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Barriers and Facilitators to Healthy Eating Among Low-income Latino Adolescents

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Abstract

Objective: The objective of this study was to explore barriers and facilitators to healthy eating among low-income Latino adolescents using an intervention development framework.

Methods: Semi-structured interviews (n=30) were conducted with Latino youth ages 13–17 who had overweight or obesity at a safety-net clinic in San Francisco, CA. Adolescent beliefs and attitudes regarding healthy eating and individual, family, and community level barriers and facilitators were elicited. Interviews were analyzed using an inductive approach and the Capability-Opportunity-Motivation (COM-B) model.

Results: Participants had *capability* gaps; while they demonstrated basic nutrition knowledge, they also held significant misconceptions about healthy eating, equating “organic” with healthy and failing to recognize sugar in a number of beverages and foods. Families were a source of support through role modeling and purchasing fresh produce, yet in many cases also undermined adolescents’ healthy eating goals through purchases of high calorie low nutrient food, an *opportunity* facilitator and challenge. By contrast, peers were mostly a negative influence due to frequent consumption of high calorie low nutrient food. The school environment posed *opportunity* challenges as participants found school lunch unpalatable and had ready access to

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Declaration of Interest:

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unhealthy options nearby. Participants were *motivated* to improve their eating habits but often not resilient in the face of obstacles.

Conclusions: Interventions to promote healthy eating among low-income Latino adolescents should address common nutritional misconceptions, target families as well as teens, consider peer influences, and advocate for policy approaches that improve the school food environment.

Keywords

adolescent; healthy eating; Latino; low-income; qualitative

Introduction

The most recent National Health and Nutrition Examination Survey demonstrated that the prevalence of obesity continues to rise among all pediatric age groups with the sharpest increase seen among adolescents (Skinner, Ravanbakht, Skelton, Perrin, & Armstrong, 2018). Latino children in the United States are nearly twice as likely to be obese compared to non-Hispanic white children (Skinner et al., 2018) and have a higher risk of obesity-related complications such as diabetes and fatty liver disease (Botero, Hoy, Jimenez, Koru-Sengul, & Messiah, 2018; Dabelea et al., 2014; Trico et al., 2018). Living in a low-income household is also associated with increased risk of childhood obesity (Ogden et al., 2018). Thus, it is critical to develop obesity prevention and treatment programs that are participant-centered and appeal to low-income, Latino adolescents. While obesity is a multifactorial condition, interventions that promote lifestyle changes including physical activity and healthy eating are promising, particularly when informed by change theory and a deep understanding of current practices, which are often complex (McCurley, Crawford, & Gallo, 2017; Soltero et al., 2018). In this article, we define healthy eating as an eating pattern consistent with the United States Department of Agriculture Dietary Guidelines for Americans which recommend consuming a variety of fruits, vegetables, whole grains, low-fat dairy, and different protein sources and oils while avoiding added sugar, salt, and saturated fat (US Department of Health and Human Services and US Department of Agriculture, 2015).

Understanding Latino adolescents' beliefs and attitudes regarding healthy eating and their perceived barriers to and facilitators of adopting healthy eating patterns is a critical precursor to effective interventions to prevent and treat obesity in this population. Previous work has revealed influential factors on adolescent eating behaviors including the home food environment (Ranjit, Evans, Springer, Hoelscher, & Kelder, 2015; Santiago-Torres et al., 2016), parental dietary patterns (Santiago-Torres et al., 2016), peers' eating behaviors (Chung, Ersig, & McCarthy, 2017), the school food environment (Mansfield & Savaiano, 2017), the neighborhood food environment (Forsyth, Wall, Larson, Story, & Neumark-Sztainer, 2012; Laska, Hearst, Forsyth, Pasch, & Lytle, 2010), and marketing (Cervi et al., 2017; Thai, Serrano, Yaroch, Nebeling, & Oh, 2017). For a subset of adolescents, emotional factors including stress and depressed mood can also impact eating behaviors (Chamberlin et al., 2018).

