

## Chapter 2

# The Social Context of Dietary Behaviors: The Role of Social Relationships and Support on Dietary Fat and Fiber Intake

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### Key Points

- Positive role modeling with structured meals in the home, increased fruit and vegetable availability, decreased availability of snacks high in saturated fats, and supportive school policies may be necessary to address the child obesity epidemic.
- Mounting evidence suggests that targeting the social support system to encourage more healthful dietary practices is also critical for adults, especially among particular ethnic and economically disadvantaged subgroups.
- By providing adequate social support to sustain the desired behavioral changes and addressing broader community level influences to make healthy eating more practical, lifelong dietary changes will result in a decline in poor-diet-associated diseases, a lowered burden on the health-care system, and a significant reduction in health disparities.

**Keywords** Social support · Dietary fats · Dietary fiber

## 1 Introduction

Poor diet, along with physical inactivity, is a modifiable behavioral risk factor that has been identified as the leading cause of mortality in the United States [1] and the major contributor to the current “obesity epidemic” [2]. Moreover, the costs associated with being overweight or obese in the United States present an enormous burden to our society not just in medical expenditures, with one study estimating a staggering \$78.5 billion in 1998 or 9.1% of the total annual US medical expenditures of that year [3], but also as lost productivity in the workplace and restrictions to unquantifiable personal opportunities [4]. Diets low in fiber and high in saturated fats

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have been linked to a wide array of clinical diseases, ranging from diabetes [5–7] to different cancers [8–11] and diminished cardiovascular health [5]. While there has been some evidence that the rise in obesity may be in part attributable to genetic factors [12–14], many scientists have accumulated evidence that the bulk of the increase in obesity can be attributed to social and cultural changes concerning food consumption and health behavior choices [15–18]. In particular, social relationships across the lifespan have been found to have profound influences on the development of health-compromising and health-promoting behaviors [19].

This chapter reviews the literature on food intake as a product and part of the social context, the role of social support in promoting or deterring healthful dietary choices, and the growing availability of interventions targeting social influences on dietary behaviors.

## 2 The Social Context of Feeding Behavior

At a very basic primal level, eating fulfills the body's needs for replenishing its depleted energy reserves. It is at the *act* of eating that one's genes, past sociocultural influences and present environment converge to create the singular behavior of eating, unique to each individual. In this context, genes refer to one's genetic predispositions toward certain diseases, such as diabetes, and toward certain food preferences. For example, northern European populations are thought to better metabolize lactose due to high levels of lactase activity well into adulthood [20]. Past sociocultural influences include exposure to certain dietary customs related to one's ethnic background and upbringing, as well as specific familial preferences/choices.

It is important to bear in mind that the interaction between the individual and her environment at any given point in time is not static, nor is this a one-way relationship; the individual is being acted upon by the environment at the same time that the individual is acting upon the environment. Baranowski [21] proposed a theory of "family reciprocal determinism" to describe this concept, adapting it from psychologist Albert Bandura's theory of reciprocal determinism that states that "an individual's behavior both influences and is influenced by personal factors and the social environment" [22]. This is especially important when designing interventions seeking to promote healthier dietary behaviors, as both the subject and the environment need to be adequately addressed if the intervention is to be successful. For example, as the following section will illustrate, in trying to reduce childhood obesity it is necessary to address not just the child's food preferences but also the availability and accessibility of low-fat and high-fiber foods in the child's home and school environments [23–26].

## 3 Childhood Influences Affecting Eating Behavior

In tackling the "obesity epidemic," children have become a particular locus of intervention efforts in the hopes of preventing, rather than treating, the next wave of Americans with obesity-related health problems. Scientists have confirmed that American children are getting "heavier and fatter," with a disproportionate amount of the burden falling on Hispanic and African-American children [27] and in the youth of lower SES backgrounds [28].

