

Visual and Participatory Research Methods for the Development of Health Messages for Underserved Populations

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Mass communication health campaign messages play critical roles in public health, yet studies show mixed effectiveness in reaching and impacting underserved populations. The purpose of this study was to evaluate the benefits of using visual and participatory research techniques toward health message development targeting older Hispanic women. Demographic information and levels of physical activity were first obtained in a sample of older Mexican women ($n = 23$; ages 71.9 ± 7.6 years) living in the city of Chicago. Perceptions of physical activity were then assessed using a visual research method known as photo-elicitation. Health message concepts promoting physical activity were developed with a subsample of the target population using a participatory approach. Photo-elicitation helped develop a unique understanding into the many factors impacting physical activity among older Mexican women. Follow-up in-depth interviews provided detailed narratives that (a) built upon visual data and (b) identified characteristic differences between physically active and inactive women. Ultimately, these findings were beneficial in constructing new, culturally tailored message concepts. Findings suggest that this method may be a valuable tool in the development of mass communication health messages, extracting rich and meaningful data from target audiences while fostering a sense of partnership between researchers and community members. Tailoring and improving the message design process around the needs of underserved populations is essential in the effort to eliminate the burden of health disparities. This study uses innovative interdisciplinary research techniques to explore new approaches to public health communication in underserved populations.

PHYSICAL ACTIVITY AMONG OLDER HISPANIC WOMEN

Health disparities research has established that Hispanic communities suffer disproportionately from obesity, type II diabetes, and cardiovascular diseases (Hovell et al., 2008). While these conditions can often be prevented with regular physical activity, data from the Centers for Disease Control

and Prevention (CDC) show that only 34% of Hispanic adults over the age of 65 years engage in physical activity in accordance with nationally recommended guidelines (CDC, 2010, 2011a). Additionally, more than 30% of older Hispanic adults are known to be inactive, achieving less than 10 minutes of moderate physical activity per week (CDC, 2010). In comparison, the CDC has found more than 40% of non-Hispanic whites to be physically active and only 20% to be inactive (CDC, 2010). Physical activity data also find substantial discrepancy between self-reported physical activity levels and those collected by accelerometers (physical activity measuring devices), suggesting that aging American adults from minority backgrounds may obtain

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even less physical activity than previously thought (Tucker, Welk, & Beyler, 2011). The significance of these disparities is augmented as population projections identify the Hispanic population to be the nation's fastest growing minority, likely to triple by the year 2050 (U.S. Census Bureau, 2008).

Many older Hispanic women face major barriers to physical activity and health care access due to language, culture, and socioeconomic status (Van Duyn et al., 2007). Recent research suggests that due to a variety of sociocultural and contextual factors, Hispanic women may conceptualize physical activity differently from non-Hispanic women (Fleury, Keller, & Perez, 2009). This may explain why this population is less responsive to health messages promoting physical activity.

Underserved populations are particularly vulnerable to disparities in health and health communication (Kelly, Sturm, Kemp, Holland, & Ferketich, 2009). In addition, mass communication health messages have been shown to have limited effectiveness in reaching and impacting underserved populations such as minorities and aging groups (Freimuth & Quinn, 2004). One potential strategy to overcome this challenge and improve the reach and impact of health messages on the underserved may be engaging target audiences as partners in message development and the dissemination process (Southwell, Hamilton, & Slater, 2011).

Translating communication efforts into behavior change warrants an integrative understanding of the distinct cultural perspectives and contextual elements that determine physical activity and health behavior (Fleury et al., 2009; Maddock, Silbanuz, & Reger-Nash, 2008; Snyder, 2007). Studies exploring physical activity among Hispanic women suggest that it is important for interventions to be culturally competent and adaptive to the needs and values of Hispanic communities (Hovell et al., 2008). Older Hispanic women not only experience language and cultural barriers, but also face age-specific barriers, including fear of falling and lack of motivation (Cerin, Leslie, Sugiyama, & Owen, 2010; Van Duyn et al., 2007). Tailoring messages to match contextual and sociocultural features of underserved audiences is a vital step to fully understand the complexities of their needs (Rodgers, Chen, Duffy, & Fleming, 2007).

strategies to successfully build awareness and informational resources, shape behavior and perceptions, and empower communities (Huhman, 2010; Kreps & Maibach, 2008).

Visual and participatory methods have been utilized previously in the fields of media, psychology, and sociology (Buckingham, 2009; Noar, 2006), but their application in public health research is relatively new. In a method known as photo-elicitation, researchers provide participants with cameras, inviting them to participate by taking pictures and visually interpreting a given subject (Wang, Yi, Tao, & Carovano, 1998). Guided by research questions and prompts, participants are given the unique opportunity to take pictures of meaningful elements of their environment—capturing objects, landscapes, events, and people—that relate to the research topics. Pioneering studies have found this technique to be beneficial in extracting perceptions and attitudes defined by an individual's viewpoint and context (Baker & Wang, 2006). Yamasaki (2010) and Baker and Wang (2006) have also demonstrated the value of photo-elicitation in understanding the experiences and perceptions of aging populations. Moreover, media and communication research finds that the use of participatory and visual methods may be viable in bridging gaps between researchers and research participants (Buckingham, 2009), effectively allowing for comprehensive learning about various social issues and phenomena (Singhal, Rao, & Pant, 2006). A recent review article has summarized the application of photo-elicitation research in health and public health research (Catalani & Minkler, 2010). The present study aims to build on this body of work by applying the approach to the older adult Latina population.

