Results: Percentage of Energy from Fat and Saturated Fat

1. Economic Variables

The calculated marginal effects in Table 18 suggest that 9-11 year old children's percentage of energy from total fat increases by 2.15 percent and from saturated fat increases by 0.82 percent for every 100 minute increase in fathers' time with their children. The percentages of energy from total fat and saturated fat increase by 1.46 percent and 1.47 percent, respectively, for every 100 minutes increase in mothers' time with their children. As explained earlier, these marginal effects are calculated using

equation (17) and they are positive because of the ratio effect. That is, fathers' time and mothers' time are overall not significantly related to energy from total fat or saturated fat but are negatively related (are statistically significant) to total energy intake (see Appendix D Table.D1). So, fathers' and mothers' time with children tends to decrease total energy intake but not necessarily fat and saturated fat intake. Consequently, as fathers' and mothers' time with the child decreases the total energy intake (the denominator component of the ratio), the percentage of energy from fat and saturated fat (the ratios) each increase.

2. Sociological Variables

Increases in mothers' control over their work is associated with the percentage of energy their children obtained from total fat; however, because a high score on work control indicates low control, for each 1 unit increase in mothers' work control, children's percentage of calories from total fat *decreases* by 1 percent (Table 18). The opposite is true for fathers; for each unit increase in fathers' control over their work, their children *increase* energy intake from fat by 4 percent. Recalling that high scores on the work commitment variable means the parent exhibits low commitment to her/his job, for each 1 unit increase in mothers' or fathers' commitment to work, children's percentage of calories from total fat decreases by 1 percent (Table 18). These results, however, occur because as both mothers and fathers' work commitment increase, children's energy intake (the denominator of percent calories from fat) increases, but have no relationship with energy from fat (the numerator in this ratio)(see Appendix D. Table D1). For each 1 unit increase in fathers' commitment to work, children's percentage of calories from saturated fat increases by 0.4 percent (Table 18).

For every education level difference between fathers and mothers, children consume 1 percent fewer kilocalories of energy from fat and less than 1 percent fewer kilocalories of energy from saturated fat (Table 18). For every 1 unit decrease in mothers' BMI, there is a 0.43 percent decrease in children's intake of energy from total fat. Fathers' BMI, on the other hand, is positively related to both intake variables. A unit increase in fathers' BMI is associated with a 1 percent increase in children's energy from total fat and from saturated fat.

B. Outcome Results: Waist Circumference and Body Mass Index

1. Economic Variables

A $10,000 increase in fathers' income is associated with a 0.2 unit increase in children's BMI; the same increase in mothers' income is associated with an 8.07 mm increase in children's waist circumference and a 0.44 unit increase in children's BMI (Table 19). Children's waist circumferences increase by 53 mm and BMI increases by 1 unit for every additional 100 minutes that fathers spend with their children; an opposing effect was seen for mothers' time. For each 100 minutes of additional time that mothers spend with children, their children's waist circumferences decrease by 58 mm and their BMI decreased by 2 units. Examining the effects of fathers' and mothers' time spent with children on those children's weight (the numerator in BMI), fathers' time is positively associated with children's weight, while mothers' time is negatively associated with children's weight (Appendix D. Table D2).

2. Sociological Variables

Greater fathers' work flexibility tends to be positively associated with their children's BMI (Table 19). Each 1 unit increase in fathers' work flexibility increases children's BMI by 0.35 units. Each 1 unit increase in fathers' work spillover is associated with a 30.08 mm increase in children's waist circumference. Both mothers' and fathers' work spillover are associated with higher children's BMIs. An increase in mothers' work spillover leads to a 1.67 unit increase in children's BMI; a 1 unit increase in fathers' work spillover leads to a 0.78 unit increase in children's BMI. One unit increases in mothers' BMI are associated with a 0.41 unit increase in their BMIs.

C. Summary for 9-11 Years Old Results

From this detailed discussion we can make several summarizing observations. First, the number of statistically significant marginal effects for mothers and fathers across the four dependent variables are comparable: 11 for mothers and 13 for fathers. Second, nine of these marginal effects overlap or are common for mothers and fathers – that is, if the marginal effect is significant for the mothers it is significant for the fathers in nine cases. Of these nine cases, four have the same sign or directional impact but five have the opposite sign. For example, mothers' and fathers' time are both positively related to percentage of energy from fat, but fathers' time is positively related to waist circumference and mothers' time is negatively related to waist circumference. Finally, in terms of absolute magnitudes of these nine overlapping or common marginal effects, the fathers' marginal effects are greater for the intake variables (percentage of energy from fat and from saturated fat) than the mothers' marginal effects. However, in terms of the

outcome variables (waist circumference and BMI) the reverse is true– the mothers' marginal effects on waist circumference and BMI are greater than the fathers' marginal effects on waist circumference and BMI. Consistent with the reviewed literature, these results suggests that mothers and fathers can have very different impacts on their children's intakes and outcomes.

IX. 13-15 Years Old Results

A. Intake Results: Percentage of Energy from Fat and Saturated Fat

1. Economic Variables

Increases in mothers' income are associated with decreases in the percentage of energy from fat (0.8 percent for every $10,000 increase) and percentage of energy from saturated fat (0.35 percent for every $10,000 increase) (Table 20). Increases in children's percentage of energy from fat are observed with increases of fathers' time spent with their children. Specifically, the percentage of energy from total fat increases by 0.82 percent for every 100 minute increase in fathers' time. However, increases in time spent with children by mothers results in declines in the percentage of energy from fat (1.9 percent for every 100 minute increase) and percentage of energy from saturated fat (0.9 percent for every 100 minute increase) in their children's diets. As the components results in Appendix D (Table D3) indicate, these findings result from the fact that mothers' time and mothers' income have a larger negative impact on children's energy intake from saturated fat and total fat than on total energy intake than fathers' time and income.

2. Sociological Variables

As mothers' work flexibility increases by 1 unit, the proportion of their children's energy from saturated fat increases by 1 percent (Table 20). A similar-sized decrease in children's energy intake from saturated fat is associated with a 1 unit increase in mothers' control over their work.

For every 1 year difference in fathers' and mothers' ages, the percentage of children's energy from total fat increases by 1 percent and the percentage of children's energy from saturated fat increases by 0.23 percent (Table 20). As mothers' BMI increases by 1 unit, their children's percentage of energy from total fat decreases by 0.25 percent and percentage of energy from saturated fat declines by 0.14 percent. For a 1 unit increase in fathers' BMI, the percentage of energy from fat in their children's diets increases by 0.45 percent.

B. Outcome Results: Waist Circumference and Body Mass Index

1. Economic Variables

A $10,000 increase in mothers' income is associated with 17 mm less in their children's waist circumference (Table 21).

2. Sociological Variables

Mothers' work control has an effect on their children's BMI. For each 1-unit increase in mothers' control over their work, children's BMIs decrease by 1.27 units (Table 21).

For every one-year difference in fathers' and mothers' age, children's waist circumference declines by 10.95 mm (Table 21). One unit increases in mothers' BMI is associated with 5.21 mm increases in children's waist circumference and 0.21 unit increases in children's BMI. Similarly a 1-unit increase in fathers' BMI is associated with a 0.39 unit increase in children's BMI.

C. Summary for 13-15 Years Old Results

From this detailed discussion we can make several summarizing observations. First, the number of statistically significant marginal effects for mothers and fathers across the four dependent variables are substantially different: 12 for mothers and three for fathers. Second, the three marginal effects that are significant for the fathers are also significant for the mothers. Of these three cases, only one has the same sign (parents' BMI on children's BMI is positive) and the other two have opposite signs: fathers' time on percentage of energy from fat is positive but mothers' is negative and mothers' BMI on percentage of energy from fat is negative but fathers' is positive. Finally, in terms of absolute magnitudes of these three overlapping or common marginal effects, the fathers' marginal effects are greater in two of the three cases. Again, consistent with the reviewed literature, these results suggest that the mothers and fathers can have very different impacts on their children's intakes and outcomes.

X. Summary and Conclusions

This multidisciplinary study analyzes the effect of economic, sociological, and control variables on energy and fat intakes as well as childhood obesity related measures. There is nothing new to the inclusion of economic and sociological variables in nutritional and health studies related to children. However, the existing theoretical and empirical models discussed in the literature review section provided an incomplete framework for conceptualizing the determinants of energy intakes and outcomes for children. Our analysis focuses on determining the separate effects of maternal and paternal economic, sociological, and control factors. For example, due to the nature of the data we collected, we are able to evaluate if the effect of mother's time spent with the child is different from the effect of father's time spent with the child. We are also able to consider similar hypotheses related to mothers' and fathers' income and sociological factors such as fathers' and mothers' work flexibility, level of control at work, spillover of work at home, and commitment to work. No other known economic, sociological, or nutritional study has examined simultaneously all the economic, sociological, and control variables we have discussed in this report.

A. Summary of Descriptive Data and Correlations

Our data suggest that waist circumference and BMI is higher in the older age group (13-15 year olds) than in the younger (9-11 year olds). Average percentage of energy from fat in the 9-11 year olds is approximately 33 percent compared with 32 percent for the 13-15 year olds. Average percentage of energy from saturated fat in the 9-11 and 13-15 year olds is 12 percent. The average income for fathers of the 9-11 age is

$86,777 and for mothers is $26,678. Fathers' incomes are slightly lower for the older age group of children, but mothers' incomes are somewhat higher. In this age group, fathers' income is $79,631 and mothers' is $34,231. Mothers of the 9-11 year olds spend an average of two hours and five minutes daily engaged in direct activities with their children; the amount of time spent by fathers' of this age group in direct activities is one hour and 20 minutes. Fathers spend about 95 minutes with their 13-15 year old children per day; mothers spend about 87 minutes in direct activities with this age group of children.

Similar to other studies (see Drewnowski et al. 2004 for a review), the bivariate correlations between the dependent variables indicate that there is little relationship between daily percentage of energy intake from fat or saturated fat and the outcome measures of waist circumference and BMI. The bivariate correlations between the explanatory variables suggest that the greater internal conflict for mothers and fathers is between money and the other variables (time with children and work/home role strain variables). Furthermore, the bivariate correlations suggest that mothers and fathers with older children have more conflict between their income, time spent with child, and work/home role than those with younger children.

B. Summary and Conclusions Based on Models Estimated

A central theme of this report is that the analysis of variables that are ratios requires special consideration. As shown and discussed, because percentage of energy from fat, percentage of energy from saturated fat and BMI are all ratios, we cannot form definitive hypotheses about the marginal effect of an explanatory variable on these

variables, even if we were willing to make definitive hypotheses about the component effects. We termed this result the ratio effect.

Table 22 provides a summary of the main marginal effects results from the multivariate analysis. Shown are only the marginal effects that are statistically significant, along with the direction of the relationship with the dependent variable (i.e. positive +, negative –). For the younger age group (9-11), somewhat surprisingly, fathers' income is found to be associated (positively) with BMI only, whereas mothers' income is positively associated with BMI and, contrary to our hypothesis, positively associated with waist circumference. Fathers' and mothers' time is positively associated with percentage of energy from fat and percentage of energy from saturated fat. The component analysis of the ratio effect reveals the main reason for this result is that as mothers and fathers spend more time with their children, total energy intake decreases, thereby decreasing the denominator in these ratios, so increasing the ratios. Fathers' time is positively associated with waist circumference, contrary to our hypothesis, and positively associated with BMI. However, mothers' time is in agreement with our hypothesis: it is negatively related to waist circumference and negatively related to BMI. These different results for fathers and mothers with respect to BMI are driven by the fact that fathers' time with the child is positively associated with weight and mothers' time with the child is negatively associated with weight.

Turning to the work/home role variables, we note that fathers' work flexibility has a positive effect on 9-11 year old children's BMIs, suggesting the more fathers are able to do things such as bringing work home with them, the greater the risk of overweight in their children in this age range. Furthermore, fathers who exercise more control over their

work tend to have children of this age who consume higher percentages of their energy from fat. By contrast mothers who control their work tend to have children who consume lower percentages of energy from fat. Both mothers and fathers who are highly committed to their work tend to have children whose percentage of energy from fat is lower; these findings, however, appear to be the artifact of the ratio effect. For when we examine the components of percentage of energy from fat, we discover that mothers' and fathers' work commitment increases the denominator of this ratio (total energy intake) as hypothesized, while having no effect on the numerator. However, fathers' work commitment tends to decrease percentage of energy from saturated fat in the children of this age group. Several things are worth noting regarding the effects of work commitment, as measured in this study, and children's diets. First, parental work commitments' effects appear to be largely associated with higher energy intakes, possibly through greater intake of foods such as soft drinks (see Morton and Guthrie 1998; Yen and Biing-Hwan 2002). Second, our measure of commitment is not as direct as it might be; it is a measure of loyalty to one's current job, not a measure of commitment to work versus family. In fact, the correlation between our measure of loyalty to present job and perceived importance of one's family is not significant for either mothers or fathers.

Fathers' and mothers' work to family spillover is positively associated with BMI in this younger age group; fathers' work spillover also has a positive effect children's waist circumference. Basically, work to family spillover increases the risk of overweight in these children.

The lower the status difference between fathers and mothers is, as reflected in the difference between their education levels, the lower the percentage of total fat and

saturated fat in their children's diets. Fathers' BMI has a positive effect on both children's percentage of energy from fat and from saturated fat; mother's BMI has a negative effect on children's percentage of energy from total fat intake.

Turning to the older age group (13-15), Table 22 indicates there are many fewer significant variables associated with the 13-15 age group. Mothers' income is negatively associated with percentage of energy from fat and percentage of energy from saturated fat, and in agreement with our hypothesis, negatively associated with waist circumference. As in the 9-11 years old analysis, fathers' time spent with children is positively associated with percentage of energy from fat. However, contrary to the 9-11 years old analysis mothers' time spent with children is negatively associated with percentage of energy from fat and saturated fat.

Only mothers' work variables are significant in the models for the older age group. Mothers' work flexibility is positively related to 13-15 year olds' percentage of energy from fat: the greater the flexibility the greater the intake of percentage of energy from fat. As hypothesized, mothers with high levels of control over their work, however, have children of this age group who consume lower percentages of energy from fat and who have lower BMIs.

Status differences between fathers and mothers have a positive effect on children's percentage of energy from fat and saturated fat in this age group. The greater the difference between fathers' and mothers' ages, the higher is the percentage of energy from fat and saturated fat in these older children's diets. Finally, father's BMI has a positive effect on their children's percentage of energy from fat and BMI; mothers' BMI

has a negative effect on children's percentage of energy from fat and saturated fat, but a positive effect on children's waist circumference and BMI.

C. What Are We to Conclude from These Findings?

There are three main themes that emerge from these findings that are all very intuitive. First, mothers and fathers have different impacts on their children's nutrient intakes and outcomes. Second, it is not just the *quantity* of time and income that is allocated to children that is important, it is also the environment within which those resources are delivered. Stated more simply, the *quality* of time and income is also important. Part of the issue of quality may be captured by work spillover to family variables. However, time spent with children does not account for the quality of the interaction between parents and children. Third, mothers' and fathers' impacts on their children's nutrient intakes and outcomes decline with the age of the child: there are more significant effects in the 9-11 age group than in the 13-15 age group. All three of these can be understood within the collective household production framework that has been developed to explain the violation of the income pooling hypothesis.

The central idea of the collective household production model is that household decisions are made collectively for the good of the entire household taking into account individuals' different comparative advantages (i.e., abilities) and bargaining positions. Comparative advantage is a technical notion which implies in this context one individual can produce an output more efficiently than another person. The theory does not however identify the source of this greater efficiency and it may be due to different technologies (i.e., approaches) in producing the good or it may be due to different input qualities. However, the key point is that the most efficient, or productive, allocation of

resources (i.e., time and income) is unequal across individuals, so it is expected there will be some specialization across parents in different activities. Furthermore it is expected that because of different comparative advantages, even if two individuals allocate the same amount of a resource to some activity (e.g., time spent engaged with a child) the impact will be different. Our findings are consistent with this prediction.

The second main theme seems consistent with a clear understanding of the collective household production framework as well. For an *individual*, non-market work time and money are generally viewed as substitutes: more of one means less of the other. However, within the *collective* family setting, more complicated relationships can emerge between money and time. For example, a father's non-market work time can become a complement for a mother's market work time: the more time a father can spend in household related activities the more time a mother can spend in market work. Each family must work out the trade-offs they are willing (and able) to make between earnings, time spent working, and time spent with children, and these arrangements can take a variety of forms. However, because these arrangements are *collective* in nature, they may be good for the household but not ideal for the *individual*. That is, the collective framework assumes efficiency, but does not consider equity. Consequently, these less than ideal solutions for the individual can be manifested in various forms, such as work stress, work commitment, work flexibility, and work control.

For example, workers who experience stress and spillover interact poorly with other family members. The time these workers spend with their children may have less of an effect on those children if those workers experience high levels of stress or spillover. In other words, the relationship between time spent with children and outcomes in

children may be non-linear. Similarly, while work control can increase the potential for being with family at times when the rest of the family is at home or participating in important family events that take place in the middle of the work day, the quality of the interaction and thus the time-spent- with-children and outcomes-in-children relationships may vary by level of work control (again suggesting a non-linear effect). Work flexibility appears to be more of a two-edged sword. Being allowed to bring work home potentially allows working parents more time at home, but can actually lessen the quality of parental-child interactions. Similarly work control and work flexibility may moderate the relationships between time spent with children by the workers' spouse and children's outcomes; in other words the relationship between spouses' time spent with children and children's outcomes may differ by workers' degree of work flexibility.

Just looking at the amount of resources allocated to a child, whether it be income or time, will not give a complete picture of the impact these allocations will have on children. The money and time allocations also influence the environment within which energy is consumed and expended.

Finally, the finding that mothers and fathers have less influence on the older children's intakes and outcomes is also consistent with the collective framework. The collective framework is dynamic and, as indicated, reflects not only comparative advantages in interacting with children but also bargaining and external household factors. As these factors change so will the *collective* arrangement, intakes, and outcomes within the household. Though we do not directly consider the influence of factors outside of the home, the results are consistent with evidence suggesting that as

children become older, they become more influenced by external household factors, such as peer pressure and societal norms.

Though there are three major themes that do emerge, there is no single or simple conclusion to be drawn from our results; instead there are several. Work and money do not always have the same effect on children; exchanging less money for more time with children will not necessarily improve children's nutrition. Nor will only increasing salaries, by themselves, decrease the risk of diets high in fats or the risk of obesity. Work affects children's nutrition in complex ways and this is exacerbated by the fact the fathers' work experiences affect children differently than mothers' work experiences. Generally, work that permits greater control over one's time and attention appears to have more favorable consequences for children, but even in families in which one parent experiences difficulty in controlling their work experience, the other working parent may be able to compensate.

D. Possible Policy Implications

As the results and the three themes indicate, parental income, time, and work/home role strain interact in complex ways in affecting children's intakes and obesity measures. This implies that if the policy goal or target is to improve children's intakes and reduce children's obesity, then multiple policy instruments that work in concert will likely be required – multiple policies that target not only the mother but also the father, and not only at home but also at work.

