Social and Cultural Context: Healthy Eating and Physical Activity

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Introduction

In any place and time, cultural practices reflect the complex interplay between broad social phenomena and values, norms, and customs. When one of us (Baumann) first visited Vietnam in 1989, available foods were primarily local due to poor transportation systems and primarily seasonal because of limited food storage options. Traditional tea breaks included fresh green tea and seasonal fruits. At that time, most Vietnamese walked or used bicycles, and the bicycle was a national symbol of Vietnam. By 2003, the tea break at a diabetes training session for nurses consisted of prepackaged tea with sugar, prepackaged coffee with sugar and whitener, and little sweet pastries made in a local factory. The hosts were quite proud of the convenience and expanded consumer choices these foods represented. Bicycles are now scarce in the large cities and are overpowered by motorcycles and automobiles on congested roads that threaten pedestrian safety.

Worldwide, sweeping social and economic changes associated with globalization have precipitated changes in cultural norms related to dietary practices and physical activity behaviors. Across nations, food and physical activity environments are becoming more homogeneous, characterized by widespread access to calorie-rich but nutrient-poor foods, built environments that pose barriers to active modes of transportation, and occupational trends toward sedentary work (World Health Organization, 2003). Within nations and communities, these broad social and economic trends interact with local culture to create unique and dynamic contexts for health behaviors.

Culture shapes illness (Kleinman, Eisenberg, & Good, 1978); it also shapes health and health behaviors. The concept of "healthy lifestyle behaviors," widely embraced by public health practitioners and researchers, is a social construct that may have limited meaning within some cultures. In many low- and middle-income settings, "healthy" is not the absence of disease but the ability to work. Or it may be the ability to reproduce and to live long enough to raise one's children. In many cultures, eating practices are foremost important for promoting acceptance, kinship, socialization, and solidarity, rather than for promoting health or preventing disease (Purnell & Paulanka, 2008). The notion of physical activity as a purposive, regular health practice is prominent in Western, high-income countries, but not elsewhere. To design effective interventions that address the underlying behavioral determinants of health, it is essential to understand the cultural context of health behaviors.

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Numerous definitions of culture exist, but they all imply a dynamic process (Andrews & Boyle, 2008). Moreover, there is agreement that defining culture too narrowly or too broadly makes it lose much of its significance. Giger and Davidhizar (2008) provide a useful definition, identifying culture as a meta-communication system based on values, beliefs, attitudes, customs, language, and behaviors that are shared by a group of people and passed down to generations through formal communication and imitation. Health beliefs and practices arise from collective cultural values that interact with an individual's unique experiences, beliefs, and values that have been learned and adapted to a particular context. Although health beliefs and practices of subgroups within a culture may be somewhat distinct, overarching cultural characteristics such as language, traditions, and sociopolitical experiences provide a shared and common experience.

Two predominant models used to explain beliefs and health-related behaviors within diverse cultural contexts are the self-regulation model (Leventhal, Meyer, & Nerenz, 1980) and the explanatory model (Kleinman, Eisenberg, & Good, 1978). Both of these models identify strategies for assessing beliefs about health and how beliefs influence behaviors. In self-regulation, beliefs about health concerns or conditions are assessed within the following dimensions: identity (symptoms, labels), cause, timeline, consequences/seriousness, control and/or cure, and coherence (overall understanding).

The explanatory model uses situated discourse to elicit illness stories about how people interpret the somatic, psychological, and social experience of an illness, as told within a "culture system." Explanatory models reflect social class, cultural beliefs, religious beliefs, and past experience. Lay explanatory models begin with an awareness of body sensations and feelings and are elicited by a series of questions (Harwood, 1981):

1. What do you think caused your problem?
2. Why do you think it started when it did?

3. What does your sickness do to you? How does it work?
4. How severe is your sickness? Will it have a long or short duration?
5. What kind of treatment do you think you should receive?
6. What are the most important results you hope to receive from this treatment?
7. What are the chief problems your sickness has caused you?
8. What do you fear most about your sickness?

Examination of explanatory models held by distinct social groups within a community can be revealing. In a classic study by Blumhagen (1980), explanatory models of hypertension were elicited from both lay people (mostly white, middle-aged men) and health experts. The lay group believed that the cause of hypertension was chronic stress, anxiety, and worry, while the experts acknowledged that the cause of hypertension is largely unknown, e.g., essential hypertension, but that the condition is probably exacerbated by chronic stress. Baumann and Leventhal (1985) conducted a worksite study in which healthy adults participated in twice-daily blood pressure monitoring and symptom reports for 2 weeks. Most participants held beliefs that blood pressure changes were associated with symptoms such as anxiety and stress, despite information they received that high blood pressure was not a condition with symptoms and evidence presented to them at the end of the trial that blood pressure fluctuations were not associated with these symptoms.