The use of photo-elicitation to analyze sociocultural perspectives and develop research-grounded health communication messages about physical activity among Hispanic women has been particularly limited. As the Mexican population encompasses the largest Hispanic subgroup, accounting for more than 60% of Hispanics in the United States (U.S. Census Bureau, 2011a), we narrowed our focus to target this rapidly growing segment. Our research sought to examine this issue among older Mexican women (65 years and older), which, to our knowledge, has not been explored.

FOUNDATIONS FOR IMPROVED COMMUNICATION STRATEGY

Effectively reaching and impacting underserved populations thus requires that researchers take a step beyond traditional public health and communication research techniques. The convergence of public health and communication science offers integrated new frameworks and perspectives that are a valuable response toward health disparities (Bellows, Anderson, Gould, & Auld, 2008; Ratzan, 2001). Emerging interdisciplinary tools in health communication research and social marketing provide researchers with innovative

METHODS

Research Objectives

Using a cross-sectional, mixed-methods design targeting older women of Mexican origin, our primary objectives were to employ visual and participatory research techniques to:

1. Enhance our understanding of choices related to being physically active and maintaining overall wellness.
2. Deepen our knowledge of the complexities and sociocultural contexts that influence such decisions.

3. Construct new message concepts promoting physical activity based on collected data.
4. Assess the benefits of using visual methods and participatory research in health message design targeting underserved populations.

We anticipated that the use of participatory and visual research methods would be an effective and useful means to derive data that capture the key drivers of physical activity behavior.

Study Design and Theoretical Framework

The study procedure was guided by the Social Ecological Model, a theoretical framework that helps explain the role of multiple levels of integration and influence in shaping individual behavior and beliefs (Stokols, 1996). Our purpose was to learn how older Mexican women might benefit from a communication-based intervention promoting physical activity that is culturally sensitive and driven by visual and participatory research methods. In order to probe the relationships between the individual and the broader community (both physical environment and sociocultural context), we adopted a community-based participatory research technique known as photo-elicitation (Wang et al., 1998), inviting participants to take photographs of salient and personally meaningful features in their lives.

Data collection was divided into three separate phases, each focusing on a different component of the research and building upon the previous phase. The first phase was centered on the photo-elicitation method and participant screening. Visual images gathered from photo-elicitation were explored in detail through in-depth interviews in the second phase. Analysis of the visual images focused especially on the significance and meaning the participant described about details of the objects and places in the photo related to physical activity and the relationship of the images to family, religion, environment, and broader cultural or traditional norms (Kreuter & McClure, 2004; Lester, 2006). Finally, the third phase examined the use of visual and participatory techniques in the health message development process. This phase was driven by the visual and supplementary data collected from previous phases, as well as by a focus group facilitated to design and pretest message concepts.

Participants

The participant sample included females aged over 65 years who were of self-reported Mexican origin, community dwelling and ambulatory, living in an urban neighborhood in Chicago known for its large Mexican population. We established networking links with community agencies (e.g., faith-based groups, aging agencies, community council) that had extensive experience working with Hispanic seniors in the Chicago area and that had agreed to assist us in recruiting

study participants. Participants were recruited from the local community via flyers posted and distributed in local grocery stores, community centers, and churches. In addition, announcements about the study were made at the end of church services. Although we were careful to distribute recruiting material in both secular and faith-based locations, our sampling procedure may have led to an oversampling of individuals with a Roman Catholic religious affiliation (91%). Review of demographic questionnaire data revealed that most participants reported 6 years of education, 70% were married or widowed, and 56% had a yearly household income for 2009 lower than \$9,999. It was not our intent to select individuals of lower socioeconomic status; however, the characteristics of the neighborhood elected for study made it likely that individuals of relatively low income and education levels were overrepresented.

This study was approved by the University of Illinois Institutional Review Board (IRB). All materials were provided in both the English and Spanish languages to accommodate linguistic preferences. All participants signed a consent form approved by the IRB upon enrollment in the study, after which an orientation took place to familiarize each participant with study goals and basic instructions for their participation.

Phase One: Photo-Elicitation and Screening

Twenty-three participants ($n = 23$; aged 71.9 ± 7.6 years) were recruited for Phase One of the study. Participants were asked to wear a physical activity monitor (accelerometer) during seven consecutive days to assess physical activity levels. Accelerometers have been previously used to successfully gather physical activity information among Hispanic populations and older adults (Marquez, Bustamante, McAuley, & Roberts, 2008; Murphy, 2009). This step enabled us to stratify the target audience into segments that were either physically active or inactive based on actual physical activity data. The Physical Activity Guidelines for Americans (U.S. Department of Health and Human Services, 2008) helped shape our operational definitions for physical activity (>150 minutes/week of moderate intensity) and inactivity (≤ 30 minutes/week). A demographic questionnaire was also administered to identify each participant's demographic characteristics.

Additionally, participants were given a disposable camera and asked to capture images of physical activity opportunities and perceived barriers to physical activity. Participants' photography was guided by a set of prompts provided by the research team, and we requested each to take about 27 pictures, representing both week and weekend days. We asked the older women to visually identify things that are meaningful to them in terms of place, people, activities, and other elements that might relate to being physically active.