A substantial portion of a child's daily energy consumption is done at home, accounting for the majority of one's daily caloric intake from childhood, through adolescence, and into young adulthood [29]. As children grow older they begin to make their own food choices outside the home setting, such as at school and at malls with peers, though most of their energy intake is still done within the confines of the home [29]. Even among more independent adolescents, food choices are associated with the food environment at home [30]. There is robust evidence to suggest that parents and caregivers can mold the child's dietary preferences based on mealtime interactions and the availability of specific foods at home [23–26] despite the growing influences of the media and “peer social norms” with increasing age [23, 30]. By increasing the availability and access to low-fat healthy foods, such as fruits and vegetables [23, 25, 30], parents can help establish healthful dietary habits.

Increasing fruit and vegetable consumption is of particular importance in children and adolescents as recent data support the notion that there is a decline in fruit and vegetable intake during the transition from early to middle adolescence (of 0.7 servings) and further reductions again from middle to late adolescence (of 0.6 servings) [31]. Solutions to tackling this problem may be fourfold: increasing the availability of fruits and vegetables in the home setting, reducing overall and saturated fat intake, changing the structure of how a meal is consumed at home with positive role modeling, and a policy shift at schools by the offering of healthier snack options.

### ***3.1 Increasing Availability of Fruits and Vegetables***

As mentioned, fruit and vegetable availability is one of the key predictors of actual fruit and vegetable intake in children and adolescents. Numerous studies have confirmed that when fruits and vegetables are accessible at home, their actual consumption by the pediatric population increases [23, 25, 30, 32]. While one study found that the only correlate for fruit and vegetable consumption in young adults and across gender was taste preference, adolescents tasting more fruits and vegetables would presumably be more likely to enjoy eating them [33]. Furthermore, despite high taste preference being such a strong indicator of consumption of these items, actual intake of fruits and vegetables is likely to increase, given a high availability, even in the presence of a low taste preference [34]. Fruit and vegetable availability in the home, in a study of middle and high school-aged adolescents, was found to be associated with social support for healthy eating, family meal patterns, family food security, and SES [34]. These social variables are critical to address in interventions aimed at increasing fruit and vegetable availability and higher fiber intakes.

### ***3.2 Dietary Fat Intake and Increasing Consumption of Meals at Fast Food Restaurants***

Besides the need for increasing fruit and vegetable intake in adolescents, reducing overall dietary fat, and more specifically saturated fats, is a significant public health concern. The decline in fruit and vegetable intake in adolescents is often accompanied by an increase in both overall

and saturated fat consumption, especially when increasing amounts of one's daily energy are consumed at fast food restaurants [35]. Skipping traditionally "at-home meals," like breakfast [36], and eating out at fast food restaurants become more frequent during the transition from late adolescence and into young adulthood [36, 37]. In turn, consumption of fast food restaurant items on a regular basis is associated with higher levels of overall energy intake [35, 37], total fat intake [35, 37], saturated fat intake [37], and increased weight gain [36].

Findings on percentage dietary fat intake as a proportion of total caloric intake in certain population subgroups are particularly alarming, with one study noting that over three quarters of urban African-American youths reported fat as accounting for 40–50% of their total caloric intake [38]. Similarly, in a study of Mexican children along the Mexican–American border, 85% of children reported consuming at least one portion of a high-fat snack daily [39]. Gehling and colleagues [40] in Australia have suggested that simple measures, such as the use of reduced fat milk, reducing number of snacks, the substitution of water for juices and soft drinks, withholding the addition of fat to vegetables, and encouraging consumption of leaner meats, may be effective in moderately reducing total energy and fat intakes [40]. Nutritional labels for food items at fast food restaurants have also been suggested as a benefit to more health-conscious adolescents, even though the data has failed to show a change in food ordering behavior in most adolescents in the presence of nutritional labels [41].

### ***3.3 Parental Influences, Positive Role Modeling, and Family Meals***

Aside from providing healthy foods in the home and reducing fat consumption, simply being a role model for healthy eating also predicts healthy eating among youth. Both children [42] and adolescents [43] have been shown to eat more fruits and vegetables when eating at the same time as their parents. Multiple studies have found evidence of parent–child dietary concordance [44, 45], with specific evidence from Stanton and colleagues [46] supporting greater concordance in the diets of mother–daughter dyads [46]. Adolescent perceptions of maternal eating behavior have been shown to be even more crucial than actual maternal eating habits in children's food choices and stress the need for mothers to share their attitudes about healthy foods with their children [47]. Other studies have found that children are more likely to try novel foods if they see an adult also trying the food [48]. Excessive parental *control* over feeding behavior, however, has been found to be correlated with disordered eating and even childhood obesity [49].