Theories of illness causation vary across cultures (Baumann, 2003). Folk systems classify disease as natural or unnatural, with natural illness the result of environmental exposure and unnatural conditions resulting from divine punishment. Latino cultures share common "labels" for certain illnesses, such as "mal ojo" or evil eye, reflecting a shared belief in magical causation and the impact of social disharmony on the physical health of an individual (Winkelman, 2009). Further, many disparate cultures, including Latinos and Asians,

believe in the hot/cold theory of disease that explains cause of illness as well as appropriate treatments aimed at creating a balance of forces (Spector, 2009). In contrast, the focus of Western medicine is diagnosis by finding the causative organism, cure, and prevention. However, within the biomedical system, little is known about physiological variability across populations, including such characteristics as nutritional needs, physiological responses, and digestive capabilities (Giger & Davidhizar, 2008).

Most belief systems across cultures address the principles of harmony, balance, and moderation. Health as a balance between the individual and the environment is a bidirectional relationship. Practices such as healthy eating and being physically active are believed to have a positive effect on the individual, who in turn has a positive effect on the environment (Spector, 2009). A widespread cultural belief of health as achieving a balance in life allows one to engage in multiple belief systems, e.g., folk and Western medicine, most of the time, without negative consequence (Giger & Davidhizar, 2008).

Some aspects of culture are not specifically related to health behaviors but nonetheless influence them. Temporal orientation can influence how people regard health behaviors. Although many people in the USA tend to be oriented toward the future, many cultural groups are oriented to the present. Preventive behaviors to affect a long-term outcome may be incompatible with a present-time orientation (Purnell & Paulanka, 2008). Fatalism is the belief that powers greater than oneself control individual destiny. In cultures where fatalism is prominent, people may feel no sense of personal control over their health status and thus no imperative to engage in recommended health behaviors. In sociocentric cultures, as compared with individualistic cultures, people are not conceived as autonomous selves but rather as part of a family or community unit (Landrine & Klonoff, 2001). Obligations to the family supersede individual needs; thus, self-care practices such as personal health behaviors may not be a cultural norm.

As the intersections between diverse world cultures increase, recognition of cultural influences on health behavior becomes more critical to our understanding of processes that guide health behavior. By failing to adequately acknowledge culture, healthcare practitioners as well as researchers decontextualize social problems and objectify them as individual problems. Researchers often do not assess the culture of participants beyond their affiliation to a specific community or race/ethnicity, making it difficult to determine the impact of culture on behaviors (MacLachlan, 2006). However, this approach may be reasonable when the social, economic, and political contexts of communities may overshadow cultural differences. For example, in the USA, the condition of poverty may be a more powerful determinant of eating behaviors than race/ethnicity and cultural traditions.

The following overview focuses on two health behaviors: healthy eating and physical activity. As major underlying determinants of noncommunicable diseases (NCDs), these behaviors represent key targets for improving global health (Fineberg, 2011, February). The overview is grounded in an ecological framework (see Fig. 13.1) that proposes that social and physical environments as well as individual factors influence health behaviors (Baker, Brennan, et al., 2000; Booth, Sallis, et al., 2001). There is substantial overlap between research that addresses environmental influences on healthy eating and physical activity and research that specifically addresses environmental influences on obesity. In general, we focus on research that has addressed behaviors rather than the distal outcome of obesity and refer the reader elsewhere (Hu, 2008) for a thorough discussion of obesity determinants. A subsequent search at the time this volume was readied for publication (January, 2015) indicated no substantial changes from the conclusions here. We conclude with a discussion of issues related to research designs for studying the sociocultural context for physical activity and healthy eating as well as recommendations for further research.
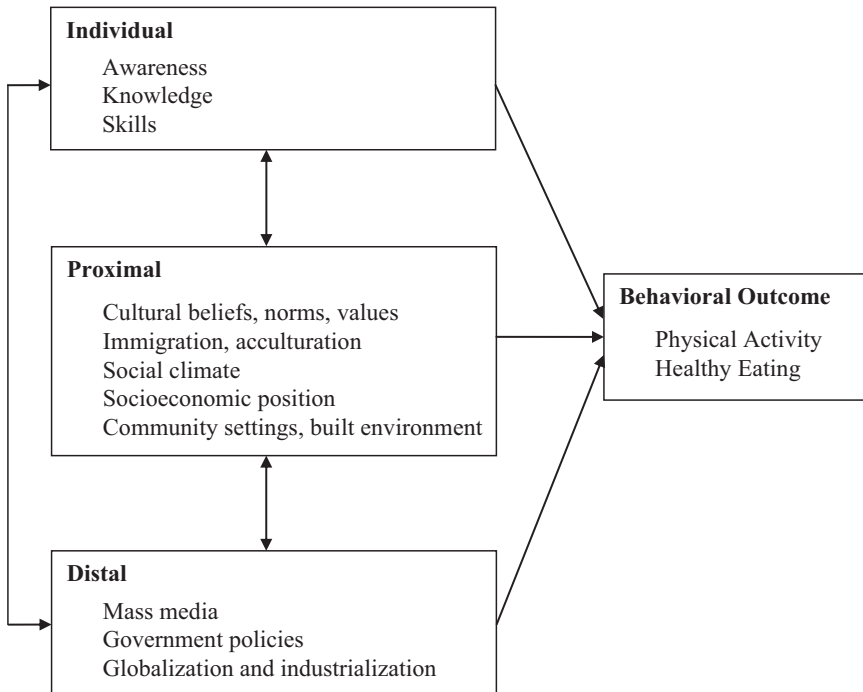
Fig. 13.1 Ecological framework of influences on physical activity and healthy eating (Adapted from Baker, Brennan, et al., 2000; Booth, Sallis, et al., 2001)