What is largely missing from the literature on eating behaviors, however, are the voices of Latino adolescents themselves (Kilanowski, 2016; Taylor et al., 2013). A limited amount of past qualitative research has examined contributors to obesity among Latino adolescents. Taylor et al. examined food choice and especially barriers and cognitions related to weight loss among obese Mexican-American adolescent girls and their families (Taylor et al., 2013). The exclusion of boys in this study is an important limitation as Latino boys have higher rates of severe obesity than Latina girls (Taylor et al., 2013). Another qualitative study conducted with 12- to 14-year-old rural Latino adolescents used a mixed-methods approach to understand decision-making about healthy eating (Kilanowski, 2016). Although including both boys and girls, this study focused solely on decision-making and did not provide a deep exploration of beliefs and contextual factors that contribute to eating behaviors. To our knowledge, no published studies provide an in-depth exploration of barriers and facilitators specific to *healthy eating* among urban, Latino adolescents in the United States. This is an important gap as food attitudes and eating behaviors are linked to culture and ethnicity and may differ among Latino adolescents relative to those from other ethnic groups (Arcan et al., 2014; Thai et al., 2017; Trofholz et al., 2018). To address these gaps in the current literature, we conducted a qualitative study with low-income adolescents with overweight or obesity living in San Francisco, California. In this study, we focused on low-income, Latino adolescents because of their heightened vulnerability to obesity and obesity co-morbidities.

To facilitate the translation of our results into intervention development and testing, we used the Capability, Motivation, Opportunity (COM-B) model for behavioral change to inform study design, analysis and the presentation of our results (Michie, van Stralen, & West, 2011). The COM-B model is informed by other health behavior theoretical frameworks that incorporate individual-, social-, and other environmental factors into understanding the target behavior, however, the COM-B model provides the additional advantage of explicitly linking behavioral factors to intervention functions, and has been widely used to inform intervention development and testing (Curtis, Lahiri, & Brown, 2015; Handley et al., 2016; Mangurian et al., 2017). In this model, “capability” refers to physical and psychological capability to perform a behavior, “opportunity” refers to physical and social environments that enable the behavior, and “motivation” refers to reflective and automatic mechanisms that activate or inhibit behavior. The specific objectives of our study were to understand factors that influence eating behaviors, specifically participants’ beliefs and attitudes about healthy eating as well as individual-, family-, and community-level barriers and facilitators to adopting and maintaining healthy eating habits using the COM-B model as a framework.

Methods

Recruitment and eligibility

All participants were recruited in the pediatric primary care clinic at Zuckerberg San Francisco General Hospital and Trauma Center, a safety-net clinic that exclusively serves low-income, publicly insured patients. Adolescents were eligible to participate in the study if they were between the ages of 13 and 17 and had a body mass index \geq 85th percentile for age and sex. Medical assistants and primary care providers informed potential participants

about the study during primary care appointments which were for well child visits, follow-up visits, same day sick visits, or visits for sensitive services (to obtain contraception or testing for sexually transmitted disease). While elevated BMI was an eligibility criteria and concerns about weight are often addressed in primary care visits, we did not systematically collect information on whether providers offered counseling on weight related topics on the day of the interview. If adolescents expressed interest, the clinic staff referred them to the study research assistant for confirmation of eligibility. To obtain assent, the research assistant described the study to potential participants and provided them with an information sheet. Potential participants were told that the objective of the study was to understand more about their day-to-day lives and what they think about healthy eating so that we can improve the support that we offer to adolescents for healthy eating. We continued recruiting new participants until thematic saturation was achieved (i.e. no new themes emerging in the interviews). Those who wished to participate gave verbal assent. Written consent was not obtained as the consent form would have been the only link between the participant and the study data; therefore verbal assent allowed for greater confidentiality. Parental consent was not obtained due to the low risk nature of the study and because adolescent patients who come to seek sensitive services often come without parents. The Committee for Human Research at the University of California San Francisco granted approval for the study. In total, we interviewed 33 adolescents. The original study sample consisted of adolescents presenting to the clinic who met the BMI criteria and race-ethnicity was not a criteria. However, due to the clinic demographics, 30 of the 33 participants self-identified as Latino. As eating behaviors are closely linked to culture and ethnicity, we restricted our analysis for this manuscript to the 30 Latino adolescents in the sample.

