



Published in final edited form as:

*Health Promot Pract.* 2010 July ; 11(4): 541–554. doi:10.1177/1524839908328991.

## Anatomy of Culturally Sensitive Interventions Promoting Nutrition and Exercise in Hispanics: A Critical Examination of Existing Literature

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### Abstract

Compared with non-Hispanic Whites, Hispanics experience a disproportionate burden of chronic diseases. Understanding the factors influencing the success of health programs in Hispanics requires a clearer examination of the principles and components of tailored interventions. This research comprises a comprehensive literature review of randomized controlled trials testing nutrition and exercise interventions tailored for Hispanics and an examination of how these interventions were constructed. The review of 18 interventions meeting study criteria suggests that most tailored programs promoting nutrition and exercise in Hispanics are theory driven and are informed by formative research. Also, the findings indicate that salient culturally sensitive intervention components are (a) bilingual and bicultural facilitators and materials, (b) family-based activities, (c) literacy-appropriate materials, and (d) social support. A clear understanding of Hispanic cultural values is also required. Further empirical examination is warranted to determine the factors mediating or predicting the efficacy of culturally sensitive health programs for Hispanics.

### Keywords

cultural; Hispanics; nutrition; exercise; interventions

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Nutrition and regular exercise are major pillars of healthy living and aging because they reduce the risk of heart attack, colon cancer, diabetes, high blood pressure, and stroke (World Health Organization, 2007). Healthy lifestyle behaviors also help control weight; contribute to healthy bones, muscles, and joints; reduce depression and anxiety; and are associated with fewer hospitalizations and medications (Ignarro, Balestrieri, & Napoli, 2007; Kanaya & Narayan, 2003; Kriska, Delahanty, & Pettee, 2004). Despite the well-documented benefits of diet and exercise and the fact that the health status of Americans improved considerably in the past decades, the health of racial and ethnic minorities continues to lag

behind that of Whites (Institute of Medicine, 2006; Liao et al., 2004). In particular, compared with non-Hispanic Whites, Hispanics report higher morbidity and mortality rates due to chronic diseases (e.g., diabetes, stroke, liver disease, and cirrhosis; Centers for Disease Control and Prevention, 2004) that could be prevented or their impact lessened by the promotion of healthy lifestyle behaviors in this population (Institute of Medicine, 2001).

The persistence of health disparities requires the adoption of a more culturally sensitive approach to illness prevention and behavioral intervention efforts that go beyond the mandated inclusion of women and minorities in health research (Caban, 1995). Health interventions adapted to the social and cultural context of ethnic minority populations are more likely to increase behavioral interventions' external validity (Bernal, Bonilla, & Bellido, 1995) and to accelerate advances in minority health (Cooper, Hill, & Powe, 2002; Marin et al., 1995).

Both the growth and the diversity of the Hispanic population pose challenges in understanding the ways and extent to which culturally sensitive interventions can improve Hispanic health behaviors and outcomes. Hispanics are now the largest minority group in the United States, representing 14.2% of the total population (U.S. Census Bureau, 2007). Equally important is the diversity within this minority, which is composed of a variety of subgroups of different origin. Individuals of Mexican descent are the largest Hispanic subgroup, representing almost two thirds of this population (64%), followed by Puerto Ricans (9.6%), Central Americans (7.2%), South Americans (5.5%), and Cubans (3.6%; U.S. Census Bureau, 2007).

Despite the consensus that cultural context and ethnicity are key components in behavioral health interventions designed for minority populations, there is an ongoing debate over how to design efficacious culturally sensitive health interventions for minorities. Also, the principles and components of cultural sensitivity in minority behavioral health research have not been extensively described or empirically examined in studies related to nutrition and exercise (Betancourt, Green, Carrillo, & Ananeh-Firempong, 2003; Castro, Barrera, & Martinez, 2004; Stiffman, Freedenthal, Brown, Ostmann, & Hibbeler, 2005). Examining nutrition and exercise behaviors among Hispanics is of great importance. In 2003–2004, Hispanic adults and children had a higher prevalence of overweight and obesity (75.8% and 41.4%, respectively) than White adults and children had (64.2% and 35.4%, respectively; Ogden et al., 2006). Hispanics are also more likely than non-Hispanic Whites to have low levels of physical activity (Adams & Schoenborn, 2006; Bolen, Rhodes, Powell-Griner, Bland, & Holtzman, 2000; CDC, 2005).

The purpose of this literature review was to identify and examine the theoretical principles and components of culturally sensitive interventions tested in randomized controlled trials (RCTs) aimed at modifying eating and physical activity behaviors in Hispanics. This review is limited to RCTs because an RCT is the most rigorous research design to assess scientific evidence of behavioral intervention efficacy since it helps rule out threats to internal validity. The following research questions guided this review:

- What is the theoretical foundation of nutrition- and exercise-related interventions tailored for Hispanics?
- How are concepts of ethnicity and culture operationalized in these studies?
- What are the main components and recruitment strategies used in these interventions?
- Did these studies test the influence of cultural factors on intervention outcomes?