Participants engaged in ethics and instructional training (in English or Spanish) regarding the use of accelerometers,

cameras, and taking photographs for the study. We reviewed prior photo-elicitation research (Baker & Wang, 2006; Fleury et al., 2009; Wang et al., 1998) to better understand training practices and begin developing our own method. Participant training took place at a local church and began by providing an overview of the study procedure and purpose to participants. When taking their pictures, we wanted our participants to think about health and physical activity in terms of their own beliefs, perceptions, and social and physical environmental surroundings. However, we chose to provide instructions that were relatively simple and minimal, in order to mitigate potential bias. Specifically, participants were given the following instructions: “We want to see the world through your eyes! Please use this camera to capture images both negative and positive of (1) Things you do in your daily life; (2) Meaningful places in your daily life (indoors and outdoors); and (3) People you interact with in your daily life.” We anticipated that this approach would be beneficial in (a) giving participants the opportunity to define the topics for themselves and express them through pictures and (b) ensuring that our instructions were easy to understand for low-literacy participants. We also provided technical training to ensure that participants were comfortable with using the cameras and performing the study procedures.

Upon completion of this phase, the accelerometers and cameras were retrieved by the research team for data analyses.

Instruments. For Phase One, study participants were asked to wear portable GT3X Actigraph (Actigraph, Inc., Fort Walton Beach, FL) accelerometers to measure their physical activity levels for a 7-day period and instructed to live their lives as they usually would. Accelerometers are small, noninvasive devices, and do not interfere with usual daily activities or function. Study participants were instructed to wear the accelerometer on a belt over the hip corresponding to their dominant hand and to remove the device during water activities (e.g., bath, shower, swimming, etc.) and while sleeping. Accelerometers were calibrated prior to data collection. Data were collected in 1-minute epochs. For compliance scoring, a valid accelerometer hour was defined as less than 30 consecutive “zero” intensity counts, and a valid day consisted of at least 10 valid hours per day. Data were cleaned and scored using MeterPlus version 4.0 software from Santech, Inc. (www.meterplussoftware.com). Scoring of moderate to vigorous physical activity was based on a commonly used cutpoint (>1952 counts/minute) (Freedson, Melanson, & Sirard, 1998), and derived as average minutes of moderate to vigorous physical activity per valid wearing day (Buman et al., 2010). To provide comparability with current physical activity recommendations based on minutes per week (Physical Activity Guidelines Advisory Committee, 2009), this variable was multiplied by 7 to obtain an estimate of average weekly minutes of moderate to vigorous physical activity.

Phase Two: In-Depth Interviews

Nine participants were selected from Phase One for follow-up interviews. To ensure that we obtained perspectives of both active and sedentary participants, we used accelerometer data to assist in selecting the interview participants. We included individuals at opposite ends of the physical activity continuum. Specifically, we chose four older women who engaged in at least 150 minutes per week of moderate-intensity physical activity and five older women who clearly did not meet the DHHS Physical Activity Guidelines (≤ 30 minutes/week). At this stage, we wanted to begin characterizing the physically active and inactive participants and to explore potential distinctions between them. We felt that choosing participants from either end of the continuum would allow for greater contrast in the data collected in Phases Two and Three and would help us learn more about perceptions and needs specific to those two segments. Participants were excluded if they participated in moderate-intensity physical activity between 30 and 150 minutes per week. All nine of the participants invited for follow-up agreed to participate. There were no additional inclusion or exclusion criteria.

For each individual, we showed all her (own) photos that served as discussion topics for the interviews. The interviewer then explored different aspects of one’s life such as family, religion, community and environment, food and cooking, tradition, culture, and norms. Additionally, the interviews explored how both active and sedentary participants viewed physical activity opportunities in their environment, probing about factors that may pose barriers or facilitators for physically active behavior. A sample interview guide was developed to address these factors based on participants’ visual data (Table 1). For each photograph, participants were asked to describe (a) what the image was, (b) what was happening in the photograph, and (c) why the image was important. Questions used to elicit detail included: (a) What do you see in this photograph and what significance does it hold for you? (b) What resources for physical activity are shown in the photograph? (c) In what ways do these resources influence physical activity? Interviews were audio-taped and conducted in English or Spanish, depending on participant preference. Upon completion of the interviews, each was transcribed, and all data were coded for analyses of emerging themes. In total, 132 pictures were reviewed by the participants and approximately 243 single-spaced pages of transcript data were generated.

Phase Three: Communication Strategy and Message Development

Our objective in this component was to develop a communication strategy that could elicit a positive change by increasing awareness and promoting physical activity in a manner that was meaningful to the target audience. The visual and supplementary data collected in Phases One and

TABLE 1
Sample Interview Questions, by Theme

General questions	-What do you see in this photograph? What is this an image of? -What is happening in this photograph?
Family	-What role do these family members play in your life? -Does caring for your family require any sort of physical activity? -Is physical activity important to you or your family? -How might a support system that included your family members encourage you to be more physically active? -If your family members regularly participated in physical activity, would this encourage you to be more active?
Religion	-What significance does religion have in your everyday life? -Do your religious beliefs or practices impact your decisions to be physically active or inactive? -Would an exercise program organized and run by your church be encouraging for you? -How do you think your local churches can help keep people in your community active?
Community and environment	-How do you feel about your community and environment? The neighborhood, safety, people, etc. -How much time do you spend around your neighborhood each day? What sorts of activities do you engage in? -Do you think that your community has adequate resources for you to be physically active? -What changes, if any, would you like to see in your community to encourage physical activity?
Food and cooking	-How often do you cook and prepare food? -Is cooking a major component of your daily life? -Do you feel that cooking is a physically intensive task? -How important is eating healthy to you? -Do the roles of food and cooking in your culture impact how physically active you are? -How useful or encouraging would a wellness program that emphasized health eating and lifestyles as well as physical activity be to you?
Tradition, culture, and norms	-What suggestions do you have in improving physical activity when thinking about food and cooking in your daily life? -To what extent do you feel your culture has developed its own gender roles and social norms? What are they? -How much of a presence do culture and norms have in your life? -How do these roles encourage or discourage you from being physically active? -How do you think physical activity can be encouraged through the rich Mexican culture that you are a part of?