The Context for Healthy Eating and Physical Activity

Almost 20 years ago, Geoffrey Rose succinctly described the power of the social environment in shaping personal behaviors, stating:

> Personal life-style is socially conditioned . . . Individuals are unlikely to eat very differently from the rest of their families and social circle. . . It makes little sense to expect individuals to behavior differently than their peers; it is more appropriate to seek a general change in behavioural norms and in the circumstances which facilitate their adoption. (Rose, 1992, p. 135)

Rose's comments highlights proximal factors such as social and cultural norms as well as distal "circumstances" in the social environment that can support, or hinder, health-supporting behaviors. Increasingly, research on diet and physical activity behaviors is grounded in ecological frameworks that depict individuals and their behaviors at the center of a nested or interlocking structure of proximal and distal influences

(Booth, Sallis, et al., 2001; Sallis, Owen, & Fisher, 2006; Story, Kaphingst, et al., 2008). Proximal influences on healthy eating and physical activity include cultural beliefs, norms, and values, immigration and acculturation, social support, socioeconomic position, and community settings and the built environment. Distal influences on healthy eating and physical activity include mass media and marketing, government policies, and globalization and industrialization. We present key concepts and evidence from studies conducted in developed and developing countries, drawing on both descriptive and intervention research.

Proximal Influences

Cultural Beliefs, Norms, and Values

In the course of clinical practice, one of us (Baumann) provided diabetes education to an African-American male and suggested that he

substitute baked, skinless chicken for fried chicken. He shared that he had never in his life eaten chicken that had not been fried and that his family would not tolerate eating "diabetic food." This example suggests how eating practices are shaped by cultural preferences and perceptions that operate at multiple levels (Larson & Story, 2009). In a study on diabetes self-care behaviors of Ugandan adults (Baumann, Opio, et al., 2010), participants indicated that the word "food" refers to any carbohydrate in a carbohydrate-rich diet. These "foods" include matooke (steamed plantains), posho (cornmeal mush), millet, rice, Irish potatoes, sweet potato, and cassava. Participants expressed beliefs that green vegetables are for animals and that fruit is for children or when someone is sick. Meat and fish are not considered "food" and are eaten in small amounts and not with most meals.

Dietary practices may be influenced by cultural attitudes toward optimal body weight. Some cultures, particularly subsistence-oriented societies that experience food scarcity and poverty, view overweight as the norm or as desirable because it conveys good health (Adams, Quinn, & Prince, 2005; Marlowe & Wetsman, 2001). In sub-Saharan Africa, large body size signifies wealth and power. The consumption of luxury foods that promote weight gain, such as meat, butter, and fried foods, is a means of attaining respect and status in the community. Thinness is associated with malnourishment, disease, and poverty, and foods that are affordable to poor people, such as vegetables and legumes, have a pejorative connotation of survival food (Renzaho, 2004). Research with Latinas indicates that they prefer plumpness in children, and these preferences may affect their child feeding practices (Contento, Basch, & Zybert, 2003). In a focus group study of women from diverse cultures, African-American and American Indian women contrasted the accepting attitude in their cultures toward heavier female bodies with attitudes in white culture that establish thinness as the standard for women (Eyler, Matson-Koffman, et al., 2002). However, the women also attributed the larger body size of African-American and American Indian women to traditional diets containing high-fat foods.

In many African cultures, men prefer women with large body size (Swami, 2006). A tribe in eastern Uganda fattens a bride for a month before the wedding by force-feeding milk, often resulting a weight gain of 30 to 40 pounds. Recent research suggests that traditional non-Western attitudes favoring heavier figures, especially for women, may be changing. A study of Ghanaian women found that women were willing to change their weight if they knew of negative health consequences associated with being overweight or if requested by their spouse (Duda, Jumah, et al., 2006). Furthermore, for women willing to change their weight to comply with a spouse's request, 92% indicated they would choose to reduce their body size, suggesting a perception that husbands prefer a smaller body size. A study that examined cross-cultural differences in attitudes toward female body weight (Swami, Frederick, et al., 2010) included 7434 adults from 26 countries. Participants completed a visual rating scale for different sizes of females and items that assessed exposure to Western media. The authors concluded that cross-cultural differences in preferred female body weight were small compared to differences by rural/urban location, with heavier female figures preferred by people in rural settings. Lifetime exposure to Western media was a significant predictor of preferences for a lower female body weight, and the authors concluded that the ideal of thinness for women is becoming international due to global exposure to Western media messages (Swami, Frederick, et al., 2010).