There has also been an added emphasis placed on the importance of family meals after three major studies concluded that children and adolescents eating their evening meals with parent(s) present were more likely to have higher consumption rates of fruits and vegetables, as well as more nutritious eating behavior in general, than those without [34, 42, 50]. In addition to the number of evening meals that were eaten with/in the presence of a parent, the nature of the meal (a positive atmosphere and the priority placed on a structured family meal with rules) was also influential [51]. Children who were allowed to snack while watching television daily were also more likely to have higher BMIs and eat fewer fruits and vegetables [52], reinforcing the need for structured family meals. Further supporting these assertions is the finding in young adults that taking one's time and eating the evening meal with others, family or otherwise, was correlated with increased fruit and vegetable intake, while "eating on the run" was associated

with an increased consumption of soft drinks and fast food and decreased intake of nutritious food items [53].

### **3.4 The Need for a Change in School Policies**

In conjunction with the changes necessary in the home environment for fostering healthier eating practices in youth, there also needs to be a concerted effort in promoting healthier snack options in the school environment. One study suggested that while parental support did yield a decrease in energy consumption from fat in girls, it did not affect energy consumption from fat in boys and neither did the study find a reduction in soft drink consumption in either gender by parental support alone [54]. By regulating what food items are available for consumption in the cafeteria and in the greater school environment and reducing less healthful options available through vending machines, primary prevention targets of improving dietary behavior in youths may be aided [55]. Additionally, perceived school social norms need to be brought in line with nutritious goals as real consumption of fruits and vegetables during school lunches was found to be correlated with pervading school social norms on eating fruits and vegetables [56].

## **4 Social Influences on Dietary Practices of Adults**

Many of the same factors associated with the dietary behaviors of children have also been documented with adults. As with children, among adults the influences of what and how the people around them are eating at multiple levels of context have a significant impact on fat and fiber intakes. For example, familiarity with the audience co-participating in the meal is predictive of one's own consumption behavior. In fact, unfamiliarity tends to reduce both men and women's consumptions, although only women have been shown to match food intake [57]. These findings may prove particularly useful in improving healthy food intake in the elderly who tend to suffer from lower absolute levels of nutrients despite no apparent reduction in the functionality of non-physiological factors in determining nutrient intake [58]. It may be possible to target overall consumption in this population in order to increase nutrient levels by controlling the familiarity of the environment, the number of people at the meals, the food tailored to individual taste preferences as well as other factors such as the duration, time, and setting of the meals [58].

The idea that social cues at mealtime can impact dietary intake furthers the notion that though it may be difficult/not possible to alter one's genetic propensities, it is certainly possible to manipulate surrounding social environments by making adjustments to key components of eating behavior associated with increased/decreased energy intake. For example, several studies have shown an increase in food consumption if the meals were longer in duration, in both males and females, suggesting that by decreasing overall meal durations we may be able to decrease total caloric intake. Pliner and colleagues [59] examined the effects of group size on consumption in which participants who were given 36 min to complete their meal were likely to eat more than participants given 12 min to complete meals [59]. However, Pliner's study failed to show an effect on energy intake of group size, though they did find that pairs eating together were closer

in energy intake matching than were groups of four people eating together. Another study found both meal duration and group size interacted to influence food intake [60]. Specifically group size modified (increasing) food intake only if the meal duration was longer but not when meal duration was shorter. Shorter meal durations may allow for greater concentration on the meal itself and more active self-monitoring of total energy intake in addition to increased attention to meal composition. Further research needs to explore the mechanism behind decreased energy intake when meals are constrained by time limits.