Two and findings from focus groups in Phase Three guided the development and testing of messages for the communication strategy.

Preproduction exploratory research and theoretical framework. Consistent with the Social Ecological Model, we wanted new messages to reflect physical activity behavior and beliefs as a product of both the individual and the physical and social environment. Additionally, self-efficacy theory (Bandura, 1977), social marketing, and the marketing mix (price, promotion, product, and place) guided our conceptualization of physical activity promotion (Lee & Kotler, 2011).

An hour-long focus group was facilitated to create a collaborative platform upon which a portion of the study participants could voice their opinions and preferences with respect to message design. The session was held in Spanish and audiotaped.

We collected responses based on a set of objectives and questions (Table 2), gathered feedback on selected content from the National Institute on Aging's "Everyday Guide on Physical Activity and Exercise" (U.S. Department of Health and Human Services, 2009a), and posed our own follow-up questions (Table 3). Messages from this exercise guide served as a starting point for new message concept development. Participants were asked to comment on previous physical activity messages targeting older adults. Next they were asked more specific questions regarding cultural

elements that should be included in future messaging. New message concepts (Table 4) were created based on focus group feedback, visual data, and literature review.

Audience segmentation and channel selection. Individual physical activity levels based on accelerometer and health questionnaire data indicated which participants were generally physically active and which were not. This also provided more insight into the needs of specific segments within a larger sample. We chose to segment our audience by their characteristics and needs pertaining to physical activity. Visual data, supplementary interviews, and focus groups very clearly illustrated channels, locations, and sources that might serve as valuable messaging platforms.

Message design. We constructed new message concepts based on participant input, visual data, and research team feedback, ensuring that messages used persuasive techniques, promoted self-efficacy, and were culturally sensitive to the values and norms of older Mexican women. Our primary goal was to persuade sedentary participants to become active, and, second, for active participants to maintain physical activity. Participation and buy-in from the women were important during this step, as we were interested in both learning firsthand about the sociocultural elements that needed to be addressed and fostering a sense of partnership with the women in promoting physical activity in their community.

TABLE 2
List of Focus-Group Planning and Objective Questions for Exploration

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- What do participants want to see in health campaign messages geared toward them with respect to physical activity? What would they be most receptive to?
 - What motivates them to change their behavior?
 - What tangible rewards would increase their motivation? For example, a coupon for walking shoes.
 - Probe for what nonmonetary rewards would increase their motivation (most likely something like feeling stronger, knowing they will be less burden on their children for caring for them. It is the “price” element in a marketing approach.
 - What cultural elements would they like to see included in messages?
 - Should themes that have emerged from our data be a critical aspect of future messages? (i.e., family, religion, food, etc.)?
 - What are participants’ responses to previous messages from the National Institute on Aging’s exercise guide?
 - What channels would be most effective in reaching this population?

 - Individual-level questions:
 - What are your overall thoughts on the messages that we have just discussed with you? Do you find them to be relevant to your everyday life?
 - What aspects of your life encourage you to be healthy the most? (i.e., family members or friends, connection to God, personal satisfaction, etc.)
 - If I was to post signs encouraging physical activity in your community environment, where should I post signs to make sure that you are able to see and read them? (i.e., a laundromat, church, community center, etc.)
 - Community level:
 - In your opinion, in order to successfully promote physical activity among older Mexican women in a communication campaign, how important is it that the following topics be considered: should probe more deeply about what about these are important: what emotional strings are they pulling? So, what feelings do they have about family—again will likely be wanting to live a long time to see their grandchildren grow up and don’t want to be a burden on their children.
 - Family, religion, food, community members and friends, etc.
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We aimed to highlight the convenience and benefits of physical activity, describing simple ways to be active and risks associated with being physically inactive. We developed concepts using gain and loss frames, persuasion, and tailoring strategy for health campaign messages that would meaningfully encourage physical activity (Latimer, Brawley, & Bassett, 2010; Rothman, Bartels, Wlaschin, & Salovey, 2006). We also wanted to build credibility by acknowledging those who were most important to older adults and ethnic minorities, such as doctors, family members, and the community.

Data Analysis

For quantitative data, analyses of variance were used for the continuous variables (e.g., time spent in moderate-intensity physical activity), while a chi-squared test was used for the categorical variables (active vs. inactive). Statistical analysis was performed using SPSS 18.0 for Windows and statistical significance was set at $p < .05$.