Cultural norms and beliefs can pose a barrier to physical activity. Walking is the default form of transportation for poor people; consequently, walking may be viewed as undesirable because it denotes poverty or idleness (Kiawi, Edwards, et al., 2006). Women face unique barriers to physical activity related to cultural beliefs and norms. Normal responses to physical activity, such as sweating or fatigue, may be perceived as unhealthy (Caperchione, Kolt, & Mummery, 2009) or unwomanly by some cultures. Gender norms and gender inequity have a substantial

impact on women's ability to be physically active, limiting options because of concerns about appropriateness of dress, safety of certain locations, and practical challenges, such as concerns about childcare. A practical issue that is very salient for African-American women is hair care. For African-American women, concerns about the effects of physical activity on their hair can pose a major barrier to exercise, because well-groomed hair represents a substantial investment of time and money (Brown, 2009; Railey, 2000). For some women, physical activity is not a cultural norm. Latina and African-American women report that being physically active is not a norm for girls in their cultures, making it difficult to establish a habit of physical activity in adulthood (Evenson, Sarmiento, et al., 2003; Sanderson, Littleton, & Pulley, 2002).

Overeating and physical inactivity have not historically been public health issues in subsistence societies, so that many individuals may not have well-developed personal representations or understandings of what constitutes healthy eating and physical activity. Even in cultures with traditional diets that are healthier than the Western diet, such as Vietnam, rates of overweight and obesity are increasing. The traditional Vietnamese diet consists of fresh vegetables and fruits, and steaming and boiling are common cooking methods. However, people are highly dependent on refined rice as a dietary staple. Rice is a food with a high glycemic index and contributes to an increased risk of diabetes (Baumann, Blobner, et al., 2006). The carbohydrate-rich diet, coupled with less physical activity as the society transitions from an agricultural economy to one based on industry and manufacturing, creates a potential for energy surplus. Vietnam is also an example of how even traditional foods, such as *pho* (beef or chicken soup), have been supersized and contain more kilocalories per serving than 10 years ago (Ho Chi Minh City Nutrition Centre, 2002). In Uganda, the carbohydrate-rich diet reflects local food availability and limited economic resources. Reliance on carbohydrates, as well as dietary customs such as only tea for breakfast and dinner at 10 p.m., presents a challenge to healthy eating.

Social Climate

The social climate for healthy eating and physical activity is constituted by specific interpersonal relationships that confer support as well as a more generalized sense of community (McMillan & Chavis, 1986). Within families, peer networks, and other social groups, supportive relationships help to establish positive behavioral norms and link individuals to resources that can support healthy behaviors (Heaney & Israel, 2002; McNeill, Kreuter, & Subramanian, 2006). Social support entails behaviors that convey caring, give affirmation, provide role modeling, or offer resources. Numerous primary studies have identified social support as a positive correlate of adult physical activity (Anderson, Wojcik, et al., 2006; Emmons, Barbeau, et al., 2007; Wendel-Vos, Droomers, et al., 2007). Stahl et al. (2001) examined the relationship between self-reported physical activity and perceived environmental support for exercise in a study of health promotion policies in six European countries with established market economies. Major variables corresponded to concepts in social cognitive theory (Bandura, 1986) and included direct and indirect social support, community opportunities for physical activity, and health policies. Social support emerged as the strongest environmental correlate of physical activity; participants who reported low levels of social support were twice as likely to be sedentary as those with high social support.

Several recent reviews have examined the relationship of social support to physical activity in youth and adults. Ferreira and others conducted a systematic review of environmental influences on youth physical activity, drawing on 66 observational studies conducted in established market economies, primarily in North America (Ferreira, van der Horst, et al., 2006). They reported mixed findings for the influence of social support on physical activity. Support and encouragement from parents, friends, and significant others were not related to youth physical activity. However, modeling of physical activity by fathers appeared to be an important influence on children. In most studies in which mother's and father's level of physical activity were mea-

sured separately, levels of youth and father physical activity were positively associated.

In its systematic review of interventions to increase physical activity, the Task Force on Community Preventive Services reviewed nine studies on social support interventions in diverse adult populations (Kahn, Ramsey, et al., 2002). Most of the studies were conducted in the USA and used experimental designs. Typical intervention components included motivational and problem-solving telephone support from research staff or participants, discussion groups, and group walking or exercise opportunities. Strong evidence was provided that social support interventions in community settings are effective at increasing adult physical activity.

Social support is also associated with healthy dietary habits. In a comprehensive review of environmental influences on food choices, Larson and Story (2009) summarized findings from research examining the relationship of family environments and social networks to dietary practices. Family and group norms and attitudes influence food choices; in particular, youth and adults are more likely to eat fruits and vegetables when their peers eat them (Larson & Story, 2009). Similarly, results from a narrative summary of six systematic reviews on the determinants of healthy eating and physical activity indicated that social support and modeling were important influences on healthy eating behaviors, particularly in youth (Brug, 2008).