Study procedures

The semi-structured interviews were conducted in a private room adjacent to the clinic. The interviews ranged in duration from 25 to 88 minutes (mean of 45 minutes) and also included some questions on physical activity which are not included in this manuscript. A bilingual, bicultural research assistant conducted the interviews in the language of the participants' choice (English or Spanish). All interviews were audiotaped and transcribed. Participants received a gift card to compensate their time. The research team developed the interview guide based on a literature review of factors influencing eating behaviors in adolescents, consultation from adolescent primary care providers in the clinic and the COM-B model constructs. The questions were designed to explore participants' daily eating patterns on weekdays and weekends with attention to the types of food consumed, how and by whom food was purchased and prepared, and the social context of participants' meals and snacks (opportunity). In addition, the interviews explored adolescent beliefs about what constitutes healthy eating (capability), past and current efforts made to improve their eating habits (motivation), whether the adolescent received support in these efforts from family and peers (opportunity), and whether the adolescent perceived that stress and their mood influenced their eating habits (capability). The guide consisted of a series of open-ended questions as well as specific follow-up probes. The research assistant was trained to deviate from the interview guide when interesting or unexpected topics came up related to the study objectives.

The interview guide began with asking participants what “healthy eating” meant to them and what they thought it meant to members of their family. They were then asked to name specific foods and beverages that they considered to be healthy and specific foods that they considered to be unhealthy. Next, they were asked to describe a typical weekday in their lives as well as a typical weekend day with attention to what they ate, where, and with whom. The guide included specific follow-up probes to elucidate details of the specific foods consumed, who prepared the foods, and who accompanied the adolescent during meals and snacks. Subsequent questions asked participants about any efforts they had made to adopt healthy eating habits as well as any efforts their family members or friends had made. Follow-up probes asked about whether the adolescent had been successful in adopting and maintaining healthier eating habits, whether the adolescents had received support when attempting to adopt healthy eating habits, and what got in the way of healthy eating. Additional questions explored whether adolescents thought their mood and stress levels related to their eating habits and if so how. Further questions asked about who did the food shopping and cooking in their home, and what foods and beverages they and their family members purchased that participants considered healthy and unhealthy, and whether they thought that their family could afford healthy food. Participants were also asked what they would like to change about their eating habits and their families’ eating habits, why they would like to make those changes, and what might get in the way of such changes. The interview concluded with a demographic survey. To determine race-ethnicity, participants were asked to choose from the following categories to describe their racial-ethnic background: 1) Latino 2) African-American 3) Asian 4) White 5) Pacific Islander 6) Filipino 7) Mixed 8) Other. If participants specified mixed or other, the research assistant asked them to clarify further and noted their response. The interviews took place between November 2016 and May 2017.

Analysis

We used descriptive statistics to summarize the demographic data. We used a general inductive approach to analyze the interview transcripts. (Thomas, 2006) NVivo 11 software (QSR international version 11.4.1) was used to assist with coding. Two bilingual researchers (AB and EI) read each transcript in its original language to identify emergent themes relevant to study objectives and code the quotes that represented each theme. They met regularly to compare the themes and quotes that they had independently identified. As new themes emerged, the researchers returned to previous transcripts to re-read and recode them as appropriate. All differences were resolved through discussion and consensus. After the coding scheme was finalized, the authors examined the themes and representative quotes to see if there were any differences by gender. Then three of the authors (AB, EI, and AF) reviewed the themes and representative quotes and mapped each theme to relevant constructs within the COM-B model by considering how the theme related to capability, opportunity, or motivation for healthy eating both at the individual level and in the context of potential interventions. Quotes were translated from Spanish to English as needed.

Results

We interviewed 30 adolescents. Of the 30 interviews, 27 were in English, two were in Spanish, and one was conducted in a mix of Spanish and English. Table 1 presents participant demographics. Half of the participants were girls and the mean age was 15.3 years. Approximately 2/3 of participants were born in the United States, with the remainder born in Latin America; all but one had parents who were born in Mexico or Central America. We identified 16 themes in the following six categories: 1) *Beliefs about healthy eating* 2) *Emotional factors* 3) *Healthy eating efforts* 4) *Family influences* 5) *Peer influences* and 6) *School environmental influences*. Table 2 presents the themes in each category with representative quotes as well as the relevant COM-B model constructs to which each theme mapped. Themes are also presented in boldface in the narrative below.

Beliefs about healthy eating

Study participants held certain beliefs that aligned with common dietary recommendations. They universally described **fruits, vegetables and water** as healthy choices. Similarly, they all considered **high calorie low nutrient foods and beverages** to be unhealthy. The most common examples of foods and beverages that participants described as unhealthy were soda, chips, candy, cookies and fast food.