For qualitative data collected from in-depth interview and focus-group procedures, we first transcribed participant responses and then began thematic content analyses. Participant responses were consolidated to identify key factors influencing perceptions on physical activity and generally being healthy. Responses were coded and categorized based upon (a) the corresponding component of the Social Ecological Model impacting specific attitudes (Stokols, 1996) toward physical activity and (b) the likelihood of each factor to either promote or discourage being physically active. These categories helped define themes

that impacted physical activity beliefs and behavior at the individual, social and physical environmental levels. Data were analyzed collectively by the research team using a constant comparative analytic method, exploring patterns in participant responses and the relationships existing among them (Corbin & Strauss, 2007; Kreuger & Casey, 2009). Examining responses in terms of Social Ecological Model dimensions and comparing individual experiences against each other allowed us to develop message concepts that were relevant to the target audience at multiple levels.

Study Timeline

All three data collection phases in this study took place across 8 months in 2010. Data from Phase One were gathered in the months of April and May. Participants were given seven days to take their photos. In-depth interviews for Phase Two were administered in the summer (May–June) of 2010, and data for the third and final phase were collected in November. Data entry and analysis began in May 2010 and continued through January 2011 to examine the data (a) after each phase, as well as (b) collectively at the end of all three phases.

RESULTS

Phase One: Photo-Elicitation and Screening

Employing the use of accelerometers in this initial phase allowed us to clearly identify participants who were

TABLE 3
List of Focus-Group Questions for Message Development and Concept Testing

<i>Message concept</i>	<i>Topics addressed</i>	<i>Focus-group question</i>
Even if you have difficulty standing or walking, you can still exercise and benefit from it. In fact, in most cases, you have more to lose by <i>not</i> doing anything.	Importance of physical activity	What are your thoughts on this message? Do you agree that you and other older adults have a lot to lose by not being physically active?
See how Greta has benefited from regular exercise: "At age 67, I'm in the best physical condition of my life. Two years ago, I joined a low-impact aerobics class at a nearby senior center. The entire routine is done to music, planned and led by an instructor. My balance has improved greatly, and my osteoporosis has remained stable."	Testimonials on the effects of physical activity	When hearing about people in your own age bracket who exercise regularly and have improved their health by doing so, do you find that this impacts your attitudes toward physical activity? Do you feel inspired to be more active?
Make it a priority: Being active and exercising regularly can change your life.	Importance of physical activity	This message conveys a clear and simple message about being active. Do you find it to be effective in encouraging physical activity as compared with the other messages? Why or why not?
Strength training physical activities can maintain your ability to: 1. Carry a full laundry basket up the stairs 2. Carry your small grandchildren 3. Lift bags of mulch in the garden.	Benefits of physical activity in everyday life these emotional benefits are critical. Moderator should spend a lot of time here.	Do you believe that strengthening your body is important and good for your health? Are the examples listed important or relevant to your daily life?
There are many ways to fit exercise into your regular routine. Rethink your priorities: how important is an entire afternoon of TV? How about a walk after lunch instead?	Making physical activity convenient	What are your opinions on this message? Do you think that making physical activity a convenient part of everyday life would encourage physical activity among older Mexican women? What changes do they need to make to their place to be active to make it appealing for physical activity?
Try to do moderate-intensity exercises on 5 days per week for 30-minute sessions each. Should this be the 150 minutes per week guideline, which was designed so people wouldn't feel locked into 30 minutes 5 days a week?	Physical activity guidelines	This message conveys the national physical activity recommendations. What are your thoughts on these guidelines? Do they seem easy to understand and achieve? Do they seem too difficult? Why?

TABLE 4
Newly Constructed Message Concepts

<i>Message concept</i>	<i>Theoretical construct, frame, and themes</i>
Being active is easy, enjoyable, and helps you live longer. Why not take a walk around the neighborhood for half an hour every morning instead of watching a soap opera on TV?	Gain frame (addressing benefits of physical activity) and self efficacy <i>Emphasizing convenience of physical activity</i>
Take a walk around the park or go salsa dancing with friends: physical activity is a key to a healthier and happier you.	Gain frame/tailored toward the community <i>Addressing friends, cultural elements and associated health benefits</i>
Doctors say that diabetes is one of the leading causes of death among Hispanics. Reduce your risk now by adding physical activity to your daily routine.	Loss frame/building credibility <i>Type II diabetes health risks</i>
It's simple. To avoid falls, I need to improve my balance and become stronger. That's why I exercise 5 days a week—for just 30 minutes each day. I've got too much to lose if I don't.	Mixed-frame message <i>Addressing physical activity guidelines, and health benefits related to older adults</i>
I want to plant flowers in my garden and take care of my grandchildren, but I can't do that without my strength. That's why being physically active everyday is important to me and important to my family.	Loss frame/self-efficacy <i>Overcoming barriers to physical activity</i>

physically active and inactive. This was critical in deepening our understanding of the target population's needs with respect to physical activity, as well as helping us define audience segments for subsequent study phases. In a quantitative analysis of accelerometer data, on average, women in our study engaged in only 12 minutes of moderate-intensity physical activity per day. Sedentary activities, on average, composed about 436 minutes per day (approximately 7.2 hours), while 354 minutes (approximately 5 hours/day) were spent in light-intensity physical activity. Data analysis pointed to high levels of physical inactivity and a lack of vigorous-intensity activity across all participants. Only four participants (17.4%) achieved the DHHS recommendation of 150 minutes of moderate or vigorous physical activity over a 7-day period, while the majority of participants were far more sedentary.