## METHOD

Articles selected for this review met the following criteria: (a) they described an intervention that was tailored for Hispanics; (b) the intervention was aimed at modifying knowledge, beliefs, or behavior related to nutrition or exercise; (c) the intervention was tailored for Hispanics of any age group; (d) the study was based on the RCT research design; (e) the study was reported in a peer-reviewed journal; (f) the study was conducted in the United States; and (g) the study was published between 1990 and 2006. The articles reviewed were identified through Medline and PubMed databases by the use of the following keywords: *Hispanic, Latino, Mexican, Puerto Rican, intervention, program, culturally, dietary, nutrition, eating, exercise, and physical activity*. An initial search across databases yielded 319 potentially eligible references. The abstracts of these potentially eligible references were reviewed, and 46 abstracts were retained. We then retrieved and reviewed the full texts of the retained abstracts. Of the 46 articles reviewed, 30 studies describing 18 RCTs were finally selected for inclusion in this review. Two of us conducted the literature search and selected articles for inclusion. In cases of disagreement, the reviewers discussed any differences in opinion until reaching a consensus.

We categorized the components of the interventions reported in the reviewed studies using the cultural sensitivity framework proposed by Resnicow, Baranowski, Ahluwalia, & Braithwaite (1999) and shown in Figure 1. In cases of disagreement when categorizing the intervention components, we reached a consensus.

The main tenet of this framework is that cultural sensitivity is a bidimensional concept, and it categorizes intervention components as *surface structure* and *deep structure*. Surface structure components include intervention materials, messages, channels, settings, and recruitment strategies that match the characteristics of a priority population (e.g., familiar places, language, music, foods, and locations; Resnicow, Soler, Braithwaite, Ahluwalia, & Butler, 2000). Deep structure components are cultural, social, historical, environmental, and psychological factors influencing health behaviors.

For each intervention we aimed at identifying the theoretical framework, the formative research efforts conducted to design and implement the RCT, the ethnic term used to describe the priority population, operational constructs of culture, intervention components, recruitment and adherence strategies, and evidence indicating whether the association between the intervention components and the outcomes was tested for significance.

## RESULTS

### Theoretical Foundation

Most (70.6%) of the interventions reviewed described their theoretical foundation, and the prevalent theories were those focusing on individual and interpersonal health behaviors. The theory most frequently used to guide the interventions was the social learning theory (41.2%; Fitzgibbon, Stolley, Dyer, VanHorn, & KauferChristoffel, 2002; Poston et al., 2001; Rosal et al., 2005; Staten et al., 2004; Trevino et al., 2004; Vazquez, Millen, Bissett, Levenson, & Chipkin, 1998). Other theories or frameworks used were the social support framework (Avila & Hovell, 1994; Castro et al., 1995; Poston et al., 2001, 2003), a peer health worker model (Castro et al., 1995; Staten et al., 2004), self-change behavioral modification strategies (Avila & Hovell, 1994), a systems perspective (Castro et al., 1995), a self-determination theory and transtheoretical model (Fitzgibbon et al., 2002), a patient-provider communication model (Staten et al., 2004), a community organization framework (Thompson, Coronado, Chen, & Islas, 2006), socioecological theory (Trevino et al., 2004),

social marketing and the Precede-Proceed Model (Wechsler, Basch, Zybert, & Shea, 1998), and a patient-centered counseling model (Rosal et al., 2005).

### Conceptualizing Ethnicity and Culture

Although the studies reviewed were RCTs testing the efficacy of culturally based interventions tailored for Hispanics, none of the studies provided an operational definition of the cultural construct. However, authors used a varied terminology to describe the cultural qualification of the intervention: *culturally appropriate* (Elder et al., 2006; Poston et al., 2001, 2003; Thompson et al., 2006), *culture specific* (Elshaw, Young, Saunders, McGurn, & Lopez, 1994; Fitzgibbon, Stolley, Avellone, Sugerma, & Chavez, 1996; Rosal et al., 2005; Vazquez et al., 1998), or *culturally focused* (Castro et al., 1995).

Seven interventions in this review measured the acculturation level of participants (Cousins et al., 1992; Elder et al., 2006; Fitzgibbon et al., 1996; 2006; Fitzgibbon, Gapstur, & Knight, 2004; Lopez & Castro, 2006; Thompson et al., 2006). A few studies recorded the generation status of participants (Avila & Howell, 1994) and their nativity (Fitzgibbon et al., 2004; Poston et al., 2001). Only one study examined the effects of acculturation on health outcomes (Balcazar, Castro, & Krull, 1995; Lopez & Castro, 2006), finding that highly acculturated, highly educated women had a stronger orientation to healthy eating than did the less acculturated. Also, different scales measuring acculturation were identified in the studies. The measurements most frequently used were the Acculturation Rating Scale for Mexican Americans (Cuellar, Arnold, & Maldonado, 1995) and the Short Acculturation Scale (Marin, Sabogal, Marin, Otero-Sabogal, & Perez-Stable, 1987).

Formative research, including focus groups, literature searches, and surveys (Castro et al., 1995; Elder et al., 2006; Fitzgibbon et al., 1996, 2004, 2006; Rosal et al., 2005; Thompson et al., 2006; Vazquez et al., 1998), guided the design and implementation of 44% of the interventions. Formative research in these studies aimed at identifying intervention needs; exploring health-related knowledge, attitudes, and barriers; and obtaining feedback from key informants about the cultural appropriateness of the intervention.