Adolescents also held some misconceptions about nutrition. Nearly half of the participants believed that **organic foods and beverages** as well as products sold in **stores perceived to be expensive** were healthy, regardless of the ingredients. Examples that participants gave of organic products that they considered healthy included organic sodas, organic popcorn, organic donuts and organic slushies. Trader Joe's (a mid-range price specialty grocery store), Whole Foods (a premium grocery store) and specific neighborhood establishments in gentrified neighborhoods in San Francisco were also named as sources of healthy food, even when the items that participants purchased were objectively unhealthy (i.e. high in added sugar, saturated fat, etc.).

There were also foods and beverages that participants considered healthy, despite their sugar content, revealing **low awareness of added sugars**. In particular, many participants considered homemade beverages (such as *agua fresca*, which is made by blending fruit, water and sugar) to be healthy despite being prepared with added sugar. Participants held nuanced views on 100% fruit juice. A number of adolescents considered 100% fruit juice to be healthy, particularly juice that was either homemade or sold under a premium brand such as *Naked* or *Odwalla*, while others recognized the high sugar content in 100% fruit juice and considered it unhealthy. Finally, several participants specifically mentioned that they considered yogurt, yogurt drinks and granola to be healthy, often mentioning specific products that are high in added sugar.

Emotional factors

When asked about how their mood and stress affected their eating habits, the majority of participants **dismissed emotional factors as irrelevant to their eating habits**. Some specifically noted that they were not “stress eaters,” while others stated that they simply ate

what was available in their environment and that emotional factors did not come into play. Others commented that they did not experience much stress and were generally happy. A subset of participants, however, noted that **stress and negative emotions led to unhealthy eating**, often because stress caused cravings for specific high-calorie foods such as sweetened cereal, *pan dulce* (a sweet bread), and fast food. A few participants also described happiness and enjoyment associated with eating preferred foods.

Healthy eating efforts

Nearly all participants described either past or current efforts to improve their eating habits as a means to lose weight, prevent disease, improve athletic performance or simply to be healthier. Common efforts that participants described included reducing soda, chips, and other junk food, eating smaller portions of starchy food (such as bread and tortillas), avoiding fast food, and bringing a homemade salad to school for lunch as an alternative to purchasing unhealthy foods. These efforts were most often self-initiated, although several participants noted that their primary care provider had encouraged the changes, and a few had seen a dietician.

Participant comments about changing eating habits were divided evenly between those who described ongoing **success with changing eating habits** and those who were **unable to sustain healthy changes**. Of those who were unable to sustain healthy changes, commonly identified barriers included getting bored with healthy food, being “lazy” (unable to maintain the extra effort needed to prepare healthy foods) and feeling tempted by unhealthy food family members and peers consume.

Family Influences

The role of families was complex. For the majority of participants, family members both served as a support for a subset of healthy eating practices while simultaneously facilitating other practices that are objectively unhealthy. For example, participants were able to identify strategies through which **parents supported healthy eating** including purchasing fresh produce, cooking dinner at home most nights and role modeling consumption of fruits and vegetables, at least on occasion. A few participants also noted that their parents provided verbal encouragement to consume fresh produce and avoid high calorie low nutrient foods and beverages.

Although most participants reported that their families purchased some fruits and vegetables, more than half described **calorie-dense typical family meals** with no mention of vegetables when talking about the main meal consumed in their household. These meals consisted of some combination of protein (such as beef, chicken, eggs or beans) and starches (such as tortillas, rice, potatoes or bread). Only 1/3 of participants described **family meals that regularly include vegetables**. When other participants mentioned vegetables, it was often in the context of a specific dish that their family only ate on occasion. This gave the impression that many families consume vegetables from time to time, but only a minority do so on a daily basis. Of note, most adolescents perceived that their families were able to afford healthy food, although a few thought that cost was a barrier.

The family environment posed other challenges to adolescents' healthy eating. Nearly all participants stated that **family members frequently purchased high calorie low nutrient foods and beverages** including soda, chips, candy and *pan dulce*. In many cases, the same adolescents who noted that their parents tended to purchase fresh produce also described frequent purchases of unhealthy food. A number of participants specifically commented on how challenging it was for them to avoid unhealthy foods because their family members consume them regularly. Some adolescents noted that they wished that their family members would stop purchasing unhealthy food, but that they did not feel empowered to ask them to change.

