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The social environment and childhood obesity: Implications for research and practice in the United States and countries in Latin America

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Summary

The environments of children influence their risk for childhood obesity through, among other factors, a child's weight-related behaviors (i.e., diet and physical activity). In this article, we present evidence on social environmental factors associated with a child's diet and physical activity, and more generally, the prevention and control of childhood obesity among Hispanic/Latinx children in the United States and children from countries in Latin America. Using a socio-ecologic lens, we present evidence from cross-sectional and longitudinal studies conducted in the United States involving Hispanic/Latinx children, and evidence from studies involving children in Latin America. Studies examining parenting factors in the home environment (e.g., parenting strategies) are especially emphasized, with more limited evidence on social environmental factors in other lived contexts (e.g., school). The influence of acculturation on social relationships cuts across levels of the socio-ecological framework. Intervention research identified strategies and research gaps for intervening on social factors to promote healthy behaviors and reduce risk for childhood obesity. Community health workers and others forms of peer support were identified as relevant approaches at multiple levels of the socio-ecological framework. This article concludes with directions for future research to further understand the environment using newer information and communication technologies.

KEYWORDS
acculturation, social capital, social influence, social support

1 | INTRODUCTION

Children's social environments are one of the most proximal influences on their weight status and weight-related behaviors (e.g., eating and physical activity).[1,2] A child's social environment is made up of family members, peers, teachers, and so on (i.e., network members), individuals who exert direct and indirect influences on the child.[3] Parents are among the most important sources of social influence on child weight status and weight-related behaviors given their relational ties and shared home environment.[4] For example, parents can monitor their child's consumption to support the adoption of healthier food choices such as greater consumption of fruits and vegetables,[1,5,6] with parental role modeling of fruit and vegetable consumption among the strongest predictors of child consumption of fruits and vegetables.[5] Modeling not only communicates norms and expectations to follow but also builds skills to engage in healthy behaviors and helps ensure that the environment is supportive of healthy choices.[7] Social environmental influences also can increase a child's risk for obesity.[8] For example, a well-intentioned parent can restrict certain foods (e.g., sugar-sweetened beverages) from their children as a way of limiting access, but these restrictions may have unintended consequences such as the child seeking out more of these foods in other contexts. Or a parent can tell their children it is important to be physically active, but then only model sedentary behavior.[9] In addition, although most research focuses on the influence of parents and family members, social environmental influences are found in many contexts of a child's life, including early care education/school,[10] healthcare,[11,12] and neighborhoods and other community settings.[13]

Examining the social environments of children in Latin America and those of Latin American origin living in the United States (US Hispanic/Latinx populations) is justified further by extant evidence for the theoretical assertions that US Hispanic/Latinx are more collectivistic,[14] family oriented,[15] and hold certain values that influence social interactions (especially around food[16]), compared with non-Latinx Whites who share similar demographic characteristics. In addition, a recent global systematic review of the social networks of vulnerable children found that ethnic minority groups had strong social networks unlike other vulnerable groups.[3] Thus, capitalizing on these networks is important, but also important is recognizing that social influences can exert both positive and negative effects simultaneously. For example, previous research among Mexican-origin families in the United States indicated that network members are an important source of motivation for engaging in physical activity.[17] However, they may also promote consumption of unhealthy foods and beverages.[18] Gatherings where food is served are an important aspect of an immigrant's life as they help to maintain cultural connections to one's country of origin.[19] However, research also shows that culturally derived practices can change the longer immigrants live in the United States, a process referred to as acculturation.[20] As such, studying and intervening on the social environment requires acknowledging these nuances and considering both diet and physical activity together.

This paper considers a child's social environment and the extent to which it has been targeted in previous interventions to prevent and control childhood obesity. Social environmental factors are often defined broadly.[21] In their review of social environmental influences on health equity issues related to childhood obesity, Vargas et al.[21] considered the following in their definition: "financial capacity/poverty, living conditions, transport access, remoteness, social support, social cohesion, working practices, eating habits, time, and social norms" (p. S33). Similar definitions have been provided by others.[8] We acknowledge the importance of social determinants of health such as socio-economic position and macrolevel social determinants such as structural racism; however, they are beyond the scope of this paper. The aims of this paper are to (1) describe components of the social environment important for childhood obesity prevention and control among Hispanic/Latinx children and families in the United States and Latin America; (2) delineate how the social environment has been targeted for change to prevent and control childhood obesity; and (3) discuss some promising future directions for cross-border research. We also recognize the importance of the process of migration as an important social environmental factor affecting childhood obesity; however, this topic is addressed in another paper from this special issue (see Vilar-Compte).