In this review, we found that there was no preference for the use of a monolithic ethnic term. The terms most frequently used were *Hispanic* (33%) and *Latino* (28%), although some studies included specific Hispanic subgroups, such as Mexican Americans (28%) or Latina Caribbean (6%).

### Surface and Deep Structure Components

Virtually all studies mentioned the components of the intervention tailored for their Hispanic audience. Table 1 shows the intervention components, recruitment strategies, outcomes, and effects.

Three studies provided a list of the components that characterized the cultural sensitivity or appropriateness of the intervention. Fitzgibbon et al. (2002) indicated that culturally specific components included easy and safe access to the program; efforts aimed at fostering identification between interventionists and participants; knowledge; attitudes; social support; cultural attitudes; unsafe neighborhoods; behavioral demonstrations; and literacy levels. Rosal et al. (2005) considered the following components: family involvement, culturally popular activities, ethnic foods, social support, and intervention materials delivered in the preferred language. Vazquez et al. (1998) listed literacy level, beliefs toward obesity and diets, culturally relevant nutrition behaviors, social support, fatalism, bilingual and bicultural interventionists, and home activities.

Based on the cultural sensitivity framework of Resnicow et al. (1999, 2000), we identified eight surface-structure intervention components, as shown in Table 1. The most prominent surface-structure component in interventions was the use of bilingual and bicultural materials and delivery agents (78%). Four interventions used a back-translation technique to prepare materials in English and Spanish (Cousins et al., 1992; Fitzgibbon et al., 2002; Fitzgibbon, Gapstur, & Knight, 2003; Puschel, Thompson, Coronado, Lopez, & Kimball, 2001). Other salient intervention surface-structure components were the inclusion of ethnic foods (33%), followed by working with *promotoras* (community health workers; 24%) and delivering the intervention in group settings (24%).

Involving the family in interventions (47%) was the dominant deep-surface component found in our review, including activities such as partner support techniques and parental training. Additional deep-structure components included the literacy level of participants (39%), use of social support and networks (29%), and incorporation of Hispanic cultural values in intervention design or implementation (29%). Hispanic values considered in the interventions included familism (Castro et al., 1995; Cousins et al., 1992; Fitzgibbon et al., 1996, 2003, 2006; Poston et al., 2003; Rosal et al., 2005; Trevino et al., 2004; Vazquez et al., 1998; Wechsler et al., 1998); trust, or *confianza* (Castro et al., 1995; Fitzgibbon et al., 2002); the need to establish smooth relationships, or *simpatia* (Fitzgibbon et al., 2003); and fatalism, or lack of empowerment (Vazquez et al., 1998).

Most studies in this review did not detail their recruitment strategies. A majority of the studies conducted their recruitment at or through community agencies, churches, schools, or the media. The effectiveness of recruitment activities was not examined in the majority of the studies. The Diabetes Prevention Program study, however, did report that phone recruitment was the most effective strategy with Hispanics (Rubin et al., 2002). Recruitment strategies are shown in Table 1.

### **Influence of Intervention Tailoring**

Although 13 studies produced significant differences in eating or exercise outcomes, the research design of most of these studies did not address whether the intervention was successful or not because of its Hispanic-tailored nature.

## **CONCLUSION**

Health scholars and experts have underlined the importance of designing and implementing culturally sensitive interventions. This comprehensive literature review examined principles and components of interventions tailored for Hispanics that aimed at modifying eating or exercise behaviors and were based on an RCT design. We wanted to find out what theories guided the interventions, how ethnicity and culture were conceptualized, what the main intervention components were, and to what extent the studies tested the influence of cultural factors on intervention outcomes.

### **Culture and Theory**

Most interventions in this review were minimally guided by cultural models or frameworks. The emphasis of using behavioral and socioecological theories found in the reviewed studies may be justified by the fact that most interventions aimed at affecting behavioral health outcomes. However, it was surprising to learn that only two studies in this review were guided by a cultural framework, particularly considering the extensive research examining cultural competency frameworks in health care services and systems (Anderson, Scrimshaw, Fullilove, Fielding, & Normand, 2003; Betancourt, Green, & Carrillo, 2002; Betancourt et al., 2003; Brach & Fraser, 2000; Howard, Andrade, & Byrd, 2001; Suh, 2004). Paucity of

culturally sensitive models in behavioral health research should be of concern because the lack of such models could result in the implementation or replication of interventions based more on practitioners' perceptions and intuitions about how to tailor interventions for Hispanics than on empirically tested culture-related theories.

Our review found that the intervention design in almost half the studies was guided by formative research, which suggests that this type of research should not be overlooked when designing and implementing a behavioral intervention for Hispanics. Furthermore, formative research has been identified by health research scholars as a basic element of intervention design (Needleman & Needleman, 1996; Resnicow et al., 1999).