Peer influences

The majority of participants reported that **peers negatively influenced their eating habits** due to regular consumption of high calorie low nutrient foods. While the majority of participants described eating breakfast and dinner at home with family members, they typically consumed lunch and afternoon snacks with friends. A number of teens expressed that seeing peers consume unhealthy food led them to abandon healthy eating resolutions. A minority of participants noted that **peers positively influenced their eating habits** by eating healthy food and avoiding junk food. In a few of these cases, adolescents explained that they had friends who were engaged in competitive athletics and were actively choosing healthy food to enhance their performance.

School environmental influences

Nearly half of participants noted a **dislike for school lunch** that led them to avoid purchasing it. A few students specifically commented that school lunches are not prepared on site, affecting flavor and freshness. The dislike of school lunch led to many adolescents not eating it and instead purchasing snack foods such as chips or fast food at lunchtime. Many adolescents described **easy access to unhealthy food near school** including convenience stores and fast food restaurants. Several participants also noted that school policies allowed them to go off-campus to purchase lunch during the school day, which also facilitated the purchase of unhealthy food. A few participants noted, however, that they would purchase fruit and water in stores near their school instead of buying school lunch, suggesting that some had healthy options available to them.

Gender Differences

For nearly all of the themes and sub-themes, we found no differences in response by gender. One exception was *emotional factors*. More girls noted that stress and their mood affected their eating habits, while boys were more likely to state that they did not observe any relationship between their mood or stress levels and their eating patterns.

Discussion

In this qualitative study with low-income Latino adolescents with overweight or obesity, we identified a number of barriers to and facilitators of healthy eating that may inform interventions as well as future research. Adolescents in our study demonstrated a basic grasp of nutrition knowledge, recognizing that fruits, vegetables, and water were healthy while

high calorie low nutrient foods were unhealthy. However, participants also held some misconceptions about nutrition including equating “organic” and “expensive” with healthy and failing to recognize (or not being concerned about) sugar in a variety of beverages and foods including homemade and store bought beverages, yogurt, and cereals. We found that most adolescents had made efforts to change their eating habits with some reporting sustained success and others having encountered obstacles. For most participants these efforts were self-initiated, but for some they were encouraged by a health care provider. The majority did not perceive emotional factors as relevant to their eating habits, although a small subset did. Families were a source of support through role modeling of healthy eating as well as purchasing and preparing fresh produce. However, families simultaneously undermined adolescents’ attempts to maintain healthy habits through frequent purchases of high calorie low nutrient foods and beverages. It also appeared that vegetables were not a part of daily meals for the majority of participants. Peers were mostly a negative influence due to frequent consumption of high calorie low nutrient food. The school environment also posed challenges as most participants found school lunch options to be unpalatable and had ready access to unhealthy options.

Some of our findings are consistent with other qualitative studies conducted with Latino participants. For example, prior studies with Latino parents reveal a preference for beverages labeled as “all natural” (Beck, Takayama, Halpern-Felsher, Badiner, & Barker, 2014) as well as food that are natural and freshly prepared (Gallagher, 2010). Beliefs about the importance of “natural” foods among Latino parents may translate to a preference for “organic” foods among Latino adolescents. Prior studies with Latino parents and youth focusing on beverage-related beliefs have also found that participants consider homemade beverages healthy despite added sugar (Beck et al., 2014; Bogart et al., 2013) and that Latino parents view certain foods such as gelatin and yogurt to be healthy despite their sugar content (Martinez, Rhee, Blanco, & Boutelle, 2014). Our finding that participants described regularly sitting down to home-cooked meals with their parents is consistent with other qualitative studies with Latino families that found the preparation of fresh home-cooked meals to be a cultural priority (Gallagher, 2010; Martinez et al., 2014). In their study with Mexican-American adolescent girls with obesity, Taylor et al. also described calorie dense family meals as well as regular consumption of sweetened beverages (Taylor et al., 2013b) Similar to our findings, Kilanowski’s study with Latino adolescent children of farmworkers found that friends were an important negative influence on dietary habits (Kilanowski, 2016).