1.1 | Conceptualizing the social environment and its impact on childhood obesity

The socio-ecological framework[22] delineates levels of influence that intersect to shape a person's weight status and weight-related behaviors, including (a) individual, (b) interpersonal, (c) organizational, (d) community, and (e) policy levels of influence (see Figure 1). This paper considers social environmental influences across four levels of the socio-ecological framework: (a) norms, attitudes and behaviors of children and their parents at the individual level; (b) parenting strategies, the family and home environments, and sibling behaviors at the interpersonal level; (c) norms and behaviors of individuals within childcare, educational, and healthcare settings at the organizational level; and (d) norms communicated within communities.

1.1.1 | Social environmental influences and the individual: gender norms and stereotypes

In terms of individual level factors, according to gender schema theory, individuals are socialized from a young age to adopt specific sex-typed characteristics.[23] Through social learning, what society considers male and female becomes embedded into one's self-concept, creating a cyclical relationship whereby behavior and self-concept reinforce each other, leading to the establishment of gender norms.[24] Gender norms are defined as the socially constructed and accepted roles and stereotypes ascribed to gender.[25] Gender stereotypes refer

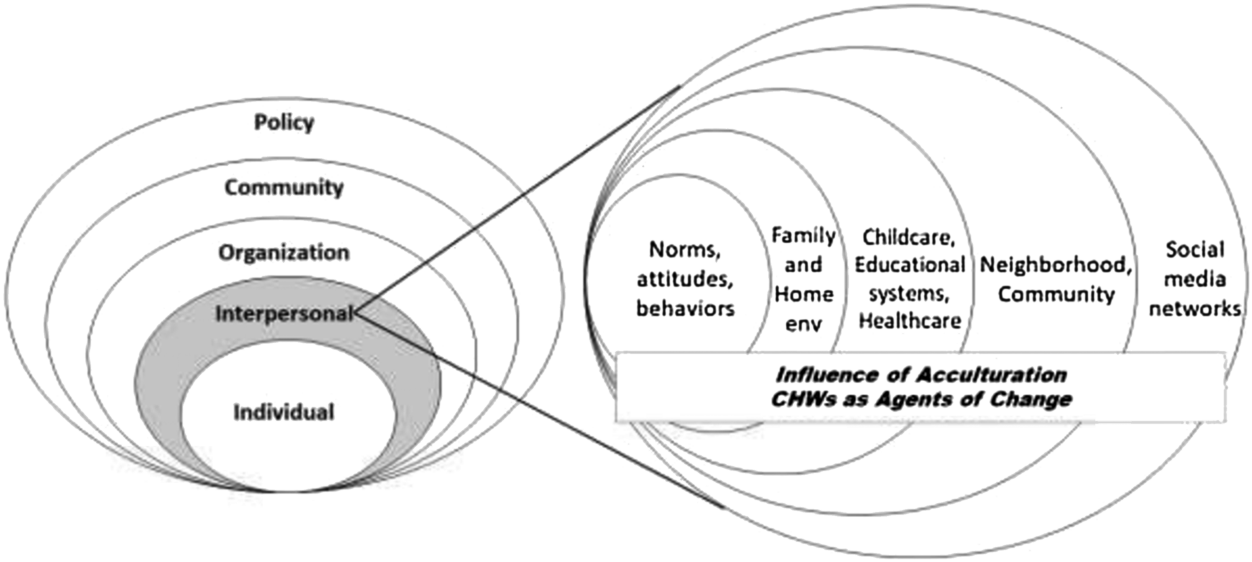

FIGURE 1 Social environmental influences on childhood obesity across ecological levels. CHWs, community health workers

to the set of social roles and behavioral norms and practices that are considered socially appropriate for men and women, so that, based on them, a person is deemed as masculine or feminine in the context of a specific culture and historical period.[26] Across many cultures, masculinity is constructed in opposition to femininity, or to what it means to be feminine.[27]