### Ethnicity and Acculturation

Although the way the Hispanic population is classified operationally has implications in health research (Mays, Ponce, Washington, & Cochran, 2003), the debate over the most appropriate generic label for this minority group is ongoing (Lopez, 2005; Mays et al., 2003). We found that studies in this review had a preference for the ethnic term *Hispanic*, followed by *Latino*, and some researchers specifically included Mexican Americans or Latina Caribbean. The acknowledgment of Hispanic subgroups has important research implications. Previous research underlines that overlooking ethnic variations and cultural differences within this minority population could become a barrier to appropriate health care and a factor sustaining health disparities. Access to health care services and the health status of Hispanics are influenced by English proficiency, country of origin, length of time living in the United States, immigration status, and acculturation (Weinick, Jacobs, Stone, Ortega, & Burstin, 2004; Zsembik & Fennell, 2005). Because the complex health patterns in the Hispanic population vary with ethnicity, diversity must be acknowledged to better serve the health needs of this group. Although our review showed that Hispanic subgroups were acknowledged in some studies, it also revealed an extreme sparseness of intervention research that includes smaller subgroups that are growing significantly and rapidly. Examples of these Hispanic subgroups are immigrants from Central America, with an increase of 44.6% in the past decade; South America, 47.2%; and Dominican Republic, 42.6% (Ramirez, 2004).

Although constructs are key elements that give specific or contextual meaning to a theoretical framework (Glanz, Rimer, & Lewis, 2002), our findings indicate that none of the studies in this review defined or operationalized the construct used to qualify the cultural nature of the intervention (e.g., culturally sensitive, appropriate, specific, or competent).

Our review shows that acculturation was measured in seven studies, and different measurement scales were applied. In addition, one study recorded the generation status of participants (e.g., first generation), and two others reported the country of origin. However, only one study examined the effects of acculturation level on health intervention outcomes (Balcazar et al., 1995; Lopez & Castro, 2006), even though it is well documented that acculturation and generation status are significantly associated with eating and exercise behaviors. Our findings are consistent with a study by Lindberg and Stevens (2007) that highlighted the need to use standardized acculturation measures and include nativity and other demographic information of participants in future interventions. Previous research has indicated that less acculturated Hispanics have a healthier food intake than those who are more acculturated (Bermúdez, Falcón, & Tucker, 2000; Lin, Bermudez, & Tucker, 2003; Mazur, Marquis, & Jensen, 2003; Neuhouser, Thompson, Coronado, & Solomon, 2004). In the case of exercise, the relationship with acculturation is not clear because of conflicting findings (Berrigan, Dodd, Troiano, Reeve, & Ballard-Barbash, 2006; Crespo, Smit, Carter-Pokras, & Andersen, 2001; Evenson, Sarmiento, & Ayala, 2004; Slattery et al., 2006). Additional research examining the influence of generation status on lifestyle found that

nativity and longer duration of time in the United States are associated with unhealthy eating behaviors (Aldrich & Variyam, 2000; Allen et al., 2007; Dubowitz, Subramanian, Acevedo-Garcia, Osypuk, & Peterson, 2008; Gordon-Larsen, Harris, Ward, & Popkin, 2003; Guendelman & Abrams, 1995; Winkleby, Albright, Howard-Pitney, Lin, & Fortmann, 1994) and inactivity (Gordon-Larsen et al., 2003). Acculturation is a complex process that has many definitions and has been measured with varied instruments and dimensions (Lara, Gamboa, Kahramanian, Morales, & Bautista, 2005). The lack of consensus in defining and measuring acculturation suggests that more research in this field is needed.

### Intervention Components and Outcomes

This review aimed at identifying the components of the tailored interventions. Based on the cultural sensitivity framework proposed by Resnicow et al. (1999), our findings indicate that the most prominent cultural component in the interventions was the use of bilingual and bicultural materials and delivery agents. However, only a few interventions in this review used the back-translation technique to prepare materials in English and Spanish. Back-translation is one of the most widely used translation techniques in research and has substantial source language transparency (Behling & Law, 2000). Another intervention component included in almost one quarter of the interventions was working with promotoras to recruit and deliver the program. Although the promotora outreach model is used in areas where low-income, uninsured Hispanics live with limited access to health care services (Eng, Parker, & Harlan, 1997), previous research has shown mixed results regarding the effectiveness of this outreach model in improving lifestyle behaviors in Hispanics (Rhodes, Foley, Zometa, & Bloom, 2007; Swider, 2002). In our review, only two (Elder et al., 2006; Staten et al., 2004) out of four interventions (Castro et al., 1995; Elder et al., 2006; Staten et al., 2004; Thompson et al., 2006) that worked with promotoras reported significant effects in health behaviors. Further research is warranted to examine more closely the effectiveness of promotoras' role as behavioral intervention facilitators for Hispanics and in achieving sustained behavioral changes over time.

Family involvement, social support, and literacy level were components found in many of the interventions reviewed. Considerable research has shown that family and social support correlate significantly with healthy eating in Hispanics of various ages, such as children (Ayala et al., 2007), pregnant women (Gutierrez, 1999), and adults with type 2 diabetes (Morales López, Burrowes, Gizis, & Brommage, 2007; Orzáez Villanueva, Rodríguez Cisneros, Morales Ruiz, & Martín Rincón, 2006; Wen, Parchman, & Shepherd, 2004). Eyler et al. (1999) also found that family and social support were strong predictors of exercise in Hispanic women.