Several of our findings are consistent with prior research conducted with different adolescent populations. In a recently published qualitative study of beliefs regarding healthy eating among an ethnically and socioeconomically diverse population of adolescents in California, participants had consistent beliefs that fruits and vegetables were healthy and that fast food and soda were not (Fielding-Singh, 2019). In addition, adolescents in this study specifically mentioned the health value of organic food and considered more expensive food to be healthier (Fielding-Singh, 2019). Ethnically diverse urban adolescents in Southern California who participated in focus groups on healthy food availability also universally mentioned fruits and vegetables when asked to describe a healthy meal (Payan, Sloane, Illum, Farris, & Lewis, 2017). In contrast to our results, several participants in this study

described school cafeteria food as healthy and appealing, specifically mentioning salad bars and pre-packaged salads as preferred options (Payan et al., 2017). Adolescents in this study were all recruited from three high schools; therefore, the contrasting findings may be due to specific cafeteria offerings at the recruitment sites (Payan et al., 2017). However, similar to our findings, others in the same study noted lack of freshness as a deterrent to purchasing cafeteria food and wished that the food could be prepared on site rather than reheated (Payan et al., 2017).

Similar to our results, a qualitative study conducted with low-income African-American adolescents also found that parental support for healthy eating often came in the form of purchasing fresh produce, but that adolescents desired more support and role modeling from parents and peers to avoid unhealthy food. In addition, several studies with adolescents from a variety of cultural backgrounds have found that peer role modeling and the easy availability of unhealthy food near schools are key factors that diverse adolescents perceive to influence their eating behaviors (Correa et al., 2017; Payan et al., 2017; Watts, Lovato, Barr, Hanning, & Masse, 2015).

Considering how our results map to the COM-B model of health behavior may facilitate their application to intervention planning. With respect to *capability*, we found that participants did possess basic knowledge of nutritional concepts including a recognition of the importance of fruits and vegetables and the negative effects of high calorie low nutrient foods. However, they also held a number of misconceptions. Targeted education that supports and refines their existing knowledge while also addressing the misconceptions that we identified is likely an important component of healthy eating interventions for the subset of Latino adolescents with overweight and obesity. Specifically, they may benefit from education on organic labeling, recognizing marketing that gives the impression that expensive products are healthy, and identifying added sugar in seemingly healthy foods.

Regarding psychological capability, the majority of adolescents did not perceive that emotions and stress affected their eating habits. While it is certainly possible that emotions play a bigger role than participants perceived, our results suggest that healthy eating interventions that focus heavily on stress reduction may only appeal to a subset of overweight and obese Latino adolescents. For some youth, it may be more important to put more emphasis on positive emotions, by teaching participants and their families to prepare enjoyable yet healthy meals.

Regarding *opportunity*, we found that our participants inhabited physical and social environments that undermined healthy eating efforts, and indeed our results would readily map onto models such as the Social Ecological model that emphasize a need for multi-layered interventions that target individuals, families and communities (Golden & Earp, 2012). While many families did purchase and prepare fresh produce on occasion, typical meals for many families were calorie dense even though they were homemade. While most participants in this study did not think that cost was a barrier to healthy eating for their families, adolescents may not be the most reliable reporters of concerns about the impact of cost, and budgetary constraints may contribute to lower produce consumption. Thus, healthy eating interventions for Latino adolescents should support home cooking while including

cost-conscious suggestions for how to increase vegetable intake in the context of traditional meals. Another critical component of healthy eating interventions for this population would be to communicate to parents and other family members that the most important way that they can support their adolescent is to avoid bringing high calorie low nutrient foods into the home. Parents and other family members should also be included in goal setting and ongoing behavior monitoring to ensure that adolescents receive adequate support for healthy changes, rather than placing the burden of avoiding unhealthy items solely on the adolescent. Furthermore, given the importance of peer influences on adolescents' opportunities for healthy eating, interventions that allow adolescents to invite peers to participate should be considered. In addition, interventions should help adolescents to develop strategies for making healthy choices in different settings including those that they frequent with peers. Finally, policies that shape the broader eating environment such as improving the palatability of school lunch offerings coupled with school policies that keep students on campus during the day are likely to improve eating patterns among low-income Latino adolescents.

With respect to *motivation*, we found that participants were motivated to engage in healthy eating, with the majority reporting previous and/or ongoing efforts to improve their eating habits, suggesting an openness to healthy eating interventions. For some participants, motivation appeared high in the initial stages only to wane later when encountering obstacles. This finding underscores the importance of teaching youth to set attainable, incremental goals, and helping them to adapt to inevitable setbacks through ongoing support.