For example, the results imply that simply increasing income for the household either through tax policies or macroeconomic policies will not necessarily improve children's obesity measures, even if the policy is directed toward the mother. A more

effective single policy in terms of child obesity measures for younger children would appear to be a policy that allows mothers to spend more time with the child. This could involve incentives for companies to have daycare centers at the mother's work during non-school time. However, as our analysis suggests, such a single policy instrument may have counteracting effects in terms of the child's obesity measures if by spending more time with the child during the day, this leads to more work/home spillover. As our analysis suggests, especially for the younger age group, policy instruments that reduce both mothers' and fathers' work/home spillover would improve child's obesity measures. Among the possible policy instruments are USDA's National School Lunch and Breakfast Programs which may be useful in providing time benefits to some families.

We find that fathers' time appears to be important for children's diet and nutrition, therefore efforts to provide fathers with information should be strengthened. These efforts could be coupled with Co-Operative Extension programs designed to strengthen parenting, particularly those that target fathers.

The general policy message is that multiple instruments are likely to be required to improve child intakes and obesity measures and the guiding principle is consistent with common sense but more holistic. Multiple policy instruments will have to be directed at not only creating an environment that reduces the tension that exists between work and home life for the individual, but also creates an environment where individuals can more easily make tradeoffs and decisions that are beneficial to their children's intakes and obesity measures.

E. Future Research Directions

There are three areas that seem immediately obvious for future research. First, the present report deals with time spent with children as an aggregate or total. Further research should consider the effects of mothers' and fathers' time spent with children in specific activities. We may discover that time spent discussing school assignments together may have a greater impact on children than time spent riding in the car to go shopping for clothing together. Of particular interest is the time parents' spend in food events (i.e., shopping for groceries; cooking; eating) and activities that potentially involve significant energy expenditure such as playing soccer versus non-food involved events or more sedentary activities such as watching television. With regard to food events, does time spent together eating in a restaurant have a greater effect on children's food intake and a greater risk for obesity than time spent eating together at home? Our data will permit the investigation of such questions.

Second, the findings presented here deal with the effects of time spent with parents in which the activity primarily (directly) involves the child. However, our data permit us to examine parental activities in which children are present. For example, a child is doing homework in the kitchen while a parent prepares a meal. Does the simple presence of a parent in the same room with the child without necessarily directly attending to the child have an effect that differs from activities that directly involve the child? Determining the differences in effects of mothers' and fathers' time with children in secondary activities on children's diet and risk of obesity seems another important area for future research.

Furthermore, children's diet and nutrition are influenced by their own as well as their parents' food behaviors such as meal skipping, purchasing fast food when in a

hurry, or choosing easy-to-prepare meals. Parental time, income, and work experiences are clearly related to these behaviors. For example, mothers' lack of control over work is associated with lack of control over what their children eat and perceptions that their children are eating too much food.

Finally, we have estimated models linear in variables, but there may be important interaction (nonlinear) effects between variables, especially between work/home role strain and time spent with the child that need to be investigated as well.

The notion that mothers and fathers have different impacts on their children seems now rather well documented in the literature and is consistent with the results found here. Furthermore, the notion that a mother's (or father's) impact on their child's nutrient intake can be different than their impact on the child's weight is also consistent with existing research, mainly because body weight and energy intake are frequently uncorrelated. These differences suggest new research should pursue two areas. First, and more fundamental than the research issue of interest here, is the apparent disconnect between intake and weight gain. It is well known that 24-hour recall data is fraught with measurement error and this is certainly part of the explanation, but untangling the effect of, say, mother's time on intake versus weight gain will ultimately require a better understanding of the relationship between intake and weight gain. Until the physiological connection between intake and weight gain is better understood, it will be difficult to understand why the same variable (e.g., mother's time with a child) can affect intake one way and weight another way. Second, while this research documents the differences of mother's and father's influences on a child, more research is needed to explore *why* these differences exist. For example, do fathers spend more time with

children in sedentary activities than mothers? Do mothers cope differently with work spillover than fathers? The dataset we have collected is rich enough to explore these types of questions and future work with these data will pursue these type questions.

In addition, as this project is one of the first of its kind, other research on larger, more geographically, ethnically, and financially diverse samples are needed.

The present study has produced interesting findings; however, due to the enormity of the required data, the demanding collection tasks, and the resulting cost considerations, the sample is relatively small. In addition, this sample was homogenous with respect to income and education as the parents in this study had a higher income and were more educated than the Houston MSA. Therefore, these results should be interpreted with caution as they cannot be generalized to a more general population. Though the data we have collected from this project is unique in its breadth and depth of information, we recommend that a larger study (e.g., regional or nationwide in scope) be undertaken to test the robustness of our findings. Any future research in this area should keep in mind that the total budget for the project was $252,000 and with about 300 families, that is about $830 per family observation. This makes it clear how expensive this type of data is to collect and with our experience we believe this is an underestimate of the true cost. Future work in this area should also consider possible ways to reduce the cost per household so the sample size may be increased without reducing significantly the quality of the data.

XI. References

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XII. Tables

Table 3. Desired Explanatory Variables

Economic Variables X_E :

x_1 = One (intercept)
x_2 = Father's income
x_3 = Mother's income
x_4 = Father's time spent with child
x_5 = Mother's time spent with child

Sociological Variables X_S :

x_6 = Father's spillover of work to home
x_7 = Mother's spillover of work to home
x_8 = Father's commitment to work
x_9 = Mother's commitment to work
x_{10} = Father's level of control at work
x_{11} = Mother's level of control at work
x_{12} = Father's work flexibility
x_{13} = Mother's work flexibility
x_{14} = Father's less Mother's age
x_{15} = Father's less Mother's education level
x_{16} = Father's body mass index
x_{17} = Mother's body mass index

Control Variables X_C :

x_{18} = Child gender
x_{19} = Child ethnicity
x_{21}= Child's puberty stage
x_{22} = Child's activity

Table 4. Hypotheses About Marginal Effects

	Components			Ratios			Components		Ratio
Explanatory Variables	Total Energy	Energy from Fat	Energy from Saturated Fat	**Percentage of Energy from Fat**	**Percentage of Energy from Saturated Fat**	**Waist Circumference**	Weight	Height Squared	**BMI**
Economic:									
x2 = Father's income	**-**	**-**	**-**	**?**	**?**	**–**	–	?	**?**
x3 = Mother's income	**-**	**-**	**-**	**?**	**?**	**–**	–	?	**?**
x4 = Father's time spent with child	**-**	**-**	**-**	**?**	**?**	**–**	–	?	**?**
x5 = Mother's time spent with child	**-**	**-**	**-**	**?**	**?**	**–**	–	?	**?**
Sociological:									
x6 = Father's spillover of work to home	+	+	+	**?**	**?**	**+**	+	?	**?**
x7 = Mother's spillover of work to home	+	+	+	**?**	**?**	**+**	+	?	**?**
x8 = Father's commitment to work	+	+	+	**?**	**?**	**+**	+	?	**?**
x9 = Mother's commitment to work	+	+	+	**?**	**?**	**+**	+	?	**?**
x10 = Father's level of control at work	**-**	**-**	**-**	**?**	**?**	**–**	–	?	**?**
x11= Mother's level of control at work	**-**	**-**	**-**	**?**	**?**	**–**	–	?	**?**
x12= Father's work flexibility	**-**	**-**	**-**	**?**	**?**	**–**	–	?	**?**
x13= Mother's work flexibility	**-**	**-**	**-**	**?**	**?**	**–**	–	?	**?**
x14 = Father's less Mother's age	+	+	+	**?**	**?**	**+**	+	?	**?**
x15 = Father's less Mother's education level	+	+	+	**?**	**?**	**+**	+	?	**?**
x16 = Father's body mass index	+	+	+	**?**	**?**	**+**	+	?	**?**
x17 = Mother's body mass index	+	+	+	**?**	**?**	**+**	+	?	**?**

Table 5. Variable Names, Units, and Description

Variable Name	Units	Description
Dependent Variables		
y1	Percent	Three day average of percentage of kcal from fat for child
y2	Percent	Three day average of percentage of kcal from saturated fat for child
y3	Millimeters	Waist circumference of child
y4	Kilograms/squared height meters	Body Mass Index for child
Independent Variables		
Economic Regressor Matrix X_E :		
x2	Dollars	Father's total income
x3	Dollars	Mother's total income
x4	Minutes	Father's time spent with child
x5	Minutes	Mother 's time spent with child
Sociological Regressor Matrix X_S :		
x6	factor	Father's spillover of work to home
x7	factor	Mother's spillover of work to home
x8	factor	Father's commitment to work
x9	factor	Mother's commitment to work
x10	factor	Father's level of control at work
x11	factor	Mother's level of control at work
x12	factor	Father's work flexibility
x13	factor	Mother's work flexibility
x14	Years	Father's less Mother's age
x15	Categories	Father's less Mother's education level
x16	Kilograms/squared meters	Father's body mass index
x17	Kilograms/squared meters	Mother's body mass index
Control Regressor Matrix X_C :		
x18	0 or 1	Child gender - is 1 for male; 0 for female
x19	0 or 1	Child race - is 1 for anglo; 0 for non-anglo
x20	0 or 1	Child ethnicity - 1 for Hispanic; 0 otherwise
x21	0 or 1	Child 's Puberty Stage – is 1 if pubescent; 0 for pre-pubescent
x22	0 or 1	Child activity - 1 if the child participated in active exercise in at least 3 to 5 days in the last 14 days; 0 if not

Table 6. Summary Statistics for Children Ages 9 to 11

Variable	N	Mean	Std. Dev.	Minimum	Maximum
Dependent Variables					
Percentage of energy (kcal) from fat (y1)	161	.33	.05	.18	.46
Percentage of energy (kcal) from saturated fat (y2)	161	.12	.03	.05	.20
Waist (y3)	169	655.60	111.67	245.00	1046.00
Body Mass Index (y4)	169	19.48	4.32	12.95	38.48
Independent Variables					
Economic Regressor Matrix X_E :					
Father's Income (x2)	116	86376.88	54432.54	8000.00	370000.00
Mother's Income (x3)	112	26677.75	29237.81	0	160000.00
Father's Time Spent with Child (x4)	112	80.42	68.81	0	419.00
Mother's Time Spent with Child (x5)	148	124.64	98.63	0	539.50
Sociological Regressor Matrix X_S :					
Father's Spillover of Work to Home (x6)	129	-.05	.89	-1.66	2.63
Mother's Spillover of Work to Home (x7)	115	1.64E-3	.81	-1.54	2.28
Father's Commitment to Work (x8)	129	2.95	.95	1.00	5.00
Mother's Commitment to Work (x9)	112	2.83	.96	1.00	5.00
Father's Level of Control at Work (x10)	127	4.2E-3	.88	-1.19	3.73
Mother's Level of Control at Work (x11)	113	-.01	.94	-1.28	3.58
Father's Work Flexibility (x12)	129	3.36	1.04	1.00	5.00
Mother's Work Flexibility (x13)	113	3.44	1.00	1.00	5.00
Father's less Mother's age (x14)	132	2.30	4.49	-6.00	33.00
Father's less Mother's education level (x15)	132	.13	1.46	-3.00	4.00
Father's BMI (x16)	132	27.63	4.17	19.90	45.78
Mother's BMI (x17)	166	26.10	6.25	17.59	58.36
Control Regressor Matrix X_C :					
Gender (x18)	169	.51	.50	0	1.00
Race (x19)	167	.72	.45	0	1.00
Ethnicity (x20)	167	.14	.35	0	1.00
Child's Puberty Stage (x21)	153	.71	.46	0	1.00
Child's Activity (x22)	169	.71	.46	0	1.00

Table 7. Summary Statistics for Children Ages 13 to 15

Variable	N	Mean	Std. Dev.	Minimum	Maximum
Dependent Variables					
Percentage of energy (kcal) from fat (y1)	136	.32	.06	.18	.52
Percentage of energy (kcal) from saturated fat (y2)	136	.12	.03	.05	.24
Waist (y3)	142	731.14	131.56	260.00	1213.00
Body Mass Index (y4)	141	22.42	5.41	14.80	45.97
Independent Variables					
Economic Matrix X_E :					
Father's Income (x2)	94	79631.51	55136.59	1200	283044
Mother's Income (x3)	106	34231.37	35431.07	540	250000
Father's Time Spent with Child (x4)	96	94.69	152.98	0	967
Mother's Time Spent with Child (x5)	126	87.37	96.13	0	530
Sociological Regressor Matrix X_S :					
Father's Spillover of Work to Home (x6)	106	.07	.90	-1.85	2.79
Mother's Spillover of Work to Home (x7)	109	.04	.82	-1.50	2.33
Father's Level of Control at Work (x8)	103	.01	.90	-1.19	2.78
Mother's Level of Control at Work (x9)	101	-.08	.75	-1.28	2.36
Father's Commitment to Work (x10)	106	2.93	.98	1	5
Mother's Commitment to Work (x11)	105	2.8	.93	1	5
Father's Work Flexibility (x12)	105	3.63	.89	1	5
Mother's Work Flexibility (x13)	105	3.40	.95	1	5
Father's less Mother's age (x14)	110	2.29	4.22	-8.00	18.00
Father's less Mother's education level (x15)	109	.01	1.44	-3.00	3.00
Father's BMI (x16)	111	27.55	4.02	17.63	39.13
Mother's BMI (x17)	140	26.04	5.55	17.97	46.02
Control Regressor Matrix X_C :					
Gender (x18)	142	0.51	0.50	0	1
Race (x19)	142	0.70	0.46	0	1
Ethnicity (x20)	142	0.11	0.32	0	1
Child's Puberty Stage (x21)	138	.99	.08	0	1
Child's Activity (x22)	142	0.76	0.42	0	1

Table 8. Correlations among the Children's Percentage of Energy from Fat, Percentage of Energy from Saturated Fat, Waist Circumference, and Body Mass Index (BMI) (9-11 year olds)

	Saturated Fat / Energy	Waist Circumference	BMI
Fat / Energy	**.716***	.067	.055
Saturated Fat/ Energy		**.038**	.147
Waist Circumference			**.752***

*significant at the .10 or less

Table 9. Correlations among the Children's Percentage of Energy from Fat, Percentage of Energy from Saturated Fat, Waist Circumference, and Body Mass Index (BMI) (13-15 year olds)

	Saturated Fat / Energy	Waist Circumference	BMI
Fat / Energy	**.765***	-.097	-.064
Saturated Fat / Energy		-**.228***	-**.204***
Waist Circumference			**.810***

*significant at the .10 or less

Table 10. Within Gender Correlations among Fathers' Income, Time, and Work/home Role Strain Variables (Children 9-11 Years of Age)

	Fathers' Time	Fathers' Work Flexibility	Fathers' Control over Work	Fathers' Spillover of Work to Home	Fathers' Work Commitment
Fathers' Income	**0.24***	**0.34***	**-0.31***	-0.04	-0.08
Fathers' Time		**0.22***	-0.09	0.08	0.03
Fathers' Work Flexibility			**-0.46***	0.11	**-0.22***
Fathers' Control over Work				-0.03	0.09
Fathers' Spillover of Work to Home					-0.01

*significant at the .10 or less

Table 11. Within Gender Correlations among Mothers' Income, Time, and Work/home Role Strain Variables (Children 9-11 Years of Age)

	Mothers' Time	Mothers' Work Flexibility	Mothers' Control over Work	Mothers' Spillover of Work to Home	Mothers' Work Commitment
Mothers' Income	-0.05	**0.18***	**-0.20***	**0.20***	-0.01
Mothers' Time		-0.03	0.00	**0.21***	-0.11
Mothers' Work Flexibility			**-0.34***	0.14	**-0.22***
Mothers' Control over Work				**0.30***	**0.37***
Mothers' Spillover of Work to Home					0.11

*significant at the .10 or less.

Table 12. Across Gender Correlations among Fathers' and Mothers' Income, Time, and Work/home Role Strain Variables (Children 9-11 Years of Age)

	Mothers' Income	Mothers' Time	Mothers' Work Flexibility	Mothers' Control over Work	Mothers' Spillover of Work to Home	Mothers' Work Commitment
Fathers' Income	-0.07	-0.05	0.14	-0.16	-0.09	0.08
Fathers' Time	-0.07	0.07	-0.03	0.07	-0.08	-0.08
Fathers' Work Flexibility	0.02	-0.11	0.13	0.00	0.01	-0.11
Fathers' Control over Work	0.02	-0.07	-0.08	0.15	-0.07	0.08
Fathers' Spillover of Work to Home	-0.15	**0.25***	0.15	0.11	0.07	0.00
Fathers' Work Commitment	0.00	-0.02	**-0.19***	**-0.34***	-0.08	-0.06

*significant at the .10 or less. The last table is a full matrix because the rows and the columns refer to different variables.

Table 13. Within Gender Correlations among Fathers' Income, Time, and Work/home Role Strain Variables (Children 13-15 Years of Age)

	Fathers' Time	Fathers' Work Flexibility	Fathers' Control over Work	Fathers' Spillover of Work to Home	Fathers' Work Commitment
Fathers' Income	-0.03	**0.33***	**-0.25***	0.14	-0.08
Fathers' Time		**-0.29***	0.10	**0.19***	-0.09
Fathers' Work Flexibility			**-0.49***	-0.04	-0.15
Fathers' Control over Work				**0.20***	0.02
Fathers' Spillover of Work to Home					0.09

*significant at the .10 or less

Table 14. Within Gender Correlations among Mothers' Income, Time, and Work/home Role Strain Variables (Children 13-15 Years of Age)

	Mothers' Time	Mothers' Work Flexibility	Mothers' Control over Work	Mothers' Spillover of Work to Home	Mothers' Work Commitment
Mothers' Income	**-0.26***	**0.23***	**-0.20***	**0.17***	0.01
Mothers' Time		0.01	0.00	0.04	-0.15
Mothers' Work Flexibility			**-0.33***	**0.19***	-0.10
Mothers' Control over Work				-0.06	0.16
Mothers' Spillover of Work to Home					0.03

*significant at the .10 or less.

Table 15. Across Gender Correlations among Fathers' and Mothers' Income, Time, and Work/home Role Strain Variables (Children 13-15 Years of Age)

	Mothers' Income	Mothers' Time	Mothers' Work Flexibility	Mothers' Control over Work	Mothers' Spillover of Work to Home	Mothers' Work Commitment
Fathers' Income	0.09	0.14	-0.03	-0.19	0.17	0.02
Fathers' Time	-0.05	-0.11	-0.07	**0.28***	0.01	0.17
Fathers' Work Flexibility	0.15	**0.20***	**0.25***	-0.07	0.11	-0.10
Fathers' Control over Work	-0.02	**-0.22***	**-0.27***	0.17	-0.06	0.06
Fathers' Spillover of Work to Home	0.07	0.04	-0.02	**0.38***	-0.04	-0.08
Fathers' Work Commitment	-0.12	-0.02	-0.02	-0.17	**-0.24***	0.09

*significant at the .10 or less. The last table is a full matrix because the rows and the columns refer to different variables.