This review also found that more than half of the reviewed studies took into account Hispanic cultural values in intervention design or implementation. Familism was the cultural value most frequently considered in the interventions. This construct is defined as individuals' strong identification with and attachment to their nuclear and extended family (Marin & Marin, 1991).

Recruitment and adherence strategies are also critical elements in behavioral interventions. Most studies in this review, however, did not provide a detailed account of these strategies. This might be because of a lack of documentation during intervention implementation or to limited publication space provided by journals.

In summary, we found that three components were common to most of the interventions that produced significant differences in behavioral outcomes: involvement of family or social support, literacy-level appropriateness, and cultural values. However, the studies reviewed did not provide evidence that would allow us to draw valid scientific conclusions about what

specific components (e.g., family-based activities, group settings, and other) mediate or predict behavioral outcomes of a culturally sensitive intervention for Hispanics. Also, it is not clear which tailored intervention elements that proved effective with one Hispanic subgroup could be systematically applicable to other subgroups. For example, would working with peer health workers be as effective with affluent, urban Hispanics as it has been with low-income, rural Hispanics?

## RECOMMENDATIONS

Based on this critical analysis, we offer the following recommendations for health researchers and practitioners interested in designing and implementing lifestyle behavioral interventions for Hispanics:

- This review highlights the importance of using theory to design behavioral interventions for Hispanics. A theoretical framework may help researchers and practitioners design interventions in a more articulate way based on scientific knowledge and with the possibility of interpreting individual and social determinants influencing behavioral modifications. But the question of how to select the most appropriate theory still remains. Burdine and McLeroy (1992) suggested a “theory of the problem approach”: (a) Instead of starting with theory, one would determine a specific health issue for which an intervention is needed; (b) one would identify the theories from a socioecological perspective and select the most appropriate one for understanding causal factors and processes of specific health behaviors; (c) one would determine potential points of interventions suggested by the selected theory or framework; and (d) one would consider “the field’s collective wisdom on what interventions work with what populations under what conditions” (p. 337). In addition, the cultural sensitivity framework of Resnicow et al. (1999) may be useful in deciding what intervention components should be considered.
- Formative research plays an important role in the design and implementation of an intervention for Hispanics. Health assessments, focus group discussions, literature searches, and interviews are tools for tailoring an intervention by identifying attitudes, beliefs, language use, and other opinions of the priority population in relation to specific health issues or behaviors (Morgan, 1998; Resnicow et al., 1999). In addition, formative research should be applied to examine socioecological contextual factors not identified in this review and that could influence the feasibility and efficacy of an intervention for Hispanics (e.g., influence of the built environment on physical activity; Leslie et al., 2005).
- The diversity of the Hispanic population must be acknowledged in intervention design. Further experimental and prospective studies in behavioral health that take into account not only ethnic variations, but also acculturation and generation status factors may broaden our understanding of how to promote healthy behaviors effectively among different groups of Hispanics. It is important to keep in mind that about one third of Hispanics in the United States are foreign born (U.S. Census, 2007) and that acculturation, nativity, and duration in the country influence the lifestyle of Hispanics.
- Although further empirical examination is warranted to determine the efficacy of cultural components of intervention and which individual or combined components could be systematically applied to various Hispanic subgroups to improve their lifestyle behaviors, intervention components that may be considered when designing nutrition or exercise interventions for Hispanics may include the following:



Intervention delivery agents and materials that not only meet the language needs of Hispanics but also reflect their cultural values and the ways these values influence health behavior. Preferably, interventions should rely on bicultural facilitators and prepare materials using the back-translation technique or another method that will ensure language transparency and cultural equivalency in materials and instruments.

Family and social support.

An extensive understanding of the degree to which Hispanic cultural values influence health behaviors. For instance, research indicates that familism is a central value among many Hispanics and thus may influence eating or exercise behaviors. It is important to note that understanding cultural values is not enough and that formative research is required to determine how these values should be included in an intervention.

Assessment of the literacy level of participants in order to develop appropriate materials and evaluation questionnaires.

- Effective recruitment sites may include community or governmental agencies such as churches, health agencies, and schools. Nevertheless, more extensive research is needed to determine the most effective recruitment and adherence methods in culturally sensitive behavioral interventions for Hispanics.

## Acknowledgments

This research was supported by the National Institutes of Health, National Institute of Child Health and Human Development (3 R01HD047143-01S1), and the Health Science Center, Texas A&M University System Research Development and Enhancement Awards Program.