Our study has a number of important limitations. First, nearly all of our participants were children of immigrants from Mexico and Central America and were all low-income. Thus, our results may not be generalizable to Latino adolescents whose parents migrated from other parts of Latin America or to Latino adolescents from middle- and upper-income families. In addition, we recruited participants in a primary care clinic and a number of participants noted that their primary care provider had encouraged them to make changes in their diet or had referred them to see a nutritionist. Thus, it is possible that our results would have been different in a population not receiving regular pediatric care including counseling on healthy eating. In addition, all of the participants in this study had a BMI greater than or equal the 85th percentile. We specifically recruited participants with elevated BMI as the goal of this study was to inform future treatment interventions. However, it is important to note that our findings cannot be generalized to Latino adolescents with a normal BMI. Finally, while we did achieve thematic saturation, our sample size was small and our findings may not represent the views of all urban Latino adolescents with Mexican and Central American heritage.

Despite these limitations, our study addressed a need to understand intrapersonal and environmental factors that support as well as deter healthy eating among low-income, Latino adolescents. By seeking the perspectives of adolescents themselves, this study provides important insights for primary care and public health practitioners to consider. The youth in our study confronted barriers to healthy eating including: misconceptions about organic foods and foods and beverages with added sugar, challenges with sticking to healthy eating goals, frequent purchases of high calorie low nutrient food by family members, negative influences from peers, and easy access to unhealthy food during the school day. However,

many also reported important facilitators to healthy eating including: basic nutrition knowledge, intrinsic motivation to change eating habits, and support from family members for preparation of homemade meals and consumption of produce. Future research and intervention design should extend this work by testing specific strategies that capitalize on the unique perspectives and circumstances of these adolescents.

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Table 1:

Demographic data describing a sample of low-income Latino adolescents in San Francisco, CA who participated in a qualitative study on barriers and facilitators of healthy eating. n=30

Variable	N (%)
Girls	15 (50)
Participant age	15.3 (1.3) *
Participant country of birth	
United States	23 (77%)
Mexico	4 (13%)
Guatemala	1 (3%)
El Salvador	1 (3%)
Nicaragua	1 (3%)
Maternal country of birth	
United States	1 (3%)
Mexico	15 (50%)
Guatemala	5 (17%)
Honduras	5 (17%)
El Salvador	3 (10%)
Nicaragua	1 (3%)

* Mean (SD)

Table 2:

Thematic categories with themes, representative quotes and relevant COM-B model constructs from a qualitative study on barriers and facilitators to healthy eating among low-income Latino adolescents in San Francisco, CA

Category	Theme	Quotes	Related COM-B Construct
Beliefs about healthy eating	<i>Fruits, vegetables, and water are healthy</i>	"[To me] healthy eating is like eating right, eating vegetables and fruits so you're healthier, so you can feel better...water, vegetables, fruits and salads."	Capability
		"Healthy eating helps you. I mean, be healthy eating fruits and vegetables, drinking water."	Capability
	<i>High calorie low nutrient foods are unhealthy</i>	"Chips, soda, candy [are unhealthy]. Anything that has sugar on it is bad for you."	Capability
		"Fast food, junk food, sodas [are unhealthy] ...chips, candy, fast food would be like from McDonald's or Burger King."	Capability
Emotional Factors	<i>Organic/expensive foods are healthy</i>	"[What's healthy in the vending machine] is these crackers and Pop-Tarts. Not Pop-Tarts, but they're like popcorn – they're organic...It's all organics. Everything in the vending machines is organic. Even the sodas are organic."	Capability
		"Yeah, I grew up with not a lot of junk food around the house... ice cream, but it's Whole Foods so it's healthy."	Capability
	<i>Low awareness of added sugar</i>	"They like the Mexican [yogurt]. I think it's the <i>El Mexicano</i> brand... Those are the ones they buy and also Yoplait. Those are the healthy things."	Capability
		"I think water is the healthiest [drink] you can think of. Homemade fruit water with not a lot of sugar, just a little bit of sugar."	Capability
Healthy Eating Efforts	<i>Emotional factors dismissed as irrelevant (majority)</i>	"I don't think my mood has anything to do with [what I eat]."	Capability
		"When I feel like sad or angry or something...actually [my eating] doesn't really change... because I usually eat the same. If I'm sad or angry I just eat whatever is in the fridge or at the corner store."	Capability
	<i>Negative emotions lead to unhealthy eating (minority)</i>	"[When I'm stressed] I'll eat peanut butter and jelly or just sometimes we'll have sweet bread at home, and I'll eat that."	Capability
		"If I'm sad, I'll probably eat junk food because I just want to eat junk, and feel better."	Motivation
<i>Unable to sustain healthy changes</i>	<i>Success with changing eating habits</i>	"Yeah, I've been eating healthier. I feel like I have ...my mom says that tortillas have a lot of flour, or something. I don't know... Lately, I haven't – I don't eat tortillas, I don't eat bread –like, sweet bread." "I changed – recently, I just changed soda to sparkling water because all it is is just carbonated water...I try to minimize the chips. I used to eat a lot of chips."	Motivation
	<i>Unable to sustain healthy changes</i>	"I'll try to start to eat healthy and start eating like vegetables, and no more junk food for like a week – And then after a week I'll get lazy and then start eating like snacks or junk food." "I had a whole year with no soda, no chips, no sweets, and I went really good, and I felt body change. And then this year kinda just like, oh, okay, just a little juice and chips. And it's kinda going bad ... I guess because my friends eat a lot of chips, so it's just like, "Oh, can I get a little?"	Motivation