In terms of weight-related behaviors, one mechanism that may underlie the effects of the social environment on physical activity is through the operation of social norms, particularly gender stereotypes. Researchers have shown that the practice of some physical activities (e.g., vigorous team sports[19]) are usually incompatible with the common constructions of feminine behavior,[28–30] and sports are gender-based activities, with value and power associated with masculine traits.[30] Girls experience complex relationships with physical activity, in that they feel pressure to appear feminine and act accordingly, limiting their ability to behave outside the normal confines of heterosexual femininity.[30,31] Some girls may challenge these norms, but risk being perceived as overly masculine, resulting in what Cockburn and Clarke[31] call a "femininity deficit." Hispanic/Latinx girls in both the United States and Latin America also may perceive pressure to be both feminine and athletic, which can create ambiguity and confusion.[29,30] For example, Costa Rican adolescent girls have reported viewing themselves as objects to be appreciated by others.[29] Unlike for US Hispanic/Latinx boys who seek vigorous physical activities and team sports,[32] this stereotyped view may prevent adolescent girls from engaging in vigorous physical activities that do not present their bodies in an aesthetic way. They also described some activities as "too girlie," and identified sports as "masculine,"[29,30,33] which contribute to perpetuating the gender-typing of physical activities.

Similarly, there are gender norms around food consumption. For example, qualitative research in the United States with Mexican-origin men determined that consumption of meat and energy-dense foods (e.g., fast food and sugar-sweetened beverages) has been identified as a marker of masculinity, whereas consuming vegetables, fruits, and other healthy foods is identified as a marker of femininity.[34] Importantly, evidence shows that among US Hispanic/Latinx children of Mexican origin, frequent consumption (i.e., weekly or more often) of away-from-home foods is associated with increased risk for childhood obesity.[35] Thus, it is possible that one contributing factor to the higher risk of childhood obesity among US Hispanic/Latinx boys compared with all other races/ethnicities are these gender norms. In terms of females, women who conform to this conception of femininity have been found to reduce the amount of food they consume and eat slowly compared to men.[36,37] Studies show that the relationship between eating habits and traditional femininity makes the woman a victim of stereotypical body shapes and puts her in danger of harmful weight-control behaviors (like dietary restraint).[30,37,38] In the United States, Neumark-Sztainer et al.[39] showed that racially/ethnically diverse adolescent girls who engaged in unhealthy weight control behaviors had an increased body mass index (BMI) over time. The concern with attaining a socially acceptable body type, reinforced by the construction of a female identity, can significantly increase obesity risk.

1.1.2 | Social environmental influences and the family and home environment

As with all families, US Hispanic/Latinx and Latin American families are systems with hierarchies and roles; there are scripts to follow based on birth order and gender. Within US Hispanic/Latinx and Latin American families, generally, parents are the authorities, and in keeping with expectations about *respeto* (respect) for elders and seniors, traditionally have unquestioned authority.[40,41] The hierarchical nature of the Hispanic/Latinx family structure has implications

for roles, rules, and rituals, including communication patterns within and outside of the family, particularly with authority figures—the supervisor, teacher, police officer, minister or priest, and so forth. *Familismo* is theorized as a core cultural value that requires the individual to submit to a more collective, family-based form of decision-making, as well as responsibility for and obligation to ensuring the well-being of family members (both nuclear and extended).[15] Sabogal et al.[20] define the *familismo* value system and its basic dimensions as follows: (a) familial obligations (e.g., providing material and emotional support to family members); (b) perceived support from the family (e.g., family reliably provides help and support to one another to solve problems); and (c) family as referents (e.g., decisions and behavior are based on conforming and consulting with family members). In placing such value on the family, group members gain social support and aid through close proximity to one another, and a means by which to form an identity. The drivers of *la Familia Latina* are the values of *familismo*, *respeto* (respect), *cariño* (caring, affection, and physical demonstrations), and *simpatía* (warmth, positive disposition, and avoidance of conflict). Finally, *respeto* is the cornerstone of Hispanic/Latinx relationships. It governs positive reciprocal interpersonal relations[42] and dictates deferential behavior towards family, thereby maintaining family harmony.[40] *Respeto* has been associated with greater family cohesion and lower family conflict.[43]