Table 16. Possible Model Combinations for BIC Based Selection

Model Number	Role Strain Variable Number	Role Strain Variables
1	0	None
2	1	Work Flexibility
3	1	Control
4	1	Spillover
5	1	Commitment
6	2	Work Flexibility, Control
7	2	Work Flexibility, Spillover
8	2	Work Flexibility, Commitment
9	2	Control, Spillover
10	2	Control, Commitment
11	2	Spillover, Commitment
12	3	Work Flexibility, Control, Spillover
13	3	Control, Spillover, Commitment
14	3	Work Flexibility, Spillover, Commitment
15	3	Work Flexibility, Control, Commitment
16	4	Work Flexibility, Control, Spillover, Commitment

Table 17. Stage I Selected Models Based on BIC

Group	Model Number
9 TO 11 YEAR OLDS	
Total Energy (z1)	5
Total Energy from Total Fat (z2)	3
Total Energy from Saturated Fat (z3)	5
Waist (z4 = y3)	4
Subscapular (z5)	5
Triceps (z6)	5
Weight (z7)	4
Height squared $(z8)^2$	2
13 TO 15 YEAR OLDS	
Total Energy (z1)	3
Total Energy from Total Fat (z2)	3
Total Energy from Saturated Fat (z3)	2
Waist (z4 = y3)	3
Subscapular (z5)	3
Triceps (z6)	3
Weight (z7)	3
Height squared $(z8)^2$	3

Table 18. Marginal Effects on Ratio of Energy (kcal) from Total Fat and Energy (kcal) from Saturated Fat to Total Energy: Ages 9 to 11[a]

Variables	Total Fat ÷ Total Energy (kcal)	Saturated Fat ÷ Total Energy (kcal)
Father's Income	-4.9E-8 (.57)	5.74E-8 (.18)
Mother's Income	-2.14E-7 (.25)	-1.11E-7 (.22)
Father's Time	2.15E-4 (8.0E-4)	8.2E-5 (.01)
Mother's Time	1.46E-4 (.03)	1.47E-4 (<1.0E-4)
Mother's Control	.01 (.02)	
Father's Control	-.04 (<1.0E-4)	
Mother's Commitment	.01 (<1.0E-4)	2.50E-3 (.27)
Father's Commitment	.01 (1.0E-4)	-3.88E-3 (.09)
Age difference	-2.9E-4 (.85)	-4.6E-4 (.56)
Edu difference	-.01 (7.0E-4)	-4.46E-3 (.01)
Mombmi	-4.31E-3 (3.0E-4)	-6.7E-4 (.22)
Dadbmi	.01 (<1.0E-4)	.01 (<1.0E-4)

[a] P-value in parenthesis

Table 19. Marginal Effects on Waist Circumference and Body Mass Index (BMI): Age 9 to 11[a]

Variables	Waist Circumference	BMI
Father's Income	3.0E-4 (.25)	2.0E-5 (8.0E-4)
Mother's Income	8.07E-4 (.06)	4.4E-5 (<1.0E-4)
Father's Time	.53 (4.0E-3)	.01 (1.5E-3)
Mother's Time	-.58 (1.9E-3)	-.02 (2.0E-4)
Mother's Work Flexibility		-.20 (.23)
Father's Work Flexibility		.35 (.10)
Mother's Spillover	25.97 (.17)	1.67 (<1.0E-4)
Father's Spillover	30.08 (.03)	.78 (2.3E-3)
Age difference	.44 (.92)	.14 (.15)
Edu difference	-4.16 (.67)	-.14 (.54)
Mombmi	.96 (.77)	.41 (<1.0E-4)
Dadbmi	-1.13 (.79)	-.01 (.88)

[a] P-value in parenthesis.

Table 20. Marginal Effects on Ratio of Energy (kcal) from Fat and Energy (kcal) from Saturated Fat to Total Energy (kcal): Age 13 to 15[a]

Variables	Fat ÷ Total energy (kcal)	Saturated Fat ÷ Total energy (kcal)
Father's Income	1.05E-7 (.54)	-1.19E-8 (.87)
Mother's Income	-8.02E-7 (.04)	-3.57E-7 (.04)
Father's Time	8.2E-5 (.07)	6.42E-6 (.73)
Mother's Time	-1.9E-4 (.03)	-9.0E-5 (.02)
Mother's Work Flexibility		.01 (.01)
Father's Work Flexibility		2.82E-3 (.24)
Mother's Control	2.26E-3 (.81)	.01 (.03)
Father's Control	-.01 (.21)	1.81E-3 (.46)
Age difference	.01 (2.3E-3)	2.28E-3 (.01)
Edu difference	-4.24E-3 (.46)	-9.0E-4 (.72)
Mombmi	-2.53E-3 (.06)	-1.4E-3 (.02)
Dadbmi	4.47E-3 (.04)	1.37E-3 (.13)

[a] P-value in parenthesis

Table 21. Marginal Effects on Waist Circumference and Body Mass Index (BMI): Age 13 to 15[a]

Variables	Waist Circumference	BMI
Father's income	-4.5E-4 (.16)	-1.0E-4 (.18)
Mother's income	-1.66E-3 (.02)	-3.0E-5 (.23)
Father's Time	.01 (.90)	-1.62E-3 (.55)
Mother's Time	.03 (.88)	.01 (.42)
Mother's Control	12.72 (.55)	1.27 (.08)
Father's Control	-6.78 (.67)	.20 (.72)
Age difference	-10.95 (.02)	-.17 (.23)
Edu difference	16.16 (.15)	.38 (.29)
Mombmi	5.21 (.05)	.21 (.02)
Dadbmi	6.74 (.11)	.39 (.01)

[a] P-value in parenthesis.

Table 22. Summary Table of Marginal Effect Results

Explanatory Variables	Percentage of Energy from Fat	Percentage of Energy from Saturated Fat	Waist Circumference	BMI
9-11 Years Old				
Economic:				
Father's income				+
Mother's income			+	+
Father's time spent with child	+	+	+	+
Mother's time spent with child	+	+	–	–
Sociological:				
Father's work flexibility				+
Father's level of control at work	–			
Mother's level of control at work	+			
Father's spillover of work to home			+	+
Mother's spillover of work to home				+
Father's commitment to work	+	–		
Mother's commitment to work	+			
Father's less Mother's education level	–	–		
Father's body mass index	+	+		
Mother's body mass index	–			+
13-15 Years Old				
Economic:				
Mother's income	–	–	–	
Father's time spent with child	+			
Mother's time spent with child	–	–		
Sociological:				
Mother's work flexibility		+		
Mother's level of control at work		+		+
Father's less Mother's age	+	+	–	
Father's body mass index	+			+
Mother's body mass index	–	–	+	+

XIII. Appendices

A. Random Digit Dialing and Sample Information

A.1. Details of the Random Digit Dialing Procedures

A sample of 10,000 randomly generated phone numbers was obtained from Survey Sampling Inc. These numbers were cleaned for unassigned, disconnected, and non-household phone numbers. Ten thousand phone numbers were selected based on the assumptions of a 50 percent contact rate, a cooperation rate of 50 percent, and a 60 percent completion rate. Random digit dialing was used to insure that unlisted phone numbers were part of the population sampled.

Once a household was contacted, an eligibility-determination was made. An eligible household was one that contained a child between the ages of 9-11 or 13-15. Where households contained more than one eligible child, a randomization technique based on age and gender was used to select the participating child.

A.2. The Population

The study was designed to draw a sample of households from a population of households that (1) contained a child aged either 9-11 or 13-15 years of age, (2) were headed by both a male and female or by a female. The age-of-child criteria were based on the following considerations: (1) Children are more greatly influenced by their parents than adolescents, and as the study was aimed at determining parental influences over children, this appeared to be an important source of variation to tap. (2) In taking into account differences in age of the sort described above, it becomes important to take into account the changes in parenting and changes in body composition and dietary intake that are likely to result from pubertal changes in the child.

A sample of 300 was desired in order to insure that a minimum of 212 respondents provided data for each of the data collection instruments employed by this study.

A.3. Sample Representativeness

Characteristic	Houston MSA	Study Sample
Median family income	$52,212	$80,516.27
% employed in professional or technical positions	35.3	36.6
% female-headed households	12.6	30.1
Ethnic composition (households):		
% non-Hispanic White	46.0	76
% Hispanic	29.9	11
% Black	17.2	11.5
% Asian	5.2	2

A.4. Sample Sizes

Survey Instrument	Sample size
Mother's telephone interview	320
Father's telephone interview	247
Mother's self administered questionnaire	285
Father's self-administered questionnaire	218
Mother's time diary	279
Father's time diary	211
Children's interview (includes 24-hour recalls of diet and activities)	312
Children's physical exam	311
Children's 2-diet, 2-day activity records	251

B. Results of Principal Factors Factor Analysis

Table B.1. Fathers' Work Spillover

	Kaiser's Measure	Factor Pattern
I experience conflicts btw/work/home responsibilities.	.862	.517
I am able to give my children the attention they need. (reverse coded)	.840	.508
I sometimes miss out on the pleasures of being a parent.	.802	.577
I worry about the effects my job may have on my children.	.846	.635
My problems at work spill over onto my family.	.839	.659

% variance explained=44.4 coefficient alpha=.748

Table B.2. Mothers' Work Spillover

	Kaiser's Measure	Factor Pattern
I experience conflicts btw/work and family responsibilities.	.882	.378
I am able to give my children the attention they need. (reverse coded)	.768	.211
I sometimes miss out on the pleasures of being a parent.	.733	.161
I worry about the effects my job may have on my children.	.797	.215
My problems at work spill over onto my family.	.830	.538

% variance explained=38.9; coefficient alpha=.724

Table B.3. Fathers' Job Commitment

	Kaiser's Measure	Factor Loading
I feel little loyalty to my company.	.878	.532
I could just as well be working for another company.	.846	.640
It would take little to cause me to leave my company.	.836	.689
I tell other people my company is a great place to work.	.859	-.619
I wouldn't want to work anywhere else.	.828	-.657
It wouldn't take much for me to work for someone else.	.851	.642
Thinking about my company, I feel like I really fit in.	.895	-.599

% variance explained=55.1; coefficient alpha=.734

Table B.4. Mothers' Job Commitment

	Kaiser's Measure	Factor Loading
I feel little loyalty to my company.	.858	.556
I could just as well be working for another company.	.897	.526
It would take little to cause me to leave my company.	.775	.621
I tell other people my company is a great place to work.	.830	-.641
I wouldn't want to work anywhere else.	.870	-.625
It wouldn't take much for me to work for someone else.	.801	.786
Thinking about my company, I feel like I really fit in.	.863	-.560

% variance explained =38.6; coefficient alpha=.742

Table B.5. Fathers' Control over Own Work (Job Autonomy)

	Kaiser's Measure	Factor Loading
There can be little done until a supervisor approves a decision.	.787	.633
A person who wants to make his own decisions would be quickly discouraged.	.762	.765
Even small matters have to be referred to someone higher up for a final decision.	.786	.736
I have to ask my boss before I do almost anything.	.762	.699

% variance explained = 51.5; coefficient alpha=.686

Table B.6. Mothers' Control over Own Work (Job Autonomy)

	Kaiser's Measure	Factor Loading
There can be little done until a supervisor approves a decision.	.842	.633
A person who wants to make her own decisions would be quickly discouraged.	.844	.765
Even small matters have to be referred to someone higher up for a final decision.	.756	.736
I have to ask my boss before I do almost anything.	.765	.699

% variance explained = 51.4; coefficient alpha=.683

C. Descriptive Statistics on All Variables: Ratio Components and Ratios

Table C.1. Summary Statistics for Children Ages 9 to 11

Variable	N	Mean	Std. Dev.	Minimum	Maximum
Dependent Variables					
Energy (kcal)	161	2024.95	551.31	938.57	4629.00
Energy (kcal) from fat	161	671.31	229.09	274.07	1739.38
Energy (kcal) from saturated fat	161	245.95	91.93	70.24	559.44
Waist	169	655.60	111.67	245.00	1046.00
Subscapular	169	10.92	7.15	4.00	42.00
Triceps	169	16.16	6.54	5.67	39.33
Weight	169	40.51	11.39	22.91	97.75
Height Squared	169	2.07	.26	1.46	2.96
Percentage of energy (kcal) from fat	161	.33	.05	.18	.46
Percentage of energy (kcal) from saturated fat	161	.12	.03	.05	.20
Energy (kcal) per kilogram of body weight	161	52.24	16.85	22.30	106.93
Body Mass Index	169	19.48	4.32	12.95	38.48
Independent Variables					
Income and Time Regressor Matrix X_E :					
Father's Income	116	86376.88	54432.54	8000.00	370000.00
Mother's Income	112	26677.75	29237.81	0	160000.00
Father's Time Spent with Child	112	80.42	68.81	0	419.00
Mother's Time Spent with Child	148	124.64	98.63	0	539.50
Work/Home Role Strain Regressor Matrix X_S :					
Father's Work Flexibility	129	3.36	1.04	1.00	5.00
Mother's Work Flexibility	113	3.44	1.00	1.00	5.00
Father's Level of Control at Work	127	4.2E-3	.88	-1.19	3.73
Mother's Level of Control at Work	113	-.01	.94	-1.28	3.58
Father's Spillover of Work to Home	129	-.05	.89	-1.66	2.63
Mother's Spillover of Work to Home	115	1.64E-3	.81	-1.54	2.28
Father's Commitment to Work	129	2.95	.95	1.00	5.00
Mother's Commitment to Work	112	2.83	.96	1.00	5.00
Control Regressor Matrix X_C :					
Gender	169	.51	.50	0	1.00
Race	167	.72	.45	0	1.00
Ethnicity	167	.14	.35	0	1.00
Father's less Mother's age	132	2.30	4.49	-6.00	33.00
Father's less Mother's education level	132	.13	1.46	-3.00	4.00
Father's BMI	132	27.63	4.17	19.90	45.78
Mother's BMI	166	26.10	6.25	17.59	58.36
Child's Puberty Stage	153	.71	.46	0	1.00
Child's Activity	169	.71	.46	0	1.00

Table C.2 Summary Statistics for Children Ages 13 to 15

Variable	N	Mean	Std. Dev.	Minimum	Maximum
Dependent Variables					
Energy (kcal)	136	2113.59	742.38	763.46	5833.70
Energy (kcal) from fat	136	693.65	320.03	202.45	2777.86
Energy (kcal) from saturated fat	136	252.81	125.82	54.90	979.34
Waist	142	731.14	131.56	260.00	1213.00
Subscapular	141	11.97	6.61	4.33	33.67
Triceps	142	15.76	7.29	4.00	41.67
Weight	141	61.12	15.39	35.38	135.63
Height Squared	142	2.73	0.297	1.36	3.50
Percentage of energy (kcal) from fat	136	0.32	0.06	0.18	0.52
Percentage of energy (kcal) from saturated fat	136	0.12	0.03	0.05	0.24
Energy (kcal) per kilogram of body weight	135	36.31	15.19	11.07	105.00
Body Mass Index	141	22.42	5.41	14.80	45.97
Independent Variables					
Resource Constraint Regressor Matrix X_E :					
Father's Income	94	79631.51	55136.59	1200	283044
Mother's Income	106	34231.37	35431.07	540	250000
Father's Time Spent with Child	96	94.69	152.98	0	967
Mother's Time Spent with Child	126	87.37	96.13	0	530
Role Strain Regressor Matrix X_S :					
Father's Work Flexibility	105	3.63	0.89	1.5	5
Mother's Work Flexibility	105	3.40	0.95	1	5
Father's Level of Control at Work	103	0.01	0.90	-1.19	2.78
Mother's Level of Control at Work	101	-0.08	0.75	-1.28	2.36
Father's Spillover of Work to Home	106	0.07	0.90	-1.85	2.79
Mother's Spillover of Work to Home	109	0.04	0.82	-1.50	2.33
Father's Commitment to Work	106	2.93	0.98	1	5
Mother's Commitment to Work	105	2.8	0.93	1	5
Control Regressor Matrix X_C :					
Gender	142	0.51	0.50	0	1
Race	142	0.70	0.46	0	1
Ethnicity	142	0.11	0.32	0	1
Father's less Mother's age	110	2.29	4.22	-8	18
Father's less Mother's education level	109	.01	1.44	-3	3
Father's BMI	111	27.55	4.02	17.63	39.13
Mother's BMI	140	26.04	5.55	17.97	46.02
Child's Puberty Stage	138	.99	.08	0	1
Child's Activity	142	0.76	0.42	0	1

D. Estimation Results for Intake and Outcome Systems

This appendix gives the estimation results for the intake and outcome systems estimated corresponding with equations (18) and (19) in the text. The marginal effects presented in the main text tables and discussed are calculated from these results.