Phase Two: In-Depth Interviews

We performed a qualitative content analysis of all participant photographs and interview data, consolidating a number of emerging and prominent themes. Participants seemed receptive toward the photo-elicitation process and corresponding interviews. Visual data captured many important elements in shaping physical activity behavior, including family and community members, neighborhood resources and settings, pets, and social activities. Participants were able to elaborate upon key components of their photographs during interviews, allowing for greater detail and explanatory power. We felt that the photographs provided a lens for our team to visualize the contexts in which participants live and make health-related choices, extracting deeply personal narratives that contribute toward beliefs and behavior.

Categorized according to the Social Ecological Model and representing factors that influence physical activity choices, several themes emerged from the data. These findings were critical to our understanding of the target audience and the development of message concepts.

At the individual level, health status, previous physical activity behavior, and beliefs about physical activity and health were major indicators for physical activity. Many participants suffered from conditions linked with old age, such as depression and a lack of physical strength and motivation, as well as diabetes and obesity, commonly associated with older Hispanic populations. These factors combined to pose major barriers toward physical activity. Additionally, the way participants prioritized and viewed being healthy was a key determinant of physical activity. Those who understood and valued the benefits of physical activity were often more active. Finally, prior physical activity was an important predictor of current physical activity behavior. We often found those participants who reported being active when they were younger to be active as older adults; similarly, those who were not previously active were inactive as older adults.

At the social environmental level, family, social influence, and community involvement played critical roles in

physical activity. Most participants did not receive a sense of support from those around them to be physically active, perhaps drawing on overarching cultural norms. While most participants did not reach recommended levels of physical activity, many were active in social networks, community, and church-related activities. Most were motivated to engage in social events, although few activities were related to improving health and being physically active. Since these platforms were vital in participants' daily lives, promoting physical activity at a community level through faith-based neighborhood organizations and social networks would be recommended.

At the physical environmental level, the availability of physical activity resources, weather, and neighborhood safety were important factors in driving physical activity. Participants often felt that their neighborhood lacked physical activity resources such as affordable gymnasiums and exercise equipment to help remain active. We found that building awareness around this topic may be valuable for this community, highlighting methods of physical activity, such as walking or dance, that are effective but do not require many resources. Many participants reported a lack of motivation to be active during the winter, citing the cold as a hindrance toward exercise. This pointed toward a need for strong physical activity promotion in warmer seasons, and additional strategies to encourage it in the colder months. Some participants felt their neighborhoods had changed and become less safe over the years, and thus improving both neighborhood safety and perceptions of neighborhood safety may help promote outdoor physical activity.

We found that physical activity was being influenced by a variety of social norms, including the role of older Mexican women in the household and religion in everyday life. Most participants did not believe that Mexican culture was supportive of physical activity as part of a daily routine. Cultural values defined activities for older women, such as cooking, cleaning, caring for children and grandchildren, watching television, and visiting the local church. Culturally etched roles left little room for promoting wellness, which was especially true for the inactive women, whereas the active women were driven by individual factors as opposed to cultural norms.

Responsibilities of the older Mexican women did not typically include physical activity, and expectations of older women did not extend to enhancing a woman's health through physical activity. This may be due to a *machismo* factor commonly found in Hispanic communities (Fleury et al., 2009), and perhaps a belief that a woman's priority is her family's well-being rather than her own health. This illustrated the increasing need to build self-efficacy and address physical activity through a sociocultural context to meaningfully reach participants.

We identified faith to be a key component for future communication efforts, as it was ubiquitous in our data. All participants were self-reportedly religious: making prayer, worship, and church visits a routine part of their lives.

However, while a connection to “God” was a major motivator for many aspects of daily life, this did not extend to encourage physical activity or to promote health. There is a need for future research to clarify our understanding of (a) the role of faith and faith-based institutions as a platform for physical activity intervention and education, and (b) the role of religion in encouraging taking care of one’s body and health. We reasoned that building physical activity awareness within a religious context may improve physical activity behavior and knowledge, since faith was an important influence for the target audience.

Phase Three: Communication Strategy and Message Development

Creating a platform for study participants to engage in the development of our communication strategy provided much insight for health message design. This method, coupled with previously collected visual and supplemental data, facilitated an environment where participants could directly share their thoughts and perspectives on the message development process. The procedure allowed the research team to obtain valuable firsthand information about the characteristics and preferences of our target audience, enabling us to clearly identify audience segments, channels, and cultural elements—from participants’ own words and images—that were vital for building a communication initiative.

This unique message development process had a number of implications for health communication efforts focused on older Mexican women and other underserved populations. For many populations that are low in literacy, socioeconomic status, and health care access, conventional formative research methods may not be sufficient to explore the sociocultural and contextual drivers of health behavior. The creative visual and participatory research techniques used were well suited for use with this population. Partnering with the target audience to build and test health messages and using visual data to drive the formative research process were not only helpful for the research team to extract important feedback, but also provided community members with an opportunity to be involved in an effort that was relevant to their society’s wellbeing.

Through this procedure, we learned that participants generally believed in the physiological and mental benefits of physical activity, claiming that it provided energy, happiness, social activity, a sense of wellness and achievement, improvement of physical appearance, and balance. Balance, motivation, and physical strength were especially relevant issues for our participants, as they are for many older adults. Derived directly from members of the community, we learned that new messages would need a strong focus on overcoming sociocultural and age-specific obstacles.

Participants seemed clear on which types of messages they preferred, reacting particularly positively to loss-frame messages that highlighted the risks associated with physical

inactivity. Gain-frame messages also elicited some positive responses. However, we found that many messages about the health benefits of physical activity were too complex and lengthy for this population, many of whom have low health literacy rates.