Multiple studies have endorsed these values as protective factors that alleviate family stress in both the United States and Latin America.[40] However, in terms of weight-related behaviors and weight-status, most studies examining the family and home environment have focused on parenting dimensions, and to a lesser extent the role of other family members and the family as a whole. Parents are the most proximal influencers of children's weight-related behaviors, yet there are subsystems within the family that could be harnessed for change, including the couple system, parent/child system, and sibling subsystem. The interactions that occur between family member shape and are being shaped by other family members' actions.[44] For example, parents' feeding practices, including restriction and pressures to eat, are associated with child weight status.[45,46] In a longitudinal study of Hispanic families in Texas, observed pressure-to-eat was associated with children's higher weight status over 3 years later; on the other hand, caregiver-reported monitoring of child's intake (e.g., regulating the types and quantities of foods and beverages consumed) was associated with lower weight status.[47] Sibling eating behaviors are more similar to each other compared with parents.[48] However, even caregiver modeling of dietary and physical activity behaviors are not always consistently related to a child's weight status.[49] Grandparents may be generally protective against excess child weight status among US Hispanic/Latinx populations except for those of Cuban descent.[50] Positive family functioning (i.e., family adaptability and positive communication), family resilience, and engaging in family meals have been found to be positively related to maintaining more optimal child weight and weight-related behaviors.[51–53]

1.1.3 | Social environmental influences in childcare, educational, and healthcare settings

Outside the home environment, children interact with a number of individuals, including other youth and adults found in childcare, school, and healthcare settings. These individuals communicate social norms, role model behaviors, and provide and/or restrict access to resources. For example, there is ample evidence that social norms about eating have a powerful effect on both food choice and amounts consumed.[37,38] Norms are a powerful influence on behavior because following (or not following) norms is associated with social judgments. Norm following is more likely when there is uncertainty about what constitutes correct behavior and when there is greater shared identity with the norm referent group. Social norms may affect food choice and intake by altering self-perceptions and/or by altering the sensory/hedonic evaluation of foods.[25] Adolescents are especially vulnerable to wanting to comply with gender stereotypes because they seek social acceptance and social validation from peers in their own gender.[54] For adolescent girls, often it is very important to be perceived by peers as engaging in socially constructed gender-appropriate behaviors and achieving feminine ideals.[29,30] Likewise, there is evidence that adolescents' diets also may be influenced by social norms, with peer norms often being more powerful than parental norms.[38]

Regarding settings outside of the home environment, there is limited research on social environmental influences in childcare, educational, and healthcare settings among US Hispanic/Latinx children and children of Latin America. This research is critical given evidence for the potential substitutability of social ties when networks are impoverished.[3] In terms of obesity risk, one study determined that US Hispanic/Latinx children cared for by a nonfamily member were more than five times as likely to be obese than non-Hispanic children in similar arrangements.[55] Teachers and other school leaders may exert social environmental influences on child weight and weight-related behaviors, through role modeling.[10] It is also possible that availability and access to different types and amounts of food, as well as physical activity opportunities also, may play a role in such settings.[56] Similarly, healthcare providers are important sources of influence related to child weight and weight-related behaviors among Hispanic/Latinx families in the United States, and deserve greater systematic attention in this field.[57,58]

1.1.4 | Social environmental influences in the community

A considerable amount of research on social culture has been guided by the notion of "cultural syndromes," which are collective social constructs that help to organize and interpret the world by focusing attention on subjective elements of the environment, such as values, norms, beliefs, and assumptions.[59,60] Of the many cultural syndromes that have been identified, individualism and collectivism have received considerable attention.[60,61] Individualism is the tendency to treat the

self as the most significant social unit. Individualistic societies emphasize the development and differentiation of a unique personality and identity, autonomy, and the primacy of personal goals and needs.[59,62] In contrast, the most significant social units in collectivist societies are the groups to which people belong, such as the family and the neighborhood, with one's identity being defined through belonging to these groups. In collectivist societies, the impact of group membership on self-definition results in a desire to maintain intragroup harmony and a tendency to subordinate personal preferences and priorities to those of the group.[59–62] Individualism is defined as a situation in which people are generally most concerned with themselves and close family members, whereas collectivism is defined as a situation in which people feel that they belong to larger in-groups or collectives which care for them in exchange for loyalty—and vice versa. Collectivism also can be defined as a cluster of attitudes, beliefs, and behaviors of a wide group of people. The difference between these two cultural norms can be expressed by the range of social "concern" typically present, which refers to bonds and links with others.[59–62] In general, the United States, Europe, and other "Western" cultures emphasize autonomy, that is, individual achievement, self-reliance, and self-assertiveness. In contrast, other cultures, particularly in Asian, African, and Latin American countries, tend to value interdependence, that is, collective achievement, sharing, and collaboration.[63]

