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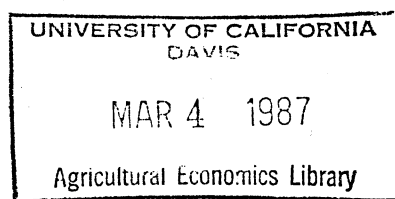
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Socioeconomic Factors Affecting Dietary
Status: An Appraisal¹



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A number of studies have used multivariate statistical methods to evaluate hypotheses related to the factors influencing dietary status. Motivating these studies are interests in food assistance policy, nutrition education, marketing and more generally, understanding the structure of consumer demand. The intent of this paper is to identify selected studies which have contributed to the present knowledge on socioeconomic characteristics of households and dietary status.

Studies of the socioeconomic factors influencing dietary status have undergone significant change in recent years because of developments in statistics and household decision theory. In the latter case, households utilize various inputs--for example, food as purchased and the labor of household members--to produce diets with varying features including nutrient compositions. As indicated by the work of Basiotis et al. (1983), Blanciforti, Green and Lane, Davis et al. (1982b), Sanderson, and Sexauer, this framework provides a systematic rationale for the incorporation of socioeconomic variables into integrated statistical analyses of food consumption and dietary status. More specifically, the scope of traditional consumer demand theory has been significantly increased by household economic decision theory. In addition, permitting explicit incorporation of socioeconomic variables in Engel and full demand systems, this theory makes a plausible linkage between food intake and dietary status. Since household economics merely extends, rather than refutes, the intrinsic utility maximization properties of traditional demand theory, the Engel and demand systems relationships postulated linking socioeconomic characteristics, food expenditure and dietary status are admitted by the theory (Stigler and Becker).

As will be demonstrated, research results are accumulating on household size, household income and expenditure, nutrient levels in household food

supplies and individual diets, efficiency of food use, away-from-home food consumption, and use of convenience foods. However, studies of the relationship between socioeconomic characteristics of households and/or individuals and nutrient availability and/or dietary intake levels have produced varying conclusions. Among other factors, these varying results can be attributed to 1) different measures of diet quality, and 2) differences in individual food intake versus food disappearance data. Further, diet quality has been assessed directly (units of nutrients available or consumed) as well as indirectly (expenditure levels on food).

The dietary components studied most frequently are food energy, protein, calcium, iron, vitamins A and C, riboflavin, thiamin and niacin. However, recently studies have given less attention to thiamin, riboflavin, niacin and vitamin C and instead have investigated vitamin B₆ and magnesium. In the near future, this list of target dietary components will probably include cholesterol, sodium, dietary fiber, zinc and copper. This extension will occur for two reasons: 1) consumer interest in these dietary components and 2) availability of survey data on these dietary components, e.g., USDA's 1985 Continuing Survey of Food Intake by Individuals and the 1987-88 Nationwide Food Consumption Survey.

Observable characteristics most commonly used in assessing factors impacting on diet quality include: income, food assistance program participation, household composition (or family life cycle), education of female/male household head, location (degree of urbanization and region of country), race and ethnic origin, employment status of female/male household head, and household headship (single or dual). Studies have also evaluated the impact of convenience foods, away-from-home food consumption and various

other eating patterns on diet quality. This review encompasses representative findings related to these factors and is not intended to be all inclusive. No attempt is made to evaluate the methodological and statistical implications of the studies.

Income

Several studies (Basiotis et al., 1983; Basiotis et al., 1986; Davis et al., 1982b; Johnson, Burt and Morgan; Morgan et al., 1985a; Neenan and Davis; Sanderson; Smallwood and Blaylock) have shown money income to have a positive and significant impact on food expenditure. However, Gallo, Salathe and Boehm and Salathe and Buse have provided information showing that money income has a significant impact (positively or negatively), depending on the characteristics of households.

Studies by Adrian and Daniel, Basiotis et al. (1983), Basiotis et al. (1986), Madden and Yoder, and Searce and Jensen have shown money income to be positively related to the dietary status of low income households. However, the magnitude of this positive effect is difficult to estimate statistically and seems dependent on the data and subtleties in model specification. Two studies (Chavas and Keplinger, Davis et al., 1982a) reported no significant effect of money income on nutritional status for very low-income households. Using intake data, as opposed to household data, Bunch and Hall, found that per capita income was significantly positively related to the intake levels of five of the nine dietary components investigated.