Table D.1 Intake System Results: Ages 9 to 11[a]

Variables	Total Energy (kcal)	Energy (kcal) from Fat	Energy (kcal) from Saturated Fat
Intercept	748.08 (.03)	-327.53 (.04)	-246.22 (1.0E-3)
Father's Income	2.96E-3 (<1.0E-4)	8.48E-4 (.01)	4.7E-4 (1.5E-3)
Mother's Income	-.01 (<1.0E-4)	-2.24E-3 (<1.0E-4)	-9.0E-4 (3.0E-4)
Father's Time	-.65 (.09)	.22 (.28)	.09 (.34)
Mother's Time	-.59 (.08)	.10 (.61)	.22 (.02)
Mother's Control		23.56 (.02)	
Father's Control		-77.62 (<1.0E-4)	
Mother's Commitment	-78.77 (<1.0E-4		-4.46 (.33)
Father's Commitment	-67.55 (1.0E-4)		-15.86 (9.0E-4)
Male	36.46 (.63)	11.58 (.78)	-27.91 (.15)
Non-Hispanic White	-322.91 (1.8E-3)	-3.28 (.96)	-1.45 (.96)
Hispanic	-2.08 (.98)	177.62 (.01)	84.43 (.01)
Age difference	18.62 (.03)	5.37 (.28)	1.31 (.56)
Edu difference	-128.91 (<1.0E-4)	-66.45 (<1.0E-4)	-24.38 (<1.0E-4)
Mombmi	-6.33 (.25)	-10.65 (2.3E-3)	-2.10 (.14)
Dadbmi	75.56 (<1.0E-4)	40.77 (<1.0E-4)	19.23 (<1.0E-4)
Puberty	-34.86 (.56)	93.64 (.02)	36.04 (.04)
Active	132.55 (.03)	8.35 (.83)	5.75 (.73)
White p-value	.44	.44	.44
R^2	-.18	-.14	-.11

[a] P-value in parenthesis

Table D.2 Outcome System Results: Age 9 to 11[a]

Variables	Waist Circumference	Subscapular Skinfold	Triceps Skinfold	Body Weight	Height Squared
Intercept	610.82 (<1.0E-4)	-13.76 (.07)	-.67 (.93)	8.51 (.19)	1.85 (<1.0E-4)
Father's Income	3.0E-4 (.25)	3.9E-5 (.01)	3.4E-5 (.02)	3.9E-5 (2.3E-3)	-8.38E-8 (.85)
Mother's Income	8.07E-4 (.06)	4.0E-5 (.08)	1.9E-5 (.40)	7.9E-5 (3.0E-4)	-6.71E-7 (.31)
Father's Time	.53 (4.0E-3)	.01 (.54)	-3.21E-3 (.73)	.03 (7.0E-4)	2.86E-4 (.34)
Mother's Time	-.58 (1.9E-3)	-.01 (.12)	-.01 (.39)	-.04 (<1.0E-4)	-6.0E-4 (.04)
Mother's Work Flexibility					.02 (.23)
Father's Work Flexibility					-.04 (.10)
Mother's Spillover	25.97 (.17)			3.47 (<1.0E-4)	
Father's Spillover	30.08 (.03)			1.62 (2.3E-3)	
Mother's Commitment		.68 (.34)	.49 (.48)		
Father's Commitment		-2.77 (<1.0E-4)	-1.72 (.01)		
Male	38.85 (.22)	-1.14 (.48)	-2.19 (.19)	4.41 (.01)	.12 (.04)
Non-Hispanic White	-25.87 (.63)	-1.99 (.49)	-2.73 (.36)	-.26 (.91)	-.03 (.76)
Hispanic	-18.00 (.75)	1.21 (.69)	.34 (.91)	.95 (.71)	.02 (.83)
Age difference	.44 (.92)	.41 (.07)	.46 (.04)	.53 (.03)	.01 (.06)
Edu difference	-4.16 (.67)	-.91 (.09)	-1.10 (.04)	-.78 (.15)	-.03 (.09)
Mombmi	.96 (.77)	.73 (1.0E-4)	.66 (5.0E-4)	.85 (<1.0E-4)	-8.5E-4 (.87)
Dadbmi	-1.13 (.79)	.33 (.16)	.10 (.67)	-.06 (.81)	-1.41E-3 (.86)
Puberty	59.03 (.12)	4.11 (.04)	2.83 (.15)	11.15 (<1.0E-4)	.40 (<1.0E-4)
Active	-16.18 (.63)	-.44 (.80)	.30 (.87)	-1.25 (.46)	.13 (.03)
White P-value	.44	.44	.44	.44	.44
R^2	.30	.53	.43	.49	.36

[a] P-value in parenthesis

Table D.3. Intake System Results: Age 13 to 15[a]

Variables	Total Energy (kcal)	Energy (kcal) from Fat	Energy (kcal) from Saturated Fat
Intercept	3488.56 (<1.0E-4)	1221.16 (2.0E-4)	429.75 (7.0E-4)
Father's Income	1.6E-3 (.20)	6.98E-4 (.23)	1.56E-4 (.49)
Mother's Income	-4.02E-3 (.09)	-2.75E-3 (.01)	-1.11E-3 (.01)
Father's Time	-.14 (.60)	0.11 (.38)	-3.33E-3 (.94)
Mother's Time	-2.46 (<1.0E-4)	-1.13 (<1.0E-4)	-.44 (<1.0E-4)
Mother's Work Flexibility			12.15 (.01)
Father's Work Flexibility			5.23 (.24)
Mother's Control	-119.72 (.03)	-33.50 (.04)	
Father's Control	-30.11 (.46)	-25.05 (.02)	
Male	556.83 (<1.0E-4)	207.28 (<1.0E-4)	88.86 (<1.0E-4)
Non-Hispanic White	-450.46 (.04)	-342.52 (<1.0E-4)	-117.73 (3.0E-4)
Hispanic	-410.65 (.22)	-326.04 (.02)	-97.22 (.07)
Age difference	17.25 (.30)	16.76 (.01)	6.13 (.01)
Edu difference	-17.50 (.71)	-13.37 (.50)	-3.61 (.64)
Mombmi	-24.33 (.01)	-12.35 (3.4E-3)	-5.30 (1.5E-3)
Dadbmi	-2.25 (.88)	7.56 (.24)	2.29 (.36)
Puberty	-278.53 (.59)	-71.03 (.73)	-20.27 (.81)
Active	-236.96 (.09)	-147.72 (.01)	-79.96 (5.0E-4)
White p-value	.44	.44	.44
R^2	-.11	-.24	-.15

[a] P-values in parenthesis

Table D.4 Outcome System Results: Age 13 to 15[a]

Variables	Waist Circumference	Subscapular Skinfold	Triceps Skinfold	Body Weight	Height Squared
Intercept	427.22 (.03)	-5.17 (.58)	1.18 (.90)	12.03 (.56)	2.30 (<1.0E-4)
Father's Income	-4.5E-4 (.16	-2.0E-5 (.29)	5.98E-10 (1.00)	1.44E-6 (.97)	1.67E-6 (.01)
Mother's Income	-1.66E-3 (.02)	-9.0E-5 (.02)	-6.0E-5 (.11)	-1.9E-4 (.02)	-4.77E-6 (1.2E-3)
Father's Time	.01 (.90)	1.87E-3 (.30)	.01 (.22)	-.01 (.30)	-2.2E-4 (.19)
Mother's Time	.03 (.88)	-.01 (.30)	3.89E-3 (.70)	-4.49E-3 (.84)	-8.3E-4 (.04)
Mother's Control	12.72 (.55)	1.08 (.31)	.20 (.85)	4.03 (.09)	.03 (.54)
Father's Control	-6.78 (.67)	-.29 (.72)	.90 (.27)	-.39 (.82)	-0.04 (.21)
Male	1.12 (.97)	-4.57 (2.1E-3)	-6.36 (<1.0E-4)	2.69 (.39)	.20 (6.0E-4)
Non-Hispanic White	9.78 (.86)	-3.79 (.18)	-6.40 (.03)	-.38 (.95)	.24 (.03)
Hispanic	-29.49 (.71)	-7.29 (.08)	-9.74 (.02)	-11.93 (.19)	.03 (.83)
Age difference	-10.95 (.02)	-.35 (.12)	-.38 (.10)	-.03 (.95)	.02 (.03)
Edu difference	16.16 (.15)	.37 (.50)	.91 (.11)	.54 (.66)	-.02 (.32)
Mombmi	5.21 (.05)	.39 (4.8E-3)	.39 (.01)	.61 (.04)	2.46E-3 (.64)
Dadbmi	6.74 (.11)	.43 (.04)	.45 (.04)	.81 (.08)	-.01 (.19)
Puberty	37.76 (.75)	5.15 (.39)	1.63 (.79)	14.56 (.27)	.47 (.02)
Active	63.48 (.06)	1.91 (.26)	2.17 (.20)	4.59 (.21)	-.02 (.76)
White P-value	.44	.44	.44	.44	.44
R^2	.39	.44	.48	.24	.43

[a] P-value in parenthesis

E. Survey Instruments

As indicated, there were six survey instruments used in collecting the data: A telephone interview instrument for each parent, a self-administered questionnaire instrument for each parent that included the time diaries, a child interview, and a child dietary recall.

The parent telephone interview instruments were identical for mothers and fathers of two parent households. The self-administered questionnaire instruments were also identical for mothers and fathers of two-parent households. Different instruments were developed for single-mother households. The survey instruments for the children were all identical regardless of the number of parents living in the house. Spanish versions of the instruments were provided for those individuals that felt more comfortable answering the questions in Spanish.

To conserve space we have included only copies of the instruments that are not redundant. Given we do not consider single-mother households in this report, those instruments are not included. Spanish versions also are not included.

E.1. Parent Survey Instruments

E.1.a. Telephone Interview

CONFIDENTIAL FORM

Parent Questionnaire
Texas A&M University

Name of Interviewer: _____

Name of Respondent: _____

Address: _____

Phone No. _____

(Name of teenager in the study: _____)

Subject Number: _____

Date and Time of Appointment

Date: Time (am/pm)

_____ _____

Date and Time of Reschedule (if necessary)

Date: Time (am/pm)

_____ _____

_____ _____

_____ _____

READ:

Hi: I'm _____ calling from Texas A&M University for the Parent Time and Children's Nutrition Project. Is this still a good time to interview you?

I am going to ask you some questions and then read you your choices of answers. It is important that your answers be accurate and complete. Please take your time. I will read each question exactly as it is worded in the questionnaire and then read to you the answer choices to each question. We are asking you to choose from the choices that comes closest to your answer. If you think that none of these answers come very close to your answer, please tell me. If necessary, feel free to ask me to repeat the question.

PARENT INTERVIEW SCHEDULE

SECTION I

To start off, we want to ask you some questions about your work.

1. Were you employed at any time during the last 12 months?

   Yes ..... 1 **If yes, skip to question 3.**
   No 2

2. If you answered no to the previous question, what is the reason you did not work during the last 12 months?

   READ:

   Retired 1
   Taking care of home/family..... 2
   Going to school 3
   Ill, disabled, unable to work 4
   Unable to find work 5
   Other, please specify _____
   [If not working at present, skip to question 16]

3. Indicate which of the following best describes your employment over the last 12 months.

   READ:

   Part time 1
   Full time 2
   Both 3

4. If you were working last week, how many hours did you work last week, at all jobs?

   Hours _____

5. A. What kind of work do you (did you) normally do? That is, what (is/was) your job called?

      OCCUPATION: _____

   B. What do/did you actually do in that job? Tell me, what are/were some of your main duties?

      _____

C. What kind of place do/did you work for?

INDUSTRY: _____

D. What do/did they make/do? _____

E. Are/Were you self employed or do/did you work for someone else? _____

IF CURRENTLY WORKING FULL-TIME, PART-TIME, OR WITH A JOB, ASK QUESTION 6; IF NOT SKIP TO QUESTION 16 ON PAGE 7.

6. What days of the week do you normally work? **CIRCLE ONE CODE.**

RESPONSE	**CIRCLE**
Works Monday through Friday	1
Works Monday-Fridays and some Saturdays	2
Works Monday-Friday and some Sundays	3
Works Saturday and Sunday plus some Monday through Friday	4
No set schedule	5
Other, please specify: _____	
Don't know	9

7. What hours do you usually work -- days, evenings, or nights?

RESPONSE	**CIRCLE**
Days (between 8am and 6 pm)	1
Evenings (between 6 pm and midnight)	2
Nights (between midnight and 8 am)	3
No set schedule, varies	4
Other, please specify: _____	5
No answer	9

8. How flexible are your work hours?

READ	**CIRCLE**
Inflexible	1
Somewhat flexible	2
Very flexible	3

9. How flexible are your work days?

READ	**CIRCLE**
Inflexible	1
Somewhat flexible	2
Very flexible	3

WE WOULD NEXT LIKE TO ASK YOU HOW YOU FEEL ABOUT YOUR WORK

10. First, we would like to know how you feel about your job. Tell me if you strongly disagree, disagree, neither agree nor disagree, agree, or strongly agree with each of the following statements.

READ:	**THEN READ:** Strongly Disagree	Disagree	Neither Agree/ Disagree	Agree	Strongly Agree
a. My work is the most important thing in my life.	1	2	3	4	5
b. My family is more important to me than my work.	1	2	3	4	5
c. Sometimes on weekends I wish I were back at work.	1	2	3	4	5
d. Even if I had enough money to live the way I want for the rest of my life, I would keep working.	1	2	3	4	5
e. Sometimes I bring work home with me to finish up.	1	2	3	4	5

11. Next we would like to ask you a few questions about the company or organization you work for. Tell me if you strongly disagree, disagree, neither agree/disagree, agree, or strongly agree with the following:

READ:	**Then read:** Strongly Disagree	Disagree	Neither Agree / Disagree	Agree	Strongly Agree
a. I feel very little loyalty to my company or organization.	1	2	3	4	5
b. I could just as well be working for a different company or organization.	1	2	3	4	5
c. It would take very little change in my present circumstances to cause me to leave my company or organization.	1	2	3	4	5
d. I tell other people that my company or organization is a great place to work.	1	2	3	4	5
e. It doesn't matter who you work for as long as they treat you right.	1	2	3	4	5
f. It doesn't matter who you work for as long as they pay you enough.	1	2	3	4	5
g. Thinking about my company or organization I wouldn't want to work any place else.	1	2	3	4	5
h. It wouldn't take much to cause me to look for another job.	1	2	3	4	5
i. Thinking about my company or organization, I feel like I really fit in.	1	2	3	4	5

12. We would like to ask you about how much freedom you have to make decisions regarding your work and the place you work. How true are the following statements?

READ:	**Then read:** Strongly Disagree	Disagree	Neither Agree / Disagree	Agree	Strongly Agree
a. There can be little action here until a supervisor approves a decision.	1	2	3	4	5
b. A person who wants to make his or her own decisions would be quickly discouraged.	1	2	3	4	5
c. Even small matters have to be referred to someone higher up for a final decision.	1	2	3	4	5
d. I have to ask my boss before I do almost anything.	1	2	3	4	5
e. I am allowed to do some of my work at home.	1	2	3	4	5
f. I am allowed to work longer some days so I can take time off on other days.	1	2	3	4	5

SECTION II

In this next group of questions, we would like to ask you about various conditions inside and outside your home.

(ASK THESE QUESTIONS OF THE EMPLOYED RESPONDENTS ONLY; SKIP TO QUESTION 16 IF THE RESPONDENT IS NOT EMPLOYED)

13. How often do the following things happen to you?

READ:	**Then read:** Very Infre-quently	Infre-quently	Some-times	Fre-quently	Very Fre-quently
a. I experience conflicts between my work responsibilities and my family responsibilities.	1	2	3	4	5
b. I am able to give my children the attention they need.	1	2	3	4	5
c. I sometimes miss out on the pleasures of being a parent.	1	2	3	4	5
d. I worry about the effects my job may have on my children.	1	2	3	4	5
e. My problems at work spill over into my family.	1	2	3	4	5
f. I feel "stressed out" by my work.	1	2	3	4	5
g. I feel frustrated by my job.	1	2	3	4	5

14. What are your working conditions like?

READ: "At Work. . ."	**Then read:** Very In-frequently	Infre-quently	Sometimes	Frequently	Very Frequently
a. I have to work very fast	1	2	3	4	5
b. I have to work very hard	1	2	3	4	5
c. I have more work than time to do it in	1	2	3	4	5
d. I have deadlines that are hard to meet	1	2	3	4	5

15. I would next like to ask you some questions about how you deal or cope with your work.

READ: **"At Work ....."**	**Then read:** Strongly Disagree	Disagree	Neither Agree/ Disagree	Agree	Strongly Agree
a. I try to work as hard as I can so I can stay ahead of things.	1	2	3	4	5
b. I try to anticipate busy times by planning ahead	1	2	3	4	5
c. I tell myself its not the end of the world if I don't finish my work on time.	1	2	3	4	5
d. I am careful not to get too involved in too many things.	1	2	3	4	5
e. I complete my work on time by making steady progress.	1	2	3	4	5
f. It's useless to plan ahead.	1	2	3	4	5

SECTION III

ASK OF ALL RESPONDENTS

16. How are things at home?

READ "AT HOME":	**Then read:** Very Infre-quently	Infre-quently	Some-times	Fre-quently	Very Fre-quently
a. I don't get enough help from others.	1	2	3	4	5
b. I have more work to do than time to do it in.	1	2	3	4	5
c. I am frequently interrupted when I am doing housework.	1	2	3	4	5
d. My spouse expects more than he/she gives in return.	1	2	3	4	5
e. There is not enough opportunity to be the person I want to be.	1	2	3	4	5
f. My spouse does his/her share of the housework.	1	2	3	4	5
g. I can't be myself around my spouse.	1	2	3	4	5
h. My spouse is easy to talk with.	1	2	3	4	5
i. My spouse is willing to listen to my problems.	1	2	3	4	5

	Always rushed	Sometimes rushed	Almost never rushed
17. Would you say you always feel rushed even to do the things you have to do, only sometimes feel rushed, or almost never feel rushed?	1	2	3

18. Do you ever do housework such as laundry or grocery shopping?
[If yes, ask them Q19]
[If no, ask Q20]

Yes _____ No _____

19. We would also like to know how you deal with your work around the house. **Ask only of those who do housework**

READ:	**Then read:** Strongly Agree	Agree	Neither Agree/ Disagree	Disagree	Strongly Disagree
a. I have made an effort to find ways to save time in doing my housework.	1	2	3	4	5
b. I try to do all of my family members' laundry at the same time.	1	2	3	4	5
c. I try to do all of the laundry once a week.	1	2	3	4	5
d. I do all my grocery shopping for the week in one trip to the grocery store.	1	2	3	4	5
e. I try to do several house chores at the same time.	1	2	3	4	5

SECTION IV

In this part of the questionnaire, I'd like to ask you a few things about your family.

1. Certain things have to be done in every household. Please tell me who does the following tasks in your family. (CIRCLE THE APPROPRIATE NUMBER)

   (IF THE RESPONDENT ANSWERS 'OTHER,' FIND OUT WHO THIS IS)

READ	**Then read:** Wife Always	Wife Usually	Both Equally	Husband Usually	Husband Always	Other →	**[Ask]** Who:
a. Who is usually responsible for the housework such as cleaning and laundry?	1	2	3	4	5	6	_____
b. Who is usually responsible for preparing dinner?	1	2	3	4	5	6	_____
c. Who is usually responsible for preparing breakfast?	1	2	3	4	5	6	_____
d. Who is usually responsible for looking after the children?	1	2	3	4	5	6	_____
e. Who is usually responsible for household repairs?	1	2	3	4	5	6	_____
f. Who is usually responsible for car maintenance and repair?	1	2	3	4	5	6	_____

21. Do you ever have anyone come in to clean the house for you?

Never	Sometimes	Frequently
1	2	3

22a. Every family has to make decisions about **whether to buy** such things like groceries, furniture or cars. We would like to find out who usually makes such decisions. We will read you a list of things that people usually buy and then ask you who in your family makes the decision to buy each thing.

PURCHASE DECISION	Husband Only	Husband More	Husband & Wife the same	Wife More	Wife Only
1. Whether to buy or rent a house	1	2	3	4	5
2. Whether to buy a car	1	2	3	4	5
3. Whether to buy appliances such as a refrigerator, washer or dryer	1	2	3	4	5
4. Whether to buy furniture	1	2	3	4	5
5. Whether to buy electronic equipment, computer, television or sound system	1	2	3	4	5
6. Whether to buy groceries	1	2	3	4	5
7. Whether to eat out	1	2	3	4	5
8. Whether to buy clothing and footwear for household members	1	2	3	4	5
9. Whether to buy school supplies	1	2	3	4	5

22b. Given a decision has been made to buy an item, every family also has to make decisions about **how much to spend** on such things as rent, groceries, furniture, or cars. We would like to find out who makes these decisions. We will read you a list of things and ask you who decides how much to spend on each thing.