For instance, eating while simultaneously engaged in other activities, particularly activities that are cognitively engaging, has also been shown to mediate increased energy consumption. Hetherington and colleagues [61] proposed that distraction from eating due to other tasks impaired the ability to self-monitor one's intake and tested this hypothesis by comparing eating behavior in different settings (eating alone versus eating with others, friends, and strangers versus eating in front of a television set in a counterbalanced order) [61]. Eating with friends and eating while watching television were associated with increases in energy consumption by about 18 and 14%, respectively, as compared to eating alone. Consistent with previous findings [59, 60], the meal duration corresponded with the amount of food consumed and eating with strangers yielded lower levels of food intake than did eating with familiar faces [61]. It is possible that while distraction impairs the self-monitoring behavior of one's food intake and attention to food, eating in the presence of unfamiliar faces diminishes this distraction and facilitates focus back to the food. The social context, and by extension overall energy intake, should thus be viewed as a complex interaction of multiple different determinants rather than being dictated by singular, isolated, and circumscribed "causal factors."

## 5 Social Support Interventions

One public health strategy to reduce dietary fat intake is to increase dietary fiber intake, such as fruits and vegetables. Perceived social support has been implicated as an important contributor to the availability of fruits and vegetables and has also been linked to improved health practices in women [62]. While social support is now recognized as being crucial in one's sustained efforts in subscribing to a novel change in routine behavior, such as amount of fat and fiber intake in one's diet, an important distinction can be made between actual social support (structural support) and perceived social support (functional support). For example, interactive support (improving one's structural support) in the form of telephone calls with nutritional coaching and verbal support in addition to supplemental mailings and prepackaged meals (high in soluble fiber) has been shown to be effective and may prove a useful model for dietitians to follow [63]. However, Verheijden and colleagues [64] argue that while the bulk of interventions are focused on increasing structural support in weight management programs, there is a stronger association between functional support and positive health outcomes [64]. They suggest that even in the presence of actual social support, individuals may perceive a lack of a sufficiently motivating environment to sustain any meaningful change in behavior. Also, notably, Verheijden found social support to be unclearly defined in most studies they reviewed.

Perhaps due to this lack of clarity, the usefulness of social support itself has not always been unequivocal. A worksite environmental intervention succeeded in increasing perceived

social support from co-workers in regard to reducing dietary fat intake but failed to produce an actual reduction in fat intake or increase in fruit and vegetable consumption [65]. Likewise, pre-intervention habits, along with perceived social support, have been implicated as being significant predictors of one's intention to alter fat intake [66] and may prove a more important target in modifying behavior. Further complicating the picture is the finding that social support may vary between genders, with females reporting more encouragement and increased support in healthy dietary behaviors and physical activity from their friends than do males [67].

Studies with youth have also found subgroup differences in perceived social support and its association with dietary intake. In a study of rural adolescents, Stanton and colleagues [68] reported that even after controlling for demographics, the frequency of how often a family member or a friend performed a behavior or said something that was supportive of healthy eating significantly predicted the adolescent's fat and fiber intake. Interestingly, African-American students in this study reported higher support for healthy eating from friends than did Caucasian students. It may be that adolescents who are more likely to have higher caloric intakes (i.e., more likely to be overweight) also have friends who are overweight and thus there is more mutual attention to and support for dieting behaviors. Alternately, this finding may have resulted from differences in how food and eating behaviors are culturally instilled. Among adults, differences in eating patterns between African-Americans and Caucasians and the social context of where and with whom food is eaten have been found to be at least as important as attitudes about specific foods [69]. Among children, Corwin and colleagues [70] found that African-American children had more exposure to foods higher in fat and sugar than did Caucasian children in that sample and this exposure was positively associated with a social support scale reflecting encouragement from parents, teachers, and peers for eating fruits and vegetables. Although preliminary evidence from these studies suggests that social support from family and friends may have differential influences on subgroups of youth, evidence suggests that across the board, specific encouraging behaviors from family and friends, such as offering low-fat snacks and talking about healthful eating, can be helpful. Identifying and fostering these sources of positive support for healthy eating are critical to developing effective health promotion programs targeting high-risk adolescents.