The empirical literature provides conclusive evidence that income is a major determinant of household food expenditure. There is also evidence of a positive relationship between income and dietary status. However, this evidence

is not as strong. Studying the impact of the National School Lunch Program (NSLP) on dietary status, Akin, Guilkey and Popkin reported a positive effect of income on the intake level of only one nutrient (vitamin C) among the five reported nutrients. The income elasticities of nutrient consumption vary widely among nutrients (Adrian and Daniel; Basiotis et al., 1983; Davis and Neenan; Johnson, Burt and Morgan; Madden and Yoder; Searce and Jensen). The income-nutrient response varies, depending on income and income as specified with other variables (Basiotis et al., 1986; Davis and Neenan). There is some evidence that increased discretionary income may be used to purchase less nutritious food (Madden and Yoder), indicating that discretionary income may have a negative effect on nutritional status.

Davis, in 1982, critiqued the literature and postulated a positive relationship between dietary status and food expenditure. He concluded that the impact was dependent on the nutrient composition of the expenditure items. Davis drew this conclusion from two studies that found expenditures to have a positive impact on nutritional status (Allen and Gadson; Lane). However, two studies found a nonsignificant impact (Price et al.; Sanderson). Since Davis' review, three studies have been completed that clarify the relationship between food expenditures and dietary status. Morgan and co-workers (Morgan et al., 1985a; Morgan et al., 1985b; Morgan et al., 1986) have shown that although dietary levels of nutrients were greater for households with a higher expenditure, nutrients per dollar of food expenditure were inversely correlated with income. As per capita household income increased, percentage allocations to high-cost meats and beverages increased while percentage allocations to other food groups decreased. Further, households with high nutrient return per food dollar were more likely to have met the NRC-RDA.

Food Assistance

Money income, food expenditure and dietary status are related to the food stamp bonus. Food stamp income has been shown to have a positive effect on food expenditures (Basiotis et al., 1983; Basiotis et al., 1986; Davis et al., 1982b; Davis and Neenan, Johnson, Burt and Morgan, Salathe, and Sanderson). Studies by Basiotis et al. (1986), Chavas and Keplinger, Davis and Neenan, Johnson, Burt and Morgan, and Searce and Jensen showed bonus income having a positive effect on dietary status. Price et al. reported a nonsignificant impact of bonus income on dietary status and Madden and Yoder reported a negative impact. Alternatively, Akin et al., who studied the elderly population, indicated that a Food Stamp Program (FSP) participant had higher predicted consumption of food energy and all nutrients investigated than did a nonparticipant with identical characteristics. However, the average, elderly FSP participant did not consume as much of any nutrient as did an average elderly FSP ineligible individual. These researchers also reported that receiving other forms of transfer income (e.g., Supplemental Security Income and Social Security) improved the nutrient intake of individuals participating in the FSP significantly more than it did the intake of those who did not participate in the FSP, regardless of eligibility.

Interactions between nutritional status, money income and the bonus income have been found. Food stamp bonus income is a "semi-in-kind" income transfer, affecting food quality and income. The food stamp bonus increased household discretionary income, which was used to meet nonfood needs or food needs (Adrian and Daniel; Basiotis et al., 1986; Davis and Neenan; Johnson Burt and Morgan; Lane; Neenan and Davis; West and Price).

Morgan et al. (1985a) showed that food stamp participants allocated significantly lower proportions of total food dollars to fruits and bread than

eligible, non-participants. Though not statistically significant, food stamp participants allocated greater proportions of their total food expenditure to cereals, rice and pasta; milk and cheese; eggs, beans and nuts; and mixtures, condiments and bakery products than did eligible non-participants. Households participating in the food stamp program had a significantly higher level of calcium per dollar of food than did eligible non-participants. Food stamp households had higher, though not statistically significant, food energy, protein, iron and magnesium return per food dollar than did eligible, non-participating households (Morgan et al., 1985b).

There exist several studies evaluating the impact of NSLP on dietary status (e.g., Chavas and Keplinger; Hanes, Vermeerch and Gale; Price et al.). The most recent, comprehensive study of NSLP (Akin, Guilkey and Popkin) demonstrated the positive impact of the NSLP. These researchers reported that NSLP participation had a consistently positive effect on overall nutrient intake. They concluded that NSLP participation was important for all children and that poorer participants gained much larger additions to their intake of each nutrient by participating in NSLP than did the other children. Chavas and Keplinger provided evidence indicating both the WIC program and Meal Service for the Elderly were effective in improving the nutritional status of participants.

Household Size and Family Life Cycle

Household size as related to nutritional status and food expenditures has received wide attention because of its importance in determining eligibility and bonus levels for food stamp households. Household size has been reported as having a significantly positive effect on aggregative household food expenditure (Davis et al., 1982b; Neenan and Davis; Smallwood and Blaylock). However,

Chavas and Keplinger concluded nutrient intake decreased significantly with increased household size. Brown and Johnson and Davis et al. (1982b) reported economies of size for food expenditures. Basiotis et al. (1983) reported that food energy and nutrient availability were related strongly to age and sex of household members. Basiotis et al. (1986) and Morgan et al. (1985b) reported a significant positive relationship between household size and nutrient return per food dollar indicating that lower nutrient intakes were probably more related to total food expenditure than food selection.