Emphasizing the convenience of being physically active was important for participants. Our data found that many older Mexican women spend large portions of the day watching television and soap operas, a prevalent cultural trait among both active and inactive participants. As a result, we reasoned that framing physical activity as a convenient and easy part of the day that can be balanced with a moderate amount of sedentary activity would be essential for future messages.

When it came to obtaining feedback on physical activity guidelines in order to assess how easy or difficult they were to comprehend, both active and inactive participants claimed that the recommendations were easy to understand. This may point toward either a social desirability bias or perhaps cognitive dissonance among inactive older women, who believe in the benefits of physical activity but do not act correspondingly. In this case, accounting for such discrepancies would also be important for future health messages, as much of the target audience was inactive despite some awareness of physical activity guidelines and benefits.

Participants were very clear on motivating factors for physical activity and the best channels for reaching the target audience. Structured exercise programs that included friends were strongly preferred. An active participant also stated that she continued to motivate herself to be active, underscoring the need to enhance self-motivation among inactive older Mexican women perhaps through messages that focus on self-efficacy and social networks. Interestingly, participants believed that the best channel to reach the target audience was the local Laundromat facility, which was photographed by some during the photo-elicitation phase. Additionally, grocery stores, drug stores, church and church newsletters, restaurants, community centers, radio, television, and newspapers were photographed and recommended by participants as valuable channels. When asked about their recommendations for a mass communication health campaign in their community, participants believed that acknowledging the cultural importance of family and food to Hispanic women was critical to changing perceptions about physical activity.

As a result of the focus-group discussions just described, the following five message concepts were identified as being most likely to have a positive impact on health communication about physical activity targeting older Latinas (Table 4). The first concept message centered on enjoying physical activity: “*Being active is easy, enjoyable, and helps you live longer. Why not take a walk around the neighborhood for half an hour every morning instead of watching a soap opera on TV?*” This gain-framed message provides information about the benefits of physical activity while at the same time reinforcing the recipient’s self-efficacy. Importantly, this

message also stresses that physical activity need not be difficult or complex and can be easily achieved and is enjoyable. The second concept message invited older Latinas to select physical activities that were meaningful to them: *“Take a walk around the park or go salsa dancing with friends: physical activity is a key to a healthier and happier you.”* This gain-framed message focuses on community resources for promoting physical activity participation while emphasizing the need for culturally meaningful physical activity. The next concept message is a more traditional loss-framed statement about the adverse consequences of physical inactivity: *“Doctors say that diabetes is one of the leading causes of death among Hispanics. Reduce your risk now by adding physical activity to your daily routine.”* Participants in the focus group appeared to resonate with the need to reduce diabetes risk, which they understood to be very common among their peers. The fourth concept message addressed issues related to loss of balance and falls, a common problem among older adults: *“It’s simple. To avoid falls, I need to improve my balance and become stronger. That’s why I exercise 5 days a week—for just 30 minutes each day. I’ve got too much to lose if I don’t.”* This mixed-frame message presents information about the U.S. physical activity guidelines while addressing both the benefits of regular physical activity and the consequences of remaining sedentary. The final message concept links a loss-frame message about declining strength in old age with the more positive perspective of maintaining independence and being available to provide caregiving to family members, in particular grandchildren: *“I want to plant flowers in my garden and take care of my grandchildren, but I can’t do that without my strength. That’s why being physically active every day is important to me and important to my family.”*

Our data suggest that a combination of traditional loss- and gain-framed messages, when tied to more specific culturally tailored messages, may be most effective in impacting health behavior among older Latinas. These principles need to be taken into consideration when developing culturally sensitive communication strategies that will help overcome some of the disparities in physical activity in this population. Future messages will need to promote physical activity in a way that is supportive, culturally competent, and tailored around the needs of the community.

DISCUSSION

Healthy People 2020 recommends increasing the proportion of strategic health communication activities that include research and evaluation, increasing the proportion of adults who report having social support, improving health literacy, and increasing the use of social marketing in health promotion and disease prevention (U.S. Department of Health and Human Services, 2009b). Improving health outcomes of underserved populations is thus a key arena for change in

public health, and improving health communication research methods is an important step toward reducing the burden of health disparities (Ratzan, 2001).

The intersection of health message design with participatory and visual research methods brings many exciting possibilities for public health, and this study is only an initial step in understanding its capabilities. We felt this method gave our participants a voice—a platform to express their needs and perceptions on physical activity. Ultimately, this provided a foundation for mass communication health campaign message development and provided an inventive framework toward understanding our complex target population that may yield improved results in reducing disparities in physical activity.

The need for a more robust approach to improving physical activity levels among older Hispanic populations grows stronger than ever as projections estimate that by 2050, at least one in five Americans will be over the age of 65 years and one in three of them will be of Hispanic origin (U.S. Census Bureau, 2008, 2011b). Previous research has demonstrated that both older adult and Hispanic populations are generally less likely to obtain recommended levels of physical activity (CDC, 2010). This is compounded by additional health disparities that may stem simply from aging or belonging to a particular ethnic minority (Cerin et al., 2010; Van Duyn et al., 2007).

Despite knowledge of health benefits, large segments of the Hispanic population do not meet national guidelines and remain physically inactive (CDC, 2011). Prior research investigating physical activity among Hispanic women has found that adapting intervention programs to accommodate for cultural attributes may be beneficial in increasing physical activity levels (Fleury et al., 2009; Hovell et al., 2008). Similarly, we found that a significant portion of our participant sample did not achieve recommended physical activity levels, and many of the barriers to being active were driven by cultural elements. As a result, we chose to design message concepts that accounted for the audience’s sociocultural context to promote physical activity.