Most research on the social climate for health behaviors has focused on social support. Sense of community is a broader concept that encompasses belonging, trust, feeling important, and emotional connection to others in the community (McMillan & Chavis, 1986). A sense of community may influence healthy eating and physical activity behaviors and may be particularly important for health promotion with people in sociocentric cultures (Bathum & Baumann, 2007), where collectivism rather than individualism is a principal value. Hystad and Carpiano (2010) examined the relationship of belonging to community and adoption of health behaviors using data from 119,693 participants in the Canadian Community Health Survey. They identified a dose-response relationship between sense of belonging and more exercise, change toward a healthier diet, or weight loss during the previous year. These authors suggested that initiatives to enhance community belonging could be an important component of population-wide health promotion initiatives. In our research with low-income, rural adults, the community social climate emerged as an important influence on physical activity and eating behaviors (Kaiser & Baumann, 2010). Participants described how mistrust of neighbors or feeling like an outsider disinclined them to engage in physical activity. However, they also described how sharing cooked meals or home-grown produce and participating in potlucks supported healthy eating and connected them to other people in the community. When we conducted community forums to share results from this research, people attending the forums, particularly Latinas, requested regular events that would bring community members together to discuss issues related to healthy lifestyles and to support and learn from one another. One Latina talked about how grateful she was to be in a setting where she could share with others; she offered the poignant comment "We didn't think anyone cared what we think."

Immigration and Acculturation

Immigration promotes both cultural change and cultural homogeneity—societies incorporate and adapt new practices, while immigrants, to various degrees, acculturate to the practices of their new country of residence (Larson & Story, 2009). Acculturation is influenced by numerous contextual factors, making generalizability of results from diverse immigrant populations difficult (Ayala, Baquero, & Klinger, 2008). Some immigrants arrive in their new country in good health due to past employment in physically demanding occupations, reliance on active transportation, and use of low-fat, high-fiber foods in their country of origin. Others may be in poor health due to malnourishment and inactive lifestyles (Caperchione, Kolt, & Mummery, 2009). The independent effects of acculturation on health

behaviors are unclear since effects of acculturation are often confounded with the effects of socioeconomic position (Satia-Abouta, 2003).

The availability, expense, and convenience of foods in the new country of residence influence dietary acculturation, a process by which immigrants adopt and adapt the dietary practices of the host country (Satia-Abouta, 2003; Satia, 2010). The process involves adding new foods to the diet, excluding some traditional foods, or finding new ways to use traditional foods. Although dietary acculturation may improve the nutritional profile of diets, acculturation to societies that are more urbanized than the country of origin typically results in diets that increase the risk for NCDs (Satia, 2010). Among Latino immigrants to the USA, greater acculturation is associated with lower consumption of fruits and vegetables, legumes, and rice and higher intake of fast foods (Ayala, Baquero, & Klinger, 2008).

New immigrants face social barriers to physical activity. Immigrant neighborhoods are often located in high-crime urban areas. Poor language skills create social isolation, discrimination or fear of discrimination, loss of social capital, lack of access to resources, and unfamiliarity with their new neighborhoods (Caperchione, Kolt, & Mummery, 2009; Satia-Abouta, 2003). When we offered a weekly physical activity and nutrition program in a low-income neighborhood in the USA, we publicized the program in Spanish and English. Many of the Latino participants told us that if our advertising had been only in English, they would have understood the information, but they would not have felt welcome to participate in the program.

Socioeconomic Position

Socioeconomic position is a powerful determinant of health and health behaviors, structuring opportunities as well as exposure to risk factors (Marmot, 2002). For 8 years, we have led a weekly exercise, health education, and social support program in a low-income neighborhood and have heard participants describe the challenges they and their family members face in developing healthier behaviors. A program participant who had been homeless described living in her car with her four children and subsisting exclusively on fast food meals for a week. In her words, "It was the most food we could get for the money we had." A Latino adult, who accompanied program sessions with his overweight adolescent son, described how he and his wife both worked two jobs. Their schedules limited their ability to model and participate in physical activity with their son. With his parents frequently out of the home, the boy spent most of his time watching television. These scenarios highlight some of the complex interactions between proximal factors such as socioeconomic position, food resources in the local environment, and social support for health behaviors.

Socioeconomic position influences the amount of money people can spend on food and physical activity resources, the amount of time people can invest in food preparation and exercise, and the neighborhood in which people can afford to reside (Caprio, Daniels, et al., 2008). Indicators of socioeconomic position include income, educational level, occupation, and poverty status, and these indicators may be measured at the individual or geographic level (Bennett, Wolin, & Duncan, 2008). Lower household income is consistently associated with lower prevalence of moderate or vigorous physical activity (National Center for Health Statistics, 2007) and less healthy diets (Drewnowski, 2004). Authors of a systematic review on environmental determinants of fruit and vegetable consumption, drawing on results from 24 studies conducted in the USA, the UK, Australia, and Europe, concluded that both household and community income are positively related to fruit and vegetable intake (Kamphuis, Giskes, et al., 2006). Limited financial resources may preclude adherence to a diet emphasizing whole grains, fruits and vegetables, lean meats, and fish (Darmon & Drewnowski, 2008), and the lowest-cost diets are those prominently featuring foods such as refined grains, added sugars, and added fats (Drewnowski, 2009). Lower socioeconomic position may limit access to healthcare providers and services that support healthy behaviors.