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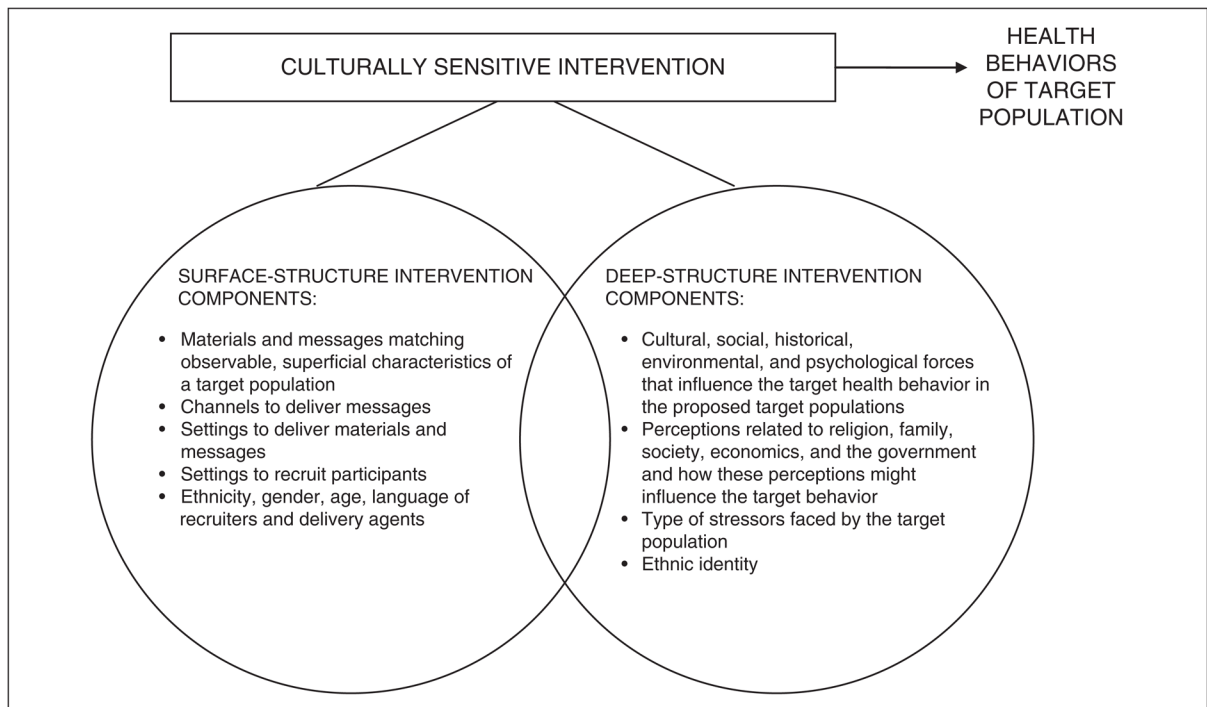
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**FIGURE 1. Components of Culturally Sensitive Interventions**

NOTE: Adapted from the culturally sensitive framework of Resnicow, Baranowski, Ahluwalia, and Braithwaite (1999). This framework was used to categorize the component interventions included in this review.

TABLE 1

## Characteristics and Components of Interventions (N = 18)

Author	Intervention Components					Outcomes	Effects
	Sample	Surface Structure	Deep Structure	Recruitment Strategies	Outcomes		
Avila & Hovell, 1994	44 obese Latinas, 18 years	<ul style="list-style-type: none"> <li>Bilingual and bicultural contents and facilitators/agents</li> </ul>	<ul style="list-style-type: none"> <li>Social support</li> <li>Flyers in churches</li> </ul>	<ul style="list-style-type: none"> <li>Community agencies and knowledge clinics, supermarkets, and adult school settings</li> </ul>	Attitudes, beliefs, in exercise, of exercise and diet; moderate and vigorous exercise rate	Significant increase walking, diet, and knowledge	
Balcazar, Castro, & Krull, 1995; Castro et al., 1995; Lopez & Castro, 2006	14 churches (447 Hispanic women, 18 years)	<ul style="list-style-type: none"> <li>Bilingual and bicultural contents</li> <li>Bilingual facilitators</li> <li>Delivered by <i>promotoras</i></li> <li>Group setting</li> <li>Cooking demonstrations</li> <li>Health fairs</li> <li>Service referrals</li> </ul>	<ul style="list-style-type: none"> <li>Cultural values</li> <li>Acknowledgment of economic, social, and environmental barriers</li> </ul>	<ul style="list-style-type: none"> <li>Local churches</li> <li>use of promotoras</li> <li>Development of a trustful working relationship with church leaders</li> </ul>	Diet-related attitudes and behaviors; cancer prevention knowledge, cancer screening behaviors; fear of cancer; family support	Not reported	
Cousins et al., 1992	168 obese Mexican American women, ages 18-45	<ul style="list-style-type: none"> <li>Bilingual and bicultural contents</li> </ul>	<ul style="list-style-type: none"> <li>Family-based</li> <li>Cultural values</li> </ul>	<ul style="list-style-type: none"> <li>Media</li> <li>Community agencies</li> <li>Direct contact (personal)</li> </ul>	Weight loss	Significantly more weight loss in individual and family groups than in control group	
Diabetes Prevention Program Research Group, 2000, 2002; Knowler et al., 2002; Rubin et al., 2002	508 Hispanic adults	<ul style="list-style-type: none"> <li>Bilingual facilitators</li> <li>Age-appropriate contents</li> <li>Ethnic foods</li> <li>Bilingual and bicultural contents</li> <li>Ethnic foods</li> </ul>	<ul style="list-style-type: none"> <li>Materials appropriate to literacy level</li> </ul>	<ul style="list-style-type: none"> <li>Media</li> <li>Direct mail</li> <li>Phone calls</li> <li>Health fairs</li> <li>Medical providers</li> </ul>	Diet; weight loss; exercise	Significant weight loss and changes in exercise	
Elder et al., 2006	357 Latinas, ages 18-65	<ul style="list-style-type: none"> <li>Bilingual and bicultural contents</li> <li>Delivered by promotoras</li> </ul>	Not described	Not described	Dietary intake; acculturation; BMI and waist-to-hip ratio control groups, but no persistence of changes 12 months postintervention	Significant short-term changes in calorie and fat intake in intervention and	
Elshaw, Young, Saunders, McGurn, & Lopez, 1994	152 older Mexican Americans	<ul style="list-style-type: none"> <li>Bilingual and/or bicultural contents and facilitators</li> <li>Group setting</li> </ul>	<ul style="list-style-type: none"> <li>Materials appropriate to literacy level</li> </ul>	<ul style="list-style-type: none"> <li>Media</li> <li>Community agencies</li> </ul>	Nutrient content food intake; weight	Significant weight loss experienced by most groups; significant decrease in calorie intake men only; significant decrease in cholesterol	