Individualist countries are more likely to commit a fundamental attribution error, that is, a bias that attributes the behaviors of a person to the characteristics of that person instead of the situation or environment that person is in.[64] This error can transfer to attributions for obesity, and it has been demonstrated that individualist countries show a stronger tendency to harbor anti-fat prejudice when they hold individuals accountable for their weight.[65] In contrast, collectivist countries are less likely to link negative cultural values (being obese is bad) to the person (being an obese person is bad). There is a cultural component to blaming obese individuals, which varies among countries. Less anti-fat prejudice and fewer attributions of individual controllability have been found in Mexico, a collectivist country, compared with the United States, an individualist country.[66] Attribution theory suggests that obtaining support for constructive and non-oppressive obesity policies would be more difficult in individualist countries where people more commonly assign greater individual controllability of obesity.[64] Conversely, garnering support for such obesity policy may be easier in collectivist countries where people are less likely to link obesity to individual control.[64]

This is important because there is growing evidence that cultural practices engaged in by a community may influence risk for childhood obesity. Using population-based data from Southern California, among Hispanic/Latinx children with Spanish versus English-speaking mothers, a curvilinear relationship was observed such that a specific density of Spanish-speaking residents was protective against excess child BMI *z*-scores, whereas lower or higher density was not.[67] Likewise, young children living in US neighborhoods with a higher density of those who were foreign-born were less likely to be at risk for obesity.[68] One explanation given for this is that living in immigrant enclaves may provide greater access to social network members who use a similar language and who have similar needs and interests.[69] A second explanation is greater access to fresh fruits and vegetables in some immigrant enclaves, particularly given the likelihood for ethnic food establishments to dominate in these neighborhoods.[70] New immigrants to the United States from Latin America often bring traditional eating habits that are rich in fruits and vegetables, fostering their availability in food stores and other local setting.[71,72] Finally, immigrant enclaves may buffer or potentially reduce the effects of stress and discrimination, which in turn can affect weight-related behaviors such as diet and physical activity.[73]

1.1.5 | Effects of acculturation on social environmental influences relevant to childhood obesity

The crosscutting issue of acculturation can have direct and indirect impacts on child weight and weight-related behaviors (Figure 1) (see also Vilar-Compte). In terms of obesity risk, there is evidence that US Hispanic/Latinx children of highly acculturated (vs. less acculturated) mothers have higher BMI percentile scores.[74] This may be explained by evidence that first generation Latina mothers are less likely to buy convenience foods and eat out.[75] Likewise, the language acculturation gap and, specifically, differences in English language use among parents and children, was identified as a risk factor for elevated BMI percentile among youth involved in the NIH-funded Hispanic Community Health Study/Study of Latino Youth (HCHS/SOL Youth).[76] In addition, in another study involving the same HCHS/SOL youth sample, poor family functioning (e.g., less effective communication) was modestly related to sugar-sweetened beverage consumption among assimilated youth only.[77] Family experiences are dependent on parents' and children's levels of acculturation as they navigate the convergence of multiple cultures that may emphasize child weight and weight-related behaviors differently. Findings observed include changes in norms; for example, machismo is greater among individuals who retain traditional values of their country of origin (i.e., less acculturated).[78] Similarly, a study designed to promote physical activity among new immigrant Latina middle school students to the state in North Carolina, USA found significant resistance from parents to their daughters' participation in school-based sports teams.[79] North Carolina was a relatively new immigrant-receiving state in the United States, particularly with respect to the in-migration of Hispanic/Latinx families. These traditional values were more pronounced than had been observed in previous studies involving first and second-generation families in the state of California, USA.[80]

1.2 | Intervening on the social environment to prevent and control childhood obesity

Knowing that the social environment presents both risk and protective factors for childhood obesity drives the call for research on how to create more socially supportive environments, ones that include

role models of healthy behaviors and support healthy choices. This research has led to several systematic reviews documenting the types of approaches that are most effective and under what conditions.[81–84] Notwithstanding the notable amount of evidence from these systematic reviews, they also help to identify research gaps.

