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COMMUNICATING CANCER PREVENTION INFORMATION TO U.S. LATINOS: THE MODERATING ROLE OF ACCULTURATION

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Abstract
ABSTRACT

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A. Susana Ramírez

Robert C. Hornik

This dissertation stems from two observations: first, while communication can improve health disparities, important health information often fails to reach U.S. Latinos; second, that research on media, Latinos, and health behaviors is woefully sparse. This project sought to improve the former situation by contributing a body of evidence to the latter. Of specific interest is diversity within the U.S. Latino population relating to media use and health behaviors and outcomes, defined by the concept of acculturation. I sought to accomplish three goals, each forming a distinct study. Study one tested the ethnic/acculturative differences in general and health-specific information exposure from media across three different data sets. Non-Hispanic Whites (NHW) and highly-acculturated Latinos (HAL) are differentially exposed to general content from the media. The same differences were observed with regards to health-specific exposures, although these comparisons proved unstable across the type of exposure and by dataset. These two sources of influence can be ascribed to methodological differences in the way the samples were collected and the surveys conducted. Study two tested the joint effects of exposure and ethnicity/acculturation on health behaviors and knowledge using two national survey data sets. There was limited support for the hypotheses. This study was plagued by the same dataset-based limitations as study one and other methodological and conceptual limitations that made it difficult to detect interaction effects. Study three addressed these limitations. In this online experiment, NHW and HAL rated the perceived effectiveness of cancer prevention messages that were either intended for the general market or Latina-targeted. Results partially support the conclusion that ethnically-targeted messages are more effective for HAL. The issues explored in this dissertation have implications for how health communication campaigns reach Latinos. A key argument underlying this dissertation is that Latinos fare worse on some outcomes as they become acculturated, yet most health communication efforts limit Latino outreach to Spanish-language. Approaches to communicating with Latinos must include outreach to highly-acculturated Latinos who are not regularly consuming Spanish-language media but may be at higher risk for lifestyle-related cancer prevention behaviors. Additionally, this dissertation contributes to communication research methodology to improve research with Latinos.

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MODERATING ROLE OF ACCULTURATION

A. Susana Ramírez

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Chapter 1: Introduction

Background and Rationale

Providing accurate, timely, and relevant information is one suggestion to improve health knowledge and behaviors, and perhaps reduce ethnic health disparities. Yet despite efforts to increase education about health, important health information fails to reach Latinos (Institute of Medicine, 2002). Efforts to improve communication to eliminate health disparities are fraught with disparities of their own, in terms of access and attention to health information. Little is known, however, about inter-ethnic differences in the usage of health information sources. As the proportion of Latinos in the U.S. population grows from 15.1% in 2008 (U.S. Bureau of the Census, 2009) to 25% by 2030 (National Research Council, 2006), it will become increasingly important to understand how Latinos might differ from the non-Hispanic White (NHW) population in terms of health information needs and message processing styles. Additionally, differences within the heterogeneous, 46.9 million member (U.S. Bureau of the Census, 2009) Latino population must be considered. Understanding the differences in exposure to health information from various sources is important for determining where and how to disseminate health information as well as to explain disparities in knowledge and health outcomes.

It has been suggested that U.S. Latinos as a group hold particular beliefs, values and attitudes, and these may be related to the ways in which information is processed (Marín, 1989). Additionally, considering the influence of the media on Latinos is warranted because Latinos, perhaps more than other population subgroups, live between two media worlds: there is a strong, if not diverse, Spanish-language broadcast presence potentially available to most Latinos (Constantakis-Valdés, 2008), and its content is somewhat different from the mainstream, English-language media (Wilkinson, 2008).

The phenomenon of Latino media exposure and health behaviors incorporates many

issues; the goal of this dissertation is to examine three specific issues, recognizing first that the

field is in need of basic research and also that this is the beginning of a long-term program of

research. The ultimate goal of this dissertation is to contribute to an improved understanding of

how communication can be used to educate U.S. Latinos about healthy lifestyles and health

risks. I seek to accomplish three specific goals with this dissertation. First, I examine differences

in general and health-specific media use by ethnicity, and within acculturation-based subgroups

of Latino ethnicity. Next, I consider how ethnicity and acculturation interact with exposure to

health-related content to influence behavior. Finally, I consider whether the persuasiveness of

Latino-targeted health messages is different than general market messages for highly-

acculturated Latinos.

This dissertation is particularly relevant given the growing interest in understanding how

acculturation impacts health, particularly as it relates to the "Hispanic paradox," which suggests

that even though Latinos experience socioeconomic conditions which should lead to worse

health outcomes, in some cases, they defy expectations (Lara, Gamboa, Kahramanian, Morales,

& Hayes Bautista, 2005). Acculturation has been blamed for reversing this paradox, as the

protective influence of the Latino paradox disappears as individuals become more acculturated

in a society (Abraído-Lanza, Chao, & Flórez, 2005; Amaro & de la Torre, 2002; Lara, Gamboa,

Kahramanian, Morales, & Hayes Bautista, 2005). In general, the influence of acculturation on

health is thought to be positive with regards to structural barriers such as access to care and

prevention behaviors that require access to health care (e.g., Pap test), but negative with

regards to individual risk behaviors.

In the sections below, I review the case for communicating with Latinos in English,

providing real-world examples from marketing and politics, followed by a detailed consideration

of acculturation. I then consider evidence for race/ethnicity-based targeting and conclude with an examination of the literature about mechanisms for the effects of such targeting.

Literature Review

The issues explored in this dissertation have implications for how health communication campaigns attempt to reach Latinos. Reach is perhaps the most fundamental consideration in health communication campaign planning. It is an unfortunate truth that the most at-risk groups are often the hardest to reach with communication (Institute of Medicine, 2002). Traditional targeting efforts to communicate health-related information to Latinos have been too literal: translating mainstream campaigns into Spanish or creating exclusive Spanish-language campaigns and choosing Spanish-language channels for dissemination. Advocates of Latino outreach have logically argued that communicating with Latinos must include first and foremost use of Spanish, with appropriate cultural message tailoring (Huerta & Macario, 1999; Huerta & Weed, 1998; Ramirez & McAlister, 1988). An informal survey of literature on health communication programs to reach Latinos reveals that most have taken the translation approach, or, where the program was exclusively targeted to Latinos, produced materials in Spanish only (cf., Backman & Gonzaga, 2003; Alcalay, Alvarado, Balcazar, Newman, & Huerta, 1999; Skolnick, 1997; Huhman, Berkowitz, Wong, Prosper, Gray, & Prince, 2008). A few exceptions illustrate concern about limiting Latino outreach to Spanish language, recognizing the need for different approaches to reach English-dominant Latinos, particularly youth (Redes en Accíon, 2009; Kelly, Stanley, Comello, & Gonzalez, 2006; Marín, 1989; Williams & Flora, 1996).

The translation approach to health communication has dominated in part because language – that is, ancestral ties to a Spanish-speaking country – has been the defining characteristic of Latinos. Certainly translation is critical to reach those who speak only Spanish.

However, the role of the Spanish language in defining the modern U.S. Latino population is intensely debated. While 31 million U.S. residents age five and older speak Spanish at home (U.S. Bureau of the Census, 2003), many Latinos do not speak Spanish at all. A 2004 Pew Hispanic Center and Kaiser Family Foundation study found that while nearly half (47%) of U.S. Latinos are more comfortable speaking Spanish, more than one-quarter (28%) consider themselves bilingual and twenty-five percent are English-dominant. Moreover, as new Latino immigrants remain in the United States, they are likely to gain English language skills, creating an even larger number of people who are comfortable with English.

From the perspective of those who adopt the translation approach to communication efforts, those Latinos who can speak English (e.g., those who can be considered more acculturated, as I will define below) will be reached through mainstream campaigns. However, even if reach is attained in such a case (an empirical question), it is difficult to ensure attention to and further processing of a message (Cappella, 2006). Gaining attention to and processing of a message may be particularly difficult when viewers do not feel themselves to be the targets of a message, for whatever reason. I expand on this idea in a subsequent section, after discussing acculturation.

In contrast to pro-social marketers such as health communicators, who have largely ignored the English-dominant Latino, commercial advertisers have, in recent years, found that reaching U.S. Latinos is not a matter of simply translating English advertisements into Spanish, or in the case of commercial marketing, of using Spanish-language materials from Latin American advertising campaigns for the U.S. market. Recognizing that Latinos in the United States belong to a specific cultural context, savvy marketers and politicos advocate that advertisers try to understand the diversity of the U.S. Latino, and in particular, diversity by acculturation (e.g., Korzenny & Korzenny, 2005). For example, one how-to article exhorts, that,

"[t]o truly connect with the Hispanic culture, companies must understand the different levels of acculturation" (DeFelice, 2005). The trend toward reaching the bilingual or English-dominant Latinos can be seen in various places (Dávila, 2001; del Valle, 2005). In an article about the cable giant Comcast's recent efforts to court Latinos, a marketing officer confessed, "One of the new areas [Comcast] is considering for 2007 is how to reach more acculturated Hispanics who might not consume much Spanish-language media but have a renewed interest in their heritage that is sometimes referred to as retroacculturation. That might take the form of English-language ads, with the Hispanic cultural cues all the more important if Spanish isn't used" (Wentz, 2006).

Like commercial marketers, political campaigns have realized that specific Latino-oriented messages must be used to reach the heterogeneous Latino population, including bilingual and English-language messages that feature Latino images and voices, along with issues relevant to Latinos (Subervi-Vélez & Connaughton, 2008). Subervi-Vélez and Connaughton (2008) traced the evolution of Latino-oriented political targeting by the Democratic and Republic parties. They found that the Republican Party has had a specific Latino outreach strategy considering the diversity of Latinos, in particular by acculturation level, since 1984. This strategy recognized the value of placing Latino-targeted ads in both English- and Spanish-language media, such that three-quarters of the budget allocated to television ads for Latinos was allocated to English-language general-market programs.

With respect to the content of the messages themselves, Subervi-Vélez and Connaughton found the Republicans and Democrats have taken quite different approaches, although this may be explained by each party's position on the issues that are important to Latinos. Subervi-Vélez and Connaughton argue that Republicans focused on communicating two main themes to Latinos: 1) Republicans are the best party to help Latinos achieve the American dream, and 2) Hispanics are equals as Americans first (e.g., before ethnic identity, or ancestral

country of origin). Consequently, the authors found quite minimal and superficial message tailoring in the Republican ads, limited to representations of ostensibly Latino characters, which had "...the slightly darker (brown/bronze) color of the skin and some facial features that do show they are not white or Caucasian" (p. 280). In contrast, more recent examination of Republican Latino-targeted political ads found that the messages themselves have been tailored to appeal to Latinos' family values and emotions (Marbut, 2005), although no doubt this is also influenced by the fact that family values are aligned with the Republican Party's own agenda. Latino outreach by Democrats, on the other hand, has included "deeper" tailoring, getting to the nature of the messages themselves, in addition to the superficial visual tailoring. Democratic Latino-targeted messages have been focused on issues that are known to be important for Latinos, for example, immigration and education policy (Subervi-Vélez & Connaughton, 2008). Again, differences in the execution of Latino targeting approaches may simply be a reflection of an alignment of some Latino and Democratic Party interests.

The above examples from commercial marketing and politics illustrate how those groups have incorporated English-language media and consideration of the acculturated Latino segment. Yet despite both commercial marketers' and political campaigns' attempts to target Latinos, there is little evidence that such targeting has been effective. One can speculate that it has been successful because such approaches are increasing; however, the data to support such a claim, if it exists, is proprietary and thus not available for academic research purposes. Additionally, beyond the consideration of language, there is little description of what it means to target Latinos. While both groups have apparently convinced their funders that Latinos are an important and diverse group, they have not provided reasons for expecting that Latino subgroups should vary either from each other or from other groups in their needs for specifically targeted messages.

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My argument for understanding media influence on Latinos incorporates the concept of acculturation as an overarching dimension of the diversity in the Latino population that is relevant to media. I argue that ethnicity may influence message processing, such that highly-acculturated Latinos (e.g., those who speak English) and non-Hispanic Whites will not respond similarly to the same stimulus, even if exposure is equal. This is the premise that undergirds ethnicity-based tailoring and segmentation approaches, despite the lack of evidence that such an approach is warranted (Hornik & Ramírez, 2006). This dissertation seeks to provide evidence about ethnicity-based tailoring based on differential media effects that may be attributed to differences in message interpretation.

I examine acculturation in more detail below.

Acculturation

Acculturation, defined as the "process by which individuals adopt the attitudes, values, customs, beliefs, and behaviors of another culture," (Abraído-Lanza, Armbrister, Flórez, & Aguirre, 2006) is an important source of diversity within the U.S. Latino population, and the most important, I argue, as regards media exposure and its potential effects. There is significant debate about how to conceptualize acculturation (Berry, 2003), although there are two primary ways to consider the process: (1) uni-dimensional and (2) bi- or multi-dimensional. Uni-dimensional models of acculturation suggest that acculturation is a bipolar process anchored by two extremes representing two cultures; on the other hand, bi- or multi-dimensional models allow for the possibility that individuals may selectively adopt new traits from the new culture while retaining traits from the old culture, so that rather than a bipolar model, acculturation is represented as a matrix made of two dimensions: Latino and mainstream (often simply Anglo). Individuals may acculturate along both or either of these dimensions, for a total of four possible acculturation outcomes, including the possibility of becoming completely bicultural and moving

with ease in both cultures (Portes & Rumbaut, 2001; Rumbaut, 1997; Cuéllar, Arnold, &

Maldonado, 1995; Berry, 1980). Multi-dimensional models also allow for the possibility that the

minority culture could influence the mainstream culture, so that the process of acculturation

becomes somewhat reciprocal[1]. Bi- and multi-dimensional models of acculturation share an

underlying belief that it is quite possible for individuals to adopt sufficient mainstream

characteristics that they are able to succeed in society, while maintaining a strong ethnic

identity that includes beliefs, attitudes and values. Cuéllar and colleagues (1995) argue that

acculturation occurs at all levels of functioning, including behavioral, affective (emotions

associated with cultural connections), and cognitive (beliefs about gender roles, ideas and

attitudes about illness, fundamental values). It is this notion that contributes to confusion about

how to assess acculturation, which in turn may partially explain why research on media

influence across Latino subgroups has been limited.

There are several standardized scales that are often used with Latino populations[2] (e.g.,

Marín & Gamba, 1996; Cuéllar, Arnold & Maldonado, 1995; Hazuda, Stern & Haffner, 1988). The

various acculturation scales have many sub-constructs in common. Language ability and

preference under different circumstances (e.g., with spouse, parents, siblings, co-workers,

neighbors) are the most often used measures of acculturation. Country of birth or generational

status in the United States and length of time residing in the United States are two other most

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[1] While multi-dimensional acculturation may be considered a more accurate reflection of the process of cultural change, for all practical purposes, bi-dimensional acculturation is what is most often discussed in the health-related acculturation literature.

[2] While these scales are conceptualized as bi-dimensional, in practice they are used to derive a uni-dimensional measure of acculturation to the mainstream culture. That is, although in theory these models produce scores that demonstrate orientation to the two cultures separately, in practice, the measure that is most commonly used for campaign segmentation and targeting is that of orientation to the dominant culture.

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commonly used indicators of acculturation. The third category of acculturation indicators is related to basic media use: frequency of use of different media in Spanish or English.

Betancourt & Regeser López (1993) argue that acculturation measures such as those described above are faulty because they capture behavioral aspects rather than attitudinal or value-based components of acculturation; as such, they argue, so-called measures of acculturation are no better than ethnicity and race in understanding relationships. The latter, they argue, are also relatively useless because they are weak proxies for beliefs and attitudes. They advocate deconstructing ethnicity, race and acculturation and using specific beliefs and attitudes that are hypothesized to be associated with selected outcomes. Others also have recognized the limits of the behavior-based acculturation scales in identifying changes in values, attitudes and norms (Marín & Gamba, 1996; Cuéllar, Arnold, & González, 1995; Negy & Woods, 1992; Rogler, Malgady, & Rodriguez, 1989).

Partially in response to such criticisms, some scales have tried to capture attitudes and values in addition to the above behavioral and demographic indicators, but these have generally failed to provide adequate discrimination across levels of acculturation, or they do not meet validity and reliability standards. For example, the original Bidimensional Acculturation Scale for Hispanics (BAS, Marín & Gamba, 1996) scale included three items about the importance of celebrating Latino-focused events; however, this "Celebrations" subscale did not meet validity criteria and was subsequently excluded from the acculturation scale. Hazuda and colleagues tested a range of attitudes and values in a sample of Mexican-Americans in Texas. They found

> "The failure of pertinent items to adequately differentiate between groups in the
> three Mexican American [SES comparison groups] suggested that Mexican Americans
> as a whole had a certain 'cultural tenacity' about maintaining a religious orientation
> which places a high value on doing God's will, an outlook about factors influencing
> one's state in life which emphasizes luck and living for the present, and an attitude
> toward health and death which is highly fatalistic. Relative to these important life

attitudes, no measurable degree of acculturation was observed among the Mexican Americans…" (Hazuda, et al., 1988, p.701)

It is not possible, given the way those tests were conducted, to know whether the failure of acculturation scales to effectively discriminate among levels of attitudes and values indicates methodological limitations or a true lack of acculturation of the part of Latinos on these dimensions. Presumably, however, Latinos should score differently than other ethnic groups on some attitudinal and values scales. Had the studies compared non-Hispanic Whites to Latinos, for example, we might have such evidence. Indeed, the central argument of this dissertation is that even as Latinos gain behavioral acculturation (e.g., language), they may not acculturate in terms of attitudes and values. Given this argument, I focus on acculturation as a behavioral construct.

Research in which acculturation is used as a secondary variable of interest has relied on a variety of proxy measures of acculturation. In health surveys, behavioral indicators based on language or country of birth have been used as proxy measures to assess acculturation (e.g., Karas Montez & Eschbach, 2008). In a recent validation of proxy measures, Cruz and colleagues argued that just three proxy indicators – language spoken at home, interview language, and proportion of life in the U.S. – make a valid proxy acculturation scale (Cruz, Marshall, Bowling & Vallaveces, 2008). They compared the performance of these three (and a fourth, generation) measures against a 12-item acculturation scale that included language-based measures (ability, preference under different circumstances, media preference), composition of social network (proportion of friends who are Latino), and attitudinal measures (comfort with Hispanics versus Anglos; importance of Latinos marrying other Latinos). They found that the three-item proxy scale has a correlation of 0.8 with the full acculturation scale. Moreover, Cruz and colleagues'

proxy acculturation scale was efficacious across the three largest Latino country of origin subgroups: Mexican, Puerto Rican, and Cuban.

Given prior acknowledgement that acculturation refers to behavioral adaptations, I accept the argument of Cruz and colleagues, and argue that proxy measures are appropriate indicators of behavioral acculturation. By definition, proxy measures are crude and leave open the question of whether and to what extent individuals may be further differentiated within acculturation level. Possible areas for differentiation that may influence media exposure and its effects include strength of ethnic identification and cultural traits associated with affective and cognitive models of acculturation. Distinctions within levels of acculturation as defined behaviorally will not be considered in this dissertation but may be important for future research to further explain how acculturation influences media choices and effects.

I turn now to an examination of identification, an explanation for why ethnicity should continue to matter, regardless of apparent acculturation level, in media processing and effects.

Identification and Media Effects

One class of explanations for why ethnicity may moderate the influence of media has to do with the extent to which individuals perceive messages as relevant to them. Important to the determination of relevance is one's sense of identification with the message. Social cognitive theory (Bandura, 2002) posits that similarity and identification with the model facilitate attention to the message, which is the first step to learning and other persuasive outcomes from media exposure (McGuire, 1986). Additionally, distinctiveness theory (McGuire, 1984; McGuire, McGuire, Child & Fujioka, 1978) suggests that the traits that identify minorities as such are more salient to minorities compared with their salience among members of the majority. For

example, in the U.S., ethnic minority members including Latinos are more likely be conscious of ethnicity than are non-Hispanic Whites.

Latinos are less represented across the board in mainstream entertainment and news media (Greenberg, Mastro & Brand, 2002): One recent study found that Latinos make up less than three percent of the characters on primetime, English-language television (Mastro & Behm-Morawitz, 2005). Subervi-Vélez and colleagues have argued that Latinos as a group and generally across levels of acculturation actively look for information that is perceived as relevant to "some aspect of their Latino identity…" (Subervi-Vélez, 2008, p. 11; Subervi & Ríos, 2005). Failing to find information that matches their Latino identity, Latinos may not engage in further processing of the message. That is, they are likely to engage in selective inattention (e.g., Knobloch-Westerwick et al., 2008).

One recent study grounded in distinctiveness theory found that Blacks were more likely than NHW to seek news articles that featured their own race, and once these articles were found, spent more than twice the amount of time reading them compared to stories that did not feature Blacks (Knobloch-Westerwick, Appiah, & Alter, 2008). Appiah has found that Blacks identify with Black portrayals but actively "dis-identify" with portrayals of Whites, resulting in more favorable evaluations of advertisements with Black sources compared with messages presented by White sources (Appiah, 2001a, 2001b). Other studies have focused on understanding the role of the strength of ethnic identification as a moderator of the effects of identification with messages but have failed to find a consistent pattern (Appiah, 2001a; Appiah, 2001b; Beaudoin & Thorson, 2005; Knobloch-Westerwick, Appiah, & Alter, 2008; Wang & Arpan, 2008).

Identification with the message to attract attention and further message processing is the underlying logic for targeting on race/ethnicity (Hawkins, Kreuter, Resnicow, Fishbein, &

Dijstra, 2008; Huhman, Berkowitz, Wong, Prosper, Gray, Prince, & Yuen, 2008; Kreuter, Farrell, Olevitch, & Brennan, 2000; Pasick, D'Onofrio, & Otero-Sabogal, 1996; Schneider, Salovey, Apanovitch, Pizarro, McCarthy, Zullo & Rothman, 2001; Skinner, Campbell, Rimer, Curry, & Prochaska, 1999), in which visual and verbal appeals and models who look and sound like the target audience are used to induce identification. The literature considering the effects of messages targeted to Latinos on Latinos' sense of identification[3] is woefully sparse; however, several studies have found that media effects, including identification, likeability, ad evaluation, source credibility, and attitudes, are stronger among African-Americans when the media contain Black characters (e.g., Appiah, 2001a; Appiah, 2001b; Beaudoin & Thorson, 2005; Wang & Arpan, 2008).

Borrayo (2004) described the creation of a video in entertainment education format intended to educate low-income Latinas about breast cancer screening. Latinas were supposed to identify with the main character because of her similar ethnicity and through her role modeling, and with the video more generally through the use of cultural cues. There is no evidence about the video's effectiveness, only about the process of generating identification with samples of the intended audience.

Schneider and colleagues manipulated message framing (gain/loss) and ethnic targeting in mammography promotion videos shown to low-income Latinas (n=189), African-American (n=318), and Anglo women (n=205) (Schneider, Salovey, Apanovitch, Pizarro, McCarthy, Zullo & Rothman, 2001). The 10-minute videos were created by the authors, and were a combination of voice-overs, text, and still images. The multicultural video was intended for all women (e.g.,

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[3] Mastro and colleagues' research has considered the effects of stereotyped portrayals of Latinos and other ethnic/racial groups on social identity and social perceptions of those ethnic groups (Mastro, Behm-Morawitz, & Kopacz, 2008; Mastro, Behm-Morawitz, & Ortiz, 2007; Mastro, 2003). Rivadeneyra and colleagues have studied the effects of stereotyped portrayals on Latino adolescents' self-esteem (Rivadeneyra, Ward, & Gordon, 2007; Rivadeneyra & Ward, 2005; Rivadeneyra, 2001).

"Breast cancer is the most common cancer found in women.") and featured an array of models

of different ethnicities. The targeted videos had still images of the targeted group and statistics

that were relevant for each racial/ethnic group (e.g., "Breast cancer is the most common cancer

found in Latinas/African-American women."). The videos were available in English or Spanish[4].

The gain- versus loss-frame messages used conventional framing techniques. Models in the

targeted ads were rated as more similar to African-American and Latina respondents than the

multicultural ads, and the targeted ads were rated as more important to these participants'

families and backgrounds; there were no interactions with race/ethnicity on these measures.

Similarity and relevance were assessed as manipulation checks of the targeted conditions,

rather than as true mediators. The loss-framed, multicultural (e.g., not targeted) messages were

more persuasive for Latinas and Anglo women: after six months, sixty percent of Latinas

exposed to the loss-framed multicultural message (and about twenty percent of those exposed

to the gain-framed multicultural message) reported having had a mammogram, compared with

forty and thirty-five percent in the loss-framed and gain-framed Latina-targeted conditions,

respectively. The targeted messages in both gain- and loss-frame conditions were more effective

than the multicultural gain-framed message, but both of the targeted conditions were less

effective than the multicultural loss-framed message. It is not clear why the targeted gain-

framed condition did not perform as well as the multicultural gain-framed condition, or why the

difference between the gain/loss targeted conditions was not greater, especially given that the

targeting manipulations appear to have worked. The authors suggest three possible

explanations. First, the targeting may not have adequately addressed women's beliefs and

concerns about mammography and the causes of breast cancer. This would imply a need for

deeper-level (e.g., arguments presented) cultural targeting. It may also be that targeting based

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[4] The article suggests but does not make clear that the non-targeted video was also available in Spanish.

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on other cultural factors, such as family and sociocultural issues, may be relevant for breast

cancer. Finally, the authors suggest that ethnic targeting for this particular behavior may not

make sense because it is well understood that breast cancer is a disease that affects all women.

Ethnicity-based targeting may work best for behaviors that are not perceived as relevant for the

targeted ethnic group. While these findings are important and interesting, they are counter to

findings from other studies with mostly African-American populations, and this single study has

not been replicated. Additionally, the sample was limited to low-income women recruited via

convenience sample from community health clinics and public housing developments and as

such is not generalizable to the larger population of U.S. Latinas. Moreover, the video and

questionnaires were available in both Spanish and English, yet the findings were not broken

down by language of interview or any other acculturation-related variable.

Keeping in mind the ultimate goal of understanding media influence on health behaviors,

and particularly to answer the question of whether ethnically targeted messages are more

effective than general market messages among Latinos, I considered the evidence for

racial/ethnic tailoring. There is little evidence that explains how messages targeted to

racial/ethnic minority populations might work to educate and persuade audiences. Identification

with the message, together with distinctiveness theory, which suggests that racial/ethnic

minorities will be more sensitive to the racial/ethnic character embedded in messages (whether

intentionally targeted or not), have been suggested as mechanisms for effects, but these

theories have been rarely tested. Studies examining the effects of message targeting to

ethnic/racial minorities have largely focused on African-Americans; these studies suggest some

benefit of race-based message targeting.

In the next section, I provide an overview of this dissertation and how it advances the

state of the research I have described above.

Dissertation Overview

In this section, I provide an overview of the dissertation, including the model of effects, main research questions and hypotheses, and analytic strategy. Each study will be further elaborated in subsequent chapters of this dissertation. This dissertation sought to answer the question: How does Latino ethnicity influence media effects? The overall aim of this research project was to contribute to an understanding of how to communicate health information to U.S. Latinos. In the following pages I describe three studies:

Study 1(a,b,c): The relationship between ethnicity, acculturation and three types of media exposure.

Study 2: Does ethnicity moderate the effects of health media exposure on behavior?

Study 3: Do message targeting and ethnicity affect message persuasiveness?

The dissertation investigated the relationships between four classes of variables. The primary independent and moderating variables were ethnicity (Latino compared with Non-Hispanic White) and acculturation (among Latinos only). Comparisons were between levels of acculturation within Latinos (less-acculturated Latinos, LAL, compared with highly-acculturated Latinos, HAL) and between highly-acculturated Latinos and NHW. The second category of variables (dependent variables in study 1 and independent variables in studies two and three) is media exposure, which includes general information usage, exposure to health-specific information (scanning), purposive health information seeking, and exposure to a specific message. The ultimate outcome variables are health behaviors, which include a variety of cancer prevention and screening variables (diet, exercise, eating fruits and vegetables, and cervical cancer screening). Also considered outcomes are determinants of behavior, including intentions, knowledge, and attitudes (Fishbein & Azjen, 1975; Fishbein, Hornik, Cappella, Sayeed, Yzer, & Ahern, 2002) and perceived effectiveness (Dillard, Weber & Vail, 2007). The final category of

variables includes those that were considered mediators of the moderating effect of

ethnicity/acculturation. The primary mediating variable tested is identification with content.

Figure 1.1. Proposed Model of Effects.
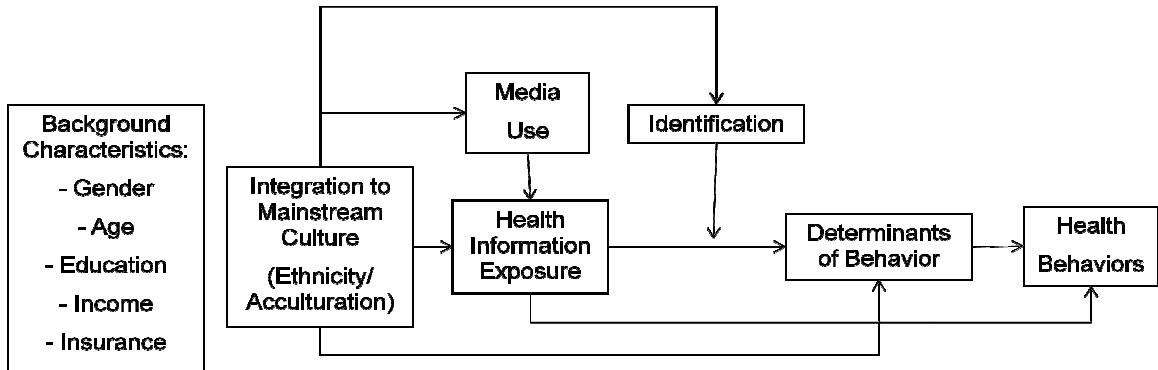
The first study serves to establish the primary relationships among ethnicity and

acculturation and media exposure hypothesized in the model of effects.

Study 1a: Media use varies by acculturation and ethnicity
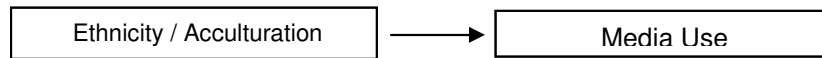
The next study establishes differences in health media exposure by ethnicity and

acculturation. Exposure here includes habitual consumption of health-oriented media and

discussion about health with friends and family, and health information scanning, a less-casual

form of exposure (Hornik & Niederdeppe, 2008).

Study 1b: Health information exposure varies by acculturation and ethnicity
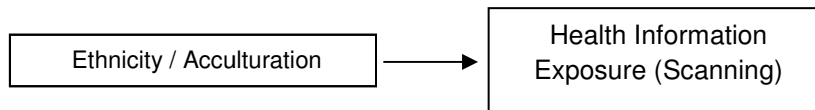
The third study in this sequence extends studies 1a and 1b by considering the influence of

acculturation and ethnicity on purposive health information seeking.

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Study 1c: Health information seeking varies by acculturation and ethnicity

| Ethnicity / Acculturation | → | Health Information Seeking |
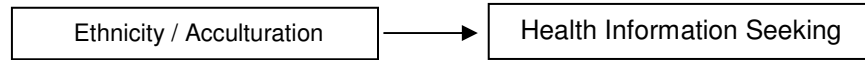
Study one serves to answer the question of how to *reach* Latinos at varying levels of acculturation with health information. Results serve to validate segmentation approaches that consider translation or Spanish-only campaigns important to reaching the less-acculturated segments but question the extent to which more-acculturated Latinos are effectively reached by mainstream messages. In contrast, study two considered whether the effects of communication on selected outcomes differ by ethnicity/acculturation, once exposure has been achieved, in randomly selected samples of U.S. NHW and Latinos, using cross-sectional survey data in which respondents are asked about their exposure to health information from a variety of sources. This approach is one way of beginning to answer a fundamental question about message effects, whether ethnicity-based targeting is useful.