Sometime ago Lansing and Kish and Coughenour observed the advantage of using "family life cycle" rather than age in explaining nutritional status. Clearly, attitudes and behavior change with age, and many of these changes are associated less with biological aging than with family membership. More recently, Blanciforti, Green and Lane found a significant relationship among life cycle stage, food expenditure and dietary status. Adrian and Daniel and Allen and Gadson also observed this relationship.

Education

The general education levels of the female household heads had a significant positive impact on food expenditures (Salathe and Buse). However, Davis et al. (1982b) and Davis and Neenan have found nutrition knowledge had a negative impact on food expenditure but a significantly positive impact on dietary status. These results were attributed to efficiency in food procurement on one hand and the selection and preparation of more nutritious meals on the other. Akin, Guilkey and Popkin, Allen and Gadson, Bunch and Hall, Chavas and Keplinger, and Searce and Jensen reported that the general education level of the female household head had a positive significant impact on nutritional status.

However, Adrian and Daniel noted an inverse relationship between education of homemaker and carbohydrate, fat, iron and thiamin availability levels in home food supplies. Alternatively, they reported a positive relationship for availability of vitamin C.

Three studies have shown nutritional knowledge of the homemaker was positively related to dietary status (Davis et al., 1982a; Davis and Neenan; Sanderson). Davis et al. (1982a) reported that, unlike nutrition education, the general education level of the homemaker had a nonsignificant impact on diet status. Four studies (Davis et al., 1982a; Davis et al., 1982b; Davis and Neenan; Sanderson) suggested that bonus food stamp income interacted with nutrition knowledge to have a positive effect on nutritional status.

Residential Location

Location has been shown to have significant impact on food expenditures (Basiotis et al., 1983; Basiotis et al., 1986; Brown, Johnson and Rizek; Johnson, Burt and Morgan; Salathe and Buse; Smallwood and Blaylock). Most of these studies have shown that food expenditure was higher for central city households and households residing in the Northeastern United States. Several studies have established that residential location had a positive or negative impact on dietary status, depending on the location (Adrian and Daniel; Allen and Gadson; Basiotis et al., 1983; Basiotis et al., 1986; Bunch and Hall; Johnson, Burt and Morgan). Most studies have indicated that the poorest dietary status was for Southern households. Results for urbanization have been mixed.

Morgan et al. (1985b) showed that both non-metropolitan and suburban households had a significantly higher return per food dollar for all dietary components except vitamin A than central city households. This study also

reported that Northeastern households had a lower nutrient level per food dollar for all dietary components than households in other regions of the United States.

Other Sociodemographic Factors

Somewhat less attention has been given to race, ethnic origin, employment status of male/female household head, and single/dual household headship and food expenditure levels and dietary status. Estimates of food expenditure incorporating race as an explanatory variable (Basiotis et al., 1983; Basiotis et al., 1986; Salathe) showed that white households had somewhat higher food costs than black households. Basiotis et al. (1983) reported that non-Spanish households had higher food costs than Spanish households. Adrian and Daniel, Allen and Gadson, Bunch and Hall, and Davis et al. (1982a) have also evaluated the relationship between race and dietary status. All of these except Davis et al. (1982a) found significant race effects; however, the direction of the effects varied by nutrient. The only consistent observation among the studies was lower calcium levels for black households than white households. Morgan et al. (1985b) showed that black households had greater food energy, protein, iron and vitamin A return per food dollar than did white households, while white households had greater return of calcium and magnesium per food dollar. These researchers also reported that Spanish households had higher iron return per food dollar and no significantly lower returns per food dollar than non-Spanish households.

Adrian and Daniel incorporated female employment status in their analysis of dietary status. They found that for nearly all dietary components evaluated, availability levels were not significantly different between households with employed and unemployed female household heads. Using individual intake data,

Bunch and Hall also found number of hours worked by the female household head was not an important determinant of nutrient consumption.

The work by Basiotis et al. (1983) is one of the few studies which has related household headship to dietary status. These researchers reported that dual headed households had significantly greater levels of calcium availability than single headed households. Households headed by a male only had significantly lower available levels of food energy, protein, calcium, iron, riboflavin, and thiamin than dual headed and female only headed households. Female headed households had significantly greater availability of food energy, protein, iron, riboflavin, thiamin and vitamin A than dual headed households. The headship variable should receive more research attention in light of the fact that more households may become single headed in future years and such circumstances will impact on available household labor.