Community Settings and the Built Environment

Key settings in communities that influence healthy eating and physical activity include parks and recreational facilities, workplaces, schools, and places of worship (Booth, Sallis, et al., 2001). Religious institutions can play an important role in supporting the health of communities, particularly in disadvantaged communities (Peterson, Sorensen, et al., 2002). *Project Joy* investigated the effects of a 1-year church-based program on cardiovascular risk profiles of African-American women age 40 and older (Yanek, Becker, et al., 2001). Sixteen African-American churches in Baltimore were randomized to a standard behavioral intervention, an intervention incorporating spiritual strategies, and a control intervention consisting of standard self-help strategies. Over the course of the project, women in the standard behavioral arm instituted their own spiritual strategies. Compared to the self-help group, the combined intervention groups showed statistically significant improvement in daily energy intake, body weight, waist circumference, systolic blood pressure, and fat and sodium intake. There is consistent evidence from studies conducted in the USA that interventions in African-American churches are effective in improving dietary habits and increasing physical activity. However, there are very few studies that examine interventions in other types of religious institutions or other countries (World Health Organization, 2009).

A systematic review of worksite health promotion programs examined results from 13 randomized controlled trials. The authors found strong evidence for the effectiveness of worksite programs in increasing fruit and vegetable intake and decreasing fat intake. However, the distinct effects of workplace environmental interventions such as food labeling and increasing availability of healthy foods could not be distinguished from the educational elements of the intervention, such as counseling and group education (Engbers, van Poppel, et al., 2005). This review found inconclusive evidence for the effect of workplace interventions on physical activity.

Growing evidence addresses features of the built environment that influence healthy eating and physical activity that include access to sources of fruits and vegetables (Zenk, Lachance, et al., 2009) and amenities such as sidewalks, paths, parks, and trails (Frumkin, Frank, & Jackson, 2004). Neighborhoods characterized by high residential density, mixed land use typified by a combination of housing units and retail sites, and short blocks are consistently associated with walking and cycling (Cervero & Duncan, 2003; Saelens, Sallis, et al., 2003; Saelens, Sallis, & Frank, 2003). Results from a meta-analysis of 16 studies on perceived environmental correlates of physical activity indicated that the perceived environment has a modest but significant association with physical activity. Environmental features significantly associated with physical activity included the presence of sidewalks, low levels of vehicle traffic, physical activity facilities, and retail shops and services. However, the authors note that in all of the included studies, the possibility of participant self-selection into "more supportive" environments cannot be ruled out (Duncan, Spence, & Mummery, 2005). A "review of reviews" examined 13 review papers on the relationship of physical activity and the built environment. Characteristics of the built environment that had consistent associations with physical activity included access to physical activity facilities, access to destinations, residential density, "walkability," perceived safety, access to exercise equipment, and footpaths. Several features of the built environment had inconsistent associations with physical activity, including aesthetic features of the environment, topographic features such as hills, and perceived crime (Bauman & Bull, 2007).

To summarize this section, we have presented proximal influences on healthy eating and physical activity. Although the ecological approach emphasizes the need to consider variables that reflect multiple contextual levels, these levels are

highly interconnected. An ecological system is dynamic and synergistic and a means of explaining complex, nonlinear processes (Stillman, Hartman, et al., 1999). For example, evidence shows that collaborative goal setting facilitates positive behavior change. However, to support patient-provider goal setting requires a healthcare provider who is skilled in supporting behavioral change efforts and a healthcare system that provides continuity of care (Glasgow & Emmons, 2007). Cultural traditions interact with local environment to influence behaviors. In Vietnam, a sociocentric culture, it is common for groups of men and women to exercise in parks and open spaces early in the morning before the pedestrian, motorbike, and automobile traffic dominate the space. Exercise is a cultural tradition taught in schools. Modern forms of morning exercise, such as aerobic exercise classes incorporating music, are increasingly popular. By contrast, in Uganda there is not a tradition of exercise, and it is rare to see men or women jogging or exercising outdoors; a solo runner is typically a *muzungu* (white person or foreigner). Modes of transportation such as walking, taking a minibus, or riding on a motorbike reflect one's socioeconomic position more than one's commitment to physical activity.

The dynamic nature of globalization fuels more intermingling of cultures worldwide. Cultural beliefs, norms, and values will continue to evolve as people encounter new barriers and facilitators to healthy lifestyle behaviors. Evidence shows that changes in nutrition and physical activity patterns are occurring rapidly and will especially impact economic development in poorer countries (Popkin & Gordon-Larsen, 2004). Finally, the built environment and community institutions such as churches, schools, and workplaces, as well as features of healthcare systems, represent important individual and family resources for supporting positive behavior change. Many of these features of the built environment are determined in large part by local, regional, and global policies and trends. Strategies to improve health need to take into account the diversity of determinants and contexts as well as the dynamic nature of the systems within which behaviors occur.

Distal Influences

Globalization, Urbanization, and Industrialization

Globalization, urbanization, and industrialization are global phenomena with similar and overlapping effects. Urbanization increases exposure to mass media, adoption of work technologies that require low levels of physical activity, and access to an increased variety of foods (Mendez & Popkin, 2004). Many developing countries are undergoing chaotic urbanization. Air pollution, traffic congestion, and urban design favoring motorized transport have created environments that discourage active forms of transportation.