Study 2: Ethnicity/acculturation as moderators of media effects.

| Ethnicity / Acculturation |

| Exposure to Health Information | → | Health Behaviors / Determinants |
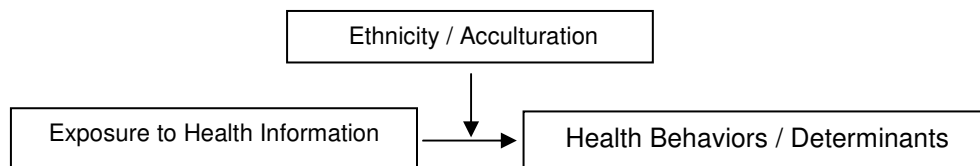
Extensive pilot testing of study two hypotheses (Chapter 4) demonstrated that the hypotheses of interest are not convincingly answered using available observational data. Chapter 5 extends the pilot studies with additional discussion.

Study three tested similar hypotheses as study two, but in an experimental context with exposure to specific messages that were more or less targeted to Latinos.

Study 3: Exposure to general-market versus ethnically targeted health messages affects perceived effectiveness differentially by acculturation and ethnicity, Experimental Study.

Ethnicity / Acculturation

Identification

Exposure to targeted vs. not
targeted Health Messages

Health Behaviors / Determinants
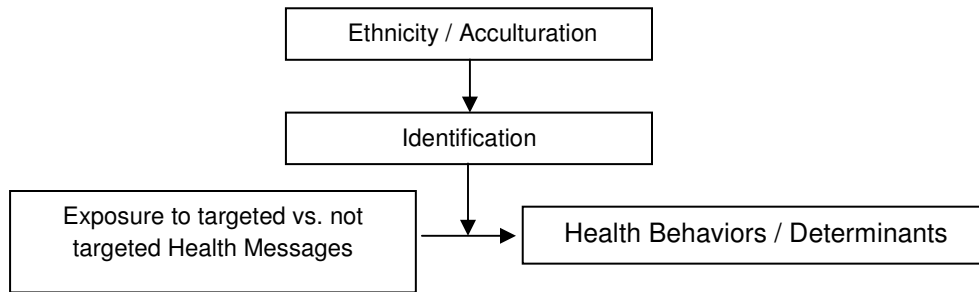
The purpose of the third study was to provide evidence about ethnicity-based targeting of health messages. The expected underlying mechanism of effects is identification with the message. In this study, I examine how ethnicity and acculturation interact with the targetedness of a message to influence effects.

The details of each study are described in subsequent chapters; the following section describes how the dissertation is organized.

Outline of dissertation chapters

Having provided an outline of the theory and literature underpinning this dissertation, I now provide an outline of the rest of the chapters. In chapter two, I review the common methodological components across studies one and two, including descriptions of the three data sets I used. I also present the research questions and the overall analytic approach I took in those studies. In chapter three I report the results of study one, which considered how exposure to general and health-related information differs by ethnicity and acculturation. Chapter four contains the results of the pilot tests of study two, in which I examine how ethnicity/acculturation interact with exposure to health information to influence outcomes, and chapter five contains the complete results of study two. Chapter six provides the results of study three, in which I conduct an experiment to test how ethnicity moderates the effects of the targetedness of a message on perceived effectiveness of the message.

In the final chapter of the dissertation, chapter seven, I bring together the findings from studies one through three and provide some conclusions about how this body of research contributes to communication science. I use the limitations of these studies to propose future research that will more definitively provide guidance about communicating cancer prevention information to U.S. Latinos.

Chapter 2: Common Methodological Components across Studies 1 and 2

In this chapter I review the common components across studies one and two, beginning with a description of the studies, including a short description of the analytic approach and hypotheses, and continuing with a description of the three data sets used across the studies, including the specific operationalization of the common measures in each data set.

Studies one and two consist of a series of similar secondary data analyses replicated in three data sets: the Annenberg National Health Communication Survey (ANHCS), the Pew Hispanic Center's 2007 Hispanic Health Survey, and the National Cancer Institute's Health Information National Trends Study 2005. The replication is useful because each of the three data sources provides a different sample and somewhat different measures of media exposure; given the difficulty of identifying and sampling the U.S. Latino population, it was hypothesized that finding similar patterns across different data sets would strengthen the claims.

Overview of Studies 1 and 2

Study one consisted of a series of analyses considering ethnicity/acculturation as the independent variable and media use as the outcomes. What varied across the series of analyses was the type of media use outcome considered. Study two considered the joint effects of ethnicity/acculturation and exposure to health information from the media on various health-related outcomes. Below is a more detailed description of each study, including research questions and the common analytic approach.

Study 1: Ethnicity, acculturation, and exposure to general and health information

Study one sought to establish differences in different kinds of media usage by ethnicity and acculturation. This study sought to establish that differences exist in media preferences across Latino acculturation levels and compared with NHW. There are two dimensions to this comparison: an obvious one between primary-Spanish-speakers and primary-English-speakers (whether Latino or NHW), where access is likely constrained by differential availability of media materials in a language, and a second and more interesting one, where the issue is whether Latino identity, separately from language ability, affects patterns of media use. This second comparison focuses on the two English-speaking groups HALs and NHWs, and engages with the claim that Latinos are forging a model of acculturation that does not end with complete assimilation into the mainstream culture even if the mainstream language becomes primary (Alba & Nee, 2003; Portes & Zhou, 1993): thus, we would expect differences between HAL and NHW.

Study one looked at three different kinds of media use: general (e.g., entertainment, general information); health information obtained somewhat incidentally (e.g., watching television news health segments, reading the health section of the newspaper); and health information obtained purposefully (e.g., health information seeking).

Two rival explanations for differences in media use across ethnicity and levels of acculturation were considered. The first explanation is that any observed differences by ethnicity/acculturation may reflect structural mediators: that is, that the differences in media use observed by ethnicity/acculturation are mediated by structural variables such as education, income, and other demographic characteristics as well as language ability. This may be a possibility because both non-Hispanic ethnicity and increased acculturation are associated with

increased income and education, and these variables are associated with some kinds of media use. Less-acculturated Latinos tend to be younger (e.g., new immigrants) and new immigrants are more likely to be male (Alba & Nee, 2003), and these characteristics are also associated with some kinds of media use (Korzenny & Korzenny, 2007). A second explanation is that some intrinsic characteristic of ethnicity accounts for differences in media habits even after taking structural circumstances into account. Study one was guided by the following research questions.

Research Question 1: Do NHW, Highly-Acculturated Latinos (HAL), and Less-Acculturated Latinos (LAL) differ in exposure to media and information seeking?

Research Question 2: How do we explain the observed differences in media exposures and information seeking?

1. Do traditional demographic characteristics (education, age, income, gender) account for all of the co-variation between ethnicity/acculturation and exposure to media? Or contrarily is there residual covariation possibly associated with ethnicity/acculturation?

2. If there is an association of ethnicity and acculturation with use of health-specific information sources, is that merely an artifact of the association of ordinary non-health specific exposure with both of those variables?

The theory behind these research questions and specific hypotheses are elaborated in Chapter 5, where I present results of pilot studies and the main study.

Study 2: Ethnicity/acculturation as moderators of media effects

Study two examined how ethnicity and acculturation interact with exposure to health-related content in their effects on health behaviors and behavioral determinants. This study sought to answer the following research questions.

Research Question 1: Does ethnicity moderate the effects of health-related media exposure on health behaviors?

Research Question 2: Does acculturation level among Latinos moderate the effects of health-related media exposure on health behaviors?

Research Question 3: How do the effects of media exposure differ between highly-acculturated Latinos and NHW?

These research questions are examined in detail in Chapter 6, where specific hypotheses and results are presented.

Data and Sample Characteristics

In this section, I will describe the three data sets that were used for study one and study two, including the key variables as they were measured in each data set. Following a general overview of each data set, I describe the samples and the common conceptual variables used across analyses. Table 2.1 shows key characteristics of each sample, and Table 2.2 compares the operationalization of key measures across data sets.

Annenberg National Health Communication Survey 2005-2009 (ANHCS)

The Annenberg National Health Communication Survey (ANHCS) is an ongoing project of the Annenberg Schools for Communication at the University of Pennsylvania and the University of Southern California. The survey is funded by the Schools and by the Annenberg Foundation Trust at Sunnylands. ANHCS is a nationally representative, rolling cross-sectional survey completed by approximately 300 individuals per month. The core instrument was pilot tested with 500 respondents in January 2005; revisions and validity tests were conducted in February, and the final instrument was fielded beginning in March 2005. The survey was administered by Knowledge Networks using a web interface. Knowledge Networks creates a national probability

sample of civilian, non-institutionalized adults in the United States through RDD techniques. Individuals identified through RDD who agree to participate in the panel are asked if they have a computer with internet access; those who do not are provided (at Knowledge Networks' expense) with a WebTV[5]. Participants remain a part of the Knowledge Networks panel for 36 months, during which time they may be asked to participate in several unrelated surveys. The panel recruitment rate was 30% and the survey cooperation rate averaged 68%. The ANHCS survey was conducted in English only, and assumes a relatively high level of literacy and technological proficiency because it requires reading text online. Nevertheless, external validity testing with the pilot test sample confirmed that the sample appeared as representative as other national, telephone-based surveys, on the major dimensions of health behaviors and media use (Ramírez, Martinez, Lewis-Persky, Freres & Hornik, 2009).

In February 2009, the English-language ANHCS core instrument was translated into Spanish and administered to 660 Spanish-dominant Latinos from a separate Knowledge Networks Latino panel. Except where otherwise noted, analyses are based on data from the English-language survey from January 2005 through January 2009 and the Spanish-language supplement from February 2009. The total sample was 14,835. The sample was reduced to include only 10,700 Non-Hispanic Whites and 1800 Latinos (1140 interviewed in English and 660 interviewed in Spanish), excluding respondents of other ethnicities.

The core ANHCS instrument aims to obtain information about U.S. adults' (ages 18 and over) use of public and private information sources about health. The data reported in this dissertation consist of a combination of information from the core ANHCS survey and profile surveys created by Knowledge Networks and administered to ANHCS survey respondents. The

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[5] Or a laptop with internet access, as of Fall 2008.

core ANHCS survey took respondents an average of approximately 19 minutes to complete and included measures of exposure to general and health-specific media use as well as predictors of health behavior based on the Theory of Reasoned Action (Fishbein & Azjen, 1975). The Knowledge Networks profiles sought participants' demographic and some psychographic characteristics, including household income, current work status, job type, region, and health status. The Knowledge Networks Hispanic profile captures additional information about Latino-identified participants (in the English and Spanish panels), including country of origin and some media use and language patterns[6].

ANHCS Key Measures

All measures rely on individuals' self-reports. Table 2.2 provides complete the question texts and coding schemes.

Ethnicity. Non-Hispanic Whites were coded as "0" and Latinos were coded "1."

Language of interview. Language of interview was used as a proxy for acculturation[7]. A three-category variable combining acculturation and ethnicity was created such that comparisons were between English-speaking Latinos, Spanish-speaking Latinos, and Non-Hispanic Whites. Latinos who responded in English are considered more acculturated than those who responded in Spanish. These categories were dummy-coded for use in models with distinct comparison objectives.

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[6] All Knowledge Networks profile questionnaires are administered separately from the ANHCS instrument, generally prior to the ANHCS survey.

[7] Although respondents were not given a choice about the language of the survey, they were recruited from panels recruited and maintained by dominant language. In effect, they selected their language preference not for this specific survey, but for all surveys.

Nativity. Nativity was a dichotomous variable indicating whether respondents were born in the United States or in Latin America[8].

Country of Origin. Country of origin was a categorical variable indicating the country of origin of a respondent, whether by birth or ancestry. This variable was used primarily as a filter for analyses including only subgroups of Latinos by country of origin. Respondents with ancestry from the countries of Central America (Ecuador, El Salvador, Guatemala, Honduras, Nicaragua, and Panama) were combined. Just over half the Latino sample for whom there were valid responses to these questions (55.3%, n=727; Table 2.1) was of Mexican origin. This was the only Latino subgroup that was large enough to analyze separately.

Generation. A three-level ordinal variable was generated from a combination of the respondent's country of birth, the country of birth of his/her parents, and the country of birth of his/her grandparents. First generation indicated the respondent was born outside of the U.S., second generation indicated the respondent was born in the U.S. to at least one parent of foreign birth, and third generation (and above) indicated the respondent was born in the U.S. to U.S.-born parents.

General media use. Participants were asked about their habitual exposure to non-news television, national television news, local television news, newspaper, radio talk shows or news, and internet usage during a typical week. Frequency of use of each source was measured in days per week: "In the past seven days, on how many days did you... [Read a newspaper?/Watch the national news on television?/Watch the local news on television?/Listen to radio talk shows or news?/Use the internet, other than email? – Days]. Possible answers ranged from 0 to 7 days.

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[8] NHW were also asked where they were born; however, this question was only relevant for Latinos as it was used to test acculturation indicators.

Internet use. Nearly one quarter (23.5%) of respondents reported not having used the internet at all in the past week. Because frequency of internet use was not assessed in all data sets, a separate dichotomous variable was created to compare internet users and non-users, which permitted comparisons across data sets.

Frequency of health information source use. Respondents were asked to estimate their average weekly exposure to five different sources for health information over the past month: newspaper health sections, health magazines or newsletters, TV news health segments, friends/family, and medical doctors. Possible answers for these questions were: "Not at all," "Less than once per week," "Once per week," and "A few times per week." These responses were recoded and treated as interval level data, with 0=Not at all, .5=Less than once per week, 1=Once per week, and 3=A few times per week.

Health information seeking. Respondents were asked to estimate how often they had actively looked for health information from each of the following sources: television; newspapers or magazines; the internet; medical doctors; and friends, family members, or coworkers. Response options were: not at all, a little, some, or a lot. Due to a lack of variation among those who reported at least some seeking, responses were dichotomized such that 0 indicated the respondent did not seek from the particular source, and 1 indicated seeking.

Table 2.1. Sample Characteristics by Ethnicity and Acculturation Status.

	ANHCS (N=12,500)						Pew (N=4013)				HINTS (N=4597)					
	Non-Hispanic White (N=10,700)		English-Responding Latinos (N=1140)		Spanish-Responding Latinos (N=660)		English-Responding Latinos (N=1041)		Spanish-Responding Latinos (N=2972)		Non-Hispanic White (N=4101)		English-Responding Latinos (N=225)		Spanish-Responding Latinos (N=271)	
	Mean (SD) or Proportion	n	Mean (SD) or Proportion	n	Mean (SD) or Proportion	n	Mean (SD) or Proportion	n	Mean (SD) or Proportion	n	Mean (SD) or Proportion	n	Mean (SD) or Proportion	n	Mean (SD) or Proportion	n
Female	52.2	5585	50.7	578	61.4	405	53.1	553	49.2	1463	66.1	2712	60.9	137	62.0	168
Age, mean	49.3		40.7		38.2		42.3		43.7		53.9		42.9		39.9	
	(16.6)		(14.6)		(12.1)		(15.6)		(15.5)		(17.6)		(16.5)		(14.6)	
Education, mean years	13.6		13.0		11.5		13.5		10.7		14.1		13.6		9.0	
	(2.5)		(2.5)		(3.5)		(2.5)		(2.6)		(2.6)		(2.7)		(4.2)	
Income, mean $	58,852		49,805		38,911		55,611		27,249		59,576		57,534		27,871	
	(43,621)		(39,572)		(33,292)		(42,669)		(24,632)		(43,907)					
% Married	64.7	6926	54.4	620	78.6	519	57.4	593	66.0	1937	59.7	2438	61.6	138	66.8	181
% Have Home Internet	71.7	7677	67.0	764	44.2	292					57.0	2335	49.8	112	11.1	30
% Use Internet or Email	77.4	8193	77.2	864	75.2	479	68.3	690	28.8	831	63.3	2592	61.3	138	14.0	38
% of Latinos:																
Mexican			37.0	245	74.0	482	64.7	586	67.4	1966						
Central American			5.3	35	9.0	59	5.9	53	11.8	345						
Puerto Rican			12.7	84	2.9	19	15.9	144	6.1	179						
Cuban			5.4	36	2.1	14	5.0	45	3.6	104						
1st Generation (Born outside of U.S.)			24.6	164	93.0	614	25.2	261	92.3	2735	3.1	126	27.6	62	94.8	257

Table 2.2. Comparison of Key Measures across Data Sets.

Construct		Data Set	Question Wording	Response Options Codes
Acculturation	Language of Interview	ANHCS	Language of interview; Spanish-language respondents were drawn from a separate panel of Spanish-dominant Latinos. English-language respondents are self-identified Latinos in the main panel.	0=English/HAL 1=Spanish/LAL
		Pew	Language of interview; respondents provided with choice of English or Spanish at start of interview.	0=English/HAL 1=Spanish/LAL
		HINTS	Language of interview; respondents provided with choice of English or Spanish at start of interview.	0=English/HAL 1=Spanish/LAL
	Nativity	ANHCS	Born in the U.S. versus other country.	0=Born in Latin America 1=Born in U.S.
		Pew	Born in the U.S. versus other country.	0=Born in Latin America 1=Born in U.S.
		HINTS	Born in the U.S. versus other country.	0=Born outside of U.S. 1=Born in U.S.
	Generation in U.S.	ANHCS	Computed by combining respondent's birth country (U.S. versus other) with parents' and grandparents' birth countries (U.S. versus other). Respondents who were born outside of the U.S. are considered first generation; those born in the U.S. to at least one foreign-born parent are second generation; and those born in the U.S. to U.S.-born parents are third generation (or higher).	1=First generation 2=Second generation 3=Third generation
		Pew	Computed by combining respondent's birth country (U.S. versus other) with parents' and grandparents' birth countries (U.S. versus other). Respondents who were born outside of the U.S. are considered first generation; those born in the U.S. to at least one	1=First generation 2=Second generation 3=Third generation
		HINTS	--	--

Table 2.2. Comparison of Key Measures across Data Sets (continued)

	Construct	Data Set	Question Wording	Response Options Codes
General Media Exposure	Newspaper	ANHCS	In the past seven days, on how many days did you read a newspaper?	0-7 days
		Pew	--	--
		HINTS	In the past seven days, how many days did you read a newspaper?	0-7 days
	TV	ANHCS	On a typical weekday, Monday through Friday, about how many hours do you watch television each day? *[0-24]* During a typical weekend, including both Saturday and Sunday combined, about how many total hours do you watch television? *[0-24]*	0-24 hours (averaged over 7 days)
		Pew	--	--
		HINTS	On a typical weekday, Monday through Friday, about how many hours do you watch television? *[0-24]* During a typical weekend, including both Saturday and Sunday, about how many hours do you watch television? *[0-24]*	0-24 hours (averaged over 7 days)
	Radio	ANHCS	In the past seven days, on how many days did you listen to radio talk shows or news?	0-7 days
		Pew	--	--
		HINTS	On a typical weekday, Monday through Friday, about how many hours do you listen to the radio? *[0-24]* During a typical weekend, including both Saturday and Sunday, about how many hours do you listen to the radio? *[0-24]*	0-24 hours (averaged over 7 days)

Table 2.2. Comparison of Key Measures across Data Sets (continued)

	Construct	Data Set	Question Wording	Response Options Codes
General Media Exposure	National TV News	ANHCS	In the <u>past seven days</u>, on how many days did you watch the national news on television?[9]	0-7 days
		Pew	--	--
		HINTS	In the <u>past seven days</u>, how many days did you watch the national news on television?	0-7 days
	Local TV News	ANHCS	In the <u>past seven days</u>, on how many days did you watch the local news on television?	0-7 days
		Pew	--	--
		HINTS	In the <u>past seven days</u>, on how many days did you watch the local news on television?	0-7 days

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[9] For Spanish respondents, the question was worded: "In the past seven days, on how many days did you watch the national news about the United States on television?"

Table 2.2. Comparison of Key Measures across Data Sets (continued)

	Construct	Data Set	Question Wording	Response Options Codes
General Media Exposure	Local TV News	ANHCS	In the <u>past seven days</u>, on how many days did you watch the local news on television?	0-7 days
		Pew	--	--
		HINTS	In the <u>past seven days</u>, on how many days did you watch the local news on television?	0-7 days
	Radio Talk Shows or News	ANHCS	In the <u>past seven days</u>, on how many days did you listen to radio talk shows or news?	0-7 days
		Pew	--	--
		HINTS	--	--
	Internet[10]	ANHCS	In the <u>past seven days</u>, on how many days did you use the internet, other than for email?	0-7 days
		Pew	Do you use the internet, or do you send or receive email, at least occasionally?	0=No 1=Yes
		HINTS	On a <u>typical weekday</u>, Monday through Friday, about how many hours do use the Internet for personal reasons? *[0-24]* During a <u>typical weekend</u>, including both Saturday and Sunday, about how many hours do you use the Internet for personal reasons? *[0-24]*	0-24 hours (averaged over 7 days)
		HINTS	--	--

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[10] A dichotomous measure was generated in ANHCS and HINTS for comparison with Pew.

Table 2.2. Comparison of Key Measures across Data Sets (continued)

	Construct	Data Set	Question Wording	Response Options Codes
Health-Related Media Exposure	General TV Programming	ANHCS	--	--
		Pew	How much information about health and health care did you get over the <u>past year</u> - would you say it was a lot of information, a little information, or none at all? And, how much information on television?	None (0) A little (1) A lot (2)
		HINTS	--	--
	Non-news TV Programs	ANHCS	Sometimes television shows (other than news programs) address issues about health or focus on doctors or hospitals. About how often have you watched such shows in the <u>past 30 days</u>?	Not at all (0) Less than once per week (.5) Once per week (1) A few times per week (3)
		Pew	--	--
		HINTS	--	--

Table 2.2. Comparison of Key Measures across Data Sets (continued)

	Construct	Data Set	Question Wording	Response Options Codes
Health-Related Media Exposure	TV News Health Segments	ANHCS	Some local or national television news programs include special segments of their newscasts which focus on health issues. About how often have you watched such health segments in the <u>past 30 days</u>?	Not at all (0) Less than once per week (.5) Once per week (1) A few times per week (3)
		Pew	--	--
		HINTS	Some local television news programs include special segments of their newscasts that focus on health issues. In the past 12 months, have you watched health segments on the local news? *[Yes/No] If Yes:* How often have you watched health segments on local news in the past 12 months?	[Has not watched] (0) Less than once per week (.5) Once or more per week (1)

Table 2.2. Comparison of Key Measures across Data Sets (continued)

	Construct	Data Set	Question Wording	Response Options Codes
Health-Related Media Exposure	Radio	ANHCS	--	
		Pew	How much information about health and health care did you get over the <u>past year</u> - would you say it was a lot of information, a little information, or none at all? And, how much information on the radio?	None (0) A little (1) A lot (2)
		HINTS	--	
	Newspaper Health Sections	ANHCS	Some newspapers or general magazines have sections that report on health matters. About how often have you read such health sections in the <u>past 30 days</u>?	Not at all (0) Less than once per week (.5) Once per week (1) A few times per week (3)
		Pew	How much information about health and health care did you get over the <u>past year</u> - would you say it was a lot of information, a little information, or none at all? And, how much information from newspapers or magazines?	None (0) A little (1) A lot (2)
		HINTS	Some newspapers or general magazines publish a special section that focuses on health. In the <u>past 12 months</u>, have you read health sections of the newspaper or of a general magazine? [Yes/No] If Yes: About how often have you read such health sections in the <u>past 12 months</u>? Would you say...once or more per week, or less than once per week?	[Has not read] (0) Less than once per week (.5) Once or more per week (1)

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Table 2.2. Comparison of Key Measures across Data Sets (continued)

	Construct	Data Set	Question Wording	Response Options Codes
Health-Related Media Exposure		ANHCS	Some people notice information about health on the internet. Do you sometimes read health information on the Internet when you were not trying to find out about a specific health concern? *[Yes/No] If Yes:* About how often have you read this sort of information on the internet in the <u>past 30 days</u>?	Not at all (0) Less than once per week (.5) Once per week (1) A few times per week (3)
	Internet	Pew	--	--
		HINTS	Some people notice information about health on the internet, even when they are not trying to find out about a specific health concern they have or their family has. Have you read such health information on the Internet in the past 12 months? *[Yes/No] If Yes:* About how often have you read this sort of information in the <u>past 12 months</u>? Would you say...once or more per month, or less than once per month?	[Has not read] (0) Less than once per month (.5) Once or more per month (1)

Table 2.2. Comparison of Key Measures across Data Sets (continued)

	Construct	Data Set	Question Wording	Response Options Codes
Other Sources for Health Information	Medical Doctors	ANHCS	--	
		Pew	How much information about health and health care did you get over the past year - would you say it was a lot of information, a little information, or none at all? And, how much information from a doctor or other medical professional?	None (0) A little (1) A lot (2)
		HINTS	--	
	Friends/ Family	ANHCS	Some people talk with family or friends about health issues. About how often have you talked with family or friends about health in the past 30 days?	Not at all (0) Less than once per week (.5) Once per week (1) A few times per week (3)
		Pew	How much information about health and health care did you get over the past year - would you say it was a lot of information, a little information, or none at all? And, how much information from family or friends?	None (0) A little (1) A lot (2)
		HINTS	--	
	Church or Community Organization	ANHCS	--	--
		Pew	How much information about health and health care did you get over the past year - would you say it was a lot of information, a little information, or none at all? And, how much information from a church or community organization?	None (0) A little (1) A lot (2)
		HINTS	--	--

Table 2.2. Comparison of Key Measures across Data Sets (continued)

	Construct	Data Set	Question Wording	Response Options Codes
Health Information Seeking	Newspapers or Magazines	ANHCS	Thinking about the <u>past 30 days</u>: how much have you actively looked for information about a specific health concern or medical problem that you or a family member had from each of the following sources? [Newspapers]	Not at all (0) A little, some, a lot (1)
		Pew	--	--
		HINTS	Have you ever looked for information about cancer from any source? *[Yes/No]. If Yes:* The most recent time you wanted information on cancer, where did you go first? [Newspapers or magazines]	No or Has not sought (0) Yes (1)
	Health Magazines or Newsletters	ANHCS	Thinking about the <u>past 30 days</u>: how much have you actively looked for information about a specific health concern or medical problem that you or a family member had from each of the following sources? [Special health or medical magazines or newsletters]	Not at all (0) A little, some, a lot (1)
		Pew	--	--
		HINTS	--	--
	Books	ANHCS	--	--
		Pew	--	--
		HINTS	Have you ever looked for information about cancer from any source? *[Yes/No]. If Yes:* The most recent time you wanted information on cancer, where did you go first? [Books]	No or Has not sought (0) Yes (1)

Table 2.2. Comparison of Key Measures across Data Sets (continued)

	Construct	Data Set	Question Wording	Response Options Codes
Health Information Seeking	Television	ANHCS	Thinking about the <u>past 30 days</u>: how much have you actively looked for information about a specific health concern or medical problem that you or a family member had from each of the following sources? [Television]	Not at all (0) A little, some, a lot (1)
		Pew	--	--
		HINTS	--	--
	Internet	ANHCS	Thinking about the <u>past 30 days</u>: how much have you actively looked for information about a specific health concern or medical problem that you or a family member had from each of the following sources? [The Internet]	Not at all (0) A little, some, a lot (1)
		Pew	How much information about health and health care did you get over the <u>past year</u> - would you say it was a lot of information, a little information, or none at all? And, how much information on the internet?	None (0) A little (1) A lot (2)
		HINTS	Have you ever looked for information about cancer from any source? *[Yes/No]. If Yes:* The most recent time you wanted information on cancer, where did you go first? [Internet]	No or Has not sought (0) Yes (1)

Table 2.2. Comparison of Key Measures across Data Sets (continued)

	Construct	Data Set	Question Wording	Response Options Codes
Health Information Seeking	Medical Doctors	ANHCS	Thinking about the <u>past 30 days</u>: how much have you actively looked for information about a specific health concern or medical problem that you or a family member had from each of the following sources? [Your doctor or other health care professional]	Not at all (0) A little, some, a lot (1)
		Pew	--	--
		HINTS	Have you ever looked for information about cancer from any source? *[Yes/No].* *If Yes:* The most recent time you wanted information on cancer, where did you go first? [Health Care Provider]	No or Has not sought (0) Yes (1)
	Friends/ Family	ANHCS	Thinking about the <u>past 30 days</u>: how much have you actively looked for information about a specific health concern or medical problem that you or a family member had from each of the following sources? [Family and friends]	Not at all (0) A little, some, a lot (1)
		Pew	--	--
		HINTS	Have you ever looked for information about cancer from any source? *[Yes/No].* *If Yes:* The most recent time you wanted information on cancer, where did you go first? [Friend/Co-worker, Family]	No or Has not sought (0) Yes (1)

Table 2.2. Comparison of Key Measures across Data Sets (continued)

Construct	Data Set	Question Wording	Response Options Codes
Language of Media Use	ANHCS	[Spanish respondents only: Immediately following general media sources, health-specific sources, and seeking from media sources questions.] Was that information mainly in Spanish or in English or in both languages? [Spanish/English/Both/Don't know]	0=Spanish 1=Both 2=English
	Pew	*[Immediately following radio, internet, television, church, and newspapers/magazines questions]* Was that information mainly in Spanish or in English or in both languages? [Spanish/English/Both/Don't know]	0=Spanish 1=Both 2=English
	HINTS	--	--

* *Note.* For Spanish respondents, the question was worded: "In the past seven days, on how many days did you watch the national news about the United States on television?"

ANHCS Data Limitations

An important limitation with this data set is that, unlike in Pew and HINTS, Latino respondents were not given a choice to respond in English or Spanish. Rather, they were automatically given the English or Spanish survey according to the KN panel they belong to. Given a choice, as in both Pew and HINTS, about sixty percent of randomly-selected Latinos would choose to respond in Spanish, and this likely is representative of the population. The ANHCS Latino Spanish-interviewed and English-interviewed respondents were sampled through different procedures and their relative numbers are an artifact of those different procedures. Spanish language respondents make up one-third of the available ANHCS sample (36.7%, n=660, Table 2.1)[11]. Those two samples can be compared to one another but they cannot be meaningfully combined to a single U.S. Latino sample.

A separate issue is whether the language subgroups are each equally representative of the population they are intended to represent. To mitigate possible biases that could result from a lack of representativeness, analyses control for the effects of important structural variables that not only co-vary across the independent and dependent variables of interest but also represent how the ANHCS sample deviates from the population: gender, age, education, and internet access (where relevant). An alternative approach would have been to weight the combined Latino sample such that it reflected the Current Population Survey (CPS) distribution by primary language, country of origin, other demographic characteristics, and internet access. Although in theory it is possible to use weights to adjust for sampling differences, in practice, it

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[11] It is not quite fair to compare in this manner, because the ANHCS Spanish respondents were recruited independently of the English respondents and the target recruitment numbers were based on a budget rather than a desire to compile a truly accurate picture of the U.S. Latino population. Nevertheless, it is important to point out that the proportion of HAL and LAL in the combined ANHCS is nearly the inverse of what is in other samples and such represents an important source of sampling difference.

is difficult at best to determine the appropriate sampling frames for these samples. Without

knowing the true population proportions of Spanish- versus English-dominant Latinos, it is not

possible to make the necessary adjustments to represent the samples to their populations[12]. In

other words, creating population weights was not possible because the true populations are not

known. It was nevertheless important to control for possible differences in the sampling

procedures when comparing results across data sets, and the best available method to do that

was to control for the structural covariates described above.

Another potential limitation is the representativeness of the internet-based data

collection process. I sought to establish the similarity of the sample to the general population by

comparing raw distributions in the sample to other national random samples (Table 2.1).

Because data collection was internet-based, I was particularly concerned that the sample not be

skewed in terms of internet access and familiarity, and that the degree of departure from the

population parameters, if any, be equal across the three subgroups of interest. Seventy-one

percent of the NHW, 67.0% of the HAL, and 44.2% of the LAL respondents had internet access at

home at recruitment (Table 2.1), compared with 67% percent in the general population

(excluding Latinos, Horrigan & Smith, 2007) and 44.0% of all Latinos (data not available by

language, Fox & Livingston, 2007).