PURCHASE AMOUNT	Husband Only	Husband More	Husband & Wife the same	Wife More	Wife Only
1. How much to spend on rent or mortgage payments	1	2	3	4	5
2. How much to spend on a car	1	2	3	4	5
3. How much to spend on appliances, such as a refrigerator, washer or dryer	1	2	3	4	5
4. How much to spend on furniture	1	2	3	4	5
5. How much to spend on electronic equipment, computer, television or sound system	1	2	3	4	5
6. How much to spend on groceries	1	2	3	4	5
7. How much to spend on eating out	1	2	3	4	5
8. How much to spend on clothing and footwear for household members	1	2	3	4	5
9. How much to spend on school supplies	1	2	3	4	5

SECTION V

23. We now would like to talk with you about your opinions about the amount and type of food you think your child should eat. **[Skip to Question 26 if they have no opinions]**

READ:	**Then read:** Strongly Disagree	Disagree	Neither Agree/ Disagree	Agree	Strongly Agree
a. My child should always eat all of the food on her/his plate.	1	2	3	4	5
b. I have to be especially careful to make sure my child eats enough.	1	2	3	4	5
c. If my child says "I'm not hungry", I try to get her/him to eat anyway.	1	2	3	4	5
d. If I did not guide or regulate my child's eating, she/he would eat much less than she/he should.	1	2	3	4	5

24. Parents sometimes try to keep track of the amount of food their children eat. Do you? **[Skip to Question 26 if they do not]**

READ:	**Then read:** Never	Infrequently	Frequently	Always
a. How much do you keep track of the sweets (like candy, ice cream, cakes, pies, pastries) that your child eats?	1	2	3	4
b. How much do you keep track of the snack food (like potato chips, Doritos, cheese puffs) that your child eats?	1	2	3	4
c. How much do you keep track of the high fat foods that your child eats?	1	2	3	4

25. Some parents are concerned about what their children eat; others are not.

READ:	**Then read:** Unconcerned	Somewhat Concerned	Concerned	Very Concerned
a. How concerned are you about your child eating too much when you are not around her/him?	1	2	3	4
b. How concerned are you about your child having a diet to maintain a desirable weight?	1	2	3	4
c. How concerned are you about your child becoming overweight?	1	2	3	4

THE NEXT SET OF QUESTIONS HAVE TO DO WITH COOKING AND SHOPPING

26. I would next like to ask you some questions about your opinions about your family's eating practices. **(Ask of parent that prepares meals or who shops. Skip to Q30 if respondent does not cook or shop)**

READ:	**Then Read:** Strongly Disagree	Disagree	Neither Agree / Disagree	Agree	Strongly Agree
a. I try to schedule dinner so that the whole family can eat together.	1	2	3	4	5
b. When I'm in a hurry, I pick up "take out" food for dinner.	1	2	3	4	5
c. At breakfast, everyone must fend for themselves at my house.	1	2	3	4	5

27. I would like to ask you a few questions about you, your teenager, and food.

READ:	**Then Read:** Never	Very Seldom	Occasion-ally	Fre-quently	Very Fre-quently	N/A
a. How frequently do you talk to about the importance of eating healthy foods?	1	2	3	4	5	6
b.How frequently do you worry about eating habits?	1	2	3	4	5	6
c. How frequently do you encourage to eat a low fat diet?	1	2	3	4	5	6
d. How frequently do you try to make sure ___doesn't eat too much junk food?	1	2	3	4	5	6
e. How frequently does ____eat dinner with the family?	1	2	3	4	5	6
f. How frequently does ____help you cook dinner?	1	2	3	4	5	6

SECTION VI

28. We would like to ask you some questions about cooking and serving food. Do you ever cook or serve food in the household? **[If no, skip to question 30]**

Read:	**Then Read:** Strongly Disagree	Disagree	Neither Agree / Disagree	Agree	Strongly Agree	N/A
a. I consider my family's health when I buy food.	1	2	3	4	5	6
b. I think the new easy-to-prepare foods are great.	1	2	3	4	5	6
c. Money is the thing I consider most when I plan meals.	1	2	3	4	5	6
d. I like meals that are easy to prepare.	1	2	3	4	5	6
e. When I get home at night, I'm just too tired to fix much of a meal.	1	2	3	4	5	6
f. It is important to me to prepare meals that the whole family enjoys.	1	2	3	4	5	6
g. Because of my schedule, we frequently go to a fast food place for dinner.	1	2	3	4	5	6
h. At dinner time my family helps me with the cooking.	1	2	3	4	5	6
i. I buy only the best quality food.	1	2	3	4	5	6

29. We now want to ask you a few questions about things you do while shopping for food.

READ:	**Then Read:** Never	Very Seldom	Once in a while	Fre-quently	Very Fre-quently	N/A
a. How frequently do you read food labels to find out the amount of calories the food contains?	1	2	3	4	5	6
b. How frequently do you read food labels to find out the amount of fat the food item contains?	1	2	3	4	5	6
c. How frequently do you read food labels to determine the type of fat the food item contains?	1	2	3	4	5	6
d. Do you ever broil rather than fry your meat in order to reduce the amount of fat in it?	1	2	3	4	5	6
e. Do you ever remove the skin from your chicken before you eat it?	1	2	3	4	5	6

SECTION VII

HEALTH AND NUTRITION

Now we would like to ask you some questions about your weight and about dieting.

30. How much do you weigh?

31. How tall are you?

32. Would you say that you are:

    1. gaining weight?
    2. staying at the same weight?
    3. losing weight?

33. Do you think you are:

    1. very thin?
    2. slightly thin?
    3. about average?
    4. slightly overweight?
    5. very overweight?

34. What would be your ideal weight?

35. Do you plan to lose weight to get to this weight?

    1. Yes
    2. No
    3. Don't need to

36. Do you think others believe you weigh too much?

    1. Yes
    2. No

37. How old were you when you first tried to lose weight? (I have never dieted is an acceptable response).

38. During the past 7 days, which of the following things did you do in order to lose weight or to keep from gaining weight? (**Circle all that apply**)

1. Ate less food
2. Ate less fat
3. Ate fewer calories
4. Fasted
5. Exercised
6. Made yourself throw up
7. Took diet pills
8. Took laxatives
9. Smoked
10. Other: please specify/describe _____
11. NONE

39. During the past 7 days, which of the following things did you do in order to gain weight or to build muscle? (**Circle all that apply**)

1. Ate more food
2. Ate more protein
3. Exercised
4. Lifted weights
5. Took food supplements such as Andro or Creatine
6. Other
7. NONE

40. About how many days a week do you eat breakfast?

41. About how many times a day do you have a snack (not counting your meals)?

42. How many times a week do you take vitamins, minerals, or other supplements?

1. Never
2. < 2 times a week
3. 2-4 times a week
4. 5-7 times a week

43. Do you smoke cigarettes?

1. Yes
2. No **[If no, skip to Q45]**

If answer is yes, record the number of packs smoked each day.

44. Did you start to smoke to help you lose weight?

1. Yes
2. No

45. Do you drink alcoholic beverages (like beer, wine, or hard liquor)?

1. Yes
2. No

[If answer is yes] How many drinks (cans, glasses, shots) do you have each day?

46. Would you say you are more active physically than most people your age, less active than most people your age or about as active as people your age?

1. More active
2. About the same
3. Less active

47. I exercise for a minimum of 30 minutes at least five times a week.

1. Yes
2. No

48. Members of my family exercise for a minimum of 30 minutes at least five times a week.

1. Yes
2. No

49. What time do you usually go to bed on week nights? *Write in time in this format HH:MM A for AM or HH:MM P for PM. Please remember that midnight is 12:00A and noon is 12:00PM*

_____

HH:MM (A or P)

50. How many hours of sleep do you usually get?

_____ hours

51. Do you usually get enough sleep?

1. Yes
2. No

52. Has your child ever been diagnosed with the following disorders/**conditions**: (condition may be a better word to use than disorder)

____ Asthma ____ Diabetes ____ Heart disease

____ High blood cholesterol ____ Eating disorder ____ Other _____

____ Attention Deficit Hyperactivity Disorder (ADHD)

53. Has your child been hospitalized in the past 6 months?
1. Yes 2. No

If yes, why? _____

54. Has your child had any broken bones in the past 6 months?
1. Yes 2. No

If yes, which ones: _____

55. Does your child take any prescribed medications on a regular basis?

1. Yes 2. No

If yes, what medication does _____ (child's name) usually take?_____

Why was it prescribed? _____

Any other medication? _____
Why was it prescribed? _____

Any other medication? _____
Why was it prescribed? _____

Any other medication? _____
Why was it prescribed? _____

Any other medication? _____
Why was it prescribed? _____

56. I would next like to ask you about some of the things your family does about meals.

How often does your family do the following things **READ:**	**Then Read:** Never	Sometimes	Always
a. My family eats at the same time every night.	1	2	3
b. At least some of my family eats breakfast together every morning.	1	2	3
c. My family eats lunch together on special family days.	1	2	3
d. My whole family eats together every night.	1	2	3
e. When you eat breakfast in the morning, do you ever watch TV?	1	2	3
f. When you eat dinner, do you ever watch TV at the same time?	1	2	3

57. How much do you agree or disagree with the following statements about dinnertime in your family?

Read:	**Then Read:** Strongly Disagree	Disagree	Neither Agree/ Disagree	Agree	Strongly Agree
a. People in my family eat dinner whenever they want.	1	2	3	4	5
b. Your never know who will be home for dinner in my family.	1	2	3	4	5
c. In my family, dinnertime is more than just a meal; it is a special time.	1	2	3	4	5
d. In my family everyone has a specific job or task to do at dinnertime.	1	2	3	4	5
e. In my family we eat together regularly.	1	2	3	4	5

Read:	**Then Read:** Strongly Disagree	Disagree	Neither Agree/ Disagree	Agree	Strongly Agree
f. In my family we have a special family food night when we order "take out" food like pizza or go to a restaurant together.	1	2	3	4	5
g. In my family it is important that the family eats at least one meal together each day.	1	2	3	4	5
h. I enjoy eating meals with my family.	1	2	3	4	5
i. In my family, eating brings people together in an enjoyable way.	1	2	3	4	5
j. In my family, mealtime is a time for talking with other family members.	1	2	3	4	5
k. Mealtime has often been a time when people argue in my family.	1	2	3	4	5

58. How many times a week do you eat out?

59. How many times a week do you purchase meals and bring them home?

SOCIODEMOGRAPHICS SECTION

Finally, we would like to ask you a few questions about your background.

60. How old are you?

61. Gender (Interviewer may determine this)

    1. Male
    2. Female

62. What is your ethnic origin?

63. How much education have you completed?

1. some grammar school
2. completed grammar school
3. some high school
4. graduated high school
5. some college
6. college graduate
7. some graduate school
8. completed graduate school

64. Are you currently:

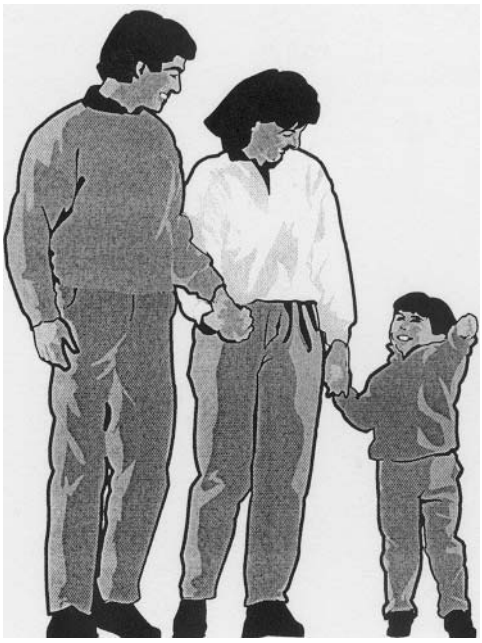
1. married
2. widowed
3. divorced
4. separated
5. never married
6. refused

THANK YOU FOR YOUR HELP WITH OUR STUDY

E.1.b. Parental Self-Administered Questionnaire

Name: _____ ID: _____

Parental Self-Administered Questionnaire



Parental Time, Role Strains, Coping and Children's Diet and Nutrition Survey
Texas A&M University

March 2001

Purpose of this Part of the Study

Thank you very much for participating in our study. The purpose of this study is to examine the effects parental time and income constraints have on nutritional intake and outcomes of children between the ages of 9 to 11 and 13 to 15. There is speculation that as parents' schedules get busier, there is less time for meal preparation and families may eat out more often or eat take out food more often. There is also evidence that food consumed or prepared away from home is less nutritious than food prepared at home. Of course, in order to eat out families must have adequate income.

A general thesis of the study is that time and income can substitute for one another and this may affect child nutrition. Consider a specific example. Suppose a mother and father both work outside the home. The mother is usually responsible for dinner during the week and usually prepares meals at home. One day the mother has to work late at the office. Now there are several ways the family could still get dinner: the mother may decide just to pick something up on the way home or the father may take off work early and take care of dinner. In the first case, income has substituted to some extent for the mother's time because she can purchase a meal, which takes less time than preparing one. Alternatively, in the second case, the father's time has substituted for the mother's time in preparing a meal. Which of these decisions the mother and family make will affect the nutrient intake of the family and children.

This portion of the study focuses on time allocation and income allocation. With respect to time allocation, we are asking you to answer these questions because in order to determine how scarce time is in your household we need to know how you spend a typical two days. We need this information from ***the father and the mother*** because as indicated mothers and fathers may trade off duties. With respect to the income as indicated, money can substitute for time. We also ask for information on income from each parent and how finances are arranged. This information is important because a few studies have found that who brings money into the household and how finances are arranged will affect how money is spent on food items and therefore child nutrition.

We would like to remind you that all of the data being collected is confidential. It will not be shared with other entities and all references to you and your family such as names, addresses and telephone number will be eliminated once we have finished collecting information from your family.

Before you begin to fill out the forms we have given you, we would like to remind you of three things.

- First, while you may not feel like your circumstances are relevant for this study, let us assure you that they are very relevant. In order for the results of the study to be representative, we need to be able to look at differences *across* households not within households. Therefore, your complete participation is very important.
- Second, please be as accurate as you can in answering the questions and be sure to answer all of the questions. You may wish to consult financial records such as your tax returns, W-2 forms, bank statements, or pay receipts in order to answer some of these questions.
- Third, we realize that some of the information we are asking for is very personal, so we wish to remind you that **your answers to these questions are completely confidential.**

Thank you very much for taking the time to answer all of these questions. Your participation will insure that we get an accurate picture of the effect of husbands' and wives' parenting styles, income and financial conditions, expenditure patterns, and time constraints/pressures on your child's dietary behavior.

This questionnaire contains questions about how you relate to your child (_____) (child's name here). We also ask some questions about the money you spend on things like food and some questions about your income. Please consult your financial records such as tax returns, W-2 forms, bank statements, or pay receipts if necessary.

We're interested in how parents get their children to do things when the child doesn't want to. For example:

1. Think about the last time you wanted _____ (name of child) to stop watching television and he/she didn't want to stop. What did you do?
   Circle the answer that fits.

   1. Just turned off the set.
   2. Pulled him/her from the set
   3. Told him/her loud and clear what he/she was to do.
   4. Explained why I wanted him/her to stop.
   5. Hit him/her.
   6. Threatened to hit but didn't.
   7. Promised him/her something nice if he/she would.
   8. Let him/her keep watching. It wasn't important.
   9. Told him/her he/she could watch for a little while longer but then it would be turned off.
   10. Just showed him/her I didn't like it.
   11. Told him/her if he/she didn't stop, he/she would be punished.

2. Now think about the last time _____ (name of child) talked back to you. What did you do?

   1. Nothing. It was OK.
   2. Hit him/her.
   3. Threatened to hit but didn't.
   4. Told him/her loud and clear there would be none of that.
   5. Sent him/her to his/her room.

6. Deprived him/her of something he/she wanted.

7. Explained why he/she was wrong.

8. Just showed that I felt bad; looked sad.

9. Told him/her that I was hurt.

10. Stopped talking to him/her.

11. Walked away.

12. Told him/her that his/her mother would hear about it.

3. How do you get _____ (name of child) to do his/her homework?

1. He/she always does it on his/her own.

2. We have a set rule that he/she always follows.

3. Tell him/her about why it is important.

4. Promise a reward for doing his/her homework.

5. Tell him/her the teacher will be mad if he/she doesn't.

6. I have to nag him/her.

7. Tell him/her he/she won't have some privilege if he/she doesn't.

8. Tell him/her we'll do something nice when he/she finishes.

9. I leave it up to him/her.

10. I don't think homework is very important at this age.

4. How do you get _____ (name of child) to help around the house?

1. Pay him/her for chores.

2. Tell him/her he/she can't do something else until the chores are finished.

3. Tell him/her that everyone in the family has to do his part.

4. Tell him/her I need his/her help.

5. Just keep at him/her till he/she does it.

6. Tell him/her how good he/she is at doing things.

7. Tell him/her how helpful he/she is.

8. Just let it go if he/she doesn't want to.

9. He/she doesn't do chores.

5. If your child clearly disobeyed you or did something wrong you really thought was wrong, what would you do?

1. Punish him/her by taking away some privilege.

2. Send him/her to his/her room.

3. Hit him/her.

4. Have his/her mother handle it.

5. Threaten to punish but probably not do it.

7. Ignore him/her for a time.

8. Talk with him/her about what happened.

9. Make him/her say he/she was sorry.

10 Nothing probably. That's they way kids are.

6. Families have different ways of taking care their children while their parents work or do other things. In some cases, one of the parents takes care of the children while the other parent works. In other cases another family member takes care of the children, while in other cases, childcare is provided by one of the parent's employers. And sometimes employers pay for childcare. Please fill out the following table in terms of how childcare is provided while you or your spouse are at work or are doing things. Please include all of your children in your answers.

Child	What is the age of this child?	Who provides care for this child?	Do you pay for childcare for this child?	How much do you usually pay for childcare each week for this child?	Does the place where you work provide care for this child?	How much do the does your employer pay for the care of this child per week?
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

The next set of questions have to do with the income you receive from your work and other sources. Please remember that we will keep all such information confidential.

7. Individuals get paid in different ways in their jobs. Some individuals are salary employees, that is, they earn a set amount of money per pay period that does not depend on the number of hours worked or amount of sales during the period. Other individuals are wage employees, that is, they get paid per hour of work during a given period. Lastly, other individuals are commission based and they get paid according to number of sales or number of services provided. Please answer the following questions that apply to you in the boxes to the right.

A	**Salary**
1. Are you paid a salary? (Yes/No)	
If No, go to B.	
2. What is your average monthly salary before taxes and benefits?	
3. How many months in the last 12 months have you worked in your job?	

B	Wages
1. Are you paid a wages? (Yes/No)	
If No, go to C.	
2. What is your average monthly wages before taxes and benefits?	
3. How many months in the last 12 months have you worked in your job?	
4. Did you earn tips or other compensation in your job? (Yes/No)	
5. About how much do you earn each month in tips and other compensation?	

C	Salary
1. Are you paid a commission? (Yes/No)	
If No, go Question 11.	
2. About how much is your average monthly commission before taxes?	
3. How many months in the last 12 months have worked in your job?	

8. In which of the following categories would your own income before taxes and benefits (not including any other household members) fall under last year?