We felt that photo-elicitation was a creative and effective method to conceptualize perceptions of physical activity. In contrast, we found that there had been little prior research in this area, specifically among Hispanic women. Focus groups, surveys, and interview methodologies have been conducted to understand attitudes toward physical activity among older adults and other ethnic minorities (Cerin et al., 2010; Van Duyn et al., 2007); however, exploring participatory and visual methods is still an emerging concept. Fleury and colleagues (2009) found that using photo-elicitation to explore physical activity resources for Hispanics helped define cultural factors that impact beliefs and attitudes. Our findings were consistent with this idea in that we were able to obtain an in-depth understanding of older Hispanic women’s perceptions through unique visual narrative.

Photo-elicitation helped build our message concepts collaboratively to account for the sociocultural context around older Hispanic women. Developing health messages for older adults and minority populations through participatory and visual methods, however, remains a growing area of health communication research (Kreps & Maibach, 2008; Noar, 2006). Previous studies on health messages have consistently indicated that targeting older adults and minority groups necessitates tailoring and segmentation to cultural and aging characteristics (Hawkins, Kreuter, Resnicow, Fishbein & Dijkstra, 2008; Rodgers et al., 2007). Additionally, incorporating self-efficacy theory constructs and gain-frame messaging is known to be beneficial in shaping health behavior (Latimer et al., 2010). Although we found that our sample of older Hispanic women responded more positively to loss-frame messages highlighting the risks of not being physically active, our results were generally in accordance with prior research on health messages for older and minority groups.

While this study had many strengths in the use of mixed and interdisciplinary methods to extract rich data and an emphasis on sociocultural context, it also had a number of limitations. First, our sample size was relatively small. Conducting our research with fewer participants allowed us to obtain detailed information, but did not allow for large-scale generalizability or external validity with respect to the greater population of older Mexican women. Next, participants were recruited on a voluntary basis from a variety of different locations; however, recruitment efforts may not have reached all women residing in the community, which may also have impacted our external validity. Our results may not be applicable to larger portions of this population due to this sampling limitation. Additional weaknesses may have been introduced due to the nature of the methodology and its time frame. Pioneering studies employing photo-elicitation note the logistical challenges associated with implementing the method because it requires significant amounts of time and resources (Wang & Burris, 1994, 1997). In this study, phases of data collection were spread across a number of months. One of the central aims of our method was to encourage participants to capture their thoughts and experiences using photography as they related to physical activity; however, participants were unable to comment on their own pictures for several weeks after taking them. Thus, we recognize that this may have resulted in a limitation, since some participants may have been unable to recall their original thoughts or to accurately convey the intended meaning of their pictures during the interviews later in the study. Training provided to participants may also have resulted in limitations to our methods and results. While we purposefully used training instructions that were brief and simple to guide participant photography, participant decisions to take or avoid taking certain pictures may have been influenced by the training we provided and our overview of the study. In terms of instrumental limitations,

the self-report nature of participant questionnaires, interviews, and focus groups may introduce additional limitations such as social desirability biases. Finally, the cross-sectional design presents a methodological limitation: Our study was a snapshot of a point in time, and does not provide information of changes in perceptions or behavior over a longitudinal period.

Future directions for this research would include to develop the message concepts from Table 4 into specific materials for implementation of a health campaign promoting physical activity among older Mexican women. Materials such as brochures advertising exercise classes, flyers posted in community centers, or public service announcements would incorporate culturally relevant graphics and text designed to resonate with older Mexican women. Before final implementation, planners should conduct an additional round of message testing through focus groups or short interviews with the target audience to define the channels for dissemination, refine the graphics and text, and ensure there are no unintended consequences of any of the visual or written materials. Collaborating with community and faith-based organizations proximal to the target audience may help develop a sense of partnership to increase the efficacy of a campaign and serve as a resource for awareness and credibility building. Process and outcome evaluations would follow these steps to assess effectiveness of a campaign development phase and effectiveness of the messages to increase physical activity knowledge and change physical activity patterns. Additionally, carrying out future studies exploring the use of visual and participatory methods in health messaging with larger sample sizes would be essential to further assess the external validity of these innovative new techniques.

Changing behaviors and improving health outcomes necessitates that researchers work collaboratively with clinicians and other public health professionals to effectively reach and connect with their target audiences (Hawkins et al., 2008; Rodgers et al., 2007). Few initiatives have attempted to reach older women of Hispanic origin to promote physical activity. The present study addresses this shortcoming and increases our understanding of factors driving the health behavior of older Hispanic women. Data presented in this study underscore the sociocultural and contextual elements that (a) enhance the evidence base with respect to health and physical activity among older Hispanic women and (b) should be considered when designing tailored communication strategies to promote physical activity in this growing population segment.

The significance of these methods is only beginning to demonstrate their capacity to better understand the needs of underserved audiences and guiding the message design process. Advancements in innovative communication-based public health initiatives may strengthen interventions focused on not only older Hispanic women, but also other underserved populations who encounter similar challenges

in being physically active and maintaining overall wellness. The intersection between communication and public health, therefore, brings many new possibilities (Kreps & Maibach, 2008), with a promise to transcend traditional research methods and make a true difference.

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