Finally, the response rates for this survey were lower than for comparable phone-based

surveys. The response rate, calculated by multiplying the panel recruitment rate (30%) by the

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[12] Knowledge Networks has computed weights taking into account the amount of Spanish spoken in Hispanic homes, the population estimate of which is based on the 2006 Pew Hispanic Health Survey. However, this remains an imperfect estimation, particularly considering the different and separate sampling procedures employed for the English- versus Spanish-language panels.

survey response rate (68%), was 19.8%. This is less than half the response rate for the Pew

Hispanic phone-based survey.

I will return to the sampling and language-based limitations of this study in Chapters 3

and 5, after testing the hypotheses of Study 1 and Study 2.

An additional limitation relevant to study two is the lack of specificity of both the

substantive and programmatic content of the media exposure variables, including the seeking

variables. For example, neither the specific health topic, nor the nature of the information

obtained from different sources was considered. Also unknown are the specific programs, or

even channels, that are used to obtain information. I will demonstrate in Chapters 4 and 6 that

this limitation became quite significant, and may explain the failure to find support for my

hypotheses.

Pew Hispanic Center's Health Survey 2007 (Pew)

The Pew Hispanic Health Survey[13] was administered by phone to a national randomly

selected sample of Latino adults (aged 18 and older) in July-September, 2007. The survey

included questions about health communication, personal and family health status, and health-

related beliefs. The response rate was 46.3%, and the total sample included 4013 respondents.

Respondents were contacted by bilingual interviewers and could choose to complete the survey

in Spanish or English[14]; three-quarters of the sample (76.3%; n=2918) answered in Spanish.

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[13] I am thankful to Gretchen Livingston at the Pew Hispanic Center for access to this data, which was made available to me for my dissertation before it was publicly available.

[14] Because interviewers were bilingual, it was possible for respondents to switch between English and Spanish. Interviewers coded both the language preference stated initially by the respondent, and at the conclusion of the interview, the interviewer's perspective on the amount of the interview conducted in Spanish and English. Of the 4013 interviews, 53 were considered having been completed equally in English

Pew Key Measures

All measures rely on self-report.

Ethnicity. Only Latinos were included in this sample.

Language of interview. Language of interview was used as a proxy for acculturation because participants were given the choice to respond in either language. This decision follows arguments that language preference, not just ability, should be taken into account when assessing acculturation (Lara and colleagues, 2005, and Mulvaney-Day and colleagues, 2007). Moreover, traditional measures of acculturation are based in part on language of media use (Marín & Gamba, 1996); such a measure would present a tautology given the purpose of the present study. A three-category variable combining acculturation and ethnicity was created such that comparisons were between English-speaking Latinos, Spanish-speaking Latinos, and Non-Hispanic Whites. Latinos who chose to respond in English are considered more acculturated than those who responded in Spanish. These categories were dummy-coded for use in models with distinct comparison objectives.

Nativity. Nativity was a dichotomous variable indicating whether respondents were born in the United States or in Latin America.

Country of Origin. Country of origin was a categorical variable indicating the country of origin of a respondent, whether by birth or ancestry. Respondents with ancestry from the countries of Central America (Ecuador, El Salvador, Guatemala, Honduras, Nicaragua, and Panama) were combined.

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and Spanish. Initial interview language preference is the variable used for dividing the sample by acculturation.

Generation. A three-level ordinal variable was generated from a combination of the respondent's country of birth, the country of birth of his/her parents, and the country of birth of his/her grandparents. First generation indicated the respondent was born outside of the U.S., second generation indicated the respondent was born in the U.S. to at least one parent of foreign birth, and third generation (and above) indicated the respondent was born in the U.S. to U.S.-born parents.

Time in the U.S. The raw time in the U.S. variable indicated the number of years (and months, if under 1 year) the respondent had lived in the United States, across all the times he/she had lived in the U.S. (e.g., respondents who migrated from their country of origin to the U.S. and back several times were asked to think about the total amount of time they had lived in the U.S.). This variable included only those respondents who were born outside of the U.S.

Proportion of Life in the U.S. The raw time in U.S. and nativity variables were combined with the respondent's age to generate a continuous variable indicating the proportion of the respondent's life lived in the U.S. The variables were combined such that a value of one indicated that a respondent was born in the U.S., and a value close to zero indicated that the respondent had lived most of his/her life outside of the U.S.

Proportion of Life in the U.S. and Generation. A composite measure incorporated the proportion of life in the U.S., as described above, with generation, such that respondents who were born in the U.S. could have a value of 1, 2, or 3, and respondents born outside the U.S. had values ranging from 0.01 to 0.99.

Language-based Acculturation Index. An acculturation index was created by combining responses to four questions about English and Spanish language ability. The first pair of questions asked about speaking ability and oral comprehension in the two languages: "Would

you say you can carry on a conversation in [Spanish/English], both understanding and speaking –

very well, pretty well, just a little, or not at all?" The second pair of questions asked about

literacy in both languages: "Would you say you can read a newspaper or book in

[English/Spanish] – very well, pretty well, just a little, or not at all?" Responses were coded in

ascending order, such that 3 indicated "very well" and 0 indicated "not at all." The "not at all"

responses were then combined with "just a little," "don't know" and "refused" for each item,

and the sum of each pair was taken, generating two 5-level (0 through 4) variables indicating

English and Spanish ability. Spanish ability was subtracted from English ability to create an index

of overall language ability ranging from -4 to 4, where -4 indicated complete Spanish

dominance, 0 indicated bilingualism, and 4 indicated complete English dominance. This index

was simplified and the final variable was a three-level ordinal variable where 1 indicated English

language dominance, 2 indicated bilingualism, and 3 indicated Spanish dominance. Dominance

here indicates that respondents scored higher on that language compared with the other

language on at least 2 of the 4 original questions: in other words, they report speaking/reading

the dominant language "pretty well" or "very well" and the other language "not at all" or "just a

little."

Frequency of health information source use. Respondents were asked how often (a lot, a little,

none at all) they got information about health from each of seven sources in the past year:

radio, television, church or community organization, newspapers or magazines, the internet,

family or friends, and doctors or other health professionals.

Language of health information source use. Immediately following each of the above items to

which the response was "a little" or "a lot," respondents were asked, "Was that information

mainly in Spanish or in English or in both languages?" Response options were: Spanish, English, or Both.

Pew Data Limitations

The primary limitation of the Pew Hispanic Health data set is that it did not include Non-Hispanic Whites, so analyses are limited to intra-Latino comparisons. Additionally, as the survey was not exclusively about health communication, there are no measures of general (non-health) media exposure. Finally, the measures of health-related media exposure and health information from interpersonal and medical sources are quite broad, in terms of the content ("information about health"), the time period that is specified ("past year"), and in the response options ("none," "a little," "a lot"). This lack of specificity makes it difficult to make a strong case that information exposure influences behaviors (Fishbein & Azjen, 1975), as study two proposed. Despite these limitations, this data set is unique in its breadth of the Latino sample and the measures that are included are strong enough to provide corroborating evidence to the pattern of results found in the other two data sets.

National Cancer Institute's Health Information National Trends Survey 2005 (HINTS)

The Health Information National Trends Survey (HINTS), an omnibus health communication survey with a national probability sample of U.S. adults, was conducted by the National Cancer Institute in 2005. Telephone interviews were conducted in English or Spanish based on respondent's preference (Davis, Park, Covell, Rizzo, Cantor, 2006; Nelson, Kreps, Hesse, Croyle, Willis, Arora, et al., 2004). The response rate was 21%. For the present analyses, the sample was reduced to 4597, comprising 271 Spanish-speaking Latinos, 225 English-speaking

Latinos, and 4101 English-speaking NHWs. For details about the methods and sampling design,

refer to Davis et al. (2006).

HINTS Key Measures

All measures rely on self-report.

Ethnicity. Non-Hispanic Whites were coded as "0" and Latinos were coded "1."

Language of interview. As with Pew, language of interview was used as a proxy for acculturation

because participants were given the choice to respond in either language. A three-category

variable combining acculturation and ethnicity was created such that comparisons were

between English-speaking Latinos, Spanish-speaking Latinos, and Non-Hispanic Whites. Latinos

who chose to respond in English are considered more acculturated than those who responded in

Spanish. These categories were dummy-coded for use in models with distinct comparison

objectives.

General media use. Participants were asked about their television, national television news,

local television news, newspaper, radio, and internet usage during a typical week.

Health-specific media use. Participants were first asked whether they had read health sections

of newspapers or magazines, watched health segments on local television news, or read health

information on the internet in the past 12 months, and those who had were asked about the

number of times they had used the source in the past 12 months.

Cancer information seeking. Respondents were asked whether they had ever looked for

information about cancer from any source. Those who replied affirmatively were then asked

which source they consulted first the last time they looked for cancer information. Response

options included: Books; brochures, pamphlets; etc…; cancer organization; family; friend/co-

worker; health care provider; internet; library; magazines; newspapers; someone with cancer; telephone information number; other. These responses were combined for theoretical and practical purposes and five dichotomous variables were generated indicating whether respondents had ever sought cancer information from each of the following sources: books; newspaper/magazines; internet; family/friends/co-workers; and health care providers.

HINTS Data Limitations

The response rate for this sample was unusually low (21%) for a phone-based survey; potential for selection bias exists in such a sample. Although analyses controlled for important demographics and comparisons to other data sets demonstrated concordance on demographics and important behavioral variables, caution is warranted in generalizing these results to the broader Latino population.

An additional limitation is that the survey did not distinguish the language of media consumed, so we are unable to ascertain just what kind of information respondents are exposed to. While we can speculate that most media will be consumed in one's primary language, this remains speculation open for empirical validation. Likewise, this survey did not ask about specific programming selections, so exposure to health information may encompass quite a broad set of behaviors.

Sample Characteristics

For the purposes of this dissertation, the samples were restricted to Latinos and Non-Hispanic Whites, except in the case of Pew, where only Latinos were sampled. Unless otherwise noted, data reported in this dissertation refer to the sample of Latinos and Non-Hispanic Whites, with a total N=12,500 (ANHCS), N=3824 (Pew), N=4597 (HINTS). Table 2.1 presents a summary of the background and demographic characteristics of each of the three comparison groups by data

set. There is general concurrence across the data sets on the main demographic variables; this provides some assurance of the general quality of all three samples. Additionally, the demographic information for each of the samples is consistent with what is known about the groups in the general population. However, statistics about Latinos generally available (e.g., the Census) are not broken down by acculturation level, so it is difficult to know just how the HAL and LAL groups, as defined for the present purposes, compare with the general population. Consistent with what is known about Latinos and NHW in the general population (U.S. Bureau of the Census, 2009), Latinos in the samples are on average about 10 years younger than NHW. Latinos also have lower incomes and less formal education compared with NHW, especially the less-acculturated. In the general population, about two-thirds of all U.S. Latinos are of Mexican origin (U.S. Bureau of the Census, 2009); this is the case in the Pew data. In the ANHCS data set, just 40% of all Latinos are of Mexican origin (37% of HAL, 74% of LAL).

Analytic Approach

In this section, I describe the common analytic approach employed to answer the guiding research questions. The first important analytic step is to validate the measure of acculturation advanced theoretically throughout this dissertation: language of interview. This is done below using Pew data. In addition to the common acculturation measure, throughout studies one and two I will rely on common constructs that were measured somewhat differently across the three data sets. The common constructs and their specific operationalization in each data set are listed in Table 2.2 and described in further detail below. I argue that although each concept was operationalized a bit differently in each data set, the underlying construct (e.g., obtaining health information from the radio versus from television) is the same. As such, I expect that while exact estimates may not match, the cross-group comparative patterns of findings will be similar across data sets.

Key Measures

Below is a short description of the key variables that will be used throughout studies one and two. Additional variables (outcomes) used in study two are described in Chapter 4. Table 2.2 shows a comparison of the conceptual variables and how they were operationalized, as described above.

Acculturation: Acculturation was defined *a priori* as the language in which the survey took place: respondents answering in Spanish were considered less-acculturated than respondents answering in English. Alternative measures of acculturation are tested later in this chapter.

General Media Use: Frequency of usage of different types of general media: television, radio, newspaper, magazines, and radio, and use of the internet.

Health-Specific Media Exposure: Two kinds of non-intentional health-specific exposure were considered in this study: (1) general health information exposure and (2) exposure to content about specific topics. The sources considered included television, radio, newspapers, magazines, radio, family/friends, and doctors.

Health Information Seeking: Deliberate, purposive information acquisition from a variety of sources (mass media, interpersonal, and clinical) was assessed.

Demographic controls: Age, gender, income, and education were considered important background structural characteristics.

Validating Language of Interview as a Measure of Acculturation

The first analytic step I took was to validate the measure of acculturation that is used

throughout the rest of the dissertation. An *a priori* decision was made that language of interview

would be the best indicator of acculturation for three reasons (1) it is simple to assess, (2) the

choice of language is likely to reflect respondents' true comfort level with the language, and (3)

it is likely to be strongly associated with other measures of acculturation (Cruz, Marshall,

Bowling, & Villaveces, 2008). In contrast to some other language-based measures of

acculturation, the measure used here does not include language of media use; given that media

use is the dependent variable, inclusion of language of media use as part of the independent

variable would have risked making study one analyses tautological[15]. Thus, the purpose of the

validation step is more modest than it would be if the purpose were to validate a measure of

acculturation for general use which might reasonably include language of media use.

I approached this analysis with the possibility that an alternate measure, even for the

purposes of this dissertation, could be a better indicator of behavioral acculturation. For

example, nativity (U.S versus other), time in the U.S. for the non-native-born, and generation in

the U.S. for the native-born, or a combination of these three items, could be plausible rival

behavioral indicators of acculturation (Cruz, Marshall, Bowling, & Villaveces, 2008). A language-

based acculturation scale that is traditionally used should be strongly associated with language

of interview, with the benefit of interview language being its brevity.

Using Pew Hispanic Health Survey data, I sought to validate a language-of-interview

proxy measure of acculturation by:

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[15] The acculturation measure used herein had been validated previously in health-related studies (e.g.,
Karas Montez & Eschbach, 2008), but not in media studies.

1. Showing that language of interview is substantially associated with nativity, time in the U.S., and generation separately and when those three characteristics are combined as a single variable.

2. Comparing the associations of language of interview and the combined nativity/time in the U.S./generation measure separately with the language-based acculturation index.

3. Showing that the alternative measures of acculturation add little to the language-of-interview measure in accounting for health information source use in nested OLS regression models[16].

I decided *a priori* that language of interview would be considered a valid and preferred indicator of acculturation if: (a) there was a substantial association with other measures and (b) the variance in media use accounted for by nativity/time/generation and the language-based acculturation index is not greater than that accounted for by language of interview alone.

Health information source use is used here as a validation test and does not represent a duplication of study one hypotheses (that acculturation influences media use) because what I consider here is the relative influence of different indicators of acculturation, not the absolute influence of any acculturation indicator on media use, as is hypothesized in study one. I made an a priori decision to use language of interview as the indicator of acculturation. One of the criteria I will use to decide whether that was a good choice is whether I would have done better in testing my hypotheses with an alternative acculturation measure. Support for the legitimacy of my choice will come from a failure to show that the alternative measures did better.

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[16] A fourth test was originally proposed: To use the different measures concurrently as predictors of media use, and compare the regression coefficients of this model with those from step 2. However, it was decided *a priori* that because there was a high probability of muticollinearity, this test would only be conducted if the correlation between the two proposed measures was less than .5. Since this condition was not satisfied (correlation was -0.61, p<.001 for all Latinos), this test was not conducted.

As an additional safeguard against a tautology, the validation tests include non-media sources of health information exposure that are not tested in study one: family/friends, doctors, and church/community organizations. The purpose of this validation exercise was to increase confidence that the measure of acculturation selected was the best available non-media-dependent indicator of behavioral acculturation.

Additionally, it is important that a measure of acculturation be equally effective across Latino subgroups (Marín & Gamba, 1996). Thus, the final validation test was to:

4. Ensure that language of interview is an equally appropriate measure of acculturation across country of origin.

I tested this last condition by adding two nested steps to the regression models predicting health information source use from language of interview: country of origin dummy variables (Puerto Rico, Central America, and Cuba, with Mexico as the reference) and their interactions with language of interview. I expected the block of interactions not to be significant, indicating that the effects of acculturation are not different by country of origin. If this condition was not satisfied, then additional tests should consider for which specific country groups it works, and the proposed measure of acculturation should be used only with those sub-populations for whom the previous conditions are upheld.

Results

The first step to validate language of interview as an indicator of acculturation was to consider the associations[17] among the alternate measures of acculturation (Table 2.3).

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[17] Different measures of association were used to correspond to the level of measurement of the two variables being compared, but all are interpretable as correlation coefficients with a range from -1 to 1 (Cohen, Cohen, West & Aiken, 2003; Warner, 2008). Table 2.3 indicates the specific measure used for each comparison.

The measures compared with language of interview were: 1) nativity, 2) a combined nativity/time in the US/generation measure[18], 3) the language-based 4-item measure of acculturation. The first condition for validation (strong associations) was supported with the combined nativity/time/generation measure for all Latinos (R=-0.71, p<.001). Variables were coded such that a negative correlation indicates that the higher the score on nativity/time/generation, the less likely it was that individual would choose to be interviewed in Spanish. Nativity and the language index were strongly associated with language of interview (ϕ=-0.67, p<.001; τ_b=-0.61, p<.001, respectively) (Table 2.3).

When Latino subgroups were analyzed separately, the pattern of association was strengthened for Mexican-origin Latinos.

The relationships between the four indicators of acculturation remained strong and highly significant for all other subgroups (Central American, Puerto Rican, Dominican, and Cuban), although they were in general weaker than the associations among Mexican-origin Latinos.

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[18] Nativity, time in the U.S., and generation were also separately correlated with language of interview; results are shown in Table 2.3.

Table 2.3. Correlations of Language of Interview with Other Indicators of Acculturation, by

Latino Subgroup.

	Measure of Association	Full Sample N=3824	Mexican N=2552	Central American N=398	Puerto Rican N=323	Dominican N=154	Cuban N=149
Nativity	Phi (φ)	-.67***	-.72***	-.45***	-.60***	-.60***	-.63***
Years in US (Foreign-born)	Pearson's R	-.22***	-.18***	-.27***	-.13***	-.01	-.23**
Years in US (inc. native-born)	Pearson's R	-.45***	-.49***	-.40***	-.23***	-.20*	-.31***
Proportion of Life in US	Pearson's R	-.65***	-.68***	-.49***	-.60***	-.52***	-.69***
Generation	Tau-b (τ_b)	-.66***	-.72***	-.45***	-.58***	-.60***	-.62***
Proportion of Life in US + Generation	Pearson's R	-.71***	-.76***	-.53***	-.62***	-.61***	-.70***
Language Index	Tau-b (τ_b)	-.61***	-.63***	-.48***	-.56***	-.60***	-.70***

Note. * indicates $p<.05$, ** indicates $p<.01$, *** indicates $p<.001$.

Having established a strong pattern of association among the acculturation indicators, the next step in the validation analysis was to compare the predictive power of each potential measure of acculturation on the use of different sources for health information. I conducted separate uncontrolled nested OLS regression[19] analyses, predicting the extent to which each health information source would be used (not at all, a little, a lot) from three separate independent variables: language of interview, a combined nativity/proportion of life in the U.S./generation measure, and the language-based acculturation index. Each measure was added as a separate block in the nested model, and I considered both the size and the significance of the R^2 change from each block. The hypothesis was that neither nativity/time in the U.S./generation nor the acculturation index would add substantially to the explained variance in health information source use outcomes associated with language of interview. This would be indicated by small or non-significant R^2 changes.

This hypothesis was substantially supported. Complete results are presented in Tables 2.4 and 2.5. Language of interview was a significant predictor of all seven health information sources, and adding the other two indicators of acculturation did not add substantially to the predictive power of language of interview for most outcomes (Table 2.4). Although the change in R^2 was significant for either nativity/time in the U.S./generation or the language scale for newspapers, the internet, church, and doctors, the magnitude of the difference was quite small – less than ten percent of the original R^2 (Table 2.4). Nativity/time in the U.S./generation explained an additional fifty percent of the variation explained by language of interview alone

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[19] Technically, with a 3-level ordinal outcome variable, the correct estimation model is an ordinal logistic regression model (O'Connell, 2005). However, ordinal logistic regression is difficult to interpret (O'Connell, 2005). As such, the analyses were first conducted using the Stata 10 *ologit* function (Statacorp, 2008), then replicated using OLS regression. As the substantial interpretation of results proved the same using ordinal logistic regression and linear regression models, the OLS regression results are presented for ease of comprehension.

for radio and television, and the coefficient of language of interview became non-significant

when this indicator was added to the model. However, it is important to note that the original

variance explained by language of interview was quite small (radio: R^2=0.007, change in R^2 with

nativity/time in U.S./generation=0.004, $p<0.01$; television: R^2=0.005, change in R2=0.002,

$p<0.05$; Table 2.4). Rather than rejecting the validation hypothesis, then, these findings suggest

that the substantive hypothesis is problematic (this will be explored further in Chapter 3).

Table 2.4. Predicting Health Information Source Use from Language of Interview, Proportion of Life in the US/Generation, and a Language-based Acculturation Measure.

	All Latinos (n=3763)					
	Block 1: Language of interview		Block 2: Nativity/Time in US/Generation		Block 3: Language Acculturation	
	β	R^2	B	$R^2\Delta$	B	$R^2\Delta$
Radio						
Language of interview	-0.08***	0.007	-0.02		-0.02	
Nativity/Time in US/Gen			-0.09***	0.004**	-0.08***	0.000
Language Scale					-0.01	
Television						
Language of interview	-0.07***	0.005	-0.03		-0.03	
Nativity/Time in US/Gen			-0.06*	0.002*	-0.05*	0.001
Language Scale					-0.01	
Newspapers/Magazines						
Language of interview	0.11***	0.011	0.11***		0.08***	
Nativity/Time in US/Gen				0.000	-0.02	0.002*
Language Scale					0.07**	
Internet						
Language of interview	0.29***	0.087	0.26***		0.20***	
Nativity/Time in US/Gen			0.05*	0.001*	0.00	0.010***
Language Scale					0.15***	
Church/Community Org.						
Language of interview	-0.07***	0.005	-0.04*		-0.03	
Nativity/Time in US/Gen			-0.04	0.001	-0.02	0.001
Language Scale					-0.04	
Family/Friends						
Language of interview	0.12***	0.015	0.12***		0.12***	
Nativity/Time in US/Gen			-0.01	0.000	-0.01	0.000
Language Scale					0.02	
Doctors						
Language of interview	0.18***	0.031	0.12***		0.11***	
Nativity/Time in US/Gen			0.07***	0.003***	0.07**	0.000
Language Scale					0.02	

Note. N is the average of the Ns for each analysis.
Note. Variables were coded such that a negative association indicates a negative relationship between acculturation and reliance on the source for health information; conversely, less-acculturated Latinos get more health information from that source.
Note. * indicates p<.05, ** indicates p<0.01, *** indicates p<0.001.

The final validation step, ensuring that language of interview was not differentially associated with health information source use by Latinos' country of origin, also was supported. The addition of the interaction of country of origin and language of interview did not explain any more variance than language of interview alone[20], for most of the health information sources (Table 2.5). For two of the seven health information sources, family/friends and doctors, the change in R^2 from the set of interactions of country of origin and language of interview was significant. However, it was not a very substantial difference: the interactions explained just nine percent of the variance explained by language of interview alone for doctors, and one third of the variance for family/friends (Table 2.5).

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[20] The main effect of country of origin did add substantially to the explanatory power of language of interview for newspapers/magazines, the internet, and doctors (Table 2.5), but this finding is not inconsistent with the validation hypothesis.

Table 2.5. Predicting Health Information Source Use from Language of Interview, Country of

Origin, and the Interaction of Language of Interview and Country of Origin.

	All Latinos (n=3763[1])			
	Block 1: Language of interview		**Block 2: Country of Origin[2]**	**Block 3: Interaction[3]**
Health Information Source	**β language of interview**	**R^2**	**$R^2 \Delta$**	**$R^2 \Delta$**
Radio	**-0.08*****	0.006	0.001	0.002
Television	**-0.07*****	0.004	0.001	0.002
Newspapers/Magazines	**0.11*****	0.012	**0.009*****	0.002
Internet	**0.30*****	0.091	**0.021*****	0.002
Church/Community Org.	**-0.07*****	0.004	0.001	0.001
Family/Friends	**0.12*****	0.015	0.001	**0.005****
Doctors	**0.17*****	0.027	**0.004****	**0.003***

[1]*Note*. N is the average of the Ns for each analysis.

[2]*Note*. Dummy codes for country of origin. The reference category was Mexico.

[3]*Note*. Dummy codes for the interactions of country of origin and language of interview, entered as a block. The reference category was Mexicans who responded in Spanish.

Discussion

Overall, the hypotheses underlying the acculturation validation procedures were supported, providing strong evidence that language of interview is a valid indicator of acculturation. Language of interview is strongly and positively associated with other standard indicators of acculturation, and this is true for all Latinos and within subgroups by country of origin. In addition, in regression analyses where three different indicators of acculturation predicted frequency of having obtained health information from each of seven sources, other traditional indicators of acculturation did not account for substantially more of the variance in source use than did language of interview alone. Additionally, the effect of language of interview on health information source use did not vary substantially by country of origin.

Given the overall success of the validation procedures for behavioral acculturation, the rest of the dissertation analyses will use language of interview as the primary indicator of acculturation, with the caveat that acculturation is limited here to the behavioral domain.

Chapter 3: Study 1: Ethnicity, acculturation, and exposure to general and health information

In this chapter, I report results from Study 1, which sought to describe the differential patterns of general and health-specific media and other source use across ethnicity and acculturation levels. I begin with an overview of the specific methods used in this study[21] and continue with results, organized by type of source, and conclude with a discussion about this set of findings.

Research Questions and Hypotheses

RQ1: Do NHW, Highly-Acculturated Latinos (HAL), and Less-Acculturated Latinos (LAL) differ in exposure to general media, or to health information from different sources?

General media use was assessed both for its own sake and as a control for health-specific media use. At a minimum, understanding differences in media use can help health communicators effectively plan where to disseminate campaign messages. Media campaigns, when carefully conducted and in conjunction with other strategies and programs for health, have demonstrated a positive effect on health (Hornik, 2002). Outside the realm of communication campaigns, there is growing interest in assessing the health information gleaned from individuals' everyday media diets as contrasted with purposeful health information seeking or that from attention to habitual health information sources (e.g., Shim, Kelly, & Hornik, 2006). Moreover, a recent theoretical proposition suggests that media use can be described as an endogenous variable in a model of effects, mediating the influences of individual-difference variables (e.g., ethnicity, acculturation) on health knowledge, behaviors, or other outcomes of

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[21] Methods common to studies one and two, including measures and details about the data sets, are described in Chapter 2.

interest (Slater, 2007). In such a conceptualization of the media effects process, it is appropriate to consider media use as an outcome of interest.

Information about media use by ethnicity is sparse, and that is even more so for data regarding acculturation-based differences in media use. The evidence that exists suggests that Latinos use broadcast media more than NHW (Delener & Neelankavil, 1990; Greenberg, Burgoon, Burgoon, & Korzenny, 1983), and that less-acculturated Latinos rely on broadcast media more than HAL (Villarreal & Peterson, 2008; Korzenny & Korzenny, 2005). Villarreal and Peterson (2008) argue that marketers need to understand the media preferences of different kinds of Latinos, segmented along cultural traits and ethnic identification, in order to determine whether ads should be culturally-targeted or not, and what form the targeting should take. La Ferle and Lee (2005) found that most Latinos do watch English-language television programming and listen to the radio in English, and conclude that to effectively reach Latinos, marketers need to advertise on general-market channels in addition to ethnic media (e.g., Spanish-language). Less is known about ethnicity- and acculturation-based differences in print preferences. Generally it is assumed that less-acculturated Latinos read newspapers and magazines less than more-acculturated Latinos, who read less than NHW (cf., Korzenny & Korzenny, 2005), although these differences may be a function of education, literacy skills, and/or availability of Spanish-language print materials.

The observed and hypothesized differences in media use by ethnicity and acculturation may have to do with the purposes served by different media (Katz, Blumler, & Gurevitch, 1974). Mainstream broadcast media can serve an acculturative function (Gordon, 1964; Shibutani & Kwan, 1965): for example, individuals can learn language, accents, and social norms from viewing and listening to English-language programs (Berry, 2003; Viswanath & Arora, 2000;

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Subervi-Velez, 1986; Johnson, 2000). This may explain why less-acculturated Latinos report more overall exposure to broadcast sources compared with HAL. In addition to serving a socializing function for the less-acculturated, ethnic broadcast media can help to connect Latinos to their homelands. Since much of the Spanish-language television programming available in the U.S. is imported from Latin America, and news broadcasts likely feature more coverage of international, particularly Latin American, events, LAL may tune in to get updates about their countries of origin. Previous studies have also found that Latinos use broadcast media to learn information more than other ethnic groups (Albarran & Umphrey, 1993). This could increase the overall exposure to broadcast media among LAL, such that they appear to be exposed to these sources more than HAL and NHW.

Print sources, in contrast, do not serve socializing functions in the same way, by their nature[22]. Newspapers targeted to Latinos, the vast majority of which are in Spanish, tend to be local, to serve smaller geographic communities, and address immediate concerns (Ball-Rokeach & Wilkin, 2009) or provide news about home countries (Lin & Song, 2006). Moreover, reading newspapers or magazines requires strong literacy skills, which many less-acculturated Latinos lack in Spanish as well as English, and which are associated with the lower typical education levels achieved by HAL in comparison to NHW. Even beyond sociodemographic explanations, print sources are less likely to be used by less-acculturated Latinos because ethnic cues, either for socializing into a culture or for connecting with the culture of origin, may be less present in print. Broadcast features at least two passive modalities to experience its content (voice and visual), while print requires active participation by the viewer yet provides less stimulation that

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[22] A contrary perspective is provided by Johnson (2000), who argues that Latino-targeted magazines in English serve both acculturative and cultural maintenance functions.

may serve acculturation or connection functions. For these reasons, we should expect that NHW report the highest levels of print media use, followed by HAL, then LAL.

Predictions about ethnicity- and acculturation-based differences in internet use pose some theoretical challenges due to its nature. The internet is largely print-based, and so it could be argued that for the same reasons as above, the NHW>HAL>LAL pattern should uphold. However, the evidence thus far suggests that HAL use the internet as frequently as do NHW, and some data even suggest they use it more often (Horrigan & Smith, 2007). This may be because, as I will argue later, Latinos are able to find information that they identify with, or perhaps more simply, because even though there are print-like features, the internet is quite interactive and has many more features that make it similar to broadcast sources (e.g., video). In light of the prior evidence and conflicting theoretical explanations, I propose that NHW and HAL shall not differ in their use of the internet, but that HAL should report more internet use than LAL.

With regards to health-specific information, the little evidence about health-related information source preferences that exists tends to follow the patterns described above with regards to general information source use. Previous studies have identified some differences between Whites' and Latinos' preferences for health information from specific sources for tobacco, AIDS, and general health information (Brodie, Kjellson, Hoff, & Parker, 1999; O'Malley, Kerner & Johnson, 1999; Marín, 1996; Marín & Marín, 1990; Harris, Harris, & Davis, 1991). Marín (1996) asked NHW and Latinos to rate potential channels for information about tobacco control in terms of credibility and behavioral motivational power (whether respondents would feel compelled to act on information obtained from that channel). He concluded that Latinos have a more overall positive valence toward mass media as sources for information about tobacco control as compared to NHW, rating those sources as more credible and reporting a higher

likelihood of following health advice found therein. Moreover, when Marín divided the Latino

sample by acculturation, he found that LAL rated television and radio sources as more

behaviorally motivating than did HAL, whereas HAL ratings were lower and closer to those of

NHW. O'Malley et al. (1999) found that some less-acculturated Latino subgroups reported a

higher likelihood of consulting television for health information. When the authors considered

all Latino subgroups, television was the most cited source for health information after

doctors/other health professionals.

In addition to considering more incidental health exposure differences, it is important to

understand how Latinos differ from NHW and by acculturation status in their active information

seeking behaviors. I argued in the literature review that one example of the influence of

identification on media effects is that Latinos may look for information that they identify with.