1. <5,000
2. 5,000-9,999
3. 10,000-14,999
4. 15,000-19,999
5. 20,000-29,999
6. 30,000-39,999
7. 40,000-49,999
8. 50,000-69,999
9. 70,000-79,999
10. 80,000-89,999
11. 90,000-99,999
12. 100,000-109,999
13. 110,000-119,999
14. 120,000-129,999
15. 130,000-139,999
16. 140,000-149,999
17. >150,000

Supplemental Income

The following questions are designed to obtain information on the sources of supplemental income (income which is not received from any source of employment) received by you.

9. a. Did you participate in the Women with Infant Children (WIC) program during the last 12 months? 1. Yes 2. No

b. How many infants participated in the program? _____

c. If yes, how long did you participate in the program? _____

10. a. Did your children participated in an after school program during the last 12 months?
1. Yes 2. No

b. How many children participated in the program? _____

c. If yes, how long did you children participated in the after school program? _____

11. a. Have you received food from a food pantry during the last 12 months?
1. Yes 2. No

b. If yes, how many times did you participate in a food pantry? _____

12. a. Did your children participate in a free lunch program during the last 12 months?
1. Yes 2. No

b. How many children participated in the program? _____

c. If yes, how long did your children participate in the free lunch program? _____

13. In the following table please indicate the sources of supplemental income that applies to you and your household, the corresponding amount received and length of time over the last 12 months that you received income from each category that applies. Again, please feel free to consult your financial records.

Source of Income	Yes/No	Approximate Average Monthly Amount	Number of Months received during the last 12 months	Who has more say so over how this item is spent (you or your spouse)
1. Food stamps (Household)				
2. Supplemental social security income (Individual)				
3. Unemployment compensation (Individual)				
4. Worker's compensation (Individual)				
5. Public assistance, welfare, or TANF (temporary assistance to needy families) (Household)				
6. Personal Investments such as interest, bonds, dividends, trusts, or rental income				

(Individual)				
7. Joint Investments such as interest, bonds, dividends, trusts, or rental income (Household)				
8. Pensions or annuities (Individual)				
9. Care of foster children, cash scholarships and fellowships, or stipends				
10. Alimony (Individual)				
11. Child support (Individual)				
12. Social security payments (Individual)				
13. Railroad retirement payments (Individual)				
14. Other				

Entire Household

*The following questions are designed to determine the sources of income, and amount of **total** income received by the household during the last 12 months.*

14. Please circle all the numbers that correspond to all the individuals that contributed to your total household income during the last 12 months? For example, if you and your spouse worked then circle 1 and 2.

1. You
2. Your spouse
3. Child
4. Other household members

Other Household Members

15. In the following table please answer the following questions in the boxes that apply to your household.

	You	Your Spouse	Child Surveyed	Other Household Member
Indicate about how much income before taxes and benefits each of these individuals have received during the last 12 months.				
About for how many months during the same period have each of the following individuals received income.				

16. In which of the following categories would **your total household income before taxes and benefits** from all sources fall under for the last 12 months?

1. <5,000
2. 5,000-9,999
3. 10,000-14,999
4. 15,000-19,999
5. 20,000-29,999
6. 30,000-39,999
7. 40,000-49,999
8. 50,000-69,999
9. 70,000-79,999
10. 80,000-89,999
11. 90,000-99,999
12. 100,000-109,999
13. 110,000-119,999
14. 120,000-129,999
15. 130,000-139,999
16. 140,000-149,999
17. >150,000

Money Spent

The following questions are designed to obtain information on the money spent ***by everyone living in your home for each of the following categories during the last 12 months.***

17. In the following table please indicate which of the following purchases you are in charge of making, and monthly expenditure on the different categories.

Type of Purchase	How much do you spend on average a month on this category?	Are you usually in charge of making this purchase? (Yes/No)	Was the amount of money you spent in this category very large or small compared to an average year? (Yes/No)
1. Money spent on groceries and other food items eaten at home			
2. Money spent on take-out and food delivered eaten at home			
3. Money spent on going out to eat			

4. All housing and household expenses (house payment, electric bill, water bill, phone bill, insurance, lawn care, repairs, etc.)			
5. All transportation (your car, bus, upkeep of your car, car insurance, subway, etc.)			
6. All health care (expenses for doctors, medicines, immunizations, etc.)			
7. All education and school supplies (tuition, registration fees, uniforms, school supplies like pens, pencils, books, etc.)			
8. Children's clothing and shoes			
9. Women's clothing and shoes			
10. Men's clothing and shoes			
11. Clothing and shoes for other household members			

18. People organize their household money in different ways. Which of the following ways comes closest to the way you organize your finances? It does not have to fit exactly, but circle the answer that comes closest to you.

    1. I manage the family income and make all spending decisions except for my partner's personal spending money which is the amount of money my partner spends on goods and services used or consumed only by my partner.

    2. My partner manages the family income and makes all spending decisions except for my personal spending money which is the amount of money that I spend on goods and services used or consumed only by me.

    3. I give my spouse an allowance to spend on household items like house payment, phone, electricity, water, yard, repairs, maintenance of the home and car. I look after the rest of the money.

    4. My spouse gives me an allowance to spend on household items like house payment, phone, electricity, water, yard, repairs, maintenance of the home and car. My spouse looks after the rest of the money.

    5. We each manage our own finances separately and split up the household expenses.

    6. We make all decisions jointly.

19. How satisfied are you with how the finances are organized?

1.Very Satisfied	2. Satisfied	3. Neither Satisfied Nor Dissatisfied	4. Dissatisfied	5.Very Dissatisfied

20. Which of the following methods comes the closest to the way you would **like** for your money to be organized? It does not have to fit exactly but choose **the nearest one**.

    1. I manage the family income and make all spending decisions except for my partner's personal spending money which is the amount of money my partner spends on goods and services used or consumed only by my partner.

    2. My partner manages the family income and makes all spending decisions except for my personal spending money which is the amount of money that I spend on goods and services used or consumed only by me.

    3. I give my spouse an allowance to spend on household items like house payment, phone, electricity, water, yard, repairs, maintenance of the home and car. I look after the rest of the money.

    4. My spouse gives me an allowance to spend on household items like house payment, phone, electricity, water, yard, repairs, maintenance of the home and car. My spouse looks after the rest of the money.

    5. We each manage our own finances separately and split up the household expenses.

    6. We make all decisions jointly.

C.1.c. Time Diaries for Parents

DAY 1

How you spend your time.

People spend their time in many ways. We are interested in how you spend your time over the next two days. We have enclosed a form for you to fill out each day. We want you to start by telling what time of the day (or night) you got out of bed. You will then write down the things that you do after getting up. We also want to know if you did more than one thing at a time (like ate breakfast and watched TV or ran the washing machine while you vacuumed or cleaned house). We would like you to also write down where you did these things (my living room, outside in my yard, at work) and if anyone helped you do these things. We have enclosed an example of how to fill out these forms. Thank you for your help.

EXAMPLE

Name: Subject ID#: Day: Date:

Instructions: For each activity you did today, please describe what the activity was, where it took place, who was with you (example friends, wife, son, daughter), how long you did this activity. Activities include getting ready in the morning, work, cooking, watching television, sports and sleeping.

AM/PM Time Begins	AM/PM Time Ended	Main Activity	What else were you doing?	Where were you?	Who helped you do these things?
AM 3:30	*5:30 AM*	Sleeping	N/A	Bedroom	Nobody
AM 4:00					
AM 4:30					
AM 5:00					
AM 5:30	*5:45 AM*	Dressed and Showered	N/A	Bedroom/Bathroom	Nobody
AM 5:45	*6:15 AM*	Making Breakfast	Getting kids ready for school	Kitchen/Livingroom	Husband
AM 6:00					
AM 6:15	*6:30 AM*	Ate Breakfast	N/A	Kitchen	Nobody
AM 6:30	*6:45 AM*	Drove to Work	Dropped kids at school	Car	Nobody
AM 6:45	*4:30 PM*	Worked	N/A	Work	Nobody

EXAMPLE

Name: Subject ID#: Day: Date:

Instructions: For each activity you did today, please describe what the activity was, where it took place, who was with you (example friends, wife, son, daughter), how long you did this activity. Activities include getting ready in the morning, work, cooking, watching television, sports and sleeping.

AM/PM Time Begins	AM/PM Time Ended	Main Activity	What else were you doing?	Where were you?	Who helped you do these things?
AM 10:30	*12:00 PM*	Worked	N/A	Work	N/A
AM 11:00					
AM 11:30					
PM 12:00	*1:00 PM*	Lunch	N/A	Chili's	N/A
PM 12:30					
PM 1:00	*5:00 PM*	Worked	N/A	Work	N/A
PM 1:30					

EXAMPLE

Name: Subject ID#: Day: Date:

Instructions: For each activity you did today, please describe what the activity was, where it took place, who was with you (example friends, wife, son, daughter), how long you did this activity. Activities include getting ready in the morning, work, cooking, watching television, sports and sleeping.

AM/PM Time Begins	AM/PM Time Ended	Main Activity	What else were you doing?	Where were you?	Who helped you do these things?
PM 4:30					
PM 4:40					
PM 5:00					
PM 5:10					
PM 5:20					
PM 5:25					
PM 6:30					
PM 6:40					
PM 6:50	*6:55 PM*	Fed the cat	N/A	Kitchen	
PM 6:55	*7:15 PM*	(gave kids a bath and	N/A	Bedroom/Bathroom	Husband
PM 7:00		dressed them for bed)			
PM 7:10	*7:25 PM*	Read to children	N/A	Bedroom	N/A
PM 7:25	*7:30 PM*	Tucked in the children	N/A	Bedroom	
PM 7:30	*7:50 PM*	Showered and dressed	N/A	Bathroom	N/A
		for bed			
PM 7:50	*8:20 PM*	Watched TV in Bed	Talked to Husband	Bedroom	N/A
PM 8:00					
PM 8:20	*5:45 AM*	Slept	N/A	Bedroom	N/A

Name: Subject ID#: Day: Date:

Instructions: For each activity you did today, please describe what the activity was, where it took place, who was with you (example friends, wife, son, daughter), how long you did this activity. Activities include getting ready in the morning, work, cooking, watching television, sports and sleeping

.

AM/PM Time Begins	AM/PM Time Ended	Main Activity	What else were you doing?	Where were you?	Who helped you do these things?
AM 12:00					
AM 12:30					
AM 1:00					
AM 1:30					
AM 2:00					
AM 2:30					
AM 3:00					

Name: Subject ID#: Day: Date:

Instructions: For each activity you did today, please describe what the activity was, where it took place, who was with you (example friends, wife, son, daughter), how long you did this activity. Activities include getting ready in the morning, work, cooking, watching television, sports and sleeping.

AM/PM Time Begins	AM/PM Time Ended	Main Activity	What else were you doing?	Where were you?	Who helped you do these things?
AM 3:30					
AM 4:00					
AM 4:30					
AM 5:00					
AM 5:30					
AM 6:00					
AM 6:30					

Name: Subject ID#: Day: Date:

Instructions: For each activity you did today, please describe what the activity was, where it took place, who was with you (example friends, wife, son, daughter), how long you did this activity. Activities include getting ready in the morning, work, cooking, watching television, sports and sleeping.

AM/PM Time Begins	AM/PM Time Ended	Main Activity	What else were you doing?	Where were you?	Who helped you do these things?
AM 7:00					
AM 7:30					
AM 8:00					
AM 8:30					
AM 9:00					
AM 9:30					
AM 10:00					

Name: Subject ID#: Day: Date:

Instructions: For each activity you did today, please describe what the activity was, where it took place, who was with you (example friends, wife, son, daughter), how long you did this activity. Activities include getting ready in the morning, work, cooking, watching television, sports and sleeping.

AM/PM Time Begins	AM/PM Time Ended	Main Activity	What else were you doing?	Where were you?	Who helped you do these things?
AM 10:30					
AM 11:00					
AM 11:30					
PM 12:00					
PM 12:30					
PM 1:00					
PM 1:30					

Name: Subject ID#: Day: Date:

Instructions: For each activity you did today, please describe what the activity was, where it took place, who was with you (example friends, wife, son, daughter), how long you did this activity. Activities include getting ready in the morning, work, cooking, watching television, sports and sleeping

.

AM/PM Time Begins	AM/PM Time Ended	Main Activity	What else were you doing?	Where were you?	Who helped you do these things?
PM 2:00					
PM 2:30					
PM 3:00					
PM 3:30					
PM 4:00					
PM 4:30					
PM 5:00					

Name: Subject ID#: Day: Date:

Instructions: For each activity you did today, please describe what the activity was, where it took place, who was with you (example friends, wife, son, daughter), how long you did this activity. Activities include getting ready in the morning, work, cooking, watching television, sports and sleeping.

AM/PM Time Begins	AM/PM Time Ended	Main Activity	What else were you doing?	Where were you?	Who helped you do these things?
PM 5:30					
PM 6:00					
PM 6:30					
PM 7:00					
PM 7:30					
PM 8:00					
PM 8:30					

Name: Subject ID#: Day: Date:

Instructions: For each activity you did today, please describe what the activity was, where it took place, who was with you (example friends, wife, son, daughter), how long you did this activity. Activities include getting ready in the morning, work, cooking, watching television, sports and sleeping.

AM/PM Time Begins	AM/PM Time Ended	Main Activity	What else were you doing?	Where were you?	Who helped you do these things?
PM 9:00					
PM 9:30					
PM 10:00					
PM 10:30					
PM 11:00					
PM 11:30					

Time Diaries for Parents

DAY 2

How you spend your time.

People spend their time in many ways. We are interested in how you spend your time over the next two days. We have enclosed a form for you to fill out each day. We want you to start by telling what time of the day (or night) you got out of bed. You will then write down the things that you do after getting up. We also want to know if you did more than one thing at a time (like ate breakfast and watched TV or ran the washing machine while you vacuumed or cleaned house). We would like you to also write down where you did these things (my living room, outside in my yard, at work) and if anyone helped you do these things. We have enclosed an example of how to fill out these forms. Thank you for your help.

EXAMPLE

Name: Subject ID#: Day: Date:

Instructions: For each activity you did today, please describe what the activity was, where it took place, who was with you (example friends, wife, son, daughter), how long you did this activity. Activities include getting ready in the morning, work, cooking, watching television, sports and sleeping.

AM/PM Time Begins	AM/PM Time Ended	Main Activity	What else were you doing?	Where were you?	Who helped you do these things?
AM 3:30	*5:30 AM*	Sleeping	N/A	Bedroom	Nobody
AM 4:00					
AM 4:30					
AM 5:00					
AM 5:30	*5:45 AM*	Dressed and Showered	N/A	Bedroom/Bathroom	Nobody
AM 5:45	*6:15 AM*	Making Breakfast	Getting kids ready for school	Kitchen/Livingroom	Husband
AM 6:00					
AM 6:15	*6:30 AM*	Ate Breakfast	N/A	Kitchen	Nobody
AM 6:30	*6:45 AM*	Drove to Work	Dropped kids at school	Car	Nobody
AM 6:45	*4:30 PM*	Worked	N/A	Work	Nobody

EXAMPLE

Name: Subject ID#: Day: Date:

Instructions: For each activity you did today, please describe what the activity was, where it took place, who was with you (example friends, wife, son, daughter), how long you did this activity. Activities include getting ready in the morning, work, cooking, watching television, sports and sleeping.

AM/PM Time Begins	AM/PM Time Ended	Main Activity	What else were you doing?	Where were you?	Who helped you do these things?
AM 10:30	*12:00 PM*	Worked	N/A	Work	N/A
AM 11:00					
AM 11:30					
PM 12:00	*1:00 PM*	Lunch	N/A	Chili's	N/A
PM 12:30					
PM 1:00	*5:00 PM*	Worked	N/A	Work	N/A
PM 1:30					

EXAMPLE

Name: Subject ID#: Day: Date:

Instructions: For each activity you did today, please describe what the activity was, where it took place, who was with you (example friends, wife, son, daughter), how long you did this activity. Activities include getting ready in the morning, work, cooking, watching television, sports and sleeping.

AM/PM Time Begins	AM/PM Time Ended	Main Activity	What else were you doing?	Where were you?	Who helped you do these things?
PM 4:30					
PM 4:40					
PM 5:00					
PM 5:10					
PM 5:20					
PM 5:25					
PM 6:30					
PM 6:40					
PM 6:50	*6:55 PM*	Fed the cat	N/A	Kitchen	
PM 6:55	*7:15 PM*	(gave kids a bath and	N/A	Bedroom/Bathroom	Husband
PM 7:00		dressed them for bed)			
PM 7:10	*7:25 PM*	Read to children	N/A	Bedroom	N/A
PM 7:25	*7:30 PM*	Tucked in the children	N/A	Bedroom	
PM 7:30	*7:50 PM*	Showered and dressed	N/A	Bathroom	N/A
		for bed			
PM 7:50	*8:20 PM*	Watched TV in Bed	Talked to Husband	Bedroom	N/A
PM 8:00					
PM 8:20	*5:45 AM*	Slept	N/A	Bedroom	N/A

Name: Subject ID#: Day: Date:

Instructions: For each activity you did today, please describe what the activity was, where it took place, who was with you (example friends, wife, son, daughter), how long you did this activity. Activities include getting ready in the morning, work, cooking, watching television, sports and sleeping.

AM/PM Time Begins	AM/PM Time Ended	Main Activity	What else were you doing?	Where were you?	Who helped you do these things?
AM 12:00					
AM 12:30					
AM 1:00					
AM 1:30					
AM 2:00					
AM 2:30					
AM 3:00					

Name: Subject ID#: Day: Date:

Instructions: For each activity you did today, please describe what the activity was, where it took place, who was with you (example friends, wife, son, daughter), how long you did this activity. Activities include getting ready in the morning, work, cooking, watching television, sports and sleeping.

AM/PM Time Begins	AM/PM Time Ended	Main Activity	What else were you doing?	Where were you?	Who helped you do these things?
AM 3:30					
AM 4:00					
AM 4:30					
AM 5:00					
AM 5:30					
AM 6:00					
AM 6:30					

Name: Subject ID#: Day: Date:

Instructions: For each activity you did today, please describe what the activity was, where it took place, who was with you (example friends, wife, son, daughter), how long you did this activity. Activities include getting ready in the morning, work, cooking, watching television, sports and sleeping.

AM/PM Time Begins	AM/PM Time Ended	Main Activity	What else were you doing?	Where were you?	Who helped you do these things?
AM 7:00					
AM 7:30					
AM 8:00					
AM 8:30					
AM 9:00					
AM 9:30					
AM 10:00					

Name: Subject ID#: Day: Date:

Instructions: For each activity you did today, please describe what the activity was, where it took place, who was with you (example friends, wife, son, daughter), how long you did this activity. Activities include getting ready in the morning, work, cooking, watching television, sports and sleeping.