In a 2018 review, which included different types of study designs from around the world, Bleich et al.[81] found the strongest evidence for school-based and multisector (e.g., school and home) obesity prevention interventions, including those involving parents. Multicomponent intervention approaches within schools (e.g., curriculum and physical environmental changes) have been found to be most effective in achieving planned outcomes, both in the United States and Latin American countries.[82] Meanwhile, multisector interventions can address a number of issues, including creating synergies across intervention strategies to reduce barriers in multiple contexts[85]; they also appear to introduce fewer health inequities by reaching underserved populations.[86] Regarding the latter populations, parenting and family factors (e.g., family cohesion and family communication) have been identified as among the most important factors for intervention engagement and achieving planned outcomes.[87] Poor family functioning has been associated with poorer adherence to a lifestyle modification program.[88] However, apart from intervening with families and schools, the social environmental influences considered and/or intervened on to prevent and control childhood obesity were identified in only a few studies involving US Hispanic/Latinx and/or Latin American populations. These included a US school-based intervention that used social marketing strategies to depict physically active role models to middle school students,[89] and community-based trials that involved community members to promote healthy options and healthy behaviors.[90,91] Studies evaluating elementary school-based interventions from Latin America have been reported from Chile,[92] Brazil,[93,94] Mexico,[95] and Argentina,[96] and have shown promising results in preventing and controlling childhood obesity using randomized controlled trial designs.[81]

In one of the few studies to consider social influences in childhood obesity interventions conducted across the global although limited to those published in English, Jalali et al.[4] examined the moderating role of three types of familial influences on the impacts of parenting interventions: (1) providing a supportive social environment using effective parenting strategies (e.g., monitoring[97]) and/or effective parenting style (e.g., authoritative[9,98,99]); (2) modeling healthy behaviors; and (3) praising and encouraging healthy behaviors exhibited by the child. Studies from across the globe, including 10 from the United States though none from Latin America, found that providing a socially supportive family environment was more effective for older children (above a mean age of 8 years old) and modeling was most effective among younger children (below a mean age of 8 years old) for promoting healthy behaviors.

A second review by Venturelli et al.[86] described mechanisms of action from various global childhood obesity prevention and control interventions and that allude to the potential for intervening on social environmental influences across settings. Among their conclusions from healthcare setting interventions was that approaches that involved multiple communication channels for sharing information, demonstrating skills, and reinforcing behavior change were more effective than single channel approaches (e.g., doctor visits or information campaigns).[100,101] Likewise, a global review that considered intervention efficacy from a developmental perspective identified several important social environmental influences to target in future efforts.[83] In their examination of developmental cascades (i.e., "cumulative consequences occurring over time that result in spreading downstream effects within and across domains", p. 2), St. George et al.[83] highlighted the important ongoing role of the family, and specifically parents, across childhood and the mechanisms by which social environmental influences may be important for reducing risk. Parenting and family management represent the overarching concepts reflecting parenting styles, parenting strategies used, parental modeling of health behaviors, and fostering a socially and physically supportive environment for healthy choices, including eating patterns and physical activity.[83] Their review concluded that parental modeling and making healthy choices accessible are critical for promoting healthy behaviors in early childhood (ages 2–5 years old). In childhood (ages 6–11 years old), effective parenting strategies (e.g., monitoring and setting limits) and parent modeling were identified as important. However, mediation analyses of early to late adolescent studies did not measure parenting dimensions and social environmental influences more generally, despite targeting them in their interventions.[94] Finally, given the previous evidence supporting parental involvement with younger children, a global review by Redsell et al.[102] focusing on early childhood concluded that the mechanism for improving child feeding, child diet, and weight status involves improving parent–child interactions. They also noted the potential for combining different communication channels by delivering culturally relevant content using digital platforms that are further reinforced by the child's healthcare providers.

1.2.1 | Agents of change: Community Health Workers

Engaging community health workers (CHWs) in the prevention and control of childhood obesity is another feasible and effective strategy.[103] In the United States and in Latin America, CHWs often provide in-home family-based education, use motivational interviewing techniques, and teach families to set behavioral goals, among other strategies.[104] Others are involved in linking families with primary care and encouraging well-child visits during which family-provider discussions are designed to occur around the child's weight and development.[105] CHWs are also involved in advocating for changes in the neighborhood and community, having engaged Latinx-serving restaurants and other businesses to support healthy behaviors.[71,106] Their role may depend, in part, on the level of the acculturation of the target population. For example, a systematic review of CHW interventions conducted with the US Hispanic/Latinx population found that individuals with less-developed English language skills may benefit from language support services provided by CHWs compared with

communities where access to resources and services is more readily available in Spanish.[107] Involving CHWs as a source for intervening with children and families is an ideal opportunity to connect important domains within the child's social environment.