Author	Sample	Intervention Components				Recruitment Strategies	Outcomes	Effects
		Surface Structure	Deep Structure	Recruitment Strategies	Outcomes			
Fitzgibbon, Stolley, Dyer, VanHom, & KauterChristoffel, 2002; Fitzgibbon et al., 2006	401 preschool Latino children and their parents	<ul style="list-style-type: none"> <li>Bilingual contents and facilitators</li> <li>Age appropriateness</li> <li>Easy and safe access to the program</li> </ul>	<ul style="list-style-type: none"> <li>Family based</li> <li>Materials appropriate to literacy level</li> <li>Based on development stage</li> </ul>	Schools	BMI; dietary intake, physical activity, television viewing	<ul style="list-style-type: none"> <li>No significant differences</li> </ul>	intake experienced by control women only	
Fitzgibbon, Stolley, Avellone, Sugerman, & Chavez, 1996	38 Hispanic American mothers and children (ages 7–12)	<ul style="list-style-type: none"> <li>Bilingual content</li> <li>Group setting</li> <li>Location familiar to participants</li> <li>Ethnic foods</li> </ul>	<ul style="list-style-type: none"> <li>Acknowledgement of cognitive and environmental barriers</li> <li>Cultural values</li> <li>Family based</li> <li>Materials appropriate to literacy level</li> </ul>	<ul style="list-style-type: none"> <li>Community agencies</li> </ul>	Diet; nutrition knowledge	<ul style="list-style-type: none"> <li>Significant reduction in fat and increased parental support, exercise, and fruit and vegetable intake among mothers;</li> <li>increased fruit and dairy intake and a decrease in meat, sweets, and heart-healthy intake in older children; significant increase in nutrition knowledge in all children</li> </ul>	Significant reduction in fat and increased parental support, exercise, and fruit and vegetable intake among mothers; increased fruit and dairy intake and a decrease in meat, sweets, and heart-healthy intake in older children; significant increase in nutrition knowledge in all children	
Fitzgibbon, Gapsur, & Knight, 2003, 2004	256 Latinas (ages 20–40)	<ul style="list-style-type: none"> <li>Bilingual and/or bicultural contents and facilitators</li> <li>Hands-on activities</li> <li>Back-translation used</li> </ul>	<ul style="list-style-type: none"> <li>Family based</li> </ul>	<ul style="list-style-type: none"> <li>Community agencies</li> </ul>	Dietary energy from fat; fruit, and vegetable consumption; depression; breast health behaviors; BMI	<ul style="list-style-type: none"> <li>Significant decrease in fat intake and percentage of energy from fat; no significant differences in breast health behaviors</li> </ul>	Significant decrease in fat intake and percentage of energy from fat; no significant differences in breast health behaviors	
Flores, 1995	110 Hispanic children (ages 10–13)	<ul style="list-style-type: none"> <li>School based</li> </ul>	<ul style="list-style-type: none"> <li>Not described</li> </ul>	<ul style="list-style-type: none"> <li>Community agencies</li> </ul>	Timed mile run; resting heart rate; BMI; attitudes toward physical activity	<ul style="list-style-type: none"> <li>Significant decrease in BMI and heart rate; significant improvement in physical activity behavior and attitudes among girls, but not boys</li> </ul>	Significant decrease in BMI and heart rate; significant improvement in physical activity behavior and attitudes among girls, but not boys	
Poston et al., 2001	379 obese Mexican American women (ages 18–65)	<ul style="list-style-type: none"> <li>Bilingual and/or bicultural contents and facilitators</li> <li>Ethnic foods</li> </ul>	<ul style="list-style-type: none"> <li>Use of social networks.</li> </ul>	Not described	Physical activity; BMI; social support; locus of control	<ul style="list-style-type: none"> <li>No significant overall improvement in physical activity levels</li> </ul>	No significant overall improvement in physical activity levels	
Poston et al., 2003	108 women of Mexican origin (ages 21–65)	<ul style="list-style-type: none"> <li>Bilingual and/or bicultural contents and facilitators</li> <li>Ethnic foods</li> </ul>	<ul style="list-style-type: none"> <li>Family based</li> <li>Social support</li> </ul>	Not described	<ul style="list-style-type: none"> <li>Caloric and fat intake; physical activity; BMI; lipid analysis; blood pressure;</li> </ul>	<ul style="list-style-type: none"> <li>Significant weight loss in experimental group</li> </ul>	Significant weight loss in experimental group	