This is particularly the case with regards to health information seeking. The health care model in

which information seeking becomes important features the active patient as an information

consumer. Some have argued that the active patient idea reflects a value that is not universal,

but is particular to the individualist culture often said to characterize the United States

(Hofstede, 2001; Rokeach, 1973). If information seeking reflects this ideal we might expect that

less-acculturated Latinos would be less likely to seek information from non-clinical sources and

also to do less with that information in doctor-patient interactions. Fewer such differences may

be seen between highly-acculturated Latinos and NHW. Studies conducted in community

settings with convenience samples have found that Latinos are more likely than NHW to prefer

not to know if they have cancer, in part because they hold more fatalistic attitudes about the

disease (Puschel, Thompson, Coronado, Lopez & Kimball, 2001). Other studies have found that

Latinos are more likely than NHW to be information avoiders (Oetzel, DeVargas, Ginossar, &

Sanchez, 2007) and that recent Latino immigrants are less likely to seek preventive health

information than information about a specific, immediate health need (Courtwright, 2005). To date, however, no published studies have documented differences in actual usage of mass media health information sources within Latino subgroups in a national randomly selected sample. Moreover, a combination of worry about a growing digital divide (Hargittai, 2002) and the increasing attention paid to the role of the internet and new media as sources for health information (Rains, 2008), warrants research that describes ethnic and intra-ethnic differences in the likelihood of obtaining health information from the internet.

Aside from the research noted above done with recent immigrants (e.g., the less-acculturated), little is known about how Latinos vary by acculturation in their health information-seeking behaviors. We may hypothesize that as Latinos gain English language skills, interactions with physicians and other medical professionals become more comfortable. Furthermore, if less seeking from mediated sources is a result of fewer options in Spanish, then improved English language skills increase the options for health information seeking. Thus, we may expect that less-acculturated Latinos will report less health information seeking from media and physicians, while more-acculturated Latinos and Non-Hispanic Whites (NHW) will report more health information seeking from those sources and rely less on interpersonal sources. If it is true that highly-acculturated Latinos (HAL) are seeking information more than less-acculturated Latinos (LAL), and on par with NHW, this might be an indirect indicator of acculturation of values (e.g., individualism). That is, HAL would have adopted individualist traits that would have traditionally been associated with NHW. On the other hand, such a pattern of effects may simply reflect a reality about both expected interactions with the medical establishment (not necessarily a preference or personal trait), and about what kind of Latinos (HAL, with their higher levels of English-language ability) have the capability to engage in this sort of activity (information seeking). The latter explanation would not necessarily indicate

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values assimilation. In summary, the influence of ethnicity/acculturation on health information seeking is unclear, but I have proposed several possibilities for the relationship.

Thus, to begin, differences in general and health-related media exposure across ethnicity and acculturation levels were considered. I hypothesized the following differences based on the previously-documented patterns of preference and the uses and gratifications theoretical model examined above. Hypotheses about health-related exposure include both intentional information seeking and more general exposure to health information.

H1: More-acculturated Latinos will differ from NHW in their patterns of general media use.

H1a: HAL and NHW will not differ in their general use of television and radio.

H1b: HAL will report lower use of newspapers and magazines compared with NHW.

H1c: HAL and NHW will not differ in their use of the internet for general information.

H2: Less-acculturated Latinos will differ from more-acculturated Latinos in their patterns of general media use.

H2a: LAL will report heavier general use of television and radio compared with HAL.

H2b: LAL will report lower use of newspapers and magazines compared with HAL.

H2c: LAL will report lower use of the internet compared with HAL.

H3: More-acculturated Latinos will differ from NHW in their patterns of exposure to health information from the media.

H3a: HAL will report more exposure to health information from television compared with NHW.

H3b: HAL will report less exposure to health information from newspapers and magazines compared with NHW.

H3c: HAL will report less exposure to health information from the internet compared with NHW.

H4: Less-acculturated Latinos will differ from more-acculturated Latinos in their patterns of exposure to health information from the media.

H4a: LAL will report more exposure to health information from television and radio compared with HAL.

H4b: LAL will report less exposure to health information from newspapers and magazines compared with HAL.

H4c: LAL will report less exposure to health information from the internet compared with HAL.

Of course, it is possible that third variables are causing any observed associations between ethnicity/acculturation and media use. Demographic variables are of particular concern in this case because increased acculturation is associated with increased income and education, and these variables are associated with some kinds of media use, as described above. Thus, the second research question asked how any observed differences may be explained.

RQ2: How do we explain the observed differences across ethnicity/acculturation in media exposures and health information source use?

First, I hypothesized that observed differences would not be merely an artifact of the demographic differences known to be associated with ethnicity/acculturation and media use (gender, age, education, and marital status).

Additionally, I hypothesized that differences in health-related exposure from specific sources would not be completely accounted for by regular, non-health exposure to the source. That is, I hypothesized that even above and beyond regular programming, HAL and NHW and

HAL and LAL would report different levels of exposure to health information. Underlying this hypothesis is a belief that the nature of the message matters – that different (ethnic) groups attend differentially to messages that appear relevant for them; I argue that ethnicity is a criterion that determines whether a message is perceived as relevant. This hypothesis is more explicitly tested in Study 3 (Chapter 6). The hypotheses tested directly in the present study are particularly relevant for health communicators because if supported, indicate that we cannot rely on more simplistic segmentation strategies based on general media use patterns, but rather should consider deeper message targeting, including matching model ethnicity to the target audience.

It follows from these hypotheses that the following media use patterns should uphold:

Broadcast: NHW<HAL; HAL<LAL

Print: LAL<HAL; HAL<NHW

Internet: LAL<HAL; HAL<NHW

While there are implicit expectations that can be derived about differences between NHW and LAL given the sets of hypotheses, they are not of specific interest and the analyses focus on the hypotheses as stated. The focus of the acculturation theory underpinning these analyses argues for the NHW-HAL difference and the HAL-LAL difference, but does not address the LAL-NHW difference. Also, underlying this project is a practical concern. NHW and LAL are never included together in communications decisions: by definition, messaging in Spanish-language outlets (which presumably make up the bulk of the LAL media exposures) is treated separately from NHW or the mainstream. It is of practical interest as to whether HALs are being reached less than LALs, and also whether HALs and NHWs can be affected by the same sources. As such, to focus on this NHW-LAL comparison pair would be of limited practical utility.

Methods

I compared media use and exposure to health information from specific media sources by acculturation level and ethnicity using OLS or logistic regression, where media use/exposure to health information (general, non-intentional health, and intentional health information seeking) were the dependent variables and ethnicity and/or acculturation level were the independent variables of interest. Separate equations were run for each type of source. The two comparison pairs were: (1) HAL versus NHW (Hypotheses 1 and 3), and (2) HAL versus LAL (Hypotheses 2 and 4). Comparison one, considering HAL and NHW, is important because it may establish differences across the two groups (NHW and HAL) that are masked when campaigns consider Latino outreach exclusively in Spanish-language terms. Comparison two sought to establish whether any differences exist between HAL and LAL. Here it will be possible to determine to what extent the two groups vary in direction or strength of association with media use.

Procedure

A series of regression models was run, where the outcome variable was media source use. Logistic regression models were run for dichotomous outcomes and linear regression models were run for ordinal and interval-level outcomes[23]. Stata 10 was used for analysis

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[23] Technically, it is correct to use ordinal logistic regression models with ordinal outcomes (O'Connell, 2005). However, ordinal logistic regression is difficult to interpret (O'Connell, 2005), and would render comparisons across outcomes and data sets where outcomes were measured differently impossible. As such, the analyses were first conducted using the Stata 10 *ologit* function (Statacorp, 2008), and, after finding the model satisfactorily met the assumption of parallelism (proportional odds) (O'Connell, 2005), were replicated using OLS regression. As the substantial interpretation of results proved the same using ordinal logistic regression and linear regression models, the OLS regression results are presented for ease of comprehension.

(Statacorp, 2008). The equation included dummy variables for ethnicity/acculturation, where HAL were left out as the comparison group.

To answer the first research question, I ran simple, uncontrolled analyses to generate mean exposure to each source for each of the three groups of interest. I then calculated a standardized measure of effect size for each comparison using the following equation (Cohen, 1988):

$$(\text{Mean}_1 - \text{Mean}_2)/\text{SD}_{\text{Overall}}$$

where Mean_1 and Mean_2 are the means for HAL, LAL, or NHW, depending on the comparison. The overall standard deviation was used as the denominator in order to keep the comparisons consistent by providing the most straightforward estimate of the magnitude of the effect.

The raw means, their 95% confidence intervals, and the standardized effect sizes for HAL/NHW and HAL/LAL comparisons are reported in Table 3.1a-3.6a. Judgment of whether the test supported the hypothesis was based on whether the difference was significant, and if so, the size of that effect. An effect size of ≥0.0.20 was considered supportive of a hypothesized difference in a positive direction, assuming the difference was statistically significant. Following Cohen's (1988) interpretation guidelines, significant effect sizes of 0.20-0.49 were considered to show small effects, 0.50-0.79 to show medium effects, and ≥0.80 to show large effects. The significance of the regression coefficient of the appropriate dummy variable indicated whether the relevant comparison was significant (Jaccard & Turrisi, 2003). For example, in H3a, I hypothesized that HAL would report more exposure to health information from television compared with NHW. The difference should be statistically significant at the $p<0.05$ level, and using the equation $(\text{Mean}_{\text{HAL}} - \text{Mean}_{\text{NHW}})/\text{SD}_{\text{Overall}}$, should result in a positive effect size. If the coefficient of the NHW dummy code (where HAL was the reference) was significant and the

effect size was ≥0.20, I could claim support for that hypothesis. Similarly, a significant coefficient (difference) and an effect size of ≤-0.20 would indicate support for a hypothesized negative effect. The converse of these results (effect size ≤-0.20 where a positive effect was hypothesized, or an effect size ≥0.20 for a hypothesized negative effect) would indicate refutation of the hypothesis. A non-significant difference or an effect size of zero or close to zero (>-0.20 and <0.20) would indicate no evidence for a hypothesized relationship. In cases where I hypothesized no effect (e.g., H1), any significant difference where the effect was ≥0.20 or ≤-0.20 was considered a refutation of the hypothesis.

To answer the second research question, I obtained covariate-controlled estimates of effect size from the adjusted means (Hayes, 2005). These are reported in Tables 3.1b-3.6b. Demographic covariates were coded in the same manner across data sets to ensure comparability (cf. Chapter 2).

The same procedure was employed for dichotomous outcomes using logistic regression[24]. However, in this case, the substantive interpretation is slightly different. Here the estimate reported represents the conditional probability of being in the "1" category: the conditional probability of reporting seeking from a specific source. Standardized effect sizes were calculated as above and have the same interpretation.

The final model, for health exposure outcomes, tested the final set of hypotheses and included a control for non-health exposure to the source in addition to demographic controls. The procedure was the same as that described above and is reported in Tables 3.1c-3.6c. A key strength of this study is the replication across data sets and using multiple measures of media exposure constructs, where available; therefore, I base my conclusions on the set of test results

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[24] Although logistic regression produces odds ratios (OR) that can be considered measures of effect size, formal estimates of effect size were computed to maintain consistency across the other comparisons.

rather than on individual tests of each hypothesis. I will elaborate on this point in a results summary section.

A note about causality

Determining causal order is difficult here because all data are cross-sectional. However, I do not seek to claim that causal order runs from acculturation/ethnicity to media use. We know from acculturation studies that media use often is associated with acculturation: exposure to media helps individuals to acculturate or in this case, given the measure of acculturation, to learn English (Berry, 2003; Viswanath & Arora, 2000). The best model thereby features a double-sided arrow. As such, study one sought to establish co-associations rather than directional relationships.

Results

The results are presented by type of media, with each hypothesis about differences in media use by ethnicity/acculturation nested under the type of medium and type of exposure (health versus general). Following a detailed review of results by hypothesis, I summarize the findings as cohesive sets. In the summary, I discuss two types of influences on ethnic/acculturative differences in media behavior: general versus health-related information exposure and comparisons across data sets (generally ANHCS versus Pew and HINTS).

Results: Broadcast Media

H1a: Ethnic Differences in General Exposure to Broadcast Media

I hypothesized that there would be no differences in general exposure to television and radio among HAL and NHW. I used three different measures[25] of general television exposure:

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[25] All measures are described in detail in Chapter 4.

daily hours of general television viewing, number of days per week of national television news

viewing, and number of days per week of local television news viewing, and one measure to

capture radio exposure (the number of days listened in a week).

Table 3.1a presents the raw, unadjusted mean usage or proportion of users of each

broadcast media source (television and radio), for general purposes, along with the standardized

effect size and the expected direction of the relationship. Table 3.1b presents the same data for

the covariate-controlled analyses.

In uncontrolled analyses, the results were mixed by specific type of exposure and by

data set (Table 3.1a). However, after adjusting for age, gender, education and marital status, the

hypothesis of no ethnicity-based differences in exposure to broadcast media was refuted. All

eight tests of this hypothesis were significant, although the magnitude of this difference did not

meet the |0.20| threshold in half the tests. HAL report more general television viewing

compared with NHW, and less exposure to national and local television news (Table 3.1b). This

pattern of findings was consistent in both data sets (ANHCS and HINTS) where these measures

were available.

Although the hypothesis of no difference is refuted in the case of radio as with

television, the results for general radio exposure are inconsistent across data sets: in ANHCS, the

size of the difference is trivial (ES=-0.17), but suggests that HAL report slightly less exposure to

radio than NHW. In HINTS, by contrast, there is a very large difference suggesting that HAL

listen to radio more than NHW (ES=1.32) (Table 3.1b).

H2a: Acculturative Differences in General Exposure to Broadcast Media

I hypothesized that HAL would report less general exposure to television and radio

sources compared with LAL, and used the same measures of exposure as for the HAL/NHW

comparisons. In general, LAL reported more exposure to general information from television and radio, although evidence for support of the hypothesis differed by data set. In eight demographics-controlled tests of this hypothesis, all four tests using ANHCS data and one test using HINTS data provided at least partial support for the hypothesis, whereas three tests using HINTS data refuted the hypothesis (Table 3.1b).

Both data sets demonstrate that LAL watch more national television news compared with HAL (Table 3.1b), although the magnitude of the difference is quite different. For example, LAL report watching the national news on television four and a half days per week (ANHCS: 4.50 [95% CI: 4.44, 4.57]), compared with less than three days per week for HAL (2.97 [95% CI: 2.91,3.04], Table 3.1b). The difference is not quite as large in the HINTS data set, although it is significant, and the effect size does not meet the |0.20| threshold to indicate full support for the hypothesis (ES=-0.16).

The results for general television, local news, and radio, are less clear-cut, however, because of inconsistency across data sets. The ANHCS results consistently indicate that HAL report less exposure than LAL, whereas the HINTS results are consistent in the opposite direction. It is noteworthy that the size of the difference is much larger in HINTS, even though all are |≥0.20|. For example, in ANHCS, LAL and HAL both report listening to the radio just over two days per week (HAL: 2.19, 95%CI [2.16, 2.22]; LAL: 2.29, 95% CI [2.27. 2.31]), and this results in a standardized difference of -0.23, a small effect size, whereas in HINTS, the standardized difference is very large – more than ten times that (2.39), with HAL reporting radio listening about two and a third days per week (2.36, 95% CI [2.32, 2.40]) and LAL just over one and a half days (1.60, 95% CI [1.56, 1.64], Table 3.1b).

Table 3.1a Exposure to Broadcast Media, by Ethnicity and Acculturation Level, Uncontrolled.

Source	Scale	Data Set	Mean				Effect Size			Expected Direction of Relationship	
			Overall, SD*	Latino (95% CI) HAL	Latino (95% CI) LAL	NHW (95% CI)	HAL-LAL	HAL-NHW	LAL-NHW	HAL-LAL	HAL-NHW
Television: general viewing	0-24 hours per day (mean over 7 days)	ANHCS (N=12,310)	4.91 3.78	5.63 (5.38,5.88)	5.85 (5.51,6.19)	4.77 (4.70,4.84)	-0.06	0.23***	0.29	–	No Difference
		Pew									
		HINTS (N=4545)	2.77 2.01	3.08 (2.81,3.36)	2.37 (2.16,2.58)	2.78 (2.72,2.85)	0.36***	0.15*	-0.21	–	No Difference
Television: national news	0-7 days per week	ANHCS (N=12,353)	3.42 2.77	2.97 (2.82,3.13)	4.51 (4.33,4.68)	3.40 (3.34,3.45)	-0.56***	-0.15	0.40	–	No Difference
		Pew									
		HINTS (N=4480)	4.08 2.81	3.90 (3.53,4.27)	4.06 (3.74,4.38)	4.10 (4.01,4.18)	-0.06	-0.07	-0.01	–	No Difference
Television: local news	0-7 days per week	ANHCS (N=12,391)	4.17 2.60	4.02 (3.87,4.17)	4.46 (4.28,4.63)	4.17 (4.12,4.22)	-0.17***	-0.06	0.11	–	No Difference
		Pew									
		HINTS (N=4481)	4.35 2.72	4.28 (3.91,4.65)	3.59 (3.26,3.92)	4.40 (4.32,4.49)	0.25**	-0.05	-0.30	–	No Difference
Radio: general information	0-7 days per week	ANHCS (N=12,309)	2.26 2.60	2.19 (2.04,2.34)	2.29 (2.11,2.47)	2.27 (2.22,2.32)	-0.04	-0.03	0.01	–	No Difference
		Pew									
		HINTS (N=4570)	1.94 2.35	2.34 (2.02,2.67)	1.60 (1.37,1.83)	1.94 (1.87,2.01)	6.11***	3.33*	-2.78	–	No Difference
						Total	8	8	8		
						Support	1	0			
						Refute	3	2			
							H2a	H1a			
							Number of Tests				

Table 3.1b Exposure to Broadcast Media, by Ethnicity and Acculturation Level, Controlling for Demographics.

Source	Scale	Data Set	Mean				Effect Size			Expected Direction of Relationship	
			Overall, SD*	Latino (95% CI) HAL	Latino (95% CI) LAL	NHW (95% CI)	HAL-LAL	HAL-NHW	LAL-NHW	HAL-LAL	HAL-NHW
Television: general viewing	0-24 hours per day (mean over 7 days)	ANHCS (N=12,310)	4.91 0.88	5.63 (5.59,5.67)	5.84 (5.77,5.92)	4.78 (4.76,4.80)	-0.24***	0.97***	1.21	–	No Difference
		Pew									
		HINTS (N=4559)	2.79 0.58	3.09 (3.02,3.16)	2.40 (2.31,2.48)	2.80 (2.78,2.81)	1.19***	0.51***	-0.69	–	No Difference
Television: national news	0-7 days per week	ANHCS (N=12,353)	3.41 1.24	2.97 (2.91,3.04)	4.50 (4.44,4.57)	3.39 (3.37,3.42)	-1.24***	-0.34***	0.90	–	No Difference
		Pew									
		HINTS (N=4559)	4.08 1.07	3.90 (3.77,4.04)	4.08 (3.97,4.19)	4.09 (4.06,4.13)	-0.16*	-0.18***	-0.01	–	No Difference
Television: local news	0-7 days per week	ANHCS (N=12,391)	4.17 0.95	4.02 (3.97,4.07)	4.45 (4.40,4.51)	4.17 (4.15,4.19)	-0.45***	-0.16***	0.30	–	No Difference
		Pew									
		HINTS (N=4559)	4.35 0.89	4.28 (4.17,4.39)	3.61 (3.51,3.72)	4.40 (4.37,4.43)	0.75***	-0.14***	-0.89	–	No Difference
Radio: general information	0-7 days per week	ANHCS (N=12,309)	2.26 0.44	2.19 (2.16,2.22)	2.29 (2.27,2.31)	2.26 (2.26,2.27)	-0.23***	-0.17***	0.06	–	No Difference
		Pew									
		HINTS (N=4559)	1.94 0.32	2.36 (2.32,2.40)	1.60 (1.56,1.64)	1.94 (1.93,1.95)	2.39***	1.32***	-1.08	–	No Difference
						Total	8	8	8		
						Support	4	0			
						Refute	3	4			
							H6a	H5a			
							Number of Tests				

Note. Estimates are adjusted for demographics: gender, age, education, and marital status.

H3a: Ethnic Differences in Health Information Exposure from Broadcast Media

I hypothesized that HAL would report more exposure to health information from broadcast media compared with NHW. I began with three different types of exposure to health information from television: general and non-news programming that had some health content, health segments in local or national television news, and health information seeking from television. Table 3.2a presents the raw, unadjusted mean usage or proportion of users of each broadcast media source (television and radio), for health-specific content and health information seeking, by ethnicity and acculturation status, along with the standardized effect size and the expected direction of the relationship. Table 3.2b presents the covariate-controlled (demographics and non-health exposure to the source) analyses[26]. I present these results rather than the demographics-only controlled results because in all cases the demographics-only controlled results did not change with the addition of non-health exposure[27].

In total, I conducted four uncontrolled and eight controlled tests (four demographics only, four demographics and non-health exposure to the source) of ethnic differences in health-related information exposure from broadcast media. These can be considered four independent tests of the hypotheses; since the ultimate hypothesis of interest is the fully-controlled test, claims are based upon the last controlled set of tests. Of the four independent controlled tests, two supported the hypotheses, indicating that HAL report more exposure to health information from non-news television programming and by actively seeking information from broadcast sources, even after adjusting for demographics and non-health broadcast exposure (ANHCS general television, HAL: 0.70 [95% CI: 0.69,0.71]; NHW: 0.61 [95% CI: 0.61,0.62]; seeking, HAL:

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[26] The one exception here is exposure to health information from the radio, because there was no measure of general exposure media available in that data set. Controlled analyses reported in Table 3.2b for this outcome therefore include only demographic covariates.

[27] The magnitude sometimes varied but the direction and whether it met the |0.20| threshold did not.

42.59% [95% CI: 41.93,43.24]; NHW: 30.21% [95% CI: 30.02,30.40]) (Table 3.2b). Both of these differences were significant, although the magnitude was small for the difference in general television exposure (ES=0.40) and large for the difference in seeking (ES=0.80). There is no support for the hypothesis that that HAL report less exposure than NHW to health information from television news programs. After adjusting for covariates, the ANHCS data show a significant but trivial difference (ES=-0.18, p<0.001). The HINTS data show the opposite effect, although this difference is not statistically significant (ES=0.37, n.s., Table 3.2b).

H4a: Acculturative Differences in Health Information Exposure from Broadcast Media

I hypothesized that LAL would report more exposure to health information from broadcast media compared with HAL. I used the same three types of exposure to health information from television as for the HAL/NHW comparison. In addition, I used one measure of exposure to health information from the radio. However, the television seeking measure produces extraordinarily high estimates of seeking among LAL such that it does not seem to be a reliable measure; comparisons of seeking by acculturation therefore have not been included in the presentation of results below, although the data are included in the tables. I discuss the problems with the measure in the summary results section.

There was more consistent support for the hypotheses about acculturative differences in health-related exposure than for the previous set of hypotheses about acculturative differences in general exposure to broadcast media. LAL report more exposure than HAL to health information from television and radio sources. For example, LAL report viewing health information on non-news television programs an average of slightly more than once per week (ANHCS: 1.17 [95% CI: 1.16,1.18]), compared with less than once per week for HAL (0.70 [95% CI: 0.69,0.71], Table 3.2b).

Table 3.2a. Exposure to Health Information from Broadcast Media by Ethnicity and Acculturation Level, Uncontrolled.

Source	Scale	Data Set	Mean				Effect Size			Expected Direction of Relationship	
			Overall, SD*	Latino (95% CI)		NHW (95% CI)	HAL-LAL	HAL-NHW	LAL-NHW	HAL-LAL	HAL-NHW
				HAL	LAL						
Television: health information (general & non-news programming)	ANHCS: Not at all (0) <1x/week (.5); 1x/week (1) A few times a week (3) Pew: None (0); A little (1); A lot (2)	ANHCS (N=12,017)	0.65 0.89	0.70 (0.65,0.75)	1.17 (1.09,1.26)	0.61 (0.60,0.63)	-0.53***	0.10***	0.63	–	+
		Pew (N=4013)	0.94 0.74	0.84 (0.80,0.89)	0.97 (0.95,1.00)		-0.18***			–	
		HINTS									
Television: health information (news programs)	ANHCS: Same as above (0-3) HINTS: [Has not watched] (0) <1x/week (.5); 1x/week (1)	ANHCS (N=12,439)	1.03 1.11	0.90 (0.84,0.96)	1.77 (1.68,1.86)	0.99 (0.98,1.02)	-0.78***	-0.08**	0.70	–	+
		Pew									
		HINTS (N=4535)	0.62 0.42	0.62 (0.56,0.68)	0.69 (0.63,0.74)	0.61 (0.60,0.63)	-0.16***	0.02	0.18	–	+
Television: health information seeking	% who sought	ANHCS (N=9745)	34.88% 47.66%	42.91% (39.53,46.29)	82.43% (79.50,85.36)	30.35% (29.36,31.33)	-0.83***	0.26**	1.09	–	+
		Pew									
		HINTS									
Radio: health information	None (0) A little (.5) A lot (1)	ANHCS									
		Pew (N=4013)	0.51 0.67	0.41 (0.38,0.45)	0.55 (0.52,0.57)		-2.28***			–	
		HINTS									
						Total	6	4	4		
						Support	4	1			
						Refute	0	1			
							H4a	H3a			
							Number of Tests				

Table 3.2b Exposure to Health Information from Broadcast Media, by Ethnicity and Acculturation Level, Controlling for Demographics and Non-Health Exposure.

Source	Scale	Data Set	Mean				Effect Size			Expected Direction of Relationship	
			Overall, SD*	Latino (95% CI)		NHW (95% CI)	HAL-LAL	HAL-NHW	LAL-NHW	HAL-LAL	HAL-NHW
				HAL	LAL						
Television: health information (general & non-news programming)	ANHCS: Not at all (0) Less than 1x/week (.5) Once a week (1) A few times a week (3) Pew: None (0); A little (1); A lot (2)	ANHCS (N=12,310)	0.65 0.23	0.70 (0.69,0.71)	1.17 (1.16,1.18)	0.61 (0.61,0.62)	-2.09***	0.40***	2.48	–	+
		Pew (N=3832)	0.95 0.07	0.85 (0.85,0.85)	0.98 (0.98,0.98)		-1.92***			–	+
		HINTS									
Television: health information (news programs)	ANHCS: Same as above (0-3) HINTS: [Has not watched] (0) Less than 1x/week (.5) Once a week (1)	ANHCS (N=12,391)	1.03 0.52	0.91 (0.88,0.94)	1.78 (1.75,1.81)	1.00 (0.99,1.01)	-1.66***	-0.18***	1.48	–	+
		Pew									
		HINTS (N=4446)	0.63 0.21	0.63 (0.60,0.66)	0.69 (0.67,0.72)	0.63 (0.62,0.63)	-0.30**	0.01	0.32	–	+
Television: health information seeking	% who sought	ANHCS (N=12,310)	34.40% 0.15	42.59% (41.93,43.24)	82.00% (81.53,82.48)	30.21% (30.02,30.40)	-2.56***	0.80***	3.37	–	+
		Pew									
		HINTS									
Radio: health information	None (0) A little (1) A lot (2)	ANHCS									
		Pew (N=3832)	0.52 0.09	0.42 (0.42,0.43)	0.55 (0.55,0.55)		-1.40***			–	
		HINTS									
						Total	6	4	4		
						Support	6	2			
						Refute	0	0			
							H8a	H7a			
							Number of Tests				

Note. Estimates are controlled for demographics: gender, age, education, marital status, and non-health exposure to the source.

Note. Means are not comparable across data sets because the scales vary, as indicated in Scale column. Refer to Table 2.2 for complete coding scheme.

Results: Print Media

H1b: Differences between HAL and NHW in General Exposure to Print Media

There was strong support for the hypothesis that HAL read general-interest newspapers and magazines less than do NHW, including concurrence across ANHCS and HINTS data sets. Table 3.3a presents the raw, unadjusted mean usage or proportion of respondents exposed to print information sources (newspapers and magazines), for general information, by ethnicity and acculturation. Table 3.3b presents the covariate-controlled mean usage or adjusted probability of print sources, for general information, by ethnicity and acculturation. After controlling for demographics, NHW report reading general-interest newspapers and magazines nearly one day more per week than do HAL (HINTS; NHW: 3.93 [95% CI: 3.89,3.96]; HAL: 2.70 [95% CI: 2.56,2.85], Table 3.3b).

H2b: Differences between HAL and LAL in General Exposure to Print Media

The hypothesized differences in exposure to general-interest print sources were supported. HAL report reading general-interest newspapers or magazines more than twice as often than do LAL (HINTS; HAL: 2.70 days per week [95% CI: 2.56,2.85]; LAL: 1.11 days per week [95% CI: 1.00,1.23], Table 3.3b).

Table 3.3a. Exposure to General Information from Newspapers and Magazines by Ethnicity and Acculturation Level, Uncontrolled.

Source	Scale	Data Set	Mean				Effect Size			Expected Direction of Relationship	
			Overall, SD*	Latino (95% CI)		NHW (95% CI)	HAL-LAL	HAL-NHW	LAL-NHW	*HAL-LAL*	*HAL-NHW*
				HAL	LAL						
Newspapers/ Magazines: general information	0-7 days per week	ANHCS (N=12,322)	3.15 2.88	2.51 (2.35,2.66)	1.69 (1.54,1.84)	3.31 (3.35,3.36)	**0.28***	**-0.28***	-0.56	+	−
		Pew									
		HINTS (N=4593)	3.70 3.00	2.72 (2.36,3.09)	1.11 (0.88,1.33)	3.93 (3.83,4.02)	**0.54***	**-0.40***	-0.94	+	−
						Total	2	2	2		
						Support	2	2			
						Refute	0	0			
							H2b	H1b			
							Number of Tests				

Table 3.3b. Exposure to General Information from Newspapers and Magazines by Ethnicity and Acculturation Level, Controlling for

Demographics.

Source	Scale	Data Set	Mean				Effect Size			Expected Direction of Relationship	
			Overall, SD*	Latino (95% CI)		NHW (95% CI)	HAL-LAL	HAL-NHW	LAL-NHW	*HAL-LAL*	*HAL-NHW*
				HAL	LAL						
Newspapers/ Magazines: general information	0-7 days per week	ANHCS (N=12,322)	3.14 1.27	2.51 (2.44,2.57)	1.68 (1.61,1.76)	3.30 (3.28,3.33)	**0.65***	**-0.63***	-1.28	+	–
		Pew									
		HINTS (N=4557)	3.70 1.32	2.70 (2.56,2.85)	1.11 (1.00,1.23)	3.93 (3.89,3.96)	**1.51***	**-0.92***	-2.13	+	–
						Total	2	2	2		
						Support	2	2			
						Refute	0	0			
							H6b	**H5b**			
							Number of Tests				

Note. Estimates are controlled for demographics: gender, age, education, and marital status.

H3b: Differences between HAL and NHW in Health Information Exposure from Print Media

There was mixed support for hypothesized ethnic differences in health information exposure from print media. The hypothesis that NHW would report greater exposure to health information from newspapers and magazines compared with HAL was supported, even after controlling for demographics and non-health exposure to newspapers and magazines (HINTS; NHW: 0.57 [95% CI: 0.72,0.73]; HAL: 0.67 [95% CI: 0.64,0.69], Table 3.4b). Although this difference was significant in both ANHCS and HINTS data sets, the magnitude of the effect was less than the *a priori* threshold in the controlled analyses from the ANHCS data set (ES=-0.16, Table 3.4b).

The hypothesis that NHW would seek more health information from magazines and newspapers than HAL was strongly supported in the HINTS data set (ES=-1.15, p<0.001), but it was refuted in the ANHCS data set, which suggests the opposite: More than one-third of HAL (ANHCS, 34.15% [95% CI: 33.33,34.97], Table 3.4b), compared with about one-quarter of NHW (26.09% [95% CI: 25.84,26.33]) reported having sought health information from newspapers or magazines, even after adjusting for demographics and non-health exposure.