1.2.2 | Enhancing social capital in local environments through community-engaged citizen science

As noted in the socio-ecological framework, local environments and the sense of interconnectedness, reciprocity, trustworthiness, and civic engagement that they create (i.e., social capital[108]) provide another source of influence on health behaviors of particular importance to childhood obesity. Through directly involving children and their parents in all aspects of a community-focused research process to address local barriers affecting these health behaviors, increases in different facets of social capital can occur.[109] For example, research studies around the world, including school-based studies in Colombia and a safe routes to school (SRTS) study with a largely Latinx community in the United States, have successfully employed one particular form of "by the people" citizen science called *Our Voice* to enhance both social and physical environments for healthy eating and physical activity.[109] In the US SRTS study, adding the technology-enabled *Our Voice* participatory action citizen science program to a standard federal SRTS elementary school curriculum resulted in twice as many SRTS student engagement and participatory events and a significantly higher increase in end-of-year walking/biking to school compared with a school receiving the SRTS curriculum alone.[110] Similarly, the school-based studies in Colombia using *Our Voice* were able to build community cohesion through empowering students ages 9–18 years to identify barriers to and enablers of healthy school environments and successfully advocate for change.[111] Building a sense of empowerment and social engagement may contribute to increased school participation and educational attainment, which in turn is critical for social and economic success worldwide.[112]

1.3 | Methodological innovations to advance our understanding of the social environment

There are numerous avenues for future research to advance the science of social environmental influences on weight status and weight-related behaviors among US Hispanic/Latinx and Latin American children and families.

From a methodological perspective, mixed-methods research has the potential to provide a broader understanding of a child's social environment. Specifically, applying mixed-methods approaches allows for breadth (e.g., quantitative methods) and depth (e.g., qualitative methods) in understanding multilevel influences on child weight status and weight-related behaviors. Three mixed-methodologies that would be important for future use in childhood obesity research focusing on the social environment include observational video-recordings (plus related resident-driven data collection methods), mHealth or ecological momentary assessment (EMA) and intervention (EMI) methods, and qualitative research.

Using video-recording methods can provide a more in-depth and contextually valid understanding of interpersonal dynamics and nuances in the child's social environment.[113,114] Specifically, observing behavior unfold in real-time allows for capturing potentially more valid behavioral patterns with more variability in behaviors over the observation time period. Prior research has shown that direct observational research conducted in the home using unstructured observations (e.g., play and routines) has more predictive validity and reliability of the behavior under study compared with laboratory settings using structured observations. For example, video-recording a family meal in a family's own home (i.e., natural setting and no observers present) while they eat as they normally do (i.e., in an unstructured way) would allow for capturing a more in-depth representation of parental, familial, and cultural factors related to eating, emotional well-being, and interpersonal dynamics. Similarly, one study involving video and audio recordings of US Hispanic/Latinx parent–child dyads experiences of food shopping provided further evidence of parental influences on food choices while grocery shopping,[115] as compared with what is more commonly written about the influence of child nudging (i.e., child-initiated purchase request interactions in a retail environment).[116]

Another example is using photovoice and similar resident-generated data to capture the different domains a child traverses in a normal week to inform interventions across multiple contexts that influence a child's diet and physical activity.[19,117] The *Our Voice* citizen science intervention described earlier has shown how such technology-enabled photo plus audio narrative data-capture can be utilized by youth as well as adults to subsequently improve, in collaboration with relevant decision-makers, local social and physical environments to support health, including healthy eating and physical activity.[109]

EMA allows for observation of behaviors as they unfold in context, moment-by-moment.[118,119] Through the use of various types of technology (e.g., mobile application), EMA captures behavior in real-time. EMA can identify whether behaviors are state-like and thus influenced by momentary mechanisms (e.g., stress) or whether they are trait-like (i.e., reasonably stable). Designs that incorporate EMA analyses address limitations of cross-sectional designs, such as reverse causality and temporal ordering of variables. EMA also avoids limitations and biases inherent in retrospective recall. And EMA lends itself well to intervention delivery. For example, momentary mechanisms that influence parent feeding practices, such as stress or depressed mood, can be identified using EMA. Those mechanisms can then be targeted in interventions that use EMI to reduce the use of unhealthy parent feeding practices. The acceptability of such methods across different US Hispanic/Latinx and Latin American populations deserves further investigation.

Using qualitative interviews to capture insights from individuals, family members, school teachers and administrators, healthcare

providers and staff, and community members concerning their motivations and attitudes regarding child eating and physical activity behaviors is a powerful method to gain an in-depth understanding of potential risk and protective factors.[13] Given this, cultural influences on the child's social environment may be more likely to be understood via qualitative dialogue versus a survey.