Based on a review by Ammerman and colleagues [71], it was found that people most likely to benefit from a dietary change program were those people who were most "at risk" and were in need of the most help [71]. The review found that *most* types of interventions ("individual-directed, system/physician-directed, access-enhancing, policy-level/environmental, media campaigns, community-based/social network, and tailored/new technologies") were successful in decreasing total and saturated fat intake and increasing fruit and vegetable consumption to at least some degree, regardless of where the emphasis was placed [71]. They also found that interventions involving small group interactions, goal setting, and with an appropriate understanding of cultural sensitivities were likely to be helpful. Another study went further and concluded that motivated, "free-living individuals" were able to successfully maintain dietary modifications over a 4-year period when given sufficient support, necessary instructions, and adequate encouragement [72], although a follow-up 8-year study failed to find an "effect of low-fat, high-fiber, high-fruit, and vegetable diet on adenoma recurrence" [73].

Several tailored interventions have also looked to achieve dietary modifications in economically disadvantaged minority populations, such as some African-American, Hispanic, and other low-income communities, and have met with a fair degree of success. Tailored Internet-based interventions were used to encourage healthful eating in African-American girls between the ages of 8 and 10 and were found to not only be effective in increasing fruit, juice, and



vegetable intake, in addition to increasing physical activity, but also be feasible [74]. Similarly, Block and colleagues [76] utilized modern technologies by having participants from low-income backgrounds have at least one experience with the Little by Little CD-ROM [75] and observed a higher consumption of fruits and vegetables in this group than in controls [76]. These innovative strategies may be used as an adjunct to supportive interventions like the “High 5, Low Fat” programs (directed toward African-American parents through personal visits, newsletters, and group meetings) [77] and “The Rural Physician Cancer Project” (aimed at rural populations through “physician-endorsed self-help using low-literacy nutrition education materials and personalized dietary feedback”) [78] that have also proven useful in promoting dietary change.

These findings confirm the need for interventions attuned to high-risk populations and that also address differences in dietary behaviors and norms arising from geographic, educational, cultural, and socioeconomic backgrounds. For example, one study found that African-American women with strong ethnocultural associations tended to consume diets higher in fat content, despite intentions to avoid high-fat foods [79]. Public health efforts may need to effect structural changes in order to reduce health disparities in determinants like price (related to low-fat eating behavior) [80] and convenient access to healthy food options which are known to be inadequate in African-American communities (of all incomes) and in areas of widespread poverty [81]. Native Americans as a group have been identified as being at “highest risk” on a number of health indices (including but not limited to diet and obesity) [82] and may require approaches that are more culturally sensitive.

## 6 Conclusions and Clinical Implications

There are many different social contextual variables that dynamically interact and hold potential for several different algorithms of interventions that may impact more healthful dietary practices. Macro-level influences also need to be addressed in effecting dietary modifications since SES has been correlated with nutritional quality [83] and environmental interventions subsidizing fruits and vegetables [84] have yielded positive results. Likewise, it may be useful to make food items that are low in saturated fat more accessible by increasing easy availability, lowering their prices, and/or providing coupons for them while visibly marketing them [85].

The successes of such varied types of interventions may alternatively be interpreted optimistically as a sign that there may not be any one “designer intervention” amenable to recasting but that perhaps we may look toward many *more* sustainable “local” solutions that utilize native systems of knowledge and follow ecological models of greater self-empowerment. This can be achieved by paying more attention to the social contexts under which local dietary practices are taking place, providing adequate social support to sustain the desired behavioral changes, and addressing broader community level influences to make healthy eating not just desirable but also practical. Ultimately, lifelong dietary changes that incorporate more fruits and vegetables and reduce intake of unhealthy fats will result in an improved quality of life through a decline in poor-diet-associated diseases, a lowered burden on the health-care system, and a significant reduction in the health disparities presently experienced by disaffected communities.



**Acknowledgments** Preparation of this manuscript was supported in part by grant K07-CA95623 from the National Cancer Institute (C. Stanton, PI). We would like to acknowledge Brian Young's database and literature review support.

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Modern Dietary Fat Intakes in Disease Promotion

Meester, F.D.; Zibadi, S.; Watson, R.R. (Eds.)

2010, XXV, 475 p., Hardcover

ISBN: 978-1-60327-570-5

A product of Humana Press