H4b: Differences between HAL and LAL in Health Information Exposure from Print Media

The evidence for acculturative difference is somewhat mixed for hypotheses relating to health-related print exposure, here based on divergent results by data set and type of exposure.

Data from HINTS and Pew support the hypothesis that HAL are exposed to more health information from newspapers/magazines compared with LAL, while the ANHCS data suggest that LAL read more health information in newspapers and magazines than do HAL (Table 3.4b). The hypothesis is refuted in both HINTS and ANHCS data with regards to health information

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seeking: LAL report nearly twice as much seeking from newspapers/magazines than do HAL

(Table 5.3b).

Table 3.4a. Exposure to Health Information from Newspapers and Magazines by Ethnicity and Acculturation Level, Uncontrolled.

Source	Scale	Data Set	Mean				Effect Size			Expected Direction of Relationship	
			Overall, SD*	Latino (95% CI)		NHW (95% CI)	HAL-LAL	HAL-NHW	LAL-NHW	*HAL-LAL*	*HAL-NHW*
				HAL	LAL						
Newspapers / Magazines: health information	ANHCS: As above (0,.5,1,3)	ANHCS (N=12,430)	0.74 *0.93*	0.66 (0.61,0.71)	1.01 (0.93,1.09)	0.73 (0.71,0.75)	**-0.37*** **	**-0.07** **	0.30	+	–
	Pew: As above (0,1,2)	Pew (N=4013)	0.65 *0.72*	0.77 (0.73,0.82)	0.60 (0.57,0.63)		**0.24*** **			+	
	HINTS: As above (0,.5,1)	HINTS (N=4573)	0.55 *0.43*	0.49 (0.43,0.54)	0.27 (0.22,0.32)	0.58 (0.56,0.59)	**0.49*** **	**-0.20** **	-0.69	+	–
Newspapers / Magazines: health information seeking	% who sought	ANHCS (N=9753)	29.21% *45.48%*	33.98% (30.75,37.21)	62.95% (59.22,66.68)	26.11% (25.16,27.05)	**-0.64*** **	**0.17*** **	0.81	+	–
		Pew									
		HINTS (N=4539)	2.42% *1.54%*	1.35% (-0.18,2.87)	2.22% (0.46,3.98)	2.50% (2.02,3.00)	-0.56	-0.74	-0.18	+	–
						Total	5	4	4		
						Support	2	1			
						Refute	2	0			
							H4b	**H3b**			
							Number of Tests				

Note. Means are not comparable across data sets because the scales vary. Refer to Table 2.2 for complete coding scheme.

Table 3.4b. Exposure to Health Information from Newspapers and Magazines by Ethnicity and Acculturation Level, Controlling for Demographics and Non-Health Exposure to the Source.

Source	Scale	Data Set	Mean				Effect Size			Expected Direction of Relationship	
			Overall, SD*	Latino (95% CI)		NHW (95% CI)	HAL-LAL	HAL-NHW	LAL-NHW	HAL-LAL	HAL-NHW
				HAL	LAL						
Newspapers / Magazines: health information	ANHCS: As above (0,.5,1,3)	ANHCS (N=12,258)	0.74 0.42	0.67 (0.64,0.69)	1.03 (1.00,1.05)	0.73 (0.73,0.74)	-0.86***	-0.16***	0.70	+	–
	Pew: As above (0,1,2)	Pew (N=3832)	0.65 0.16	0.79 (0.78,0.80)	0.60 (0.60,0.61)		1.15***			+	
	HINTS: As above (0,.5,1)	HINTS (N=4554)	0.55 0.23	0.49 (0.46,0.51)	0.28 (0.26,0.29)	0.58 (0.57,0.58)	0.92***	-0.39***	-1.30	+	–
Newspapers / Magazines: health information seeking	% who sought	ANHCS (N=9617)	28.76% 0.15	34.15% (33.33,34.97)	63.85% (63.11,64.58)	26.09% (25.84,26.33)	-1.93***	0.52***	2.45	+	–
		Pew									
		HINTS (N=4496)	2.43% 0.01	1.36% (1.29,1.43)	2.24% (2.15,2.33)	2.50% (2.47,2.53)	-0.89***	-1.15***	-0.26	+	–
						Total	5	4	4		
						Support	2	2			
						Refute	3	1			
							H8b	H7b			
							Number of Tests				

Note. Estimates are controlled for demographics: gender, age, education, marital status, and non-health exposure to the source.

 Note. Means are not comparable across data sets because the scales vary, as indicated in Scale column. Refer to Table 2.2 for complete coding scheme.

Results: Internet

H1c: Differences in Internet Use between HAL and NHW

After controlling for demographic covariates, there was no evidence of support for the hypothesis that HAL and NHW use the internet for general purposes equally; in both data sets, HAL report using the internet more than NHW. However, the difference was not large, and, in the HINTS data set, was not significant (ES=0.42, n.s., Table 3.5b). Table 3.5a presents the raw, unadjusted mean usage or proportion of internet users, for general information, by ethnicity and acculturation. Table 5.5b presents the covariate-controlled mean usage or adjusted probability of use of the internet by ethnicity and acculturation.

H2c: Differences in Internet Use between HAL and LAL

I hypothesized that LAL would report less use of the internet compared with HAL. Tests in all three data sets, each using a different metric, pointed to the conclusion that HAL use the internet more than LAL, even after adjusting for demographic covariates. Sixty-nine percent of HAL report using the internet (Pew; 69.01% [95% CI: 67.72,70.31]) compared with less than thirty percent of LAL (28.81% [95% CI: 28.02,29.59], Table 3.5b). HAL use the internet more than half a day more per week than do LAL (ANHCS; HAL: 4.11 days [95% CI: 4.05,4.16]; LAL: 3.50 days [95% CI: 3.41,3.59]), or fifty minutes longer per day (HINTS; HAL: 1.03 hours [95% CI: 0.99,1.08]; LAL: 0.14 [95% CI: 0.09,0.19]).

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Table 3.5a. Internet Use by Ethnicity and Acculturation Level, Uncontrolled.

Source	Scale	Data Set	Mean				Effect Size			Expected Direction of Relationship	
			Overall, SD*	Latino (95% CI)		NHW (95% CI)	HAL-LAL	HAL-NHW	LAL-NHW	*HAL-LAL*	*HAL-NHW*
				HAL	LAL						
Internet: general information	ANHCS: 0-7 days	ANHCS (N=12,348)	3.84 *2.83*	3.76 *(3.60,3.93)*	2.88 *(2.69,3.07)*	3.91 *(3.85,3.96)*	**0.31***	-0.05	-0.36	+	*No Difference*
	Pew: Yes (1) No (0)	Pew (N=3898)	39.02% *0.17*	68.25% *(65.37,71.12)*	28.78% *(27.13,30.44)*		**2.28***			+	
	HINTS: 0-24 hours per day (mean over 7 days)	HINTS (N=4575)	0.83 *1.23*	1.02 *(0.81,1.24)*	0.14 *(0.08,0.19)*	0.87 *(0.83,0.90)*	**0.72***	0.13	-0.59	+	*No Difference*
						Total	**3**	2	2		
						Support	3	0			
						Refute	0	0			
							H2c	H1c			
							Number of Tests				

Note. Means are not comparable across data sets because the scales vary, as indicated in Scale column. Refer to Table 2.2 for complete coding scheme.

Table 3.5b. Internet Use by Ethnicity and Acculturation Level, Controlling for Demographics.

Source	Scale	Data Set	Mean				Effect Size			Expected Direction of Relationship	
			Overall, SD*	Latino (95% CI)		NHW (95% CI)	HAL-LAL	HAL-NHW	LAL-NHW	*HAL-LAL*	*HAL-NHW*
				HAL	LAL						
Internet: general information	ANHCS: 0-7 days	ANHCS (N=12,348)	3.83 *1.06*	4.11 *(4.05,4.16)*	3.50 *(3.41,3.59)*	3.83 *(3.81,3.85)*	**0.57***	**0.27***	-0.31	+	*No Difference*
	Pew: Yes (1) No (0)	Pew (N=3832)	39.29% *0.28*	69.01% *(67.62,70.31)*	28.81% *(28.02,29.59)*		**1.45***			+	
	HINTS: 0-24 hours per day (mean over 7 days)	HINTS (N=4559)	0.83 *0.41*	1.03 *(0.99,1.08)*	0.14 *(0.09,0.19)*	0.86 *(0.85,0.87)*	**2.18***	0.42	-1.76	+	*No Difference*
						Total	3	2	2		
						Support	3	0			
						Refute	0	1			
							H6c	H5c			
							Number of Tests				

Note. Estimates are controlled for demographics: gender, age, education, and marital status.

Note. Means are not comparable across data sets because the scales vary, as indicated in Scale column. Refer to Table 2.2 for complete coding scheme.

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H3c: Differences between HAL and NHW in Health Information Exposure from the Internet

I hypothesized that NHW should report more exposure to health information from the internet compared with HAL. Once differences in demographics and internet access are accounted for, the general pattern of results suggests that the hypothesis should be rejected, although there was only one test where the standardized difference is at least 0.20. In ANHCS, HAL report viewing health information online slightly more than NHW (HAL: 0.60, 95%C CI[0.58,0.61]; NHW: 0.54, 95% CI [0.54,0.55]; p<0.01, Table 3.6b). A single test supported this hypothesis: in HINTS, one-quarter (24.97%) of NHW report having sought health information from the internet, compared with just one-fifth of HAL (21.03%, Table 3.6b).

H2c: Differences between HAL and LAL in Health Information Exposure from the Internet

I hypothesized that HAL would report more exposure to health information from the internet compared with LAL. The results vary by data set: Estimates from the Pew and HINTS data sets support the hypothesis, but ANHCS data contradicts these findings. For example, the standardized difference between HAL and LAL in Pew and HINTS was about 1.20 (Table 3.6b), indicating that HAL reported more exposure to health information from the internet compared with LAL. However, the result was nearly the opposite in the ANHCS data set, where the standardized difference of -0.84 indicates that LAL report more exposure to health information from the internet compared with HAL (Table 3.6b). What to make of the apparently contradictory findings is discussed in the next section.

Table 3.6a. Exposure to Health Information from the Internet by Ethnicity and Acculturation Level, Uncontrolled.

Source	Scale	Data Set	Mean				Effect Size			*Expected Direction of Relationship*	
			Overall, SD*	Latino (95% CI)		NHW (95% CI)	HAL-LAL	HAL-NHW	LAL-NHW	*HAL-LAL*	*HAL-NHW*
				HAL	LAL						
Internet: health information	ANHCS: As above (0,.5,1,3)	ANHCS (N=12,455)	0.56 0.85	0.59 (0.54,0.64)	0.81 (0.73,0.88)	0.54 (0.52,0.55)	**-0.25*****	**0.06***	0.32	+	−
	Pew: As above (0,1,2)	Pew (N=4013)	0.43 0.71	0.78 (0.73,0.83)	0.31 (0.29,0.33)		**0.66*****			+	
	HINTS: As above (0,.5,1)	HINTS (N=4589)	0.32 0.43	0.37 (0.31,0.43)	0.05 (0.02,0.07)	0.34 (0.33,0.35)	**0.75*****	0.08	-0.68	+	−
Internet: health information seeking	% who sought	ANHCS (N=9716)	51.48% 49.98%	52.78% (49.37,56.19)	73.30% (69.89,76.71)	49.64% (48.56,50.72)	**-0.41*****	0.06†	0.47	+	−
		Pew									
		HINTS (N=4537)	23.29% 42.27%	20.72% (15.38,26.07)	1.11% (-0.14,2.36)	24.92% (23.59,26.25)	**0.46*****	-0.10	-0.56	+	−
						Total	5	4	4		
						Support	3	0			
						Refute	2	1			
							H4c	H3c			
							Number of Tests				

Note. Means are not comparable across data sets because the scales vary, as indicated in Scale column. Refer to Table 2.2 for complete coding scheme.

Table 3.6b. Exposure to Health Information from the Internet by Ethnicity and Acculturation Level, Controlling for Demographics and Non-Health Exposure to the Source.

Source	Scale	Data Set	Mean				Effect Size			Expected Direction of Relationship	
			Overall, SD*	Latino (95% CI)		NHW (95% CI)	HAL-LAL	HAL-NHW	LAL-NHW	*HAL-LAL*	*HAL-NHW*
				HAL	LAL						
Internet: health information	ANHCS: As above (0,.5,1,3)	ANHCS (N=12,348)	0.56 0.26	0.60 (0.58,0.61)	0.82 (0.80,0.84)	0.54 (0.54,0.55)	-0.84***	0.23*	1.07	+	−
	Pew: As above (0,1,2)	Pew (N=3797)	0.44 0.40	0.79 (0.77,0.81)	0.31 (0.30,0.32)		1.18***			+	−
	HINTS: As above (0,.5,1)	HINTS (N=4554)	0.32 0.27	0.37 (0.34,0.41)	0.05 (0.03,0.07)	0.34 (0.33,0.35)	1.23***	0.13***	-1.09	+	−
Internet: health information seeking	% who sought	ANHCS (N=9603)	51.17% 0.20	52.44% (52.27,53.61)	74.08% (72.59,75.56)	49.66% (49.30,50.00)	-1.07***	0.14***	1.21	+	−
		Pew									
		HINTS (N=4554)	23.37% 0.18	21.03% (19.04,23.03)	1.12% (0.90,1.33)	24.97% (24.43,25.51)	1.12***	-0.22***	-1.34	+	−
						Total	5	4	4		
						Support	3	1			
						Refute	2	1			
							H8c	H7c			
							Number of Tests				

Note. Estimates are controlled for demographics: gender, age, education, marital status, and non-health exposure to the source.

Note. Means are not comparable across data sets because the scales vary, as indicated in Scale column. Refer to Table 2.2 for complete coding scheme.

Summary Results

I began this study with specific hypotheses about differences in media exposures by ethnicity and acculturation, with some differences expected based on the kind of exposure (general versus health). The results of my hypothesis testing demonstrate two different, but related, sources of influence on observed ethnic/acculturative differences in media exposures: type of information exposure; and comparisons across data sets, generally pitting ANHCS versus Pew and HINTS. In this section, I discuss the results using these two organizing themes, beginning first with a summary of hypothesized versus observed differences and including a discussion of potential threats to inference.

Summary of Hypothesized versus Observed Differences

There was some support for hypotheses about differences in media exposures by ethnicity, between NHW and HAL, and extensive support for hypotheses relating to differences in media exposures by acculturation level, between HAL and LAL. Because I conducted a number of tests for each hypothesis[28], using multiple data sets and multiple measures of some underlying constructs, I now present a summary table showing the number of tests of each hypothesis, and the number that supported or did not support the hypothesis (Table 3.7). I elaborate on the limitations and implications of selected results in separate sections below.

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[28] A legitimate concern about the multiple hypotheses tests is the possibility of chance results. Given the pattern of findings, where most tests meet the *a priori* threshold of meaningful effect size, |0.20| (either in the direction hypothesized or in the opposite direction), it is unlikely that these results are simply a function of chance. Moreover, the standard of effect I use, the standardized effect size, is a more conservative estimate than a t-test. In most cases where I claim support or refutation of hypothesized differences, the effect size is substantially larger than the minimum expected, further supporting the legitimacy of the claim of effects. A final guard against chance effects is the consistency of the pattern of effects across the three sets of hypotheses: that is, the effects that were significant in uncontrolled models were by and large significant in the controlled models. If the pattern had been less stable, there would be more reason to worry about the possibility that the results were simply due to chance.

After controlling for demographics and non-health exposure to the source, where

relevant, there was little support for the hypothesized differences (or lack thereof) in the media

use and exposures of NHW and HAL (H1, H3). The general pattern of results indicates that NHW

and HAL report differential levels of general and health-related exposures to media. Of the 24

original hypothesis tests (controlling for demographics and non-health exposure to the source,

where relevant), seven supported the hypotheses, seven refuted it, and the rest did not provide

significant evidence in either direction. These results indicate that NHW and HAL are

differentially exposed to both general content from the media (NHW report reading newspapers

and magazines more than HAL, while HAL report more exposure to television and radio) and to

health information (HAL report less exposure than NHW to health information from print

sources and more from television, as hypothesized, but, contrary to the hypothesis, one test

showed that HAL report more health exposure from the internet compared with NHW).

In contrast to the mixed pattern of evidence for the NHW/HAL comparisons, the

hypotheses about differences in media use and exposures between Latino acculturative

subgroups (H2, H4) were strongly supported, indicating overall that LAL and HAL rely on

different sources for general and health information. Of the 26[29] controlled hypothesis tests, 19

supported the hypotheses, while seven appeared to refute the hypotheses. I now turn to a

discussion of the differences by type of exposure and across data sets.

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[29] There were 29 original, uncontrolled hypothesis tests. However, these were reduced to 26 because of
the odd seeking patterns found in the ANHCS data set. The odd results will be discussed more fully in a
following section.

Table 3.7. Summary of Hypothesis Tests.

	Uncontrolled			Controlled for Demographics			Controlled for Demographics & Non-Health Exposure		
	Total number of tests	# tests supporting hypothesis	# tests refuting hypothesis	Total number of tests	# tests supporting hypothesis	# tests refuting hypothesis	Total number of tests	# tests supporting hypothesis	# tests refuting hypothesis
H1: Differences between HAL and NHW, General Media Use	12	2	3	12	2	5			
H1a: No difference in general TV & radio exposure among HAL and NHW (effect size ≥-0.20 and ≤0.20).	8	0	3	8	0	4			
H1b: HAL will report lower use of newspapers and magazines compared with NHW.	2	2	0	2	2	0			
H1c: No difference in general internet use among HAL and NHW (effect size ≥-0.20 and ≤0.20).	2	0	0	2	0	1			
H3: Differences between HAL and NHW, Health Information Exposure	12	4	3	12	6	3	12	5	2
H3a: HAL will report more exposure to health information from television and radio compared with NHW.	4	2	1	4	2	1	4	2	0
H3b: HAL will report less exposure to health information from newspapers and magazines compared with NHW.	4	2	1	4	3	1	4	2	1
H3c: HAL will report less exposure to health information from the internet compared with NHW.	4	0	1	4	1	1	4	1	1
H2: Differences between HAL and LAL, General Media Use	13	7	3	13	9	3			
H2a: LAL will report heavier general use of television and radio compared with HAL.	8	2	3	8	4	3			
H2b: LAL will report lower use of newspapers and magazines compared with HAL.	2	2	0	2	2	0			
H2c: LAL will report lower use of the internet compared with HAL.	3	3	0	3	3	0			
H4: Differences between HAL and LAL, Health Information Exposure	13	10	3	13	10	3	13	10	3
H4a: LAL will report more exposure to health information from television and radio compared with HAL.	5	5	0	5	5	0	5	5	0
H4b: LAL will report less exposure to health information from newspapers and magazines compared with HAL.	4	2	2	4	2	2	4	2	2
H4c: LAL will report less exposure to health information from the internet compared with HAL.	4	3	1	4	3	1	4	3	1

Note. Tests counted as "refuting" the hypothesis must meet the effect size threshold of |0.20| in the opposite direction of the hypothesis, and

the difference must be statistically significant. Where the hypothesis was of no difference, tests counted as refutations must indicate a

significant difference and an effect size ≥|0.20|.

Differences by Type of Exposure

One interesting and unexpected pattern of results is with regards to ethnic and acculturative differences by type of exposure within sources; that is, whether we consider general exposure, general-health-related exposure, or purposive health information exposure (seeking) from each source. The departure from the hypotheses is particularly striking when considering the case of seeking. I argued that LAL would seek less than HAL, and that HAL would seek less than NHW, from all sources, in part because seeking is construed as an activity for active consumers of health and health information. This particularly American characteristic is not one that I hypothesized as associated with less-acculturated Latinos. Yet in nearly all cases, the evidence demonstrated exactly the opposite result of that which was hypothesized, with quite strong effects. For example, LAL reported seeking more health information than did HAL from television, newspapers/magazines, and the internet, despite consistent findings showing the opposite results for non-seeking health information outcomes (Tables 3.2b, 3.4b, 3.6b) and, in some cases, general use of those sources (Tables 3.1b, 3.3b, 3.5b). In the same vein, HAL reported seeking more health information than NHW from newspapers and magazines (Table 3.4b), even though NHW tended to read more general-interest newspapers and magazines (Table 3.2b). In other words, when access to the source is held constant, the less-acculturated (LAL relative to HAL, and HAL relative to NHW) become greater active consumers of health information from those sources. The exception to this pattern is with regards to seeking from the internet, which approximately equal proportions of HAL and NHW report having done. Although this effect is not consistent with the pattern of findings that are the inverse of the hypothesized relationships, the null finding is nonetheless inconsistent with the hypothesis. It is possible, then, that the premise of the hypothesis was incorrect: information seeking is not associated with acculturation to the mainstream U.S. culture, or with the culture at all.

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However, I can also imagine an explanation that would be consistent with my underlying concern about the ethnic/acculturative differences: It is possible that individuals who seek health information are looking for more culturally-relevant information than what is available in the mainstream sources, possibly even in the Spanish-language sources that they generally rely on. There is no way to test this hypothesis with the present data, but it does suggest an interesting avenue for further research.

Ultimately, however, I can claim differences in purposeful versus incidental health information exposure only between NHW and HAL because of the remarkably high information seeking levels reported by LAL in the ANHCS data set. These seem too high to be credible, particularly in comparison to the levels reported in other data sets (comparisons across data sets are discussed more fully below). For example, 82% of LAL report having sought health information from television, compared with 30% of NHW and 43% of HAL (Table 3.2b). As such, I do not make claims about differences acculturation-based differences in health-related information seeking. Indeed, the hypothesis testing counts reported in the summary results section exclude information seeking comparisons by acculturation level, and are discussed above only as speculation in conjunction with ethnicity-based differences.

As to why the reported seeking levels are so high among LAL, there may be an interpretation issue with the translation of the survey instrument. The translation is literal, and was reviewed by native Spanish speakers from Mexico and Peru to ensure its comprehension (cf. Chapter 2 for a description of survey instrument development). However, it is possible that the phrasing prompted some kind of desirability effect that generated a bias toward positive responses. Although the original and translated wording is very similar to that used in HINTS, the set up of the question, where a distinction was explicitly made between active and passive information exposure, may also have contributed to a positive response bias. As mentioned in

Chapter 2, there may be additional explanations relating to the methods used to collect this data, which are discussed further in the sections below.

Comparisons across Data Sets

Despite the general support for my hypotheses, there were instances in which the data appear to refute the hypotheses. In almost all cases where some evidence suggests the opposite of what was hypothesized, the pattern of results is inconsistent across data sets, and it is the ANHCS data set that consistently fails to support the hypothesis[30]. The repetition of analyses across three different data sets was a study design decision intended to increase confidence in a general pattern of information exposures. That there is substantial disagreement from among data sets presents a problem for the generalization of conclusions obtained from the results. Why would ANHCS produce different (opposite) results from HINTS and Pew? I can speculate about several possible explanations. The most convenient would be that the measures are capturing different constructs. Even though many of the measures are virtually identical (indeed, HINTS 2005 items served as the basis for the ANHCS measures), the scales varied and the lead-in phrasing was different. What makes this explanation less plausible, however, is that the magnitude of the standardized differences across data sets was quite different, in some cases, not only was the magnitude quite different, but the sign was reversed. Another potential explanation could be that the models differed: for example, if different control variables were used in each model, or if the relationships across the variables were different, that could explain differential patterns of results. However, the pattern of results is similar in the uncontrolled and controlled results; moreover, all the controlled models had the same variables in them, coded in the same manner. It is true that the measured control variables varied slightly in their format

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[30] The exception to this pattern is with general television use among Latinos, where the HINTS data show that HAL report heavier use of television than LAL.

(e.g., the number of categories allowed for education); however, this seems unlikely to be a

plausible explanation for the dramatic nature of the results. Additionally, the different

measurement patterns do not necessarily correspond to the pattern of differences observed

(for example, HINTS and Pew did not match each other exactly, yet their results concurred for

the most part). A third possible explanation is that the data sets could have recruited different

diverse groups of Latinos. This seems quite a possible explanation, and one that I was prepared

for prior to conducting the study: I conducted the same analyses in ANHCS and Pew[31], restricting

the samples to Latinos of Mexican origin, and controlled for important structural and

demographic characteristics. These results are not reported in full in this dissertation because in

most cases they failed to reach significance in the ANHCS data set, likely due to the small cell

sizes that resulted after this filtering. However, the same pattern of results emerged as when all

Latinos were included: ANHCS doesn't match Pew.

An alternative explanation has to do with the survey administration procedures

themselves: that is, observed differences in ethnic/acculturative media exposures may be a

function of differences in the timing of survey administration (2005-2009), survey collection

(phone versus internet), and survey recruitment procedures (changes in the Knowledge

Networks' protocol that affect the ANHCS sample). To begin, increased adoption of the internet

by the general population from 2005 to 2009 would help to explain the high rates of internet

use reported by LAL in the ANHCS data compared with the other data sets and HAL and NHW in

the ANHCS, since LAL data were collected in January-February 2009, whereas HINTS data were

collected in 2005, Pew in 2007, and most ANHCS NHW/HAL in 2005-2008 (cf. Chapter 2). Indeed,

it appears that use of the internet became much more common among HAL respondents, and

somewhat more common among NHW, over the course of ANHCS data collection, suggesting

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[31] HINTS was not included because country of origin was not available.

the plausibility of time of survey collection as an explanation for the observed differences across

data sets. For example, in the period from the launch of the survey (January 2005) to August

2008, just 65.7% (95% CI: 62.8,68.7) of HAL and 71.6% (95% CI: 70.7,72.5) of NHW had internet

access at recruitment, compared with 76.2% (95% CI: 70.7,81.7) and 77.8% (95% CI: 76.0,79.6),

respectively, from September 2008 through May 2009 (Table 3.8). If the internet supplants

other media, then the time of survey collection may also help to explain observed differences in

other types of media exposures across data sets.

Table 3.8. Post-Hoc Analyses: Pre-Recruitment Household Internet Access by Survey

Completion Date: Time 1 (pre-Sept.2008) vs. Time 2 (Sept2008-May2009).

Time Period	% with Internet Access		
	Latino		NHW
	HAL	LAL	
ANHCS I	65.73%		71.56%
(N=10,530)	*(62.8,68.7)*		*(70.7,72.5)*
ANHCS II	76.19%	49.01%	77.79%
(N=2890)	*(70.7,81.7)*	*(45.2,52.8)*	*(76.0,79.6)*

Differences in how the survey data were collected also may have influenced the observed differences across data sets. ANHCS data was collected online, whereas HINTS and Pew were traditional phone-based surveys. The most obvious concern is that internet respondents must have a basic level of internet proficiency to complete the survey that may affect the extent and purposes for which they interact with other sources. It is possible, for example, that those who are more internet-savvy also have certain traits that characterize their relationship with information sources as more active. Such a situation would explain the much higher levels of information seeking observed in the ANHCS (internet-based) respondents, if we presume that the ANHCS respondents are more internet-savvy than the general population simply as a function of being in the KN panel. This is a more subtle argument than that which would claim that giving internet access changed respondents in some qualitative way, which Knowledge Networks claims to have avoided (Graham, 2009).

Related to the data collection methods, changes by Knowledge Networks (KN) in panelist recruitment strategies also may help to explain the differences in internet use across data sets. As explained in Chapter 2, KN uses RDD techniques to recruit members into their panel, which is said to be representative of the U.S. population. ANHCS survey respondents are drawn from this panel. In the early years of ANHCS data collection, prospective panelists who did not have a computer with internet access at home were provided WebTVs. This procedure changed, however, and newer panelists[32], including all LAL respondents, who did not have internet access at home were provided with a laptop computer and internet connection.

Even though in all cases ANHCS respondents had internet access, the experience of using the internet via WebTV compared with a computer is qualitatively different, and this may

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[32] Procedure changed in January 2009 for the main panel and in fall 2008 for all Spanish-language panelists.

affect the extent to which individuals feel comfortable using the internet for other purposes. In

other words, the experience of using a WebTV may not be as fast, interesting, or easy as

accessing the internet through a computer with high-speed internet access. The effect of this

change on observed internet usage patterns may vary: it may be that the WebTV users were less

interested in using the internet at all, or that they chose to use it for casual pleasure exclusively

if it cost too much effort to use it to find information. In contrast, those with internet access via

computer may have quickly embraced the new medium. Or it may be that regardless of

platform, the act of receiving free internet access resulted in a sample that is more internet-

savvy than the rest of the population, ostensibly represented better in the Pew and HINTS data

sets. This would explain the higher reported levels of internet use reported in by ANHCS

respondents.

It is also possible that, rather than being a methodological aberration, the differences

observed across data sets in media exposures across ethnicity and acculturation levels reflect

true differences in the population behaviors in the four years since the first surveys were

collected. To test this possible explanation, I selected as an examplar health information seeking

from the internet because it had quite dramatic results, as described above, and because, as I

argued above, internet-based differences seem most likely to be affected by time given internet

adoption rates in this time period. I compared LAL responses with HAL and NHW responses in

ANHCS from September 2008-May 2009[33] and then with HAL and NHW responses from January

2005-August 2008. Additionally, to control for the issue described above, that of increasing

familiarity with the internet given internet access by Knowledge Networks, I compared

responses only for those who had internet access at the time of recruitment. If this rival

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[33] Although this dissertation utilizes data only through February 2009, the survey continues to run on a weekly basis, making this comparison possible.

hypothesis were true, we should see: (a) lower rates of seeking for both NHW and HAL in the earlier time period compared with the later time period, (b) rates of seeking for NHW and HAL in the second time period comparable to those of LAL, and (c) rates of seeking for NHW and HAL in the first time period should be comparable to those reported in HINTS.

In fact, the results provide some mixed evidence in support of this alternative explanation. With regards to the first criterion, seeking within ethnic groups across time periods, there appears to be support for the possibility that history influenced the results. HAL report much more seeking in the second time period compared with the first from television (2nd time period, 50.92% versus 1st time period, 38.97%, for a standardized difference of -1.45), print (41.10% versus 31.37%, ES=-1.23), and the internet (71.86% versus 56.71%, ES=-3.22) (Table 3.9). NHW also report more seeking from the internet in the second time period compared with the first (61.31% versus 56.78%, ES=0.31, Table 3.9). NHW seeking differences from television and print sources are negligible over the time periods (television ES=0.03; print ES=-0.03, Table 5.9). There is no evidence for the other criteria put forth above as evidence for this explanation, however. Rates of seeking for NHW and HAL in the second time period, while higher than in the first, are nonetheless still much lower than those reported by LAL, but much higher than those reported in HINTS (Table 3.9). This is true even when the time period for the ANHCS comparison is restricted more tightly, to 2005-2006, and when respondents using WebTVs or KN-provided laptops are included (data not shown).

Table 3.9. Post-Hoc Seeking Analyses: Time 1 (Jan. 2005-Aug. 2008) vs. Time 2 (Sept. 2008-May 2009), controlling for all confounders including non-health use of the source.

Source	Data Set	Mean				Effect Size				
		Overall, SD*	Latino (95% CI)		NHW (95% CI)	HAL T2-T1	NHW T2-T1	HAL-LAL	HAL-NHW	LAL-NHW
			HAL	LAL						
Television	ANHCS I (N=7408)	30.64% 0.11	38.97% (38.10,39.83)		29.84% (29.60,30.08)	0.44	0.03		0.87	
	ANHCS II (N=2066)	39.33% 0.20	50.92% (49.28,52.57)	78.59% (77.78,79.39)	30.45% (29.96,30.94)			-1.39	1.03	2.42
Newspapers / Magazines	ANHCS I (N=7385)	26.46% 0.13	31.37% (30.37,32.38)		25.98% (25.69,26.28)	0.51	-0.03		0.43	
	ANHCS II (N=2056)	31.87% 0.19	41.10% (38.66,43.54)	60.10% (58.63,61.58)	25.34% (24.63,26.05)			-1.00	0.83	1.82
	HINTS (N=4496)	2.43% 0.01	1.36% (1.29,1.43)	2.24% (2.15,2.33)	2.50% (2.47,2.53)			-0.89	-1.15	-0.26
Internet	ANHCS I (N=5489)	56.77% 0.16	56.71% (55.44,57.98)		56.78% (56.40,57.16)	1.05	0.31		0.00	
	ANHCS II (N=2077)	65.16% 0.14	71.86% (70.25,73.48)	81.07% (79.66,82.48)	61.31% (60.69,61.92)			-0.64	0.73	1.37
	HINTS (N=4554)	23.37% 0.18	21.03% (19.04,23.03)	1.12% (0.90,1.33)	24.97% (24.43,25.51)			1.12	-0.22	-1.34

Note. ANHCS data include only respondents who had internet access at home at the time of recruitment into the Knowledge Networks panel.