Globalization is the process by which distinctive social and cultural characteristics of diverse geographic areas recede over time (Caprio, Daniels, et al., 2008). The forces of globalization are pervasive and include the reduction of trade barriers, broad penetration of international corporations into national economies, access to Western media, and uptake of advanced technologies in manufacturing and agriculture (Popkin, 2004). These forces have far-reaching influence on human behavior. Globalization exerts direct effects on behavioral choices via marketing of energy-dense foods and indirect effects due to transitions to occupational structures that require less physical activity (Beaglehole & Yach, 2003; Mendez & Popkin, 2004).

There are benefits to globalization. Globalization can improve dietary sufficiency in areas with food scarcity and increases access to healthy food (Mendez & Popkin, 2004). However, one of the most recognizable consequences of globalization is its impact on the availability of energy-dense foods worldwide, including "fast foods." Globalization has created a worldwide culture of international food such a McDonalds and KFC. Hawkes (2006) presented a case study of increasing snack consumption in Thailand. She described how global free trade agreements have interacted in Thailand with national policies that are favorable to foreign investment to create a booming market in sweet and savory snacks; between 1999 and 2004, the value of snack sales

increased 75% (Hawkes, 2006). In settings such as Uganda, intensive marketing of sugar drinks makes them the most available beverages, even more available than safe water. As we have worked in Uganda in recent years, we have been struck by the strong preference Ugandans have developed for high-calorie soft drinks, favoring the full-calorie version over low-calorie versions. In fact, a non-calorie cola beverage produced by an industry giant has been withdrawn from the country due to poor sales.

Mass Media and Marketing

Several years ago, we conducted key informant interviews with health and social service professionals as part of a project to assess influences on physical activity and healthy eating in a low-income, rural population. One of the informants was a public health nurse who described how the parents she worked with struggled with their children's constant requests for heavily marketed high-fat or high-sugar products. From her perspective, an essential parental skill was establishing a plan for responding to children's requests for junk foods or "how to say no to McDonald's."

The influence of mass media, and particularly its influence on children's food preferences, has drawn increasing attention from researchers and policy makers. Mass media can influence physical activity and diet behaviors through multiple mechanisms. Watching television or using the Internet may supplant recreational physical activities, and television watching is associated with increased consumption of food (Strasburger, Jordan, & Donnerstein, 2010). Perhaps the most powerful and pervasive effect of mass media is its effect on food preferences and purchases. In a synthesis of research on food marketing to children and youth, The Institute of Medicine (2006) found strong evidence that television advertising influences the preferences, purchase requests, and short-term food consumption of children ages 2–11 years but insufficient evidence to support similar effects on youth 12–18 years. While much of the attention on food marketing has focused on its effect on children, adults' con-

sumption of energy-dense foods may also be influenced by advertising (Thomson, Spence, et al., 2008). In a cross-sectional study of 1495 Australian adults, more time watching television was significantly associated with consumption of fast food for dinner and snacks (Scully, Dixon, & Wakefield, 2008).

Most television advertising that targets children and youth promotes high-calorie, low-nutrient products (Harris et al., 2009). Because interventions to decrease television viewing are impractical at a population level, regulation of television marketing to children represents the most promising strategy for decreasing the influence of advertising (Swinburn & Shelly, 2008). Results from an experiment with children and youth attending a summer camp demonstrated that children will eat low-sugar ready-to-eat cereals and those children who eat low-sugar cereals tend to eat less cereal and more fruit than children who eat high-sugar cereals (Harris et al., 2011). These results have implications not only for parents but also for policy makers. For example, a requirement that manufacturers of ready-to-eat cereals devote a proportion of their cereal advertising to low-sugar cereals may be a promising policy intervention to decrease sugar consumption in children and youth.

Policy

Policy operates at a broad societal level to structure physical activity and diet behaviors. Because policy-making, particularly at the national and international levels, is distant from the daily lives of most people, its effects are not generally obvious to individuals. Policies related to road construction, public transportation, and pedestrian and bicycle access ultimately affect personal choices about using active modes of transportation. Decisions to walk or bicycle are affected by urban design and land-use policies (Heath, Brownson, et al., 2006). At a community level, effective interventions to increase walking and bicycling include zoning regulations that provide convenient access to retail and investments that improve the quality and connectivity of sidewalks.

At a street-scale level, active forms of transportation are supported by improved street lighting, traffic calming measures, and landscaping that enhances the aesthetic quality (Heath, Brownson, et al., 2006). In Bogotá, the urban environment has been transformed through policies that discourage private vehicle use, improve public transportation, promote nonmotorized transportation, and convert parking areas to attractive public spaces (Wright & Montezuma, 2004). A weekly car-free day, *Ciclovía*, was established through a city referendum, and women who participate in the event are more likely to engage in leisure-time physical activity than those who do not (Gomez, Mateus, & Cabrera, 2004).