AM/PM Time Begins	AM/PM Time Ended	Main Activity	What else were you doing?	Where were you?	Who helped you do these things?
AM 10:30					
AM 11:00					
AM 11:30					
PM 12:00					
PM 12:30					
PM 1:00					
PM 1:30					

Name: Subject ID#: Day: Date:

Instructions: For each activity you did today, please describe what the activity was, where it took place, who was with you (example friends, wife, son, daughter), how long you did this activity. Activities include getting ready in the morning, work, cooking, watching television, sports and sleeping.

AM/PM Time Begins	AM/PM Time Ended	Main Activity	What else were you doing?	Where were you?	Who helped you do these things?
PM 2:00					
PM 2:30					
PM 3:00					
PM 3:30					
PM 4:00					
PM 4:30					
PM 5:00					

Name: Subject ID#: Day: Date:

Instructions: For each activity you did today, please describe what the activity was, where it took place, who was with you (example friends, wife, son, daughter), how long you did this activity. Activities include getting ready in the morning, work, cooking, watching television, sports and sleeping.

AM/PM Time Begins	AM/PM Time Ended	Main Activity	What else were you doing?	Where were you?	Who helped you do these things?
PM 5:30					
PM 6:00					
PM 6:30					
PM 7:00					
PM 7:30					
PM 8:00					
PM 8:30					

Name: Subject ID#: Day: Date:

Instructions: For each activity you did today, please describe what the activity was, where it took place, who was with you (example friends, wife, son, daughter), how long you did this activity. Activities include getting ready in the morning, work, cooking, watching television, sports and sleeping.

AM/PM Time Begins	AM/PM Time Ended	Main Activity	What else were you doing?	Where were you?	Who helped you do these things?
PM 9:00					
PM 9:30					
PM 10:00					
PM 10:30					
PM 11:00					
PM 11:30					

E.2. Child Survey Instruments

E.2.a. Child Interview

CONFIDENTIAL FORM

Child/Adolescent Questionnaire
Texas A&M University

Name of Interviewer _____

Name of Respondent _____

Address: _____ Phone No: _____

_____

Household Number: _____ Subject #: _____

Date and Time of Appointment

Date: Time (am/pm)

_____ _____

Date and Time of Reschedule (if necessary)

Date: Time (am/pm)

_____ _____

_____ _____

_____ _____

READ:

I am going to ask you some questions and then read you your choices of answers. It is important that your answers be accurate and complete. Please take your time. Feel free to ask questions if at any point it is not clear what we are asking you. I will read each question exactly as it is worded in the questionnaire and then read to you the answer choices to each question. We are asking you to choose from among these choices the answer that comes closest to your answer. If you think that none of these answers comes very close to your answer, please tell me. Please remember that your answers will be kept confidential. They will not be reported to other people.

To start things off, we would like to ask you about who you live with at home? Do you live with your real or biological mom and dad, other relatives, or with step-parents?

READ:

1. With "real" (biological) mom and dad
2. With real mom only (no other parent like a step parent present)
3. With real mom and step dad
4. With real dad and step mom
5. **With real mother and other relatives.**
   Who is that? _____
6. Adoptive or foster parents

Then Read:

We will be asking you questions about your mother and father. If you live with a step-mother or step-father most of the time, the questions we ask apply to them.

1. **Real mom and dad**
2. **Real mom**

ADOLESCENT SURVEY INSTRUMENT

1. When important family problems come up, which parent usually has the most influence in the decision making? (Interviewer: circle the appropriate response).
   READ:

   1. Father (step-father) usually
   2. Father (step-father) more often
   3. Both about equally
   4. Mother (step-mother) more often
   5. Mother (step-mother) usually

2. Suppose your parents disagree about something, which parent usually makes the final decision?

   1. Father (step-father) usually
   2. Father (step-father) more often
   3. Both about equally
   4. Mother (step-mother) more often
   5. Mother (step-mother) usually

3. In general, how are decisions made between you and your mother (step-mother)? **[Hand respondents card A and read with them]**

   1. My mother (step-mother) just tells me what to do.
   2. She listens to me, but makes the decision herself.
   3. I have considerable opportunity to make my own decisions, but she has the final word.
   4. My opinions are as important as my mother's (step-mother's) in deciding what I should do.
   5. I can make my own decision, but she would like me to consider her opinion.
   6. I can do what I want regardless of what she thinks.
   7. She doesn't care what I do.

4. In general, how are decisions made between you and your father (step-father)? **[Hand respondents card B and read with them]**

   1. My father (step-father) just tells me what to do.
   2. He listens to me, but makes the decision himself.
   3. I have considerable opportunity to make my own decisions, but he has the final word.
   4. My opinions are as important as my father's (step-father's) in deciding what I should do.
   5. I can make my own decision, but he would like me to consider his opinion.
   6. I can do what I want regardless of what he thinks.
   7. He doesn't care what I do.

READ:

[In the next questions, *parents* can include two parents, including step parents, or it can mean only one parent if only one parent (without a step parent) is present. **[Circle the answer to each question.**]

5. Do your parents let you make your own decisions about what time you have to come home on weekend nights?

    1. Yes
    2. No

6. Do your parents let you make your own decisions about the people you hang around with?

    1. Yes
    2. No

7. Do your parents let you make your own decisions about what you wear?

    1. Yes
    2. No

8. Do your parents let you make your own decisions about how much television you watch?

    1. Yes
    2. No

9. Do your parents let you make your own decisions about which television programs you watch?

    1. Yes
    2. No

10. Do your parents let you make your own decisions about what time you go to bed on week nights?

    1. Yes
    2. No

11. Do your parents let you make your own decisions about what you eat at home?

    1. Yes
    2. No

12. We would like to ask you how your parents **reward** and **punish** you and how often they do it.

(A.) How often does your mother or step mother: **READ:**	**Then read**: Never	Very Seldom	Once in a While	Fre-quently	Very fre-quently
a. Give you praise, encouragement, or approval.	1	2	3	4	5
b. Discipline or punish you by nagging, yelling, scolding	1	2	3	4	5
Discipline by criticizing or making fun of you.	1	2	3	4	5
d. Discipline or punish you by spanking, slapping or hitting you.	1	2	3	4	5

(B.) How often does your father or step father: **READ:**	**Then read:** Never	Very Seldom	Once in a While	Fre-quently	Very fre-quently
a. Give you praise, encouragement, or approval.	1	2	3	4	5
b. Discipline or punish you by nagging, yelling, scolding.	1	2	3	4	5
Discipline by criticizing or making fun of you.	1	2	3	4	5
d. Discipline or punish you by spanking, slapping or hitting you.	1	2	3	4	5

13. For the next set of questions, please answer in terms of how often your mother does these things:

READ:	**Then read:** Never	Once in a While	Some-times	Usually	Almost Always	Always
a. She comforts and helps me when I have problems.	1	2	3	4	5	6
b. She makes me feel I can talk with her about everything.	1	2	3	4	5	6
c. She makes me feel she is there if I need her.	1	2	3	4	5	6
d. When she punishes me, she explains why.	1	2	3	4	5	6
e. When she wants me to do something, she explains why.	1	2	3	4	5	6
f. She helps me with homework or lessons if there is something I don't understand.	1	2	3	4	5	6
g. She teaches me things I want to learn.	1	2	3	4	5	6
h. I know what she expects of me and how she wants me to behave.	1	2	3	4	5	6
i. When I do something she doesn't like, I know exactly what to expect from her.	1	2	3	4	5	6

READ:	**Then read:** Never	Once in a While	Some-times	Usually	Almost Always	Always
j. She encourages me to try new things on my own.	1	2	3	4	5	6
k. She lets me make my own plans about things I want to do even though I might make a few mistakes.	1	2	3	4	5	6
l. She lets me off lightly when I do something wrong.	1	2	3	4	5	6
m. She cannot bring herself to punish me.	1	2	3	4	5	6
n. She expects me to keep my things neat.	1	2	3	4	5	6
o. She expects me to help around the house or yard.	1	2	3	4	5	6
p. She keeps after me to do well in school.	1	2	3	4	5	6
q. She keeps after me to do better than other children.	1	2	3	4	5	6
r. She wants to know exactly where I am going when I go out.	1	2	3	4	5	6
s. She expects me to	1	2	3	4	5	6

READ:	**Then read:** Never	Once in a While	Some-times	Usually	Almost Always	Always
tell her exactly how I spend my money.						
t. She worries that I cannot take care of myself.	1	2	3	4	5	6
u. She won't let me go places because something might happen to me.	1	2	3	4	5	6
v. When I do something she doesn't like, she acts hurt and disappointed.	1	2	3	4	5	6
w. She punishes me by trying to make me feel guilty and ashamed.	1	2	3	4	5	6
x. She punishes me by not allowing me to be with my friends.	1	2	3	4	5	6
y. She punishes me by not letting me use my favorite things for awhile.	1	2	3	4	5	6

14. For the next set of questions, please answer in terms of how often your father does these things: **[Skip if no father is present in household]**

READ:	**Then read:** Never	Once in a while	Some-times	Usually	Almost always	Always
a. He comforts and helps me when I have problems.	1	2	3	4	5	6
b. He makes me feel I can talk with him about everything.	1	2	3	4	5	6
c. He makes me feel he is there if I need him.	1	2	3	4	5	6
d. When he punishes me, he explains why.	1	2	3	4	5	6
e. When he wants me to do something, he explains why.	1	2	3	4	5	6
f. He helps me with homework or lessons if there is some-thing I don't understand.	1	2	3	4	5	6
g. He teaches me things I want to learn.	1	2	3	4	5	6
h. I know what he expects of me and how he wants me to behave.	1	2	3	4	5	6
i. When I do some-thing he doesn't like, I know exactly what to expect from him.	1	2	3	4	5	6

READ:	**Then read:** Never	Once in a while	Some-times	Usually	Almost always	Always
j. He encourages me to try new things on my own.	1	2	3	4	5	6
k. He lets me make my own plans about things I want to do even though I might make a few mistakes.	1	2	3	4	5	6
l. He lets me off lightly when I do something wrong.	1	2	3	4	5	6
m. He cannot bring himself to punish me.	1	2	3	4	5	6
n. He expects me to keep my things neat.	1	2	3	4	5	6
o. He expects me to help around the house or yard.	1	2	3	4	5	6
p. He keeps after me to do well in school.	1	2	3	4	5	6
q. He keeps after me to do better than other children.	1	2	3	4	5	6
r. He wants to know exactly where I am going when I go out.	1	2	3	4	5	6
s. He expects me to tell him exactly how I spend my money.	1	2	3	4	5	6
t. He worries that I	1	2	3	4	5	6

READ:	Then read: Never	Once in a while	Some-times	Usually	Almost always	Always
cannot take care of myself.						
u. He won't let me go places because something might happen to me.	1	2	3	4	5	6
v. When I do something he doesn't like, he acts hurt and disappointed.	1	2	3	4	5	6
w. He punishes me by trying to make me feel guilty and ashamed.	1	2	3	4	5	6
x. He punishes me by not allowing me to be with my friends.	1	2	3	4	5	6
y. He punishes me by not letting me use my favorite things for awhile.	1	2	3	4	5	6

15. **[Hand respondent card C.]** Which of the things listed on this card have you done with your mother (step mother) in the past 4 weeks? **(Circle all that apply)**

1. Gone shopping
2. Played a sport or worked out
3. Gone to a religious service or church-related event
4. Talked about someone you're dating, or a party you went to
5. Gone to a movie, play, museum, or concert, or sports event
6. Had a talk about a personal problem you were having
7. Had a serious argument about your behavior
8. Talked about your school work or grades
9. Worked on a project for school
10. Talked about other things you're doing in school

16. Which of these things have you done with your father (step father) in the past 4 weeks? **(Circle all that apply) [Use card C]**

1 Gone shopping
2. Played a sport or worked out together
3. Gone to a religious service or church-related event
4. Talked about someone you're dating, or a party you went to
5. Gone to a movie, play, museum, or concert, or sports event
6. Had a talk about a personal problem you were having
7. Had a serious argument about your behavior
8. Talked about your school work or grades
9. Worked on a project for school
10. Talked about other things you're doing in school

SELF-ESTEEM

17. Now we would like to ask you some questions about how you feel about yourself. Remember, all of these answers will be kept confidential.

Read:	**Then Read:** Strongly Agree	Agree	Disagree	Strongly Disagree
a. I feel I'm as good a person as others are.	1	2	3	4
b. I feel that I have a number of good qualities.	1	2	3	4
c. All in all, I feel like that I am a failure.	1	2	3	4
d. I am able to do things as well as most other people.	1	2	3	4
e. I feel I do not have much to be proud of.	1	2	3	4
f. I feel positive about myself.	1	2	3	4
g. On the whole, I am satisfied with myself.	1	2	3	4
h. I wish I could have more respect for myself.	1	2	3	4

Read:	Then Read: Strongly Agree	Agree	Disagree	Strongly Disagree
i. I feel useless at times.	1	2	3	4
j. Sometimes I think I am no good at all.	1	2	3	4

HEALTH AND NUTRITION SECTION

Now we would like to ask you some questions about your weight and about dieting.

18. How much do you weigh? _____

19. Would you say that you are:
READ:

1. gaining weight?
2. staying at the same weight?
3. losing weight?

20. Do you think you are:
READ:

1. very thin?
2. slightly thin?
3. about average?
4. slightly overweight?
5. very overweight?

21. How much do you think you should weigh?

22. Do you plan to lose weight to get to this weight?

1. Yes
2. No
3. Don't need to

23. Do you think others believe you weigh too much?

1. Yes
2. No

24. Are you now dieting to lose weight?

1. Yes
2. No

25. If you have ever dieted, how old were you when you first started to diet? (I have never dieted is an acceptable response). _____

26. Are you trying to lose weight, gain weight, or stay the same weight?
READ:

1. Lose weight (*ask Q 27*)
2. Gain weight *(skip to Q 28)*
3. Stay the same weight
4. not trying to do anything about weight

27. During the past 7 days, which of the following things did you do in order to lose weight or to keep from gaining weight? **(Circle all that apply) [Show Card D]**
READ:

1. Ate less food
2. Ate less fat
3. Ate fewer calories
4. Fasted
5. Exercised more
6. Made yourself throw-up
7. Took diet pills
8. Took laxatives
9. Smoked cigarettes
10. Other (please specify/describe) _____
11. NONE

28. During the past 7 days, which of the following things did you do in order to gain weight or to build muscle? **[Show Card E]**

1. Ate more food
2. Ate more protein
3. Exercised
4. Lifted weights
5. Took food supplements
6. Used steroids or supplements such as Creatine or "Andro"
7. Other (please specify/describe) _____
8. NONE

29. I'd like to ask you some things about your parents.

READ:	Strongly Disagree	Disagree	Neither Agree/ Disagree	Agree	Strongly Agree
a. My mother thinks I weigh too much.	1	2	3	4	5
b . My mother talks about dieting all the time.	1	2	3	4	5
c. My mother thinks I eat too much.	1	2	3	4	5
d. My mother thinks I need to exercise more.	1	2	3	4	5
e. My mother thinks we should exercise together.	1	2	3	4	5
f. My mother weighs too much.	1	2	3	4	5
g. My mother thinks I need to gain weight.	1	2	3	4	5
h. My mother thinks we need to go on a diet together.	1	2	3	4	5
i. My father thinks I weigh too much.	1	2	3	4	5
j. My father talks about dieting all of the time.	1	2	3	4	5
k. My father thinks I eat too much.	1	2	3	4	5
l. My father thinks I need to exercise more.	1	2	3	4	5
m. My father thinks we should exercise together.	1	2	3	4	5
n. My father weighs too much.	1	2	3	4	5

READ:	Strongly Disagree	Disagree	Neither Agree/ Disagree	Agree	Strongly Agree
o. My father thinks I need to gain weight.	1	2	3	4	5
p. My father thinks we need to go on a diet together.	1	2	3	4	5

30. About how many days a week do you eat breakfast? _____

31. About how many times a day do you have a snack (not counting your meals)?

32. How many times a week do you take vitamins, minerals, or other supplements?
READ:

1. Never
2. < 2 times a week
3. 2-4 times a week
4. 5-7 times a week

33. During the past month, have you taken supplements in pill, liquid, or powdered form? Would you bring me some the containers of the supplements so that I can see labels? **[If the containers are brought to you, check all that apply. If they are not available, give the Card F to the subject so that he or she can tell you which ones were taken] [Record the type or types of supplements]**

____ multiple vitamin
____ multiple vitamin/multiple mineral
____ vitamin A
____ beta-carotene
____ vitamin D
____ vitamin E
____ thiamin
____ riboflavin
____ niacin
____ vitamin B6
____ folic acid
____ biotin
____ vitamin C
____ other vitamins? List
____ bee pollen
____ carnitine
____ coenzyme Q10
____ creatine
____ ginseng
____ brewer's yeast
____ calcium
____ magnesium
____ iron
____ zinc
____ selenium
____ phosphorus
____ iodine
____ chromium picolinate
____ other minerals? List
____ vitamin B12
____ pantothenic acid
____ protein
____ amino acids
____ omega-3 fatty acids
____ guarana
____ royal jelly
____ spirulina
____ St. John's Wort
____ Echinacea
____ other supplements: _____

34. Do you smoke cigarettes?

1. Yes
2. No

[If answer is yes] How many packs do you smoke everyday? _____

35. **[If the respondent smokes]** Did you start to smoke to help you lose weight?

1. Yes
2. No

36. Do you drink alcoholic beverages (like beer, wine, or hard liquor)?

1. Yes
2. No

[If answer is yes] How many drinks (cans, glasses, shots) do you have everyday?

37. **For females subjects only. If male subject, skip to question 39.**
Have you ever been pregnant? Yes No

38. **If female, ask**: At what age did you have your first period? _____

39. Do you play a team sport?

1. Yes
2. No

If yes, how many hours a day do you usually practice? _____

40. Are you more active physically than most people your age, less active than most people your age or about as active as people your age?

1. More active
2. About the same
3. Less active

41. Do you exercise for a minimum of 30 minutes at least five times a week?

1. Yes
2. No

42. How many times in the past 14 days have you done at least 30 minutes of exercise hard enough to make you breathe heavily and make your heart beat fast? (Hard exercise includes, for example, playing basketball, **jogging**, or **fast** bicycling; include time in physical education class)

1. None
2. 1 to 2 days
3. 3 to 5 days
4. 6 to 8 days
5. 9 or more days

43. How many times in the past 14 days have you done at least 30 minutes of light exercise that was not hard enough to make you breathe heavily and make your heart beat fast? (Light exercise includes playing basketball, **walking** or slow bicycling; include time in physical education class)

1. None
2. 1 to 2 days
3. 3 to 5 days
4. 6 to 8 days
5. 9 or more days

44. Does anyone in your family exercise for a minimum of 30 minutes at least five times a week?

1. Yes
2. No

45. During a normal week how many hours a day do you watch television and videos, or play computer video games, **or game boy** before or after school?
Is that:

1. None
2. 1 hour or less
3. 2 to 3 hours
4. 4 to 5 hours
5. 6 to 7 hours
6. 8 to 9 hours
7. 10 to 11 hours
8. 12 to 13 hours
9. More than 13 hours

46. Some of my friends exercise for a minimum of 30 minutes at least five times a week.

1. Yes
2. No

47. What time do you usually go to bed on week nights? **[Write in time in this format HH:MM A for AM or HH:MM P for PM. HH = hour; MM = minutes. Please remember that midnight is 12:00A and noon is 12:00P!]**

_____
HH:MM (A or P)

48. **About how** many hours of sleep do you usually get **every night**?