Note. Effect size for comparisons across time periods is a standardized difference calculated using the formula: $(M_{T2}-M_{T1})/SD_{T2}$.

This leaves two possibilities, neither of which is particularly palatable for the purposes of drawing generalized conclusions about communicating health information to U.S. Latinos, as was the objective of this study. First, there have been changes in the five years in the make-up and media/health information habits of the U.S. Latino population since the HINTS sample was drawn, and the nearly two years since the Pew sample was collected. Even in this short time frame, the U.S. Latino population has grown tremendously, and, importantly for the purposes of survey analysis, the population is one that is more reliant on cell phones, and therefore more difficult to accurately sample using the traditional RDD techniques that were employed for these samples (Keeter, Kennedy, Clark, Tompson & Mockrzycki, 2007). Regarding the health information habits of U.S. Latinos, it seems possible that the increasing outreach to Latinos in the past several years has improved LALs' access to health information sources. It seems less likely that a cultural change has resulted in such a short timeframe such that LALs should report the health information patterns observed in the ANHCS data.

The second potential explanation is that the ANHCS sample is not a good representation of the U.S. Latino population as a whole. Although these differences should be controlled through the use of control variables, it is possible that the Latinos who agree to participate on a Knowledge Networks panel are very different from the rest of the Latino population (ostensibly better represented in the HINTS and Pew samples) in their information needs and habits.

The problem with either explanation of the ANHCS sample as the issue is that it did sometimes concur with other estimates, and it often provided important support of the hypotheses. It seems untenable to, on the one hand, claim that the data are illegitimate, pointing to concurrence across other data sets where ANHCS provides contradictory evidence, but on the other hand, claim the effects I would like to claim that come from the ANHCS data. Perhaps the most judicious interpretation of these results is to refrain from making claims

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where there was not consistent support. This is the approach I have tried to follow. In the next section I describe, with caution, some implications of those results that are clear for media research involving and health outreach to U.S. Latinos.

Discussion

These findings have implications for health communications designed to reach Latinos and for research methods to understand Latinos, despite some inconsistent results across data sets. Traditional language-based audience segmentation strategies and the notion of behavioral acculturation are supported: Latinos cannot be said to engage in the same media behaviors across the acculturation spectrum, nor in comparison to NHW.

Practical implications can be derived from this study as well. For example, consider the finding that less-acculturated Latinos are far less likely to access health information online (excluding ANHCS), even after controlling for general use of the internet. This finding raises the question of whether the efforts to make cancer prevention and other health information available in Spanish online are the best use of limited resources, particularly compared with other sources, including radio and television, that LAL report already using to obtain health information. On the other hand, this study did not consider the type or amount of health-related content found in the various sources. It is possible that the (presumably Spanish-language) content available on the internet is more detailed and relevant than that which is available through more traditional, passive sources like radio and television. If this is the case, health information from the internet would not substitute for health information from other sources, but would serve a unique function, perhaps more akin to hotlines or other more interactive information sources. A relevant next step would be to consider the content of each source, both objectively (What kind of health information is available in each of these sources?) and subjectively (What do respondents think they are learning from these sources?). Such

analyses of content would help campaign planners better understand what is missing in the media environment, and would provide a more bottom-up approach to health information dissemination. Consistent with this recommendation are findings that suggest that the type of content, not just the medium, matters with regards to understanding acculturative/ethnic exposures. Consider, for example, differences in exposures to television news (HAL report less than NHW) compared with television broadly (HAL report more than NHW, Table 3.1b).

It is also important to consider the role that access to Spanish-language media plays in influencing the amount of information that Latinos obtain in Spanish. Although metropolitan markets with long histories of large Latino populations (e.g., Los Angeles, Miami, New York, Chicago) have many publicly-available Spanish radio and television stations and newspapers, in cities and geographic areas where Latinos have more recently settled (e.g., Atlanta and the rest of the South), such variety of free media content does not yet exist (although it may be available through paid channels via cable or satellite). Given that the Latinos who are settling in those areas are generally recent immigrants (U.S. Bureau of the Census, 2009), and so less likely to speak English, access to information in Spanish is particularly important. If it is true that there is less information available in Spanish, what does that mean for their media use habits, and, more to the point for this dissertation's goals, for their access to health information?

Additionally unknown at this point is whether Latinos who are similar in media use patterns to NHW will respond to media content equally. This hypothesis will be tested in studies two and three, using two different methods. The first tests simply the notion that similar patterns of media use result in different outcomes. The second tests a more specific proposition: that specific exposures result in different outcomes.

One final methodological contribution of this study is the distinction between HAL and LAL, as defined by language of survey interview. When Latinos are given the choice of

responding in Spanish or English, more than half respond in Spanish. This is important from a

practical methodological perspective in at least two ways. First, surveys that do not offer Latinos

the choice of responding in Spanish cannot claim to represent the entire U.S. Latino population.

Moreover, given the demonstrated differences in the use of media and in the health content

obtained from media, analyses about how Latinos learn about health that consider the two

acculturative groups together would be misleading. This would be particularly ineffectual if such

data (e.g., about HAL) were used to inform campaign strategies that were executed only toward

less-acculturated Latinos (e.g., in Spanish-language media).

In summary, although there were substantial methodological limitations that preclude

definitive statements about how ethnicity and acculturation affect general media use and

exposure to health information from the media, this study has demonstrated that there are

enough differences to warrant further examination. This is particularly relevant where that

further examination extends to include media effects analyses, as I will do in the following

chapters.

Chapter 4: Pilot Tests of Study 2: Ethnicity/acculturation as moderators of media effects

In this chapter, I report results from three pilot tests for study two, which tested the proposition that ethnicity/acculturation level moderate the effects of health-related media exposure on health-related outcomes. These results are presented here to demonstrate the evolution of my hypotheses and because they were crucial to the development of hypotheses for study two. I present the original research questions below, followed by the specific methods[34] and results for each of the three pilot tests, and conclude with a discussion that leads to the refinement of study two hypotheses and methods. Because these tests were conducted as a pilot of study two, this chapter should be regarded as foundational for the full test of study two (Chapter 5), rather than as a standalone set of claims.

Research Questions

As described in Chapter two, study two examined how ethnicity and acculturation interact with exposure to health-related content in their effects on health-related outcomes. The pilot studies explored different aspects of the following research questions, the logic of which is outlined in the literature review (Chapter 1).

Research Question 1: Does ethnicity moderate the effects of health-related media exposure on health behaviors?

Research Question 2: Does acculturation level among Latinos moderate the effects of health-related media exposure on health behaviors?

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[34] Methods common to studies one and two, including details about the data sets, are described in Chapter 2.

Research Question 3: How do the effects of media exposure differ between highly-acculturated

Latinos and NHW?

I turn now to a description of the methods and results of each of the three pilot studies.

Pilot Study 2.1: Perceived effects of health information exposure on health-related outcomes vary by acculturation, Pew 2007 Data

Methods

The first pilot study used data from the Pew Hispanic Health 2007 Survey (Pew) to

consider how the effects of health information exposure on perceptions of influence differed by

Latino acculturation status. For this preliminary analysis, respondents were divided into HAL and

LAL by language of interview and compared on the three health-related outcomes associated

with exposure to health content on the media using using crosstabs and chi-square tests.

Outcome measures: Three different outcomes were considered, all self-reports of the

effects of health information from the media. These are reports of attribution of behavior to

information engagement rather than reports of behavioral outcomes; nevertheless, they were

considered relevant for the purposes of a pilot test of media effects. Respondents were asked,

"Thinking about **the past year**, did any information you found from the media [affect a decision

about how to treat an illness or medical condition / lead you to ask a doctor or other medical

professional new questions / change the way you think about diet or exercise]." Response

options were Yes/No.

Results

There were differences by acculturation level in the effects of health-related media

exposure on talking to a doctor and thinking about healthy lifestyles. Nearly two-thirds (61.41%)

of LAL reported taking information learned from media exposure to their doctors, whereas just

half (49.67%) of HAL did so (Chi^2=36.93, p<.001, Table 4.1). LAL were also more likely (70.03%)

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than HAL (55.26%) to report that information from the media changed the way they think about diet or exercise (Chi^2=63.28, p<.001, Table 4.1).

Self-reported exposure to health-related media was not differentially associated with decision-making about treating health problems; approximately 41% of both groups reported using health information obtained from media sources to inform health treatment decisions (Table 4.1).

Table 4.1. Proportion of Respondents who were influenced by Information from the Media, by

Acculturation Level.

		HAL	LAL	Total
…did any information you found from media….		N=892	N=2359	N=3251
….lead you to ask an MD for more information?	**% Yes**	**49.67**	**61.41**	**58.20**
	n	445	1467	1912
	% No	**50.33**	**38.59**	**41.80**
	n	451	922	1373
		Chi^2=36.93, p<0.001		
…change the way you think about diet or exercise?	**% Yes**	**55.26**	**70.03**	**66.01**
	n	494	1671	2165
	% No	**44.74**	**29.97**	**33.99**
	n	400	715	1115
		Chi^2=63.28, p<0.001		
…affect a treatment decision?	**% Yes**	**41.03**	**41.75**	**41.56**
	n	366	985	1351
	% No	**58.97**	**58.25**	**58.44**
	n	526	1325	1900
		Chi^2=0.14, n.s.		

Note. Refer to Table 2.2 for complete question wording.

Limitations and Discussion

One limitation of this pilot study is that it was an uncontrolled analysis. Particularly for the last outcome, decision-making about health problems, perhaps a more appropriate comparison would have been to restrict the sample to those who report having a chronic health problem or having concern about a health problem. It is also possible that the effects of acculturation may be entirely explained by structural characteristics such as demographics, and a controlled analysis would reveal whether this was the case.

Additionally, the question used to derive the outcomes in this analysis is quite broad and required respondents to recall how general health-related media exposure influenced more specific health-related outcomes, which may be difficult to estimate accurately and so perhaps lead to over- or under-estimation, particularly given the restricted range of response options (yes/no). On the other hand, restricting response choices to yes/no simplifies the question, and there is good variation on the responses, both within each question and across the set of three questions. This suggests that respondents are making reasonable distinctions about the effects of media exposure across three different kinds of outcomes.

The important take away from this preliminary study is that there are acculturation-based differences in perceived media effects, using a subjective self-report measure of media influence. Several caveats must be made. First, the dependent variable used was a subjective self-report measure of media influence. Such measures are known to be unreliable; recognizing this limitation, I do not seek to claim definitive differences in effects here but rather use these findings to suggest that it is possible that media effects may be moderated by acculturation level.

Pilot Study 2.2: Effects of health information exposure on health-related outcomes vary by ethnicity and acculturation, HINTS 2005 Data

Methods

This study used data from NCI's Health Information National Trends Survey (HINTS) 2005 to describe how acculturation interacts with health information exposure to influence specific health behaviors. Acculturation was measured by language of interview: English-speaking Latinos were considered more highly-acculturated than Spanish-speaking Latinos. No other measures of acculturation were captured in this survey. A three-category variable capturing ethnicity (NHW, n=4101) and acculturation (among Latinos, responded in English, n=225; responded in Spanish, n=271) was created and then dummy coded to create interaction terms to test for the moderating effects of these constructs on media effects on behavior.

Three kinds of health-related media were considered separately. Respondents were asked about how often in the past 12 months they had read newspaper health sections, watched the health segments on local television news, and read unsolicited health information on the internet. Response options included "Never," "Less than once per week," and "Once per week or more"; for the purposes of this analysis, media exposure was dichotomized such that 0 indicated never using the source and 1 indicated ever. Three healthy lifestyle outcomes were considered: eating fruits and vegetables (0-10 per day), exercising (0-7 days per week), and attempting to lose weight in the past year (yes/no).

OLS and logistic regression were used to determine the effects of ethnicity, exposure to the three health media sources, and their interaction on each of the three healthy lifestyle behaviors.

Results

      The analyses tested whether ethnicity or acculturation moderated the association of

health-related media exposure with the three lifestyle behaviors. The only moderation effect

that was significant was the effect of watching local television news health segments on reports

of having tried to lose weight in the past year. NHW who watched television news health

segments were half as likely as HAL who did so to report having dieted to lose weight in the past

year (OR=0.51, p<0.05, Table 4.2c). There was a strong main effect of exposure to television

news health segments as well: those who report exposure were nearly three times as likely

(OR=2.74, p<0.001, Table 4.2c) as others to report having dieted. No other moderation effects

achieved significance (Table 4.2c).

Table 4.2a. Association of the Interaction of Ethnicity and Media Exposure with Exercise

Frequency, HINTS Data.

		Reading Newspaper Health Sections	Viewing TV News Health Segments	Internet Health Information
		b	b	b
NHW		-0.34	0.03	-0.12
LAL		-0.58	-0.19	-0.22
Exposure		-0.47	0.03	0.07
Exposure*NHW		0.37	-0.20	-0.15
Exposure*LAL		0.58	-0.20	-0.85
	N	3392	3694	2359
	R^2	0.000	0.001	0.000
	F	0.80	1.57	1.06

Table 4.2b. Association of the Interaction of Ethnicity and Media Exposure with Fruit and

Vegetable Consumption, HINTS Data.

		Reading Newspaper Health Sections	Viewing TV News Health Segments	Internet Health Information
		b	b	b
NHW		0.03	0.35	0.08
LAL		-0.12	-0.14	0.74
Exposure		0.40	0.30	-0.01
Exposure*NHW		0.18	-0.15	0.27
Exposure*LAL		-0.14	-0.02	-0.67
	N	4021	4425	2661
	R^2	0.018	0.004	0.004
	F	15.76	4.34	2.97

Table 4.2c. Association of the Interaction of Ethnicity and Media Exposure with Dieting to Lose

Weight, HINTS Data.

	Reading Newspaper Health Sections	Viewing TV News Health Segments	Internet Health Information
	OR	OR	OR
NHW	0.65	1.35	1.28
LAL	0.60	0.78	0.55
Exposure	1.30	**2.74****	1.74
Exposure*NHW	1.23	**0.51***	0.79
Exposure*LAL	0.70	0.63	0.73
N	4049	4460	2677
Pseudo R^2	0.009	0.008	0.007

Note. + indicates p<0.10, * indicate p<0.05, ** indicates p<.01, *** indicates p<.001.

Discussion

There was minimal evidence for the hypothesized interaction of health-related media exposure with ethnicity or acculturation. Of the 18 interactions tested (three channels by three behaviors by two ethnicity/acculturation comparisons), only one was significant. This study likely suffers from a lack of statistical power. Combining the small sample sizes with the modest effects detected, it was perhaps impossible to achieve significant interaction effects in exposure to the internet and newspaper. The next pilot test has a much larger sample, as do the main tests of these hypotheses, described in Chapter 5.

Pilot Study 2.3: Effects of health information exposure on health-related outcomes vary by ethnicity, ANHCS 2005-2008 Data

Methods

Data from the first three years of the Annenberg National Health Communication Study (ANHCS; 2005-2008) was used to analyze how ethnicity interacts with health information exposure to influence specific healthy-lifestyle behaviors. For the purposes of the present study, only Non-Hispanic Whites (NHW) and Highly-Acculturated Latinos (HAL) were included in these analyses (N=11,629).

The purpose of this pilot study was to establish that ethnicity moderates exposure effects on behavior, the central issue addressed in this dissertation. Latinos in this sample were considered highly-acculturated because the questionnaire was administered in English only[35]. Thus, the comparison here is across ethnic groups but with a caveat that Hispanic ethnicity represents highly-acculturated Latinos.

I considered the same three healthy lifestyle outcomes as in the HINTS pilot test: exercising in the past seven days, daily fruit and vegetable consumption, and dieting to lose weight. The questions were identical in form and coding. The independent variables were exposure to six different health information sources. Respondents were asked about non-purposive exposure to health information from newspapers, magazines, television news, television shows other than news, family and friends, newspapers, and the internet. Response options ranged from "not at all" to "a few times per week." For the purposes of this pilot test, responses were dichotomized to indicate whether the participant had obtained information

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[35] This pilot test was conducted prior to the recruitment of the KN Spanish panel described in Chapter 2 and used in the full test of Study 2 (Chapter 5).

from that source at all in the specified time period or not. Exact wording and original response options are detailed in Chapter 2 (Table 2.2).

To test the hypothesis, I ran six separate models per outcome behavior (OLS regression for exercise and fruit and vegetable consumption, logistic regression for dieting). Each model used exposure to a different health information source as the predictor, along with ethnicity and the interaction of ethnicity and exposure.I repeated the tests with two different sub-samples of HAL in order to address potential concerns about the nature of diversity within Latino ethnicity and the KN Latino sample in particular. First, I compared all HAL (n=1085) with NHW (n=10,544). Next, I restricted the HAL sample to include only those who were first- or second-generation U.S. residents (n=302[36]).

Results

Sample 1: All HAL compared with NHW

I tested whether the associations of health-related exposure with healthy lifestyle behaviors were moderated by ethnicity. There was no evidence for moderation effects in these models (Tables 4.3a-c).

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[36] Data about country of birth were available only for 614 of the 1085 Latinos in this sample.

Table 4.3a. Association of the Interaction of Ethnicity and Media Exposure with Exercise Frequency, ANHCS Data.

		Newspaper Health Sections	Health Magazines	Heath Segments on TV News	Non-News TV Programs	Family & Friends	Internet
		B	b	B	b	b	b
Ethnicity (HAL=1)		-0.13	**-0.34*****	-0.14	**-0.27***	-0.26	**-0.32****
Exposure		**0.64*****	**0.57*****	**0.33*****	**0.21*****	**0.36*****	**0.13****
Exposure*Ethnicity		-0.20	0.14	-0.18	-0.01	0.00	0.06
	N	11,273	11,219	11,298	11,122	11,120	11,363
	R^2	0.019	0.019	0.005	0.003	0.004	0.002
	F	73.56	71.82	20.16	12.92	16.42	8.99

Note. †indicates p<0.10, * indicates p<.05, ** indicates p<.01, *** indicates p<.001.

Table 4.3b. Association of the Interaction of Ethnicity and Media Exposure with Fruit and Vegetable Consumption, ANHCS Data.

		Newspaper Health Sections	Health Magazines	Heath Segments on TV News	Non-News TV Programs	Family & Friends	Internet
		B	B	B	b	b	b
Ethnicity (HAL=1)		0.03	-0.03	0.08	-0.14	0.22	0.03
Exposure		**0.69*****	**0.74*****	**0.37*****	**0.31*****	**0.61*****	**0.30*****
Exposure*Ethnicity		0.00	0.07	-0.09	0.24†	-0.22	-0.01
	N	11,254	11,199	11,277	11,101	11,102	11,342
	R^2	0.026	0.033	0.006	0.006	0.010	0.005
	F	101.10	128.80	24.23	24.47	36.93	20.88

Note. †indicates $p<0.10$, * indicates $p<.05$, ** indicates $p<.01$, *** indicates $p<.001$.

Table 4.3c. Association of the Interaction of Ethnicity and Media Exposure with Dieting to Lose Weight, ANHCS Data.

	Newspaper Health Sections	Health Magazines	Heath Segments on TV News	Non-News TV Programs	Family & Friends	Internet
	OR	OR	OR	OR	OR	OR
Ethnicity (HAL=1)	1.07	1.08	0.96	1.10	1.24	**1.10**
Exposure	**1.66***	**1.73***	**1.59***	**1.60***	**1.65***	**1.75***
Exposure*Ethnicity	1.09	1.01	1.22	0.96	0.87	1.00
N	11,412	11,311	11,465	11,125	11,122	11,569
Pseudo R^2	0.011	0.013	0.008	0.009	0.005	0.014

Note. †indicates $p<0.10$, * indicates $p<.05$, ** indicates $p<.01$, *** indicates $p<.001$.

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I was concerned that perhaps the nature of the KN Latino sample could be obscuring

moderation effects. It is possible that the Latinos KN recruits are far more acculturated than the

general Latino population. I have been arguing that language of interview is the best rough

estimate of acculturation available; however, using language was not an option here since all

respondents answered in English. Thus, I considered generation in the U.S. as a proximate

measure of acculturation[37]. I computed generation using KN Hispanic profile measures of

respondents' and parents' country of birth. Consistent with sociological definitions (Alba & Nee,

2003), respondents who were born outside of the U.S. were considered first generation (n=151),

while those who were born in the U.S. but whose mother or father (or both) was born in Latin

America were considered second generation (n=151), and those who were born in the U.S. and

whose parents both were born in the U.S. were considered third generation (n=312). As

mentioned in Chapter 2, half of the KN sample consisted of third generation or higher Latinos

while in the general population they make up only about thirty percent (U.S. Bureau of the

Census, 2009) of the Latino population. This lends credibility to my concern about the

representativeness of the KN Latino sample (see also Study 1 discussion, Chapter 3). For the

sake of this analysis, I was not interested in the extremely highly acculturated – e.g., those

whose families had been in the U.S. for multiple generations and who may have achieved not

just behavioral acculturation but also cognitive and affective acculturation. Thus, the sample

was restricted to Latinos who were first- or second-generation U.S. residents (n=302). I could

have restricted this even further to compare first- and second-generation to each other, and

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[37] This is not necessarily inconsistent with my argument; generation in U.S. is highly associated with interview language (Cruz et al., 2008). In a different sample, the correlation between generation and language of interview among Mexican-Americans is -.74, p<.001; fewer than two percent (1.5%) of third-generation or higher Mexican-Americans responded in Spanish, while 90.9% of first generation and 7.6% of second-generation respondents did so (Pew Hispanic Health Survey).

separately to NHW, however, I became concerned with sample size and power issues. Moreover, I suspect that even those who are first generation but are in the KN panel are more acculturated than the typical (or stereotypical) first-generation immigrant, perhaps by virtue of the proportion of their lives they have been in the U.S., or as a function of the social class to which they belonged in their country of origin.

There is no evidence for moderation in this reduced sample. There is a single significant interaction effect, of the internet on exercise (b=0.39, p<.01, Table 4.4a). There were also three marginally significant results (p<0.10, Tables 4.4a-b). However, given the thirty-six (total) tests I conducted, it is again possible that the one significant effect was a function of chance.

Table 4.4a. Association of the Interaction of Ethnicity and Media Exposure with Exercise Frequency among NHW and 1st/2nd Generation HAL,

ANHCS Data.

	Newspaper Health Sections	Health Magazines	Heath Segments on TV News	Non-News TV Programs	Family & Friends	Internet
	B	b	B	b	b	b
Ethnicity (HAL=1)	-0.21	**-0.36****	-0.23	**-0.46****	-0.10	**-0.43*****
Exposure	**0.64*****	**0.57*****	**0.33*****	**0.21*****	**0.36*****	**0.13*****
Exposure*Ethnicity	-0.04	0.06	-0.02	0.30†	-0.12	**0.39****
N	11,177	11,138	11,209	11,046	11,041	11,262
R^2	0.019	0.017	0.005	0.003	0.003	0.002
F	72.54	66.04	18.08	12.90	12.99	9.13

Note. †indicates $p<0.10$, * indicates $p<.05$, ** indicates $p<.01$, *** indicates $p<.001$.

Table 4.4b. Association of the Interaction of Ethnicity and Media Exposure with Fruit and Vegetable Consumption among NHW and 1st/2nd Generation HAL, ANHCS Data.

	Newspaper Health Sections	Health Magazines	Heath Segments on TV News	Non-News TV Programs	Family & Friends	Internet
	B	b	B	b	b	b
Ethnicity (HAL=1)	**0.31***	0.16	0.01	0.11	0.37†	**0.47***
Exposure	**0.69*****	**0.74*****	**0.37*****	**0.31*****	**0.61*****	**0.30*****
Exposure*Ethnicity	0.01	0.06	0.36†	0.30†	0.02	-0.14
N	11,154	11,115	11,185	11,022	11,019	11,239
R^2	0.028	0.035	0.010	0.009	0.013	0.008
F	108.73	135.03	37.28	34.89	49.18	31.21

Note. †indicates $p<0.10$, * indicates $p<.05$, ** indicates $p<.01$, *** indicates $p<.001$.

Table 4.4c. Association of the Interaction of Ethnicity and Media Exposure with Dieting to Lose Weight among NHW and 1st/2nd Generation HAL, ANHCS Data.

	Newspaper Health Sections	Health Magazines	Heath Segments on TV News	Non-News TV Programs	Family & Friends	Internet
	OR	OR	OR	OR	OR	OR
Ethnicity (HAL=1)	1.25†	**1.27***	1.24	**1.32***	**1.55***	**1.40****
Exposure	**1.65****	**1.73****	**1.59****	**1.60****	**1.65****	**1.75****
Exposure*Ethnicity	1.22	1.02	1.13	1.04	0.93	1.01
N	11,304	11,223	11,364	11,048	11,042	11,455
Pseudo R^2	0.013	0.015	0.009	0.012	0.007	0.016

Note. †indicates $p<0.10$, * indicates $p<.05$, ** indicates $p<.01$, *** indicates $p<.001$.

Discussion

This pre-test, the most comprehensive of the three testing study two hypotheses, failed to provide compelling evidence that ethnicity interacts with habitual health-related media exposure to influence healthy lifestyle behaviors. On the other hand, neither is this preliminary study substantial enough to warrant a claim that these elusive interaction effects do not exist. The lack of support for my hypotheses may be attributable to a number of methodological and conceptual limitations. First, it is possible that the exposure measures are not sensitive enough to capture important but subtle differences in knowledge and other outcomes gained from exposure. More specific measures, for example, topic-specific seeking or scanning, or non-purposive information exposure about specific topics, might be more informative than the aggregate measures of general exposure that the present pilot study used. This possibility led me to formulate a more specific hypothesis that was tested in study two, that information seeking (rather than simple exposure) has differential effects. A related limitation relates to the outcomes selected: although behavioral change is the ultimate outcome of interest, and studies have demonstrated association of information seeking on these outcomes (Kelly et al., 2010; Ramírez et al., 2009), these documented effects are not very large. It is possible that they are not large enough to be detected in an interaction analysis. It is possible that intermediate outcomes such as attitudes and perceived norms may be differentially influenced by media exposure. This alternative is unfortunately not testable in study two using the data available; however, I did include two knowledge outcomes, precursors to the above intermediate outcomes, in study two.

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Conclusions from the Pilot Studies

Three pilot studies considered the interaction effects hypotheses proposed in study two. The first pilot study, using Pew data, provided the most straightforward evidence that LAL and HAL are differentially affected by health information they obtain from the media. However, this study was severely limited by the nature of the outcome variables used; it is perhaps the least convincing study. The second pilot study of Study 2 considered the associations of health-related media exposure from three sources on three lifestyle behaviors (dieting, exercise, and eating fruits and vegetables). Here, the data provided very limited support for the hypotheses; however, effects were not strong and it is likely that the study did not have sufficient power to detect the most interesting effects. The strongest test of the hypotheses proposed in study two is provided by the third pilot study in this series, using ANHCS data. Here I was limited to comparisons between NHW and HAL because there was no Spanish-speaking Latino component at the time of the pilot test. I repeated the tests from HINTS, using exposure to health-related content from a variety of sources to predict three lifestyle behaviors. I found a lack of convincing support for the moderating effect of ethnicity on these effects. It is possible, however, that the kinds of effects I was looking for are not visible with the kinds of exposure I have tested, or at least without knowing more detail about exposure that may be difficult to assess using survey data. Thus, these studies have informed not only the development of more specific hypotheses and methods for study two (Chapter 5), but also the third study of this dissertation, an experiment in which exposure is manipulated (Chapter 6).

Chapter 5: Study 2: Ethnicity/acculturation as moderators of media effects

In this chapter, I report results from study two, which tested the proposition that ethnicity/acculturation level moderate the effects of health-related media exposure on health behaviors and on determinants of health behaviors. I use the term "health-related media exposure" to refer both to information obtained casually (for example, from newspapers) and that obtained through active information seeking. I begin with an overview of the specific methods used in this study[38] and continue with results, organized by outcome (healthy lifestyle behavior or knowledge), concluding with a discussion about this set of findings, in combination with the results from pilot studies presented in the previous chapter.

Hypotheses

The relative influence[39] of media exposure/information seeking on health behaviors was expected to vary across ethnic groups and by acculturation status, following the logic outlined in the literature review (Chapter 1) and in study 1 (Chapter 3).

The first two hypotheses sought to establish the basic pattern of interaction effects using uncontrolled analyses.

H1: Health-related media exposure will have a stronger association with health behaviors and knowledge for NHW compared with highly-acculturated Latinos.

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[38] Methods common to studies one and two, including measures and details about the data sets, are described in Chapter 2.

[39] Although it is clear that my argument rests on the causal relationship between information exposure and outcomes, based on prior research that has established the main effects of this relationship using over time controlled analyses (Ramírez et al., 2009), the data I use to test my hypotheses in this study are cross-sectional. As such, the hypotheses seek to test associations.

H2: Health-related media exposure will have a stronger association with health behaviors and knowledge for less-acculturated Latinos compared with highly-acculturated Latinos.

The next pair of hypotheses sought to control for important potential confounders for the interaction hypotheses. As in study one, demographics (age, gender, education and income) were considered potential prior causes of the relationship between exposure and effects, and were therefore included in the models as controls. Additionally important to consider for knowledge about diabetes was personal experience with diabetes[40].

H3: Health-related media exposure will have a stronger association with health behaviors and knowledge for NHW compared with highly-acculturated Latinos, controlling for demographics (and personal diagnosis of diabetes).

H4: Health-related media exposure will have a stronger association with health behaviors and knowledge for less-acculturated Latinos compared with highly-acculturated Latinos, controlling for demographics (and personal diagnosis of diabetes).

The final pair of hypotheses is an attempt to test one explanation for the moderation effects, that the effects of media depend on identification with the content, using language of media as a proxy for the targetedness of the content. Underlying these hypotheses were the following assumptions:

Assumption 1: Mainstream media is not targeted to Latinos.

Assumption 2: Latinos will not identify with content that is not targeted to them.

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[40] Ideally, I would have also controlled for cervical cancer diagnosis and overweight status in predicting the effects on HPV/cervical cancer knowledge and weight loss attempts, respectively. Unfortunately, data about cervical cancer diagnosis and BMI were unavailable for respondents interviewed in Spanish in ANHCS, so I could not control for relevant health factors in the HPV/cancer knowledge and dieting to control weight outcome tests.

Assumption 3: Spanish-language media is by nature targeted to Latinos; however, HAL will be minimally exposed to such content.

Given these assumptions, the following hypotheses were proposed. I was unable to test H5 and H6 using ANHCS data because language of health-related seeking was available only for LAL, not HAL. I was unable to test H5 using Pew data because there were no NHW in the sample.

H5: Health-related media exposure will have a stronger association with health behaviors and knowledge for NHW compared with highly-acculturated Latinos, controlling for demographics, diagnosis, and language of exposure.

H6: Health-related media exposure will have a stronger association with diabetes knowledge for less-acculturated Latinos compared with highly-acculturated Latinos, controlling for demographics, personal diagnosis of diabetes, and language of exposure.