Category	Theme	Quotes	Related COM-B Construct
Beliefs about healthy eating			
	Family influences	<p>Parental support for healthy eating</p> <p>"My mom supported me. She told me like, 'Oh, you need to eat healthy because I don't want nothing to happen to you.' And I was like, 'Yeah, I'm going to start eating healthy.'"</p> <p>"There's times when my mom sometimes switches up, and she gives us salads, fruit salads for our food."</p>	Opportunity
Peer influences	Typical family meals are calorie dense (majority)	<p>"[I eat] whatever my mom made. It differs from day – so, like one day she makes like flautas, and then, another day she makes chilaquiles, and stuff."</p> <p>"I eat what they give me at home which is rice and chicken, but just one plate, and like two tortillas."</p>	Opportunity
	Family meals regularly include vegetables (minority)	<p>"[For dinner] we eat rice – some rice and then meat or chicken with vegetables."</p> <p>"My mom is very... she's health conscious because she does do a lot of vegetables. Whenever she does something, there has to be vegetables."</p>	Opportunity
	Family members frequently purchase high calorie low nutrient foods	<p>"I guess when it's the soda and the sweet bread, it's mostly my dad. So, for him, it's almost every day. And then, the candy is more my sisters, and I'd say every other day... It's hard because you're trying to change, but then you see all this stuff and you want it because it's good."</p> <p>"When my family brings junk food home, I want to eat it, but at the same time I don't because I want to be healthier. [They buy] candy, chips, soda, juices."</p>	Opportunity
		Negative peer influences (majority)	<p>"I don't think my friends are healthy. I don't see them eat outside of – like at their home, but at school they eat a lot of junk food, like soda, chips, candy, and Lunchables, and all of that unhealthy stuff. They don't eat a lot of fruits."</p> <p>"My friends are all unhealthy... [They eat] chips, soda. Just greasy food. Fast food. Food from restaurants and all that."</p>
School environment influences	Positive peer influences (minority)	<p>"I want to lose weight, and this one day, I came to the Boys and Girls Club with like little sweet things, like that's not healthy. [My friend] took it out of my hand and threw it in the garbage. Yeah. It's helping me a lot."</p> <p>"[One of my friends] tries to watch how many calories each thing has that he eats because he tries to stay below his calorie count because he's a soccer player. He wants to stay in shape."</p>	Opportunity
	Dislike of school lunch	<p>"I don't like [school lunch]. They give me cheese pizza, cheeseburgers, meatballs and pasta. And, I don't know, it looks disgusting."</p> <p>"The lunches at school are sort of nasty... Hamburgers are very nasty because they get wet and it's basically eating wet bread."</p>	Opportunity
	Easy access to unhealthy food near school	<p>"They let us go off campus and we can eat whatever you want to bring... [I get] Chinese food, tacos or a pizza."</p> <p>"Well, there used to be always snacks after school. And, there still kind of is, like usually chips and soda... I just buy them right there at the corner store."</p>	Opportunity