_____ hours

49. Do you usually get enough sleep?

1. Yes
2. No

50. We would next like to ask you how your mother, father and your friends feel about your eating habits.

READ:	Never	Once in a while	Frequently	Very frequently
a. My mother frequently criticizes the things I eat.	1	2	3	4
b. My father frequently criticizes the things I eat.	1	2	3	4
c. My friends frequently criticize the things I eat.	1	2	3	4
d. I usually eat more food when I'm with my friends.	1	2	3	4
e. My mother thinks I eat too much "junk" food.	1	2	3	4
f. My father thinks I eat too much "junk food"	1	2	3	4
g. When I'm with my friends I can eat what I want.	1	2	3	4

51. Next, I'd like to ask you about some of your eating habits.

Read	**Then Read:** Every-day	A couple of days a week	About once a week	A couple of times a month	About once a month	Several times a year	Never
a. How often do you eat breakfast with your family?	1	2	3	4	5	6	7
b How often do you eat lunch with your family?	1	2	3	4	5	6	7
c. How often do you eat dinner with your family?	1	2	3	4	5	6	7
d. How often do you have a snack at a friend's home?	1	2	3	4	5	6	7
e. How often do you go out to dinner with your family?	1	2	3	4	5	6	7

52. How important is it for <u>you</u> to eat dinner with your family?
READ:

1. Not important at all
2. Somewhat important
3. Important
4. Very important

53. Now I am going to ask you about where your foods and drinks came from during the last 7 days.

1. How **many times** did you get food or drinks from a fast food restaurant in the last 7 days? (We mean food you bought yourself.) _____

2. How **many times** did you get food or snacks from a grocery or convenience store during the last 7 days? (We mean food you bought yourself.) _____

54. How many times last week was at least one of your parents in the room with you while you ate your dinner? _____ days

55. Next, how often does your family do the following things:

READ:	**Then Read:** Never	Sometimes	Always
a. My family eats at the same time every night.	1	2	3
b. At least some of my family eats breakfast together every morning.	1	2	3
c. My family eats lunch together every Sunday.	1	2	3
d. My whole family eats together every night.	1	2	3
e. When I eat breakfast in the morning, I usually watch TV.	1	2	3
f. When I eat dinner, I usually watch TV at the same time.	1	2	3

56. How much do you agree or disagree with the following statements about dinnertime in your family?

Read:	**Then Read:** Strongly Disagree	Disagree	Neither Agree/ Disagree	Agree	Strongly Agree
a. People in my family eat dinner whenever they want	1	2	3	4	5
b. You never know who will be home for dinner in my family.	1	2	3	4	5
c. In my family, dinnertime is more than just a meal; it is a special time.	1	2	3	4	5
d. In my family, everyone has a specific job or task to do at dinnertime.	1	2	3	4	5
e. In my family, we eat together regularly.	1	2	3	4	5
f. In my family we have a special family food night when we order "take out" food like pizza or go to a restaurant together.	1	2	3	4	5
g. In my family it is important that the family eats at least one meal together every day.	1	2	3	4	5
h. I enjoy eating meals with my family	1	2	3	4	5
i. In my family, eating brings people together in an enjoyable way.	1	2	3	4	5
j. In my family, mealtime is a time for talking with other family members.	1	2	3	4	5
k. In my family, mealtime has often been a time when people argue.	1	2	3	4	5

Read:		Then Read: Strongly Disagree	Disagree	Neither Agree/ Disagree	Agree	Strongly Agree
l.	In my family, it is okay for a child to make something else to eat if he/she doesn't like the food being served.	1	2	3	4	5
m.	In my family, a child should eat all of the foods served even if he/she doesn't like them.	1	2	3	4	5

57. I would like to ask you a few things about what your parents do about food.

Read:		Then Read: Strongly disagree	Disagree	Neither Agree/ Disagree	Agree	Strongly Agree
a.	My parents buy the kinds of foods I like.	1	2	3	4	5
b.	My parents buy the kinds of snacks I like.	1	2	3	4	5
c.	My parents cook the kinds of foods I like.	1	2	3	4	5
d.	My parents let me choose what will be served for dinner.	1	2	3	4	5
e.	My parents let me pick out what kind of breakfast cereals I want.	1	2	3	4	5
f.	I don't have to eat all the things my parents cook.	1	2	3	4	5
g.	My parents never make me eat things I don't like.	1	2	3	4	5

The next set of questions are about the money you get and the money you spend.

58. Do you get an allowance or money for helping out around the house from your parents or someone else?
READ:

1. Yes
2. No

IF YES, ASK: How often do you get this money?

_____ more than once a week
_____once a week
_____ every two weeks
_____ once a month
_____ other (Have them tell you how often): _____

IF YES, ASK how much money do you get?

_____

59. Do you have a job?

1. Yes

2. No

IF YES, ASK:

READ:	**Record Answer:**
a. What kind of place do you work for?	
b. What kind of work do you normally do? That is, what is your job called?	
c. What do you actually do in your job? Tell me, what are your main duties?	
d. Are you self-employed or do you work for someone else?	
e. About how much do you get paid each month in your job?	

READ:	Record Answer:	
f. If you get tips or any other kind of extra money, how much do you usually get each month?	Salary?	Tips?
g. Do you have to give your parents or someone else any of the money you make from your job?	1. Yes	2. No
h. **If Yes**, How much of your income do you keep for yourself? **(In dollars)**		

60. Next we would like to know how you spend your money. We will read you a list of things and ask you about how much money you spend on these things each month.

STATE:	THEN ASK: How much do you spend?
a. Foods or drinks you eat at home.	
b. Foods or drinks you eat away **from** home.	
c. Phone bill.	
d. Money to ride the bus.	
e. Medicine like aspirin or vitamin pills.	
f. Clothes and shoes.	
g. Buying CDs or DVDs.	
h. Buying video games.	
i. Renting movies or video games.	

61. What is your ethnic background?

a. Mexican American
b. Anglo
c. Black
d. Other. Please specify: _____

62. Gender

1. Male
2. Female

63. How old are you? _____

THANK YOU FOR YOUR HELP WITH OUR STUDY.

E.2.b. 24-Hour Diet Recall

24-HOUR DIET RECALL

INTERVIEWER NAME:_____ DAY:_____

SUBJECT NAME:_____ DATE:_____

SUBJECT 1D #:_____

TIME	FOOD/BEVERAGE EATEN AND METHOD OF PREPARATION	AMOUNT (HOW MUCH)	WHERE EATEN	WHO WAS WITH YOU	MEAL OR SNACK

24-HOUR DIET RECALL

INTERVIEWER NAME:_____ DAY:_____
SUBJECT NAME:_____ DATE:_____
SUBJECT 1D #:_____

TIME	FOOD/BEVERAGE EATEN AND METHOD OF PREPARATION	AMOUNT (HOW MUCH)	WHERE EATEN	WHO WAS WITH YOU	MEAL OR SNACK

24-HOUR DIET RECALL

INTERVIEWER NAME:_____ DAY:_____
SUBJECT NAME:_____ DATE:_____
SUBJECT 1D #:_____

TIME	FOOD/BEVERAGE EATEN AND METHOD OF PREPARATION	AMOUNT (HOW MUCH)	WHERE EATEN	WHO WAS WITH YOU	MEAL OR SNACK

E.2.c. 24-Hour Activity Recall

24-HOUR ACTIVITY RECALL

INTERVIEWER NAME:_____ DAY:_____
SUBJECT NAME:_____ DATE:_____
SUBJECT 1D #:_____

TIME	ACTIVITY	WHERE DID ACTIVITY TAKE PLACE	WHO WAS WITH YOU	LENGTH OF TIME OF ACTIVITY
	Went to bed (two nights ago)			
	Woke up (yesterday)			

24-HOUR ACTIVITY RECALL

INTERVIEWER NAME:_____ DAY:_____
SUBJECT NAME:_____ DATE:_____
SUBJECT 1D #:_____

TIME	ACTIVITY	WHERE DID ACTIVITY TAKE PLACE	WHO WAS WITH YOU	LENGTH OF TIME OF ACTIVITY

24-HOUR ACTIVITY RECALL

INTERVIEWER NAME:_____ DAY:_____
SUBJECT NAME:_____ DATE:_____
SUBJECT 1D #:_____

TIME	ACTIVITY	WHERE DID ACTIVITY TAKE PLACE	WHO WAS WITH YOU	LENGTH OF TIME OF ACTIVITY

E.2.d. Adolescent Diet and Activity Record Packet

Adolescent Diet and Activity Record Packet

DIET RECORD (EXAMPLE)

SUBJECT NAME: Betty Boop DAY: Monday _____

SUBJECT ID #: 1234 DATE: May 14 _____

TIME	FOOD/BEVERAGE EATEN AND METHOD OF PREPARATION	AMOUNT (HOW MUCH)	WHERE EATEN	WHO WAS WITH YOU	MEAL OR SNACK
8:30 am	Toast (Iron Kids whit bread)	2 slices	Kitchen	Sister	Meal (M)
	Margarine	2 tablespoons	Kitchen	Sister	M
	Lucky Charms	1 cup	Kitchen	Sister	M
	Whole Milk	`1 ½ cups	Kitchen	Sister	M
12:00 noon	9-piece Chicken McNuggets	9 pieces	McDonald's	Friends	M
	Honey Mustard Sauce	1 package	McDonald's	Friends	M
	French Fries	1 small package	McDonald's	Friends	M
	Coke	12 ounces	McDonald's	Friends	M
2:00 pm	Ruffles Sour Cream & Onion Potato Chips	20 chips	Friend's House	Friends	Snack (S)
	Kool Aid	20 ounces	Friend's House	Friends	S
6:15	Baked Chicken Breast	1 piece (5 ounces)	Home (kitchen)	Mom, Dad, sister	M
	Steamed broccoli	1 cup (cooked)	Home (kitchen)	Mom, Dad, sister	M

DIET RECORD (EXAMPLE)

SUBJECT NAME: Betty Boop DAY: Monday

SUBJECT ID #: 1234 DATE: May 14

Instructions: Write down everything you eat and drink today. Please include how much you ate or drank, where the food or drink was consumed, and who was with you when you consumed the food or beverage. Also, tell us if the food or drink was a meal or a snack. A snack is any food or beverage not eaten with a regular meal.

TIME	FOOD/BEVERAGE EATEN AND METHOD OF PREPARATION	AMOUNT (HOW MUCH)	WHERE EATEN	WHO WAS WITH YOU	MEAL OR SNACK
	Baked Potato	1 medium potato	Home (kitchen)	Mom, Dad, sister	M
	Margarine	2 tablespoons	Home (kitchen)	Mom, Dad, sister	M
	Water	2 cups	Home (kitchen)	Mom, Dad, sister	M
8:30 pm	Blue Bell Cookies & Cream Ice Cream	I cup	Living Room	Dad & Sister	S
9:00 pm	Dr. Pepper	12 ounces can	Living Room	Dad & Sister	S
10:00 pm	Act II Microwave Butter Popcorn	2 cups	Bedroom	Nobody	S
	Water	16 ounces	Bedroom	Nobody	S

DIET RECORD

SUBJECT NAME:_____ DAY:_____

SUBJECT 1D #:_____ DATE:_____

TIME	**FOOD/BEVERAGE EATEN AND METHOD OF PREPARATION**	**AMOUNT (HOW MUCH)**	**WHERE EATEN**	**WHO WAS WITH YOU**	**MEAL OR SNACK**

Instructions: Write down everything you eat and drink today. Please include how much you ate or drank, where the food or drink was consumed, and who was with you when you consumed the food or beverage. Also, tell us if the food or drink was a meal or a snack. A snack is any food or beverage not eaten with a regular meal.

DIET RECORD

SUBJECT NAME:_____ DAY:_____

SUBJECT 1D #:_____ DATE:_____

TIME	**FOOD/BEVERAGE EATEN AND METHOD OF PREPARATION**	**AMOUNT (HOW MUCH)**	**WHERE EATEN**	**WHO WAS WITH YOU**	**MEAL OR SNACK**

Instructions: Write down everything you eat and drink today. Please include how much you ate or drank, where the food or drink was consumed, and who was with you when you consumed the food or beverage. Also, tell us if the food or drink was a meal or a snack. A snack is any food or beverage not eaten with a regular meal.

DIET RECORD

SUBJECT NAME:_____ DAY:_____

SUBJECT 1D #:_____ DATE:_____

TIME	**FOOD/BEVERAGE EATEN AND METHOD OF PREPARATION**	**AMOUNT (HOW MUCH)**	**WHERE EATEN**	**WHO WAS WITH YOU**	**MEAL OR SNACK**

Instructions: Write down everything you eat and drink today. Please include how much you ate or drank, where the food or drink was consumed, and who was with you when you consumed the food or beverage. Also, tell us if the food or drink was a meal or a snack. A snack is any food or beverage not eaten with a regular meal.

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SUBJECT NAME:_____ DAY:_____

SUBJECT 1D #:_____ DATE:_____

TIME	**FOOD/BEVERAGE EATEN AND METHOD OF PREPARATION**	**AMOUNT (HOW MUCH)**	**WHERE EATEN**	**WHO WAS WITH YOU**	**MEAL OR SNACK**

Instructions: Write down everything you eat and drink today. Please include how much you ate or drank, where the food or drink was consumed, and who was with you when you consumed the food or beverage. Also, tell us if the food or drink was a meal or a snack. A snack is any food or beverage not eaten with a regular meal.

DIET RECORD

SUBJECT NAME:_____ DAY:_____

SUBJECT 1D #:_____ DATE:_____

TIME	**FOOD/BEVERAGE EATEN AND METHOD OF PREPARATION**	**AMOUNT (HOW MUCH)**	**WHERE EATEN**	**WHO WAS WITH YOU**	**MEAL OR SNACK**

Instructions: Write down everything you eat and drink today. Please include how much you ate or drank, where the food or drink was consumed, and who was with you when you consumed the food or beverage. Also, tell us if the food or drink was a meal or a snack. A snack is any food or beverage not eaten with a regular meal.

DIET RECORD

SUBJECT NAME:_____ DAY:_____

SUBJECT 1D #:_____ DATE:_____

TIME	**FOOD/BEVERAGE EATEN AND METHOD OF PREPARATION**	**AMOUNT (HOW MUCH)**	**WHERE EATEN**	**WHO WAS WITH YOU**	**MEAL OR SNACK**

Instructions: Write down everything you eat and drink today. Please include how much you ate or drank, where the food or drink was consumed, and who was with you when you consumed the food or beverage. Also, tell us if the food or drink was a meal or a snack. A snack is any food or beverage not eaten with a regular meal.

ACTIVITY RECORD (EXAMPLE):

SUBJECT NAME:___Betty Boop_____ DAY:____Monday_____

SUBJECT 1D #:____1234_____ DATE:___May 14_____

TIME	ACTIVITY	WHERE DID ACTIVITY TAKE PLACE	WHO WAS WITH YOU	LENGTH OF TIME OF ACTIVITY
9:00 p.m.	Went to bed (last night)	My bedroom	No one	9 hours
6:00 a.m.	Woke up and got dressed	My bedroom	No one	15 minutes
6:15 a.m.	Had breakfast	Kitchen	Mom and sister	30 minutes
6:45 a.m.	Went to bus stop	Corner of my street	Sister	20 minutes
7:05 a.m.	Rode bus to school	On bus	Sister and schoolmates	50 minutes
8:00 a.m.	Started school	School	Classmates	7 hours
3:05 p.m.	Got on bus	School	Sister and schoolmates	50 minutes
4:00 p.m.	Had a snack and did homework	My room	No one	1 hour
5:00 p.m.	Watched TV	Frontroom	Sister	1 hour
6:00 p.m.	Helped Mom prepare dinner	Kitchen	Mom	30 minutes
6:30 p.m.	Eat dinner and played cards	Kitchen and family room	Family	1.5 hours
8:00 p.m.	Watched TV	Frontroom	Family	45 minutes
8:45 p.m.	Got ready and went to bed	Bedroom	No one	9 hours

Instructions: For each activity you did today, please describe what the activity was, where it took place, who was with you (example: friends, sister, father, mother, and how long you did this activity. Activities are not just limited to sports and included watching television or reading a book.

ACTIVITY RECORD

SUBJECT NAME:_____ DAY:_____

SUBJECT 1D #:_____ DATE:_____

TIME	ACTIVITY	WHERE DID ACTIVITY TAKE PLACE	WHO WAS WITH YOU	LENGTH OF TIME OF ACTIVITY

Instructions: For each activity you did today, please describe what the activity was, where it took place, who was with you (example: friends, sister, father, mother, and how long you did this activity. Activities are not just limited to sports and included watching television or reading a book.

ACTIVITY RECORD

SUBJECT NAME:_____ DAY:_____

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SUBJECT NAME:_____ DAY:_____

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TIME	ACTIVITY	WHERE DID ACTIVITY TAKE PLACE	WHO WAS WITH YOU	LENGTH OF TIME OF ACTIVITY

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ACTIVITY RECORD

SUBJECT NAME:_____ DAY:_____

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TIME	ACTIVITY	WHERE DID ACTIVITY TAKE PLACE	WHO WAS WITH YOU	LENGTH OF TIME OF ACTIVITY

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SUBJECT NAME:_____ DAY:_____

SUBJECT 1D #:_____ DATE:_____

TIME	ACTIVITY	WHERE DID ACTIVITY TAKE PLACE	WHO WAS WITH YOU	LENGTH OF TIME OF ACTIVITY

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ACTIVITY RECORD

SUBJECT NAME:_____ DAY:_____

SUBJECT 1D #:_____ DATE:_____

TIME	ACTIVITY	WHERE DID ACTIVITY TAKE PLACE	WHO WAS WITH YOU	LENGTH OF TIME OF ACTIVITY

Instructions: For each activity you did today, please describe what the activity was, where it took place, who was with you (example: friends, sister, father, mother, and how long you did this activity. Activities are not just limited to sports and included watching television or reading a book.

E.2.e. Anthropometric Assessment

ANTHROPOMETRIC ASSESSMENT

INTERVIEWER NAME:_____

Subject Name: _____

Subject ID #: _____

Age: _____

Sex:_____ Female _____ Male _____

1. Body height _____ in. (nearest 1/8 inch)
   (without shoes and not leaning against wall)

2. Body weight _____ lbs.
   (without shoes)

3. Mid-arm circumference _____ cm.

4. Triceps skinfold thickness
   _____
   _____
   _____
   Avg. _____ mm.

5. Subscapular skinfold thickness
   _____
   _____
   _____
   Avg. _____ mm.

6. Waist circumference _____ cm.

7. Hip circumference _____ cm.