More specifically, I expected the following:

H5a: Among HAL who report exposure to mostly English-language health content, exposure will be less strongly associated with outcomes than among NHW who are exposed to health content. *(Not testable, given data)*

H5b: Among HAL who report equal exposure to Spanish- and English-language health content, exposure will be equally associated with outcomes compared with NHW who are exposed to health content. *(Not testable, given data)*

H5c: Among HAL who report exposure to mostly Spanish-language health content, exposure will be equally associated with outcomes compared with NHW who are exposed to health content. *(Not testable, given data)*

H6a: Among LAL who report exposure to mostly Spanish-language health content, or to English and Spanish content equally, exposure will be more strongly associated with outcomes compared with LAL who report exposure to mostly English-language health content. *(Testable)*

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H6b: Among LAL who report exposure to mostly Spanish-language health content

exposure will be more strongly associated with outcomes compared with HAL who report

exposure to mostly English-language health content. *(Testable)*

Methods

This study used data from ANHCS and Pew to demonstrate how ethnicity and

acculturation interact with health information exposure to influence health behaviors and/or

determinants of behavior[41]. In particular, this study was concerned with the association of

media exposure with the health behaviors and knowledge of highly-acculturated Latinos,

because of the prevailing failure of health communicators to distinguish this group from NHW or

less-acculturated Latinos. Pilot testing of hypotheses 1 and 2 using Pew, HINTS 2005, and ANHCS

data did not provide compelling evidence in support of these hypotheses (Chapter 4). However,

they did suggest possible theoretical and methodological explanations that I sought to address

in this study. First, I tried to include more specific exposure measures. This was possible using

ANHCS data, where health information seeking measures were selected instead of general

health exposure. Additionally, I wanted to address the possibility that the threshold I had set,

behavior change, was too high an outcome to expect from information exposure. I did this by

including two knowledge outcomes, as described below. In this chapter, I report results of

interaction effects testing (hypotheses one through four and six) of Latino ethnicity and

acculturation on:

    a.   The association of non-clinical health information seeking (from television,

        newspapers, general magazines and newsletters, health-specific magazines and

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[41] HINTS data were not used because pre-testing indicated insufficient power to detect effects (Chapter 4).

newsletters, and the internet) with dieting, exercise, and eating fruit and vegetables, using ANHCS data.

b. The association of non-clinical health information seeking (from television, newspapers, general magazines and newsletters, health-specific magazines and newsletters, and the internet) with knowledge of the link between HPV and cervical cancer, using ANHCS data.

c. The association of non-clinical health information exposure (from television, radio, newspaper health sections, and the internet) with knowledge about diabetes, using Pew data.

Measures

Five outcome variables, three health behaviors and two health knowledge items, were selected for analysis. The behaviors were selected because they represent healthy lifestyle and cancer prevention behaviors that have been negatively associated with acculturation (Karas, Montez & Eschbach, 2008). The knowledge items were included for two reasons: first, as described above, and as a result of the pilot testing, because it is easier to detect media effects on determinants of behavior than on ultimate behaviors on the assumption that effects on behavior work through those determinants. In addition, the knowledge items selected are about health issues that disproportionately affect Latinos (Healthy People 2010), but knowledge about the topics has been negatively associated with Latino ethnicity (cf. Tiro, Meissner, Kobrin, & Chollette, 2007).

Exercise (0-7 days). Exercise was measured with two complementary questions: "During an average week are you able to exercise at least once per week?" [Yes/No]. If yes, respondents were asked "During an average week, how many days do you exercise?" and were given the

chance to type in a number between zero and seven. Responses to the two questions were merged: "No's" on the first question were coded as zero.

Fruit and vegetable consumption (0-10 servings/day). Fruit and vegetable consumption was assessed through two parallel questions: "In the past week, on average, how many servings of fruit did you eat or drink per day? Please include 100% fruit juice, and fresh, frozen or canned fruits." "In the past week, on average, how many servings of vegetables did you eat or drink per day, not counting potatoes? Please include green salad, 100% vegetable juice, and fresh, frozen or canned vegetables." Six response options were provided for each question, from "Less than one serving per day" to "5 or more servings per day." The response options were treated as interval-level variables, with the first treated as .5 and five or more servings per day treated as five. Responses for the two questions were summed for a final variable with a range zero to 10.

Dieting to control weight (yes/no in the past month). Dieting was measured by a dichotomous question: "During the past 30 days, have you controlled your diet to lose weight?" [Yes/No]. Dieting to lose weight is recommended only for people who are overweight or obese, therefore this outcome is relevant only for those who have a Body Mass Index (BMI) greater than 24.9 (NHLBI, 1998). However, BMI was not available for the Spanish-responding sample in ANHCS, so it was not possible to filter the sample by need to diet.

Knowledge about cervical cancer (correct/incorrect). A single multiple-choice question asked, "Which one of the following is most likely to be associated with an increased risk of cervical cancer?" Response options were: human papilloma virus, or HPV, the sexually transmitted virus that causes genital warts (correct); one or more abortions; high blood pressure; a history of obesity; breastfeeding one or more children; don't know. The correct response was coded one; all others were coded zero.

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Knowledge about diabetes (index of correct answers; 0-8). An index of diabetes knowledge with a range of 0 to 8 was created by summing responses to the following questions. Correct responses were given a value of one; incorrect, refused, and don't know responses were coded 0. (1-4)"As far as you know, are any of the following a symptom of diabetes? Would you say that [frequent urination/increased fatigue/excessive thirst/blurry vision] is a symptom of diabetes?" [Yes/No]; (5) "As far as you know, is there a cure for diabetes, meaning that there is a medicine or a treatment that can permanently fix it?" [Yes/No]; (6) Once someone has been diagnosed with diabetes, do you happen to know whether there are effective treatments that will significantly reduce the chances of blindness, death or other serious complications? Would you say…[Yes, there are effective treatments/No, there are not effective treatments]."; (7) What's more helpful in preventing diabetes? [Avoiding all sugar, or Maintaining a healthy weight]; (8) If none of your relatives has a history of diabetes, do you have a risk of getting it yourself? [Yes/No].

Below is a summary of the independent, moderating, and control variables that are fully described in Chapter 2, and a full description of the control variables that are introduced for the first time in this study.

Independent variables, ANHCS. Three different sources for health information seeking were tested separately as independent predictors of health behaviors: print, television, and the internet. Print consisted of a variable combining responses to questions about seeking from newspapers, general-interest magazines, and health magazines/newsletters: respondents who sought from at least one of those sources were counted as having sought from print. A fourth variable, combining responses to each of the above sources, was created, such that respondents who sought from at least one of above sources (print, television, and the internet) were counted

as having sought health information from the media. This was done to provide a summary version of the effects.

Independent variables, Pew. Four different sources for health information exposure were tested separately as independent predictors of health behaviors: television, radio, newspapers, and the internet. As above, a fifth variable was created for summary purposes: all respondents who reporting having obtained health information from any of the above sources were counted as having obtained health information from the media.

Moderating variables, ANHCS. The same variable used in Study 1 was used here. Language of interview was used as a proxy for acculturation. A three-category variable combining acculturation and ethnicity was created such that comparisons were between English-speaking Latinos, Spanish-speaking Latinos, and Non-Hispanic Whites. Latinos who responded in English are considered more acculturated than those who responded in Spanish. These categories were dummy-coded for use in models with distinct comparison objectives.

Moderating variable, Pew. The hypothesized moderating variable in the Pew data was acculturation, using language of interview as the proxy for behavioral acculturation.

Control variable: Diabetes Diagnosis, Pew. Respondents were asked whether they had ever been diagnosed with diabetes or high blood sugar. Eighteen percent (17.9%) of HAL and fifteen percent (15.0%) LAL responded affirmatively.

Control Variable: Language of Exposure, Pew. Following each media exposure question, respondents who answered that they had looked for health information from that source were asked, "Was that information mainly in Spanish or in English or in both languages?" Response

choices were Spanish, English, or Both. I dichotomized these variables by combining "Spanish" and "Both" responses.

Interaction terms. Interaction terms were created to test the moderating hypotheses. These terms were composed of each exposure variable multiplied by the dummy codes for the ethnicity/acculturation term in ANHCS and the acculturation variable in Pew. All terms used in the interactions were dichotomous, so no centering was necessary (Aiken & West, 1991).

Analytic Approach

To test the first pair of hypotheses, a series of OLS regression models was run, where the outcome variables were exercise, fruit and vegetable consumption, and knowledge about diabetes; the main independent variable was information seeking from a specific source; and the moderating variable was ethnicity or acculturation, depending on the comparison. Logistic regression models were run for two dichotomous outcomes: knowledge about cervical cancer and dieting behavior, with the same independent and moderating variables.

The specific source considered the independent variable (and its interaction with ethnicity/acculturation) varied in each model, such that there were 8 sets of comparisons for each outcome variable in ANHCS (1 model per independent variable, repeated for NHW/HAL and HAL/LAL comparisons, per outcome) and 5 sets of comparisons for the Pew outcome variable (1 model per independent variable).

The procedure described above was repeated to test H3 and H4, with the addition of the control variables. H3 and H4 were tested only for those models in which H1 or H2 were at least marginally supported ($p<0.10$). The approach for testing H6a and H6b was different since the hypotheses focused on comparisons of specific subgroups.

To test H6a, I looked only at LAL who reported looking for health information from each of the four sources (radio, television, newspapers/magazines, and the internet). Since language of exposure was assessed by media source, and asked only of those who responded that they had looked for health information from that source, I did not have a language of exposure variable for all media. I ran OLS regression models predicting diabetes knowledge from language of exposure to each source (where Spanish=1) and the control variables (age, gender, education, income, and diabetes diagnosis). Since all respondents in these models were exposed to health information, there was no language by exposure interaction term: To determine the effects of language of exposure, I simply looked at the coefficient of the main effect of language of exposure.

To test H6b, I created an interaction term consisting of the dichotomized language of exposure variable multiplied by acculturation. The product of these variables may be interpreted as follows: 1=LAL exposed in Spanish and 0=HAL exposed in English, HAL exposed in Spanish or English/Spanish equally, and LAL exposed in English. It was important to separate HAL exposed in English from those exposed in English and Spanish equally because the underlying logic of the hypothesis has to do with targetedness of content: any Spanish exposure could be perceived as targeted, rendering interpretation of any effects impossible. I ran OLS regression models predicting diabetes knowledge from acculturation, language of exposure to a specific source, the interaction of acculturation and language of exposure, and the control variables. As with H6a tests, these models included only respondents who reported having been exposed to the source at all.

STATA 10 was used for analysis (StataCorp, 2007). Regression assumptions were tested using diagnostic procedures for OLS models[42] (Fox, 1991). Violations of the linearity assumption were resolved through transformations of the independent variable (Kleinbaum, Kupper, Muller & Nizam, 1998). Robust standard errors were used to mitigate the effects of other violations of regression assumptions on significance testing (Acock, 2008; Allison, 1999).

A note about statistical power to detect moderation effects

Statistical power is a particular concern when testing for moderating effects in observational data, in contrast to controlled experiments. McClelland and Judd (1993) describe several theoretical and empirical reasons for this limitation; I briefly elaborate one fundamental reason here, the joint distributions of the independent and hypothesized moderating variables, following Yzer (2007). McClelland and Judd (1993) found through simulation that the power to detect interaction effects strongly depends on the number of jointly extreme distributions. In

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[42] Accurate results from OLS regression equations rely on the satisfaction of several regression assumptions: (1) linearity; (2) mean independence; (3) homoskedasticity; (4) uncorrelated error; and (5) normality of error (Allison, 1999). Of these, the least important for large sample sizes such as those tested in this study is the assumption of normality of error (Allison, 1999); as such, that assumption was not tested. Moreover, robust regression in Stata does not assume normality of error (Acock, 2008). The fourth assumption, uncorrelated error, is difficult to diagnose and would be most likely a problem with over-time data or data collected through cluster sampling (Allison, 1999). This assumption was not formally tested; however, the effect of this violation is incorrect estimation of the standard errors of the b coefficients, and is resolved through the use of robust regression (Allison, 1999). The third regression assumption, homoskedasticity, was tested using the Breusch-Pagan/Cook-Weisberg test (Breusch & Pagan, 1979; Stata, 2007). A p-value smaller than 0.05 indicates significant heteroskedasticity of variance. It is sometimes possible to resolve issues of heteroskedasticity by resolving linearity violations (Allison, 1999). However, the majority of the models tested demonstrated a violation of this assumption, even after testing for and resolving problems with linearity. Once again, robust regression was used to mitigate concerns about this violation (Allison, 1999). Allison (1999) argues that heteroskedasticity is a minor problem because "it has to be pretty severe before it leads to bias in standard errors" (p. 128). Finally, the assumption of linearity was tested by running nested regression models successively including squared and cubed transformations of the three interval-level independent (control) variables (age, education, income). Where the addition of the transformed variable resulted in a model with improved predictive power (e.g., the change in R-squared was significant), that term was added to the final model. In most models, age had a non-linear relationship with the outcome, so the squared term was included.

experimental settings, individuals are assigned to conditions that generally result in approximately equal distributions in each cell of a two-factor experiment, including the extreme categories. Such distributions are crucial to establish that there is sufficient statistical power, inasmuch as they are responsible for reducing the standard errors around the product terms. In contrast, in observational studies, the natural joint distribution of the variables of interest is much less likely to be extreme. In their simulations, McClelland and Judd found that, where all else was equal between the experimental and observational studies, experiments will have more statistical power to detect effects. McClelland and Judd conclude with an observation that the odds are against finding interaction effects in observational data, pointing to evidence from their simulations, in which 91% of the observational tests committed Type II errors by incorrectly failing to reject the null hypothesis.

One warning the researchers give to observational researchers is to avoid artificially creating the necessary distributions by manipulating the data through median splits, or by reducing the number of categories available. Instead, they propose the following alternatives: (1) increase sample size (this is impractical at best and not feasible when conducting secondary data analysis); (2) accepting higher levels of Type I error (again, impractical as this is unlikely to be accepted by reviewers; in this study, p-values of 0.06 to 0.1 were considered marginally significant); and (3) to oversample extreme observations to ensure that the joint distributions come close the optimal design (this is their preferred, albeit imperfect, recommendation; it is again not feasible when conducting secondary analysis of existing data). I thus began this study wary of the likelihood of finding effects.

Results

H1, H2: Do the effects of health information exposure on behavior and knowledge vary by ethnicity and acculturation?

Overall, the pattern of findings failed to support H1, differences between NHW and HAL, and only marginally supported H2, differences between HAL and LAL, with a strong caveat about the trustworthiness of the LAL seeking reports that was discussed in Chapter 3. Below I review the results of each test, by outcome. Full results are presented in Table 5.1.

Exercise. There were no significant interactions of health information seeking from any single media source by ethnicity on frequency of exercising. When seeking from all media sources was considered a single independent variable, the interaction with acculturation was significant. The effects of seeking from any source were greater among LAL than among HAL (b=0.63, p<0.05).

Fruit & Vegetable Consumption. The joint effect of information seeking from print sources and ethnicity was marginally significant, with NHW who sought from print sources report eating about one-quarter fewer servings of fruits and vegetables than HAL (b=0.25, p<0.10), indicating marginal support for H1. Among Latinos, the joint effect of seeking from the internet and acculturation status on fruit and vegetable consumption was marginally significant (b=-0.46, p<0.10). LAL who sought from the internet reported nearly one-half fewer servings of fruits and vegetables per day compared with HAL internet seekers.

Dieting. There were no significant interaction effects of ethnicity and information seeking from media sources on dieting to control weight. However, among Latinos, the interactions of acculturation and television seeking and acculturation and print sources were marginally significant, indicating that LAL had roughly 60% higher odds of having dieted (television: OR=1.58, p<0.10; print: OR=1.60, p<0.10). When all media were considered together, LAL

seekers were three times as likely as HAL who sought from any media to report having dieted in

the past month (OR=3.06,p<.01).

HPV/Cervical Cancer Knowledge. The effects of seeking from any media source did not differ by

ethnicity or acculturation.

Diabetes Knowledge. There were no joint effects of acculturation and health information

exposure on diabetes knowledge.

Table 5.1. Joint Effects of Information Exposure and Ethnicity/Acculturation on Health Behaviors and Knowledge.

		Data Set (analyzed N)	Statistic	LAL	NHW
				Comparison: HAL	
Exercise (0-6 days)	Print Sources	ANHCS (9507)	b / 95% CI	0.40 (-0.05,0.85)	-0.14 (-0.42,0.14)
	Television	ANHCS (12,243)	b / 95% CI	0.37 (-0.14,0.89)	-0.07 (-0.39,0.25)
	Internet	ANHCS (9479)	b / 95% CI	0.04 (-0.42,0.50)	-0.10 (-0.42,0.21)
	All Media	ANHCS (12,243)	b / 95% CI	**0.63*** (0.10,1.17)	-0.13 (-0.39,0.14)
Fruit & Vegetable Consumption (0-10 servings/daily)	Print Sources	ANHCS (12,208)	b / 95% CI	0.29 (-0.23,0.82)	0.25† (-0.04,0.55)
	Television	ANHCS (9479)	b / 95% CI	0.18 (-0.38,0.73)	0.01 (-0.32,0.34)
	Internet	ANHCS (9454)	b / 95% CI	-0.46† (-0.97,0.05)	-0.02 (-0.34,0.30)
	All Media	ANHCS (12,208)	b / 95% CI	0.00 (-0.72,0.72)	0.15 (-0.12,0.42)
Dieting to Lose Weight (Yes/No)	Print Sources	ANHCS (12,449)	OR / 95% CI	1.60† (0.99,2.59)	0.89 (0.68,1.16)
	Television	ANHCS (9709)	OR / 95% CI	1.58† (0.95,2.62)	0.88 (0.66,1.19)
	Internet	ANHCS (9677)	OR / 95% CI	1.09 (0.69,1.70)	1.11 (0.83,1.48)
	All Media	ANHCS (12,449)	OR / 95% CI	**3.06**** (1.51,6.22)	0.96 (0.75,1.23)
Knowledge of HPV/Cervical Cancer Link (Correct/Incorrect)	Print Sources	ANHCS (12,433)	OR / 95% CI	0.93 (0.58,1.49)	1.05 (0.81,1.36)
	Television	ANHCS (9701)	OR / 95% CI	0.94 (0.57,1.53)	0.92 (0.69,1.24)
	Internet	ANHCS (9038)	OR / 95% CI	0.65† (0.41,1.01)	1.20 (0.89,1.60)
	All Media	ANHCS (11,786)	OR / 95% CI	0.72 (0.39,1.34)	0.96 (0.74,1.23)
Diabetes Knowledge (0-8 correct answers)	Print Sources	Pew (3989)	b / 95% CI	-0.15 (-0.43,0.14)	--
	Radio	Pew (3993)	b / 95% CI	0.12 (-0.17,0.41)	--
	Television	Pew (3994)	b / 95% CI	0.06 (-0.25,0.36)	--
	Internet	Pew (3988)	b / 95% CI	-0.18 (-0.47,0.11)	--
	All media	Pew (4013)	b / 95% CI	-0.35 (-0.78,0.08)	--

Note. † indicates p<0.10, * indicates p<0.05, ** indicates p<0.01.

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H3, H4: Do the effects of health information exposure on behavior and knowledge vary by ethnicity and acculturation, controlling for demographics?

I tested H3 and H4 only for those equations where there were at least marginally significant (p<0.10) uncontrolled interaction effects. The results were mixed: the effects of health information seeking from media on exercise and dieting appear to differ across Latino acculturative subgroups, even after controlling for demographics. However, there was no evidence that NHW and HAL respond differentially to health information exposure. All significant interaction effects on fruit and vegetable consumption became non-significant once demographic controls were added. The results are detailed in Table 5.2, and I describe them below by outcome.

Exercise. The interaction of acculturation and media seeking remained significant after controlling for demographics (b=0.70, p<0.05).

Fruit and Vegetable Consumption. Neither acculturation nor ethnicity interacted with health information seeking to influence fruit and vegetable consumption.

Dieting. There is consistent evidence that LAL are more likely than HAL to diet as a result of information seeking from various media. LAL who sought from either television or print sources are seventy percent more likely than HAL television or print seekers (television seeking: OR=1.70, p<.05; print seeking: OR=1.68, p<0.05) to diet. When seeking from any media source is considered, the size of the difference is much greater: LAL seekers are nearly three and a half times (OR=3.34, p<.001) as likely as HAL to report dieting to control their weight.

Table 5.2. Joint Effects of Information Exposure and Ethnicity/Acculturation on Health Behaviors and Knowledge, Controlling for

Demographics.

	Exercise (0-7 days)	Fruit & Vegetable (0-10/day)			Dieting (Yes/No)		
	All Media	Print	Internet	Television	Print	All Media
	b	b	b	OR	OR	OR
Ethnicity *(1=NHW)*	0.13	**-0.22****	-0.16	0.91	0.93	0.88
Acculturation *(1=LAL)*	**-0.58****	0.05	**0.70*****	0.76	0.76	**0.42****
Health Seeking	**0.37****	**0.34***	**0.36***	**1.81*****	**1.89*****	**1.58*****
Ethnicity*Seeking	-0.12	0.20	0.02	0.89	0.86	0.97
Acculturation*Seeking	**0.69****	0.37	-0.34	**1.70***	**1.68***	**3.34*****
Age	**-0.16*****	**-0.04*****	**-0.03*****	1.00	**1.00***	1.00
Female	**-0.11****	**0.60*****	**0.60*****	**1.74*****	**1.77*****	**1.75*****
Education	**-0.57*****	**-0.66*****	**-0.52*****	**1.03*****	**1.03*****	**1.03*****
Income	0.00	**0.00*****	**0.00****	**1.00*****	**1.00*****	**1.00*****
Has Diabetes/ Cervical Cancer	--	--	--	--	**--**	--
N	12,243	12,208	9,454	9,706	12,449	12,449
R^2 / Psedo R^2	0.04	0.07	0.06	0.00	0.03	0.03
F / LR Chi^2	35.43	77.64	54.56	411.00	556.54	530.56

*Note. † indicates p<0.10, * indicates p<0.05, ** indicates p<.01, *** indicates p<.001.*

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H6a: Among exposed LAL, are the effects of health information exposure stronger for those who were exposed primarily to Spanish-language or equally to English- and Spanish-language sources, compared with those who were exposed to mostly English-language sources?

As expected, most LAL chose health information sources mostly in Spanish. Half to two-thirds of LAL reported obtaining health information from radio, television, and newspapers exclusively in Spanish. Twenty-eight percent (27.7%) reported using the internet for health in Spanish only, and another forty-four percent (43.6%) used the internet for health equally in Spanish and English (Table 5.3). Thus, the variable comparing language of exposure is not equally distributed (skewed in the direction that would be expected), a fact that may have some bearing on the results of the hypothesis testing.

Table 5.3 Distribution of Health Information Exposure by Language and Acculturation.

			%	
			HAL	**LAL**
			N=1041	**N=2972**
Radio	Spanish		9.33	67.76
		n	*35*	*849*
	Equal		28.00	25.14
		n	*105*	*315*
	English		62.67	7.10
		n	*235*	*89*
Television	Spanish		6.75	58.46
		n	*46*	*1213*
	Equal		29.22	32.63
		n	*199*	*677*
	English		64.02	8.92
		n	*436*	*185*
Newspaper	Spanish		3.67	47.66
		n	*23*	*652*
	Equal		20.77	34.8
		n	*130*	*476*
	English		75.56	17.54
		n	*473*	*240*
Internet	Spanish		4.08	27.66
		n	*23*	*174*
	Equal		17.55	43.56
		n	*99*	*274*
	English		78.37	28.78
		n	*442*	*181*

The controlled analyses predicting the effects of language of exposure on knowledge about diabetes show no evidence in support of the hypothesis. None of the coefficients of language of exposure are significant (Table 5.4). Moreover, none of the coefficients are large or even moderate, relative to the coefficients of the control variables. This suggests that even though it is possible that the study was under-powered, it is likely that even if they exist, the effects of language of interview for LAL who already claim to be exposed to health information from media are not strong.

Table 5.4. Effects of Language of Information Exposure on Diabetes Knowledge among Less-

Acculturated Latinos, Controlling for Demographics and Diabetes Diagnosis.

		Diabetes Knowledge (0-8 correct)		
	Radio	Television	Print	Internet
	b	b	b	b
Language of Health Exposure	0.00	-0.01	-0.03	-0.06
Age	0.04	**0.78*****	**0.74*****	**0.73****
Age (squared)		**-0.80*****	**-0.74*****	**-0.75*****
Female	**0.14*****	**0.12*****	**0.10*****	0.07
Education (Number of years)	**0.06***	**0.10*****	**0.09****	0.08
Income	**0.27****	0.03	0.00	0.00
Income (squared)	**-0.23***			
Has Diabetes	**0.11*****	**0.13*****	**0.13*****	**0.12*****
N	1029	1678	1132	524
R^2	0.05	0.07	0.06	0.05
F	**8.97*****	**19.87*****	**11.48*****	**5.35*****

Note. [†] *indicates p<0.10, * indicates p<0.05, ** indicates p<.01, *** indicates p<.001.*

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H6b: Among those exposed to health information from the media, are the effects of health information seeking stronger for LAL who were exposed primarily to Spanish-language or equally from English- and Spanish-language sources, compared with HAL who were exposed only to English-language sources?

I expected to find that HAL who were exposed to health information from the media primarily in the English language (that is, through non-targeted, mainstream, content) would learn less from that exposure compared with LAL who were exposed to health information from the media in their own language, which would be inherently targeted to them. In this hypothesis, language of exposure was a presumed proxy for targetedness of content.

Results show exactly support for the hypothesized pattern for seeking from radio, television, and print sources, and the opposite of the hypothesis for internet seeking. However, none of the tests were statistically significant (Table 5.5).

An alternate ideal test of this hypothesis would have been to compare the effects of language of exposure among HAL only; however, there were too few HAL who reported exclusive health-related exposure in Spanish to conduct any meaningful analyses (Table 5.3). Therefore, I conducted an additional test of this hypothesis by comparing the effects of language of exposure only on less-acculturated Latinos. I considered only those who reported all-Spanish or all-English exposure, so as to avoid the potential confounding role of exposure in the other language. Again, none of the results were significant (data not shown).

Table 5.5. Joint Effects of Language of Exposure and Acculturation on Diabetes Knowledge, Controlling for Demographics and Diabetes Diagnosis.

	Radio		Television		Print		Internet	
	HAL English Exposure	LAL Spanish Exposure	HAL English Exposure	LAL Spanish Exposure	HAL English Exposure	LAL Spanish Exposure	HAL English Exposure	LAL Spanish Exposure
Mean Knowledge Score	4.22	4.30	4.04	4.11	4.27	4.31	4.47	4.32
95% CI	(3.56,4.89)	(3.77,4.82)	(3.51,4.56)	(3.69,4.54)	(3.70,4.81)	(3.83,4.79)	(3.77,5.17)	(3.69,4.94)
F	0.22		0.37		0.11		1.30	

Limitations and Discussion

Limitations

Although there was some evidence of differential media effects by acculturation, these

results should be interpreted with caution. There was underwhelming evidence of support for

the hypotheses proposed, and several of the proposed hypotheses were unable to be tested

due to data limitations. Additionally, given the many tests performed, it is possible that those

results that were marginally statistically significant are in fact the result of chance.

The lack of strong support for my hypotheses may be attributable to a number of

methodological and conceptual limitations. First, it is possible that the exposure measures are

not sensitive enough to capture important but subtle differences in knowledge and behaviors

gained from exposure. This study used mostly seeking measures (from ANHCS data), which are

more specific than the general health information exposure measures tested in the pilot studies

as an improvement in specificity from those tests. However, the general nature of the type of

seeking (e.g., "health information" broadly, as opposed to seeking about a specific topic) may

not have been sensitive enough to influence specific behavioral and knowledge outcomes. In

other words, the failure to find significant effects may be a function of a lack of correspondence

between the independent and dependent variables (Fishbein & Azjen, 1975). Perhaps most

importantly with regards to the hypotheses tested herein, the concern described in Chapter 3

about the possible misinterpretation of the seeking measure in the Spanish-language version of

the questionnaire poses a severe problem.

A related limitation relates to the outcomes selected: although behavioral change is the

ultimate outcome of interest, and studies have demonstrated effects of information seeking on

these outcomes (Kelly et al., 2010; Ramírez et al., 2009), these documented effects are not very

large. It is possible that they are not large enough to be detected in an interaction analysis because of the complex nature of the influence of exposure on behavior, which has many mediators. It is possible that intermediate outcomes such as attitudes and perceived norms may be differentially influenced by media exposure. This alternative is unfortunately not testable in the dissertation using the data available in ANHCS or Pew. Two knowledge outcomes were added to mitigate this limitation; that they were not differentially influenced by ethnicity/acculturation further suggests caution in interpreting the few significant interactions that were found.

Additionally, because it was not possible to control for Body Mass Index (BMI) in this study, there exists the possibility that differences in BMI by acculturation may account for the observed difference in dieting behavior (that is, it is possible that LAL are on average heavier and thus should be dieting more than HAL). To mitigate this concern, I considered whether differences in BMI existed by acculturation using an alternate national data set, the National Cancer Institute's Health Information National Trends Survey (HINTS). The mean BMI is nearly identical for the two groups: HAL, 27.3 [95% CI: 26.5, 28.1]; LAL, 26.9 [95% CI: 26.2, 27.6]. Although this may not be the case in ANHCS, the possibility seems remote.

Discussion

In spite of the limitations described above, this study did provide some evidence in support of my hypotheses, which with caution can be used to make preliminary claims about the joint effects of health-related information exposure and acculturation.

There is evidence in support of an interactive effects hypothesis on dieting and exercise. Compared with highly-acculturated Latinos, less-acculturated Latinos who report seeking from television, print, or all media sources are sixty to ninety percent more likely to report dieting, controlling for demographic confounders. Less-acculturated Latinos who seek from print or all

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media also exercise more than highly-acculturated Latino seekers. In setting forth these hypotheses, I argued that the mechanism for these effects is that HAL are going to obtain less useful information from media, because the English-language sources from which they seek do not include information that is targeted to them and therefore is not perceived as relevant, compared with LAL, who obtain information from Spanish-language sources that may be considered inherently targeted. In light of these results, one lesson for health communicators is that care must be taken to ensure that information is perceived as relevant for all target audiences. Either "mainstream" media messages must include Latinos explicitly, or separate, specific messages for Latinos should be created.

But, why was there no support for my hypotheses across the other outcomes: fruit and vegetable consumption, HPV/cancer link knowledge, or diabetes knowledge? It seems that the nature of the content must be examined to understand the reason for the effects.

Understanding the specific content is important also to decipher the influence of language of information exposure on knowledge. I am surprised by the results of hypothesis H6a, that Spanish-language exposure is not more influential than English-language exposure among exposed LAL. Setting aside a likely methodological explanation (insufficient statistical power), there may be something unique about LAL who are proficient enough in English to turn to English-language sources for health information. For example, these truly bilingual individuals may be able to navigate the English-language world of health information with enough dexterity to find information that is relevant to them, ultimately "matching" the targetedness of the information that Spanish-dominant LAL obtain from Spanish sources.

Similarly, the results of H6b showing the inverse relationship of the hypothesis suggest that HAL managed to find information that they perceived as relevant to them in the English-language content. It would be interesting to test this explanatory hypothesis using active

seeking as the independent variable (as opposed to the health "exposure" variables in Pew): if

we could test whether Latinos who actively sought information preferred English or Spanish

sources, we could better understand whether indeed ethnically targeted content (again, using

language of the source as a proxy for targetedness) was perceived as more relevant – and

thereby more influential – than non-targeted content.

In summary, these results raise more questions than they answer about the

effectiveness of targeted health information. Ultimately, it is possible that there is something

about the content other than ethnicity-based targeting that influences receptivity, and that

factor is differentially activated in some cases by acculturation status.

Taken together, the results of the hypothesis tests in this study failed to provide

compelling support for the primary underlying argument of this dissertation, which is that

information exposure affects NHW and HAL differentially. The differences observed between

HAL and LAL are interesting, but, as discussed above, are not only inconsistent, but also severely

limited by methodological problems with measurement of the independent variable. It is

tempting, then, to conclude that the original hypothesis regarding ethnicity-based

interpretation differences must be rejected. Although it is certainly possible that ethnicity does

not influence media effects, I am not convinced that this study provides sufficient evidence to

reject a hypothesis that has such potential importance. The hypotheses proposed herein were

perhaps not best tested with survey data, given both the nature of the hypotheses (e.g.,

fundamentally having to do with message effects) and the methodological difficulty in testing

moderation effects using observational data. In the next chapter, I present the final study of this

dissertation, an experiment designed to test the effectiveness of targeted messages explicitly.