Convenience Foods and Foods Away From Home

Not until recently has research become available on impacts of convenience foods and foods consumed away from home on food expenditure patterns and dietary status. Two studies have been conducted on the demand for convenience foods and the impact of convenience foods on diet quality. Capps, Tedford and Havlicek reported that the budget shares for convenience and nonconvenience foods were generally more responsive to prices than to real total expenditure. Additionally, the quantities demanded of convenience and nonconvenience foods were generally more sensitive to changes in income and own-prices than to cross-prices. Primary users of convenience foods were identified as being white, non-Spanish households with employed household managers less than 35 years of age who resided in central city or suburban areas outside the Southern part of

the United States. Havlicek et al. reported that approximately 55 percent of the dollar for food at home was spent on nonconvenience foods, 18 percent on basic convenience food, 19 percent on complex convenience foods and 7 percent on manufactured convenience foods. As the share of the food dollar for convenience foods increased, there was a small decrease in the nutrient level per nutrition unit for food energy and all nutrients except calcium, vitamin A and carbohydrate.

A study conducted by Morgan and Goungetas showed that increasing per capita income had a positive impact on the number of meals consumed away from home. The number of meals consumed away from home decreased with increasing age, probably because school lunch meals were included. Persons residing in single-headed households consumed more meals away from home suggesting that a single household head had fewer at home labor substitutes for at home production. There was a strong positive relationship between employment of a female household head and the number of away-from-home meals.

Haines, McCracken and Brandt and Smallwood and Blaylock studied expenditures on away-from-home food. Both Haines and McCracken and Brandt assessed not only income elasticities for total away-from-home food expenditure but also elasticities by establishment source. Haines found that household characteristics strongly influenced individual away-from-home food expenditure patterns. If the meal producer was employed, more was spent on away-from-home foods. The presence of preschool age children had a negative impact on restaurant expenditures, but had a positive impact on fast food expenditures. Further, increased household size yielded decreased expenditure at restaurants and increased expenditure on fast foods. Individuals from single headed

households spent more for food away from home than did those from dual headed households. Haines reported an income elasticity for all food consumed away from home of 0.48. In contrast, Smallwood and Blaylock reported a greater income elasticity for away-from-home food expenditure of 0.81, while McCracken and Brandt reported a smaller elasticity of 0.24. These differences in elasticities may be attributable to differences in estimation procedures (OLS versus Tobit) used and/or the omission/inclusion of an implicit measure for the household's value of time. The income elasticities reported by Haines ranged from 2.00 for restaurant food, 0.92 for fast food, to a low of 0.18 for cafeteria food. Alternatively, McCracken and Brandt indicated income elasticities of 0.34, 0.04 and 0.36 for restaurant expenditures, fast food expenditures and other commercial expenditures, respectively.

Haines, Morgan and Goungetas, and Bunch and Hall, examined the effect of away-from-home food consumption on diet quality. All three studies showed an increase in fat, protein and food energy intake with increased away-from-home food consumption. Haines did not observe concomitant increases in micronutrient intakes; however, Morgan and Goungetas noted concomitant increases in calcium, magnesium and iron. Bunch and Hall concluded that individuals who consumed large percentages of their calories away from home frequently had adequate diets, but higher caloric consumption was required to achieve this level of nutrient intake. Alternatively, Morgan and Goungetas concluded that where persons obtained food did not strongly influence their nutritional well-being.

Concluding Remarks

The concluding remarks by Davis in his presentation at the 1982 Annual Meeting of the American Agricultural Economics Association indicated the necessity of broadening the theoretical and methodological base of food policy research. Davis concluded that applied economic research had not fully exploited the theoretical contributions of household economics in effectively linking food expenditure and household socioeconomic characteristics to dietary status.

Since then, efforts have been made to improve the linkage he advocated. For example, Basiotis et al. (1986) studied simultaneously food cost, nutrient availability and nutrient intake. The specifications were motivated by the household production theory and were shown to be effective in relating food stamp bonus income to improved dietary status. Another example of innovative work is that by Akin, Guilkey and Popkin who used switching regression analysis to evaluate NSLP impact on nutrient intake. In another study (Akin et al.), these researchers formulated a model with endogenous FSP participation and nutrient intake decisions. The insights gained regarding the effects on elderly peoples' behavior caused by interactions among FSP, Supplemental Security Income, Social Security, and elderly feeding programs will be useful in designing future transfer programs.

This is not to say that all questions have been answered and no further refinements are needed in our models. Rather, it is to note the progress that has been made in recent years and to advocate the formation of more multidisciplinary research groups to further pursue meaningful national food and nutrition policies and programs.

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