Author	Sample	Intervention Components				Recruitment Strategies	Outcomes	Effects
		Surface Structure	Deep Structure	Deep Structure	Deep Structure			
Rosal et al., 2005	25 Spanish-speaking individuals with type 2 diabetes (ages 18 years)	<ul style="list-style-type: none"> <li>Bilingual contents and facilitators/agents</li> <li><i>Novela</i> format</li> <li>Ethnic foods</li> <li>Socializing opportunities</li> </ul>	<ul style="list-style-type: none"> <li>Family based</li> <li>Materials appropriate to literacy level</li> <li>Use of social networks</li> </ul>	<ul style="list-style-type: none"> <li>Community health center</li> <li>Elder program</li> <li>Community registry</li> </ul>	<ul style="list-style-type: none"> <li>adverse events; mediation use and adherence</li> <li>Quality of life</li> <li>Insulin management</li> <li>Self-efficacy</li> <li>Diabetes-related knowledge</li> <li>Depressive symptoms</li> <li>Physical activity</li> </ul>	<ul style="list-style-type: none"> <li>No significant differences in dietary intake or physical activity; significant decrease in glycosylated hemoglobin and depression</li> </ul>		
Staten et al., 2004	217 Hispanic women (ages 50)	<ul style="list-style-type: none"> <li>Bilingual content and facilitators</li> <li>Delivered by promotoras</li> </ul>	<ul style="list-style-type: none"> <li>Social support provided by promotoras</li> </ul>	<ul style="list-style-type: none"> <li>Community agencies</li> </ul>	<ul style="list-style-type: none"> <li>Blood pressure; cholesterol; glucose; physical activity; fruit and vegetable consumption</li> </ul>	<ul style="list-style-type: none"> <li>Significant increase in fruit and vegetable consumption and physical activity; significant decrease in systolic blood pressure</li> </ul>		
Thompson, Coronado, Chen, & Islas, 2006	20 communities with 918 Hispanics (ages 18)	<ul style="list-style-type: none"> <li>Delivered by promotoras</li> </ul>	<ul style="list-style-type: none"> <li>Not specified</li> </ul>	<ul style="list-style-type: none"> <li>Health fairs</li> <li>Block parties</li> <li>Festivals</li> <li>Fun runs</li> </ul>	<ul style="list-style-type: none"> <li>Cancer screening behaviors; fruit and vegetable consumption; and smoking</li> </ul>	<ul style="list-style-type: none"> <li>No significant differences in fruit and vegetable consumption or smoking; significant differences in use of screening services</li> </ul>		
Trevino, Hernandez, Yin, Garcia, & Hernandez, 2005; Trevino et al., 1998, 2004	27 schools (2,640 Mexican American children)	<ul style="list-style-type: none"> <li>Student after-school health club</li> <li>Theatrical plays</li> <li><i>Loteria</i> game (bingo)</li> <li>Salsa dancing</li> <li>School cafeteria program</li> </ul>	<ul style="list-style-type: none"> <li>Family based</li> <li>Materials appropriate to literacy level</li> <li>Cultural values</li> <li>Social support</li> </ul>	<ul style="list-style-type: none"> <li>Schools</li> </ul>	<ul style="list-style-type: none"> <li>Glucose level; percentage of body fat; physical fitness; fiber intake; and saturated fat intake</li> </ul>	<ul style="list-style-type: none"> <li>Significant changes in fitness and fiber intake and glucose level</li> </ul>		
Vazquez, Millen, Bissett, Levenson, & Chipkin, 1998	38 Latina Caribbean (ages 32–70)	<ul style="list-style-type: none"> <li>Bilingual and/or bicultural contents and facilitators</li> <li>Ethnic foods</li> </ul>	<ul style="list-style-type: none"> <li>Materials appropriate to literacy level</li> <li>Cultural values</li> </ul>	<ul style="list-style-type: none"> <li>Community agencies</li> <li>Churches</li> <li>Participant referrals</li> </ul>	<ul style="list-style-type: none"> <li>Energy, saturated fat, carbohydrate, and fiber intake</li> </ul>	<ul style="list-style-type: none"> <li>Significant changes in energy, total fat, saturated fat, carbohydrate, and fiber intake</li> </ul>		

Author	Sample	Intervention Components			Recruitment Strategies	Outcomes	Effects
		Surface Structure	Deep Structure				
Wechsler, Basch, Zyburt, & Shea, 1998	6,902 elementary school students (86% Latino)	<ul style="list-style-type: none"> <li>• Group setting</li> <li>• Home-based activities</li> <li>• Latino role models</li> <li>• Fun activities</li> </ul>	<ul style="list-style-type: none"> <li>• Based on socioeconomic structural factors</li> <li>• Family based</li> </ul>	<ul style="list-style-type: none"> <li>• Media (radio, newspapers, television)</li> <li>• Schools</li> </ul>	Increase low-fat milk consumption	Significant increase in low-fat milk consumption	

NOTE: BMI = body mass index; *promotoras* = peer health workers.