2 | CONCLUSIONS

In this paper, we sought to describe social environmental influences on children's weight status and weight-related behaviors at multiple levels of influence in the socio-ecological framework. We also sought to describe the state of the evidence for intervening on social environmental influences to prevent and control childhood obesity among US Hispanic/Latinx and Latin American populations. The evidence from observational research provides some support for the importance of individual social norms on weight-related behaviors that may be specific to the Latinx/Hispanic culture. In addition, observational research provides strong support for the importance of parenting and the family and home environment on weight status and weight-related behaviors. However, more research on social influences in all countries are needed as it relates to individuals in other context. In terms of intervention research and based on available systematic reviews, the research evidence to-date supports intervening in the social environments of children, particularly interventions targeting parenting behaviors and aspects of the family and home environments. Other promising though less studied Latinx/Latin American contexts that deserve further systematic evaluation include childcare, educational, healthcare, and other community settings (e.g., neighborhoods). Notwithstanding the limited evidence to-date, particularly in South American countries, it is possible that one of the reasons multicomponent interventions within schools appear to be particularly effective at achieving changes is that they involve multiple sources of social influence. For example, Vargas et al.[21] suggested that the active participation of parents in school-based intervention activities may simultaneous promote social cohesion, further reinforcing the effectiveness of these types of multicomponent interventions particularly with underserved populations. The positive effects of active parent and student participation also were observed in the Latinx/Latin American citizen science studies.[109] A potential benefit achieved by researchers and practitioners who have considered how best to reach and serve groups who are more collectivistic and family-oriented is that they have been less likely to consider the problem of overweight and obesity in isolation from the social context, a problem that has occurred in other obesity-related research.[120]

2.1 | Limitations

There are a number of limitations to consider. First, we recognize and agree with St George et al.[83] that most intervention articles do not provide sufficient detail to fully understand the conceptual underpinnings and methods of the interventions being studied. Second, although the home environment is known to influence child weight status and weight-related behaviors, there is limited research conducted on multiple family members and their individual and collective influence on children[48]; for example, most parental research is conducted with mothers only. It is important to consider other family members such as fathers and grandparents who may have regular contact and influence on child behaviors.[121] In addition, as noted earlier, there is insufficient consideration of other cultural dimensions relevant to these interpersonal relationships. Third, distinctions made between interventions that require individual action versus structural or physical environmental changes that are designed to promote healthier individual action often do not sufficiently consider social environmental influences.[86] Finally, although there are a growing number of studies occurring on both sides of the border, there have been few collaborative efforts to-date exploring how intervention strategies and insights may differ in US Latinx versus Latin American contexts. Such cross-country research could shed further light on shared issues and solutions that could benefit both geographic regions.

2.2 | Future directions

Our limitations indicate where more attention is needed. In addition to these next steps, additional research is needed in the following areas. First, we should consider exploring potential behavioral synergies between diet and physical activity behaviors in relation to the social environments to better understand how to harness these influences, some of which may complement each other, whereas others may not. Second, our research would benefit from deconstructing the norms, attitudes, and behaviors that many girls and boys continue to internalize related to gender roles. A promising strategy is to improve dynamics around the decision to do physical activity and adopt healthy eating habits is to engage socialization agents (parents, peers, and teachers) to break down the stereotypes of gender appropriateness. Third, implementation researchers could examine the influence of cultural beliefs on intervention engagement. For example, previous interventions with US Hispanic/Latinx families to prevent and control childhood obesity have reported on the challenges with engagement. Among the factors associated with poor engagement was maternal mental health.[122] One of the few national cohort studies examining the gender roles of machismo and Marianism, HCHS/SOL found that the cultural scripts of Marianism (i.e., family pillar, spiritual pillar, and virtuousness) were associated with depression, anxiety, and anger symptoms among US Hispanic/Latinx women.[123] Marianism is a set of values and expectations about female gender roles and emphasizes the role of women as centered on family and home; it also encourages passivity, respect for patriarchal values and behaviors (i.e., protector), self-sacrifice, and chastity.[40] Marianism has been identified as important in the context of a healthy eating intervention for Mexican-origin families in the United States.[124] Considering the cultural beliefs and mental health of the parent when engaging in childhood obesity prevention and control is critical to achieve the intended outcomes.

Finally, cross-border research is needed to shed further light on the similarities as well as differences between various regions when it comes to social environmental influences on child weight status and weight-related behaviors.

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CONFLICT OF INTEREST

The authors have no conflict of interest to declare.

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