Public policies broadly determine the type and costs of foods available to individuals. A large and complex array of agricultural, industrial, and economic policies have created the contemporary food environment in the USA and other nations. The agriculture sector represents a substantial part of the US economy; government policies support this sector through subsidies, farm credits, commodity programs, trade policies, marketing assistance programs, and sponsorship of agricultural research (Tillotson, 2004). During an era when nutrient deficiencies were common, policies to increase the food supply played an important role in improving public health. However, at the present time, these same agricultural policies support the proliferation of processed foods and conflict with national nutritional policies that guide Americans to eat more fruits and vegetables, less processed food, and a smaller volume of food (US Department of Agriculture, 2010). Tillotson (2004) questions whether targeted policy initiatives such as taxes on high-fat or high-sugar products or limits on food advertising can affect American eating habits in the absence of changes to broad agricultural policies. Similar questions can be raised for other high- and middle-income nations where national policies encourage a surplus food supply.

Until recently, distal influences on health behavior such as policies, mass media and marketing, and globalization have not been a routine area of investigation for behavioral scientists. However, it is these distal influences that have radically and pervasively changed the environment in which individuals worldwide make choices regarding food and physical activity. The development of ecological models of healthy eating and active living has helped to broaden the scope of behavioral research to the larger social and political arena and has set the stage for an era when interdisciplinary collaboration is not a rarity but an absolute requirement for conducting relevant and contextualized behavioral research.

Synthesis of Research Issues

The number of studies on environmental influences on healthy eating and physical activity has increased enormously in recent years, making it a challenge to synthesize and make sense of the evidence. Numerous narrative and systematic reviews in this area have been conducted, such that "reviews of reviews" are appearing (Bauman & Bull, 2007), and more work is needed to combine and reconcile the disparate findings in these many reviews. Systematic reviews are highly selective, and studies with sufficient rigor for inclusion in systematic reviews are most often conducted in high-income countries. Contextual evidence, such as local evaluations of community-based health promotion programs, is barred from most evidence hierarchies yet constitutes the bulk of evidence for health promotion in the developing world (McQueen, 2001). Few systematic reviews have rigorously integrated results from qualitative and quantitative studies. However, this type of methodological strategy may provide a sounder evidence summary and a more appropriate base for policy decisions related to healthy eating and physical activity than overreliance on one type of study.

There is a great need for more "contextualized" research that examines unique processes, environments, and behavioral outcomes in a wide variety of settings; there is a corresponding need for greater diversity in the design of research in this area. Randomized controlled trials in community settings are expensive, difficult to implement, and probably inadequate for measuring population-level change (Victora, Habicht, &

Bryce, 2004). "Rather than efficacy in the purposefully limited context of experimental design, more timely questions surround reach, success in engaging high priority population, or robustness and replicability of impacts" (Fisher, 2008, p. 16). The great majority of studies on the environmental context for healthy eating and physical activity are correlational in design and examine a very limited range of environmental influences; few apply multilevel modeling techniques. Most studies using an ecological framework do not address the nested nature of behavioral influences (Glasgow & Emmons, 2007). However, studies examining multiple factors at multiple levels of influence present substantial challenges to researchers, such as developing measures at multiple levels, building interdisciplinary research teams, applying advanced statistical analyses, and engaging in the political processes that lead to policy and environmental change (Sallis, Owen, & Fisher, 2008). More research on sustainability and cost-effectiveness in diverse settings is also needed (World Health Organization, 2009). Researchers should consider developing studies related to the process, output, and outcome indicators developed by the World Health Organization (2008) to monitor and evaluate environmental and policy changes related to healthy eating and physical activity. Rigorous evaluation of community-based healthy lifestyle programs is especially needed in developing countries. Finally, working closely with diverse community partners is an absolute prerequisite to designing studies that are culturally appropriate and suit the local context (Baumann, 2011; World Health Organization, 2009).

Conclusion

Decades of research on individual-level approaches to promoting healthy eating and physical activity have had no demonstrable effect on improving population levels of these behaviors. The burgeoning rates of NCDs that threaten global public health are concurrent with dramatic changes in the environmental context for healthy eating and physical activity. To counter the broad forces that predispose individuals around the world to sedentary behaviors and unhealthy diets, the World Health Organization (2004) has recommended the development of environments that enable populations and individuals to achieve energy balance, shift to unsaturated fats, increase fruits and vegetables, limit free sugars and salts, and engage in developmentally appropriate amounts of moderate and vigorous physical activity. Prevention-focused, population-based policies and programs for physical activity and dietary behaviors will be needed to achieve improved and have the best potential to substantially reduce the predicted growth of the global burden of noncommunicable disease. This climate of change provides an opportunity for behavioral scientists to make a recognizable impact on public health. As environments change and new policies are enacted, opportunities abound for natural experiments, quasi-experiments, comparative case studies, and longitudinal research. The pandemic nature of NCDs demands strategic behavioral research that is timely, moving quickly from design to dissemination of results, and targeted, reaching the opinion leaders and policy makers who lead change efforts (Brownell, 2010, August). Timely and targeted research that takes place in community settings that reach large numbers of participants will provide the best evidence for practices, programs, and policies that create a more supportive context for healthy eating and physical activity for people worldwide.

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