This study was designed to resolve some of the unanswerable questions raised in study 2, which

relied on secondary data analysis, with self-reported exposure and incomplete characterization

of that exposure.

Chapter 6: Study 3: Exposure to general-market versus ethnically targeted health messages affects perceived effectiveness differentially by acculturation and ethnicity, Experimental Study

In this chapter, I report on results of study three[43], which examined how ethnicity and acculturation interact with exposure to messages that differ in their ethnic targetedness in their effects on perceived effectiveness of the messages. The purpose of this study was to provide evidence about ethnicity-based targeting of health messages. This study is a conceptual extension of the research questions explored in study two, using experimental methods to test outcomes of exposure to specific messages. The underlying mechanism of effects is identification with the message.

Given the argument advanced in this dissertation, that ethnicity-based targeting must mean more than simply translating into Spanish if health promotion messages are to be effective for all Latinos, this study focused on differential reactions to general-market and Latino-targeted messages between NHW and HAL. Less-acculturated Latinos, up to now defined as those whose primary language is Spanish, were not included in this study because targeted campaigns that exist already reach out to this group. Moreover, the underlying argument I advance has to do as much with exposure and attention as with message processing: English-speaking Latinos and NHW, as established in study 1, are likely to be exposed to the same information, while Spanish-speaking Latinos inhabit a unique media world that overlaps little with HAL and NHW. The model of effects tested in this study is illustrated in Figure 6.1.

Fig. 6.1. Study 3 Model of Effects.

```
        ┌─────────────────────────────┐
        │   Ethnicity / Acculturation │
        └──────────────┬──────────────┘
                       │
                       ▼
        ┌─────────────────────────────┐
        │       Identification        │
        └──────────────┬──────────────┘
                       │
┌──────────────────────────────┐   ▼   ┌──────────────────────────────────┐
│  Exposure to Health Message  │──────▶│  Health Behaviors / Determinants │
└──────────────────────────────┘       └──────────────────────────────────┘
```
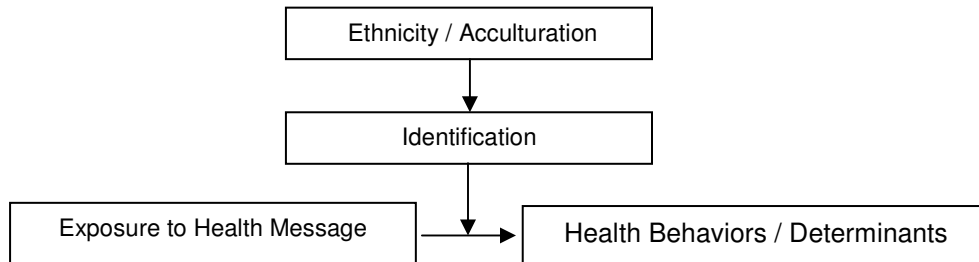
This study sought to answer three research questions; specific hypotheses are elaborated in the next section.

Research Question 1: Are general-market messages less effective for highly-acculturated Latinos compared with NHW?

Research Question 2: Are ethnically-targeted messages more effective than general-market messages for highly-acculturated U.S. Latinos?

Research Question 3: Does identification mediate the relationship between message exposure and perceived effectiveness?

Hypotheses

Two related sets of hypotheses about message effectiveness were tested. First, the relative effectiveness of general-market and Latino-targeted messages between NHW and HAL was established. This analysis is crucial for establishing that a general-market approach to communicating health information is differentially effective for NHW and Latinos. I hypothesized the following:

H1: The general-market message will be more effective for NHW than for HAL.

Fig. 6.2. H1.
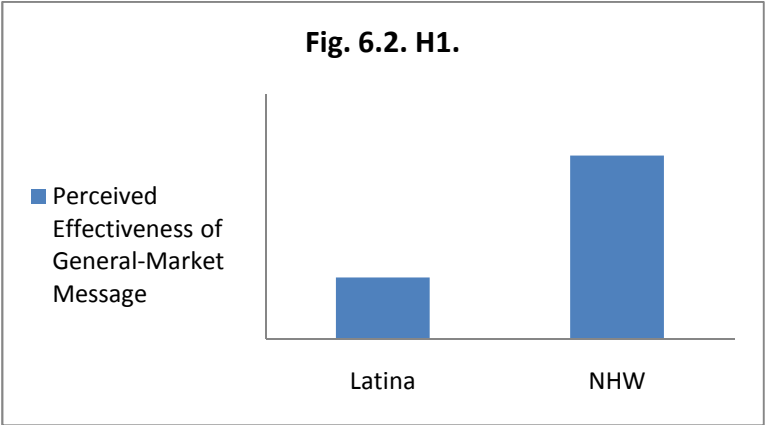
H2: The Latino-targeted message in English will be more effective for HAL than for NHW.

Fig. 6.3. H2.
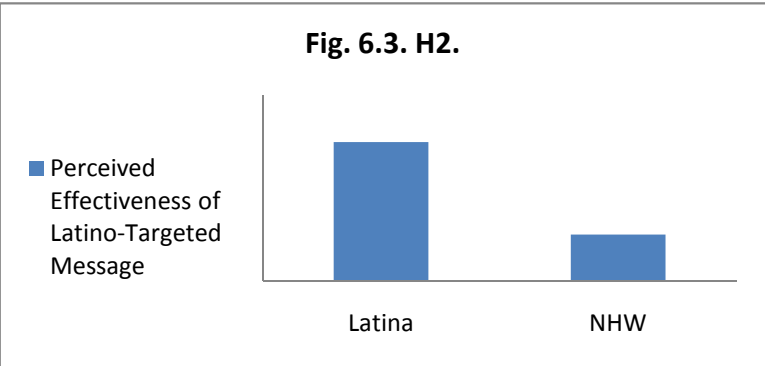
Additionally, I considered the relative effectiveness of differently-targeted messages within each of the stratification groups.

H3: Among HAL, the Latino-targeted message will be more effective than the general-market message.

Fig. 6.4. H3.

■ Perceived Effectiveness Among Highly-Acculturated Latinos

Targeted PSA   Mainstream PSA
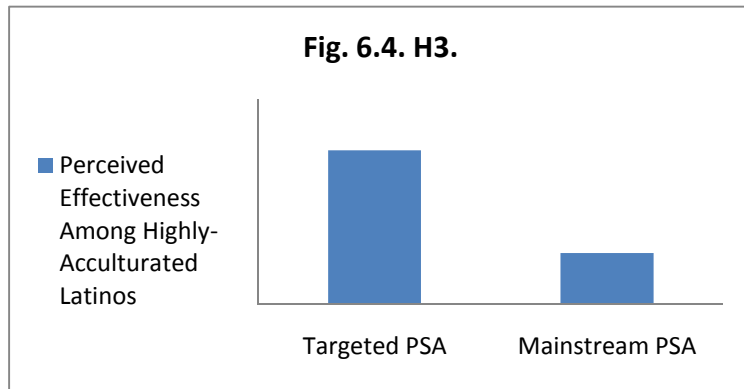
H4: NHW will be more persuaded by the general-market message than by the Latino-targeted message.

Fig. 6.5. H4.

■ Perceived Effectiveness of General-Market Message

Targeted PSA   Mainstream PSA
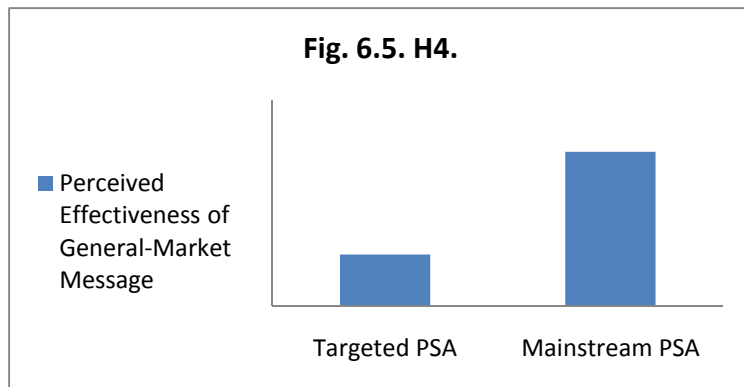
The explanation for the effects of ethnicity-based targeting, or for how acculturation might influence message processing, hypothesized in this study is identification. The model of effects proposed in Chapter 3 posits that identification mediates the relationship between message targetedness and perceived effectiveness, such that Latinas should identify more with, and thereby perceive as more effective, Latina-targeted messages than with general-market messages, and compared with how much NHW identify with Latina-targeted messages. Likewise, NHW should identify more with, and perceive as more effective, general-market

messages than with Latina-targeted messages, and compared with how much Latinas identify

with general-market messages. These hypotheses are formally described below.

H5: NHW will identify more with the general-market message than will HAL.

H6: HAL will identify more with the Latina-targeted message than will NHW.

H7: HAL will identify more with the Latina-targeted message than with the general-

market message.

H8: NHW will identify more with the general-market message than with the Latina-

targeted message.

Hypotheses five through eight are necessary to establish the mediation path; however,

by themselves, they are not particularly instructive, as the PSAs were pre-selected to be

perceived as targeted or not targeted[44]. Expectations regarding mediation effects are stated as

follows:

H9: The relationship between exposure and PE is mediated (at least in part) by

identification with the message, such that:

The mediation path through identification with the message between the interaction

between message targetedness and PE (H1-H4) will be significant.

It is possible that ethnic identification matters only for minority groups because

ethnicity is felt more acutely by members of minority cultures than of majority cultures

(McGuire, 1984; McGuire, McGuire, Child & Fujioka, 1978). If this is the case, hypotheses about

NHW's reactions to Latino-targeted messages will not be supported (i.e., H2, H4), nor will H9 as

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[44] This logic is similar to that of studies using the Elaboration Likelihood Model that test for argument
strength using arguments that have been pre-selected to have strong audience ratings (Petty &
Caccioppo, 1986); however, in this case, the ultimate dependent variable is a persuasion outcome (PE),
and identification is only treated as an intermediate outcome variable to establish the mediation path. I
guard also against a tautology by having used a different sample to establish the targetedness of the
messages that I then selected to use in this study (cf. pre-test procedure, Appendix A).

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it applies to NHW. Such a pattern of effects would not undermine the central argument of this dissertation: that Latinos and NHW are not equally responsive to the same messages. Rather, these results would underscore the argument that Latinos are a unique group with a distinct lived experience of ethnicity compared to NHW (Phinney, 1992).

Design

Study 3 was a 2 (ethnicity) x 2 (message targetedness) between-subjects design, replicated in two experiments for two topics (Pap test and breast cancer) (Table 6.1).

Table 6.1. Research Design.

	General Market		Latino-Targeted (English)	
	Breast Cancer	**Pap Test**	**Breast Cancer**	**Pap Test**
NHW (N=700)	R (n=175)	R (n=175)	R (n=175)	R (n=175)
Highly-Acculturated Latina (HAL) (N=700)	R (n=175)	R (n=175)	R (n=175)	R (n=175)

Subjects were randomly assigned to the general market breast cancer, Latino-targeted breast cancer, general market Pap test and Latino-targeted Pap test conditions; assignment was stratified by ethnicity.

Procedure

To control for the possible effects of gender, and because the public service announcements used as the manipulations were focused on issues relating to women, the sample was limited to females only. The study was conducted online, in English, with Latina respondents characterized as highly-acculturated. The two experiments were run

simultaneously such that within stratification groups (NHW versus Latina), subjects were

randomly assigned to one of four message conditions: general-market Pap smear (n=360),

general-market breast cancer (n=353), Latina-targeted (English-language) Pap smear (n=333), or

Latina-targeted (English-language) breast cancer messages (n=373) (Table 6.2). Randomization

was computed by an algorithm developed by SurveyGizmo based on when respondents clicked

on the survey link. The goal was to achieve 25% of each of the stratification groups in each

condition; that goal was approximately[45] achieved (Table 6.2).

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[45] The randomization appears to have worked in all cases, although a larger number of Latinas were randomized into the targeted breast cancer condition and a smaller number into the targeted Pap condition. More to the point, the differences in the numbers of Latinas randomized across condition do not mean the conditions were biased in some way: analyses show no significant differences in age, education, or income across the conditions (data not shown). This discrepancy is likely the result of the interaction of the SurveyGizmo randomization technology with the email recruitment waves submitted by SSI. The randomization technology, the specific algorithm of which is proprietary and confidential to SurveyGizmo, is based upon the timing of each individual potential respondent: every time an invited respondent clicked on the survey link, she was assigned a condition, even though the majority of those who clicked did not complete the study. Each time a recruitment message was sent out by SSI, there was a resulting wave of hits to the SurveyGizmo website. Overall, it was harder to get Latinas to participate (response rate was 43.76%, versus 51.46%), such that SSI had to send the recruitment message to more of their Latina sample. This resulted in somewhat of an imbalance with regards to the SurveyGizmo randomization technology, which produced a slight imbalance in the randomization targets. This sampling issue is not a problem particular to this study, but rather reflects population differences: it is simply harder to recruit ethnic minority populations (Swanson & Ward, 1995). There is no reason to believe that Latinas intentionally dropped out of the targeted Pap condition more than of the other conditions, since these dropouts occurred prior to the PSAs being shown (e.g., prior to the randomization).

Table 6.2. Randomization Results by Condition.

Condition	NHW	Latina	Total
Mainstream Breast Cancer	184	169	353
	26.1%	*23.6%*	*24.9%*
Mainstream Pap Smear	179	181	360
	25.4%	*25.3%*	*25.4%*
Targeted Breast Cancer	165	208	373
	23.4%	*29.1%*	*26.3%*
Targeted Pap	176	157	333
	25.0%	*22.0%*	*23.5%*
Total	704	715	1,419[46]

Subjects were exposed to a message consisting of a PSA embedded in a newscast. The newscast was selected and downloaded from real local newscasts uploaded to the video-sharing site YouTube (www.youtube.com). Two separate stories were shown, one before the PSA (an older Caucasian male discussing nutrition, shown behind a news desk), and one after the PSA (a young female African-American reporter discussing heart disease, shown outside of an office building). Subjects were informed that the purpose of the study was to study how people react to health information in different formats. Identification (mediator) and perceived effectiveness (outcome) were assessed immediately following exposure, in that order. Subjects were then asked a battery of questions relating to general and health-specific information exposure and personal lifestyle and cancer prevention behavior questions. Demographic information was collected at the end of the experiment. The complete instrument can be found in Appendix C, and a summary of the scripts of the newscasts and PSAs can be found in Appendix D.

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[46] The projected 1500 was not reached because a single pilot study was conducted, and fewer than anticipated cases were sufficient to fulfill the purposes of the pilot.

Sample

Participants were drawn from a national sample panel from Survey Sampling International (SSI) and the experiment was hosted and administered online using Survey Gizmo software (www.surveygizmo.com). SSI was selected for the following reasons: (1) access to a reasonably diverse, if not randomly representative, sample of U.S. residents; (2) immediate fielding and instant data availability, because the investigator controlled the survey instrument and responses come directly to me via Survey Gizmo; and (3) affordability. The sample and procedure (i.e., English-only administration) is meant to be representative of the more-acculturated population, not all U.S. Latinas.

The final analyzed sample includes a total of 1,419[47] subjects, 728 Latina and 691 NHW.

Measures

Subjects were post-tested on identification with the message, which is the hypothesized mechanism of effects.

Subjects were asked to answer basic demographic questions (for Latinas, this included: country of origin, own/parents'/grandparents' nativity, and length of time in U.S., if foreign-born), as well as questions about exposure to general and health-specific media. Latinas additionally were asked about the language of media for each media exposure question.

Dependent Variables

Perceived effectiveness (PE) was the outcome measure assessed, rather than a behavior or a behavioral intention, because PE can be assessed after a single exposure. Perceived effectiveness is known to predict actual effectiveness (Dillard, Weber & Vail, 2007), and is thus a useful measure to identify whether the PSAs were likely to be effective. Moreover, none of the

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[47] This total includes the 132 subjects recruited for the pilot study. The final study was virtually unchanged from the pilot study so all respondents could be considered.

PSAs had a clearly defined behavioral outcome objective from which an intention measure could be derived.

Perceived effectiveness. A three-item scale measuring perceived effectiveness was used (Dillard & Ye, 2008): (1) This ad was convincing; (2) This ad got my attention; (3) This ad said something to me. Respondents were asked, "Please indicate how much you agree or disagree with the following statements." A five-point scale anchored with "Strongly Agree" and "Strongly Disagree" was provided for each item, and the answers for the individual items were summed to create a scale with a range of three to fifteen. This scale had a mean Cronbach's alpha of 0.90 across the four PSAs.

Independent, Mediating and Control Variables

Technical check: Subjects were asked whether they had any trouble viewing and/or hearing the video. Anyone who reported being unable to hear and/or see the video was disqualified and taken to a thank you page, ending her participation in the study.

Manipulation check: In the pilot test only, a manipulation check in the experimental conditions was conducted to ensure that respondents could distinguish between the news stories and the PSA (the manipulation). This is described in more detail in the pilot study results.

Identification. Identification was a two-item scale of validated measures of similarity and identification (Slater, Rouner & Long, 2006). Similarity: "How similar do you think you are to the characters in the ad?" Identification: "How much do you identify with the characters in the ad?" The two questions were assessed in a grid format using a five-point scale anchored with "Not at all" and "Very Much." The order of the questions was rotated randomly so as to minimize order effects. The mean correlation between the items was 0.85 across the four PSAs.

Age. Age was measured in years, with respondents pre-selected to be between the ages of 29 and 49 years. This age range was selected to ensure that the PSA messages would be relevant to the subjects.[48]

Education. Respondents were asked "what is the last grade or class you completed in school?" Responses included: grade 8 or lower; some high school, no diploma; high school diploma or equivalent; some college, no degree; associate degree or 2-year college degree; bachelor's degree; master's degree; Ph.D. or professional degree (JD, MD, DDS, etc...). These categories were transformed into the equivalent number of years and the variable was treated as an interval-level variable.

Income. Respondents were asked "what is your total household income from all sources before taxes?" Seven response options were provided: less than $10,000; more than $10,000 but less than $25,000; more than $35,000 but less than $50,000; more than $50,000 but less than $75,000; more than $75,000 but less than $100,000; $100,000 or more. This variable was treated as an interval-level variable after the categories were labeled with their mean values. Incomes under $10,000 were assigned the value of $5,000; incomes over $100,000 were assigned the value of $110,000.

Message selection and pre-testing

Television public service announcements (PSAs) that were created for use by real campaigns were selected by the experimenter. The crucial tests of hypotheses one and two did not depend upon finding identical messages, since they only suggested different responses to the same messages; in contrast, hypotheses three and four did require comparison across

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[48] Regular Pap tests are recommended for all women beginning no later than age 21 (American Cancer Society, 2009). The breast cancer PSAs advocate awareness of family history, which is relevant for women of all ages. Women under age 29 were not sampled because of the cost of sampling, and women over age 49 were not included primarily to keep the sample as homogenous as possible.

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messages. As such, attempts were made to locate two matching (that is, created by the same organization and differing only in their execution) messages: one that was targeted to Latinas, and one that was intended for the general market. Unfortunately, no such matching pairs were located. Instead, message pairs were selected because they were about the same general topic (e.g., Pap tests), even if they featured slightly different kinds of appeals and were created by different organizations[49]. Nevertheless, I argue that the lack of exact similarity may not preclude claims about the influence of ethnicity on relative responsiveness. Hypotheses three and four are a paired set of hypotheses making opposite predictions about relative responsiveness as a function of ethnic group. Given that the selected messages were substantially similar in the focal behavior and appeal, there is a reasonable argument that it is the targeted nature of the ads, rather than some other differences between them, which would account for the hypothesized reversal in expected results. In addition, analyses control for overall message effectiveness, in the event that one message is more effective than the other.

Messages were selected to vary on: ethnicity of the characters (Latina-targeted featured Latina/o models; the general-market message featured predominantly NHW models), text/voice over where appropriate (e.g., general market appeals to "all Americans" versus Latina-targeted appeals to "all Latinas"), and background cues (e.g, the location or background of the message, other characters who may be visible, etc…).

Three matched message pairs that met the basic criteria described above were pre-tested for selection into the experiment using a two-step process described below. Please refer

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[49] I am grateful to Dr. Amelie G. Ramirez of the Redes en Accíon National Latino Cancer Action Network for providing me with access to public service announcements created for the national screening campaign.

to the appendices for message script summaries (Appendix D) and complete pre-testing

analyses (Appendix A).

1. *Expert judge evaluation.* A panel of six judges, experts[50] in message effectiveness, were

   asked to evaluate the selected message pairs (evaluation was done on each ad separately,

   but the results for both ads were considered) on their plausible persuasiveness, using both

   expert judgment and perceived effectiveness measures (Dillard, Weber & Vail, 2007). The

   purpose of this step was to eliminate any messages that were strongly perceived as

   ineffective, and to identify the central argument and appeal of the ads, so as to develop

   appropriate outcome measures. Message pairs that received the highest ratings and most

   positive qualitative evaluations were selected for pre-testing with convenience samples of

   Latinos and NHW. All three message pairs were judged appropriate.

2. *Pre-testing with convenience samples: targetedness (manipulation check) and perceived*

   effectiveness. The experts' three highest rated message pairs were pre-tested with a

   combination of a convenience sample (recruited via email snowball sampling) and an SSI

   sample. The aims of this pre-testing were to establish that the Latino-targeted message is

   perceived as targeted to Latinos by both Latinos and NHW, and that both messages in a pair

   (Latina-targeted and mainstream) were perceived as relatively effective. Analyses of the

   pre-tests demonstrated that the best pair of messages was on the topic of knowing one's

   family history about breast cancer (Appendix D). A second pair of messages, on the topic of

   annual Pap tests, was selected for the second experiment in order to minimize concerns

   about the case control confound, which is further discussed in the limitations. This message

   pair also performed relatively well in the pre-tests.

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[50] Doctoral Candidates in communication at the Annenberg School for Communication.

Pilot Study

A pilot study using the two top-ranked pairs of messages (breast cancer and Pap tests), as rated in the pre-test (Appendix A), was conducted. The purpose of the pilot test was three-fold. First, the pilot served to test the full procedure with a small sample. Additionally, the pilot test was designed to determine whether the purpose of the study was transparent, and if so, whether it may have influenced responses. This was assessed after the debriefing using a combination of qualitative and closed-ended responses, discussed below. Finally, the pilot test was used to test whether there is a chance of detecting the expected effects. If no evidence for the hypotheses could be detected in the pilot test, I would have reconsidered the procedure and possibly the hypotheses themselves prior to running the full study. In fact, there was sufficient support for some of the hypotheses to warrant running the complete study, so the pilot data were merged with the main data, and complete results are reported in the next section of this chapter.

Procedure and Sample

The procedure used for the pilot study was mostly identical to that followed for the main experiment: Respondents were recruited via email and provided with a link to the survey hosted on the SurveyGizmo.com website. The pilot test included the complete instrument used in the main study, with one exclusion and two inclusions. The general media use questions, including language of interview, were excluded due to timing limitations. Two sections were included just before the demographics section in the pilot study but not the main experiment: a series of debrief questions intended to assess whether the aim of the study (i.e., targeting by ethnicity) was transparent, and a series of questions intended to assess whether the manipulations worked (i.e., manipulation check). The complete pilot test instrument is in

Appendix B. The total pilot study sample included 70 Non-Hispanic White women and 62

Latinas, between 29 and 49 years of age.

Manipulation Check Results

The pilot study results indicate that the point of the study was not transparent for most

subjects, but that the PSAs were correctly identified as the topic of the study as compared with

the news stories. The combination of the news stories wrapped around the PSA and the general

health/cancer knowledge, belief, and behavior questions that were mostly unrelated to the

experiment appear to mask the intent of the study. Ethnic targeting did not appear to be the

goal of the experiment, according to respondents. In open-ended responses, subjects indicated

that the study appeared to be about cancer or health generally. Some observed that it was

about women's health, while fewer than a handful observed that it was about how to educate

women about cancer/health. Only one subject (a Latina) specified that it was about knowing

what Latinas know about cancer/health. The closed-ended responses support these

observations. The news stories were moderately successful at hiding the intent of the study: half

(50.8%) of the respondents did not agree with the following statement: "I wasn't fooled by the

news stories; it was clear the purpose of the study was to look at the ad." One-third (34.1%)

agreed, and fifteen percent had no opinion (data not shown). Additionally, I created a scale by

averaging the responses to four items (Cronbach's alpha=0.65) to assess whether subjects

sensed the purpose was to target ads by ethnicity: (1) "I consciously tried to avoid thinking

about my ethnicity when responding to questions about the ad."; (2) "This study was testing

how to target ads to different ethnic groups."; (3) "I felt like I had to answer the questions in a

way that represented my ethnic identity."; (4) "I tried to think about how women most like me

would think about the ad." Response options were on a four-point Likert scale, anchored by

"Strongly Disagree" (0) and "Strongly Agree" (3); respondents could also indicate "no opinion"

(these responses were dropped). The mean score on the scale was 0.95 (range 0-3), which indicated that subjects did not respond based on ethnic cues. This was true whether I looked at the complete sample, by condition, or by whether the condition matched the respondents' ethnicity (e.g., NHW in mainstream condition). However, consistent with identity theory (McGuire, 1984), Latinas were slightly more inclined to report having noticed ethnic cues and to have responded with a sense of ethnic responsibility (mean score on ethnicity-related debriefing scale for Latinas was 1.14, compared with 0.77 for NHW, p<0.01) (data not shown). Although this was a statistically significant difference, it is not substantively different: a score of 0 or 1 indicated respondents did not respond to the main experimental questions thinking intentionally about their ethnicity, whereas a score of 2 or 3 indicated the opposite. In this case, both means were close to 1. In general, I am satisfied that the purpose of the experiment was sufficiently opaque to most subjects.

Subjects did accurately distinguish the PSAs from the news segments. However, the format of the manipulation check to assess whether respondents noticed the manipulation itself (e.g., the PSA versus the news segment) may have confused respondents: I asked first about the order in which they saw two news segments and then a PSA (91% of subjects answered correctly: news, PSA, news). I then asked, in three separate questions on the same page as the order question, the topic of each of the news segments and the ad, but the order of these questions was: news1 (85.6% got this correct), news2 (49.2%), ad (49.2%). I deliberately changed the order of my manipulation check questions in order to mask the correct answer to the previous question. Of the half who got the wrong answer to the ad question, 61.2% appear to have mixed it up with the second news story; of the half who answered the news2 question incorrectly, 67.2% mixed up the topic with the topic of the PSA. This seems quite a reasonable error to make given the order of the questions. My interpretation is that the first question is

sufficient to establish that respondents understood the distinction between the two types of content shown. Having established this, I felt satisfied that a manipulation check to test whether the PSA was distinguishable from the news stories was unnecessary in the main study.

The essential manipulation, that the targeted PSAs are indeed perceived as targeted, was established in the two pre-tests. The Latina-targeted PSAs selected for the study were judged to be more targeted to Latinas than to NHW by both expert judges and a convenience sample of women. Latina respondents identified more and felt more targeted by with the Latina-targeted message than with the general-market message. NHW identified less with the Latina-targeted message than with the general-market message, and they perceived the Latina targeted message to be targeted to Latinas. Details about this manipulation check, including specific tests and other criteria for message selection, are provided in Appendix A.

Analytic Approach

To answer RQ1 and RQ2, testing H1-H4, I ran a single OLS regression model per experiment, where the outcome variable was perceived effectiveness (PE, range=3-15); the independent variables were ethnicity (Latina=1), condition (targeted=1), and their interaction (a product term); and the three demographic control variables were age, education, and income (all treated as interval-level variables). The hypotheses were formally tested by looking at the significance of the interaction term in the controlled regression models. Additionally, I used the raw means to generate bar graphs used for display purposes. Stata 10 was used for analysis (Statacorp, 2008). Using the same set of means to test each hypothesis creates some redundancy, so I first present the means tests, which serve to illustrate the specific hypotheses. I then present the OLS regression results, and consider the evidence for the general research question based on the significance of the coefficient of the interaction term.

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To answer RQ3, I employed Baron and Kenny's (1986) mediation testing approach[51]. The first step is to establish that the independent and dependent variables are related, which was done as part of testing H1-H4. Here I sought to establish the following pattern (Figure 6.6).

Fig. 6.6. Ethnicity and Message Targetedness interact in their effects on Perceived Effectiveness.
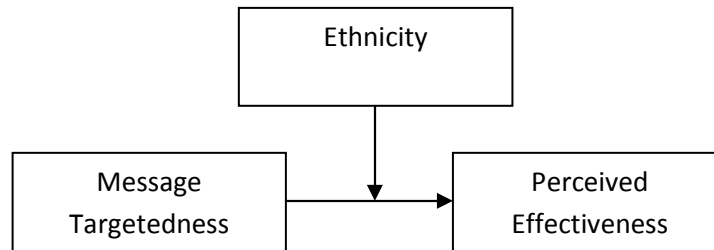
The second step is to establish that the mediating variable (identification) is associated with the independent variables (ethnicity and message targetedness). To do this, I repeated the above set of procedures, replacing PE with identification (range=2-12), to test H5-H8 (Figure 6.7).

Fig. 6.7. Ethnicity and Message Targetedness interact in their effects on Identification.
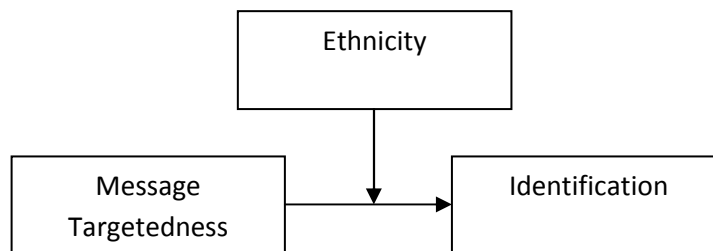
If H5-H8 were supported, then I could proceed with the final step in mediation testing: using the Sobel (1982) test to establish the significance of the mediation path (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). This step is represented in the following model (Figure 6.8).

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[51] Baron & Kenny (1986) specify four steps, but only three of these steps require active testing. Steps three and four rely on the same model and differ only in how the model is interpreted: whether there is partial mediation (Step 3) or complete mediation (Step 4).

Fig. 6.8. Ethnicity and Message Targetedness interact in their effects on Identification, which mediates Perceived Effectiveness.
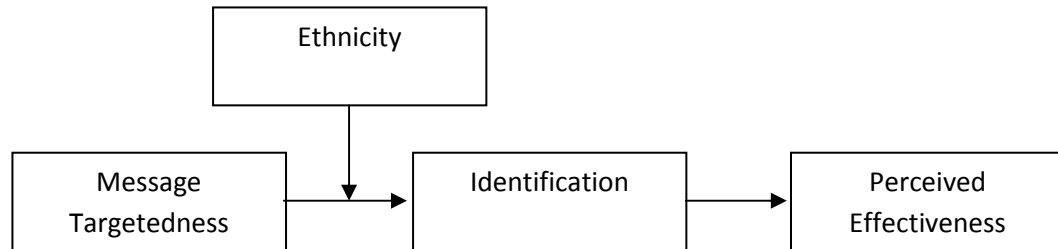
Results

Because this was an experimental study, there was a sacrifice of external validity in exchange for strong internal validity (Shadish, Cook and Campbell, 2005). As such, I was concerned with maximizing external validity to the extent possible so as to be able to generalize claims about observed effects to the broader populations of Latinas and NHW (Shadish, Cook and Campbell, 2005). Given the recruitment approach, I expected the samples to match the general population[52] fairly closely. This is indeed the case for the most part, although both samples[53] appear less wealthy than their general populations, and sampled Latinas make slightly less money than sampled NHW, whereas in the general population, that pattern is reversed (Table 6.3). Additionally, the sampled Latinas include fewer Latinas of Mexican heritage and more first-generation Latinas than would be expected from the general population proportion (Mexican heritage: 43.0% sampled versus 58.6% in the general population; first-generation:

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[52] I used the CPS-weighted Pew and ANHCS data (cf. Chapter 2) as the general population standard for Latinas and NHW, respectively. I could not use the raw CPS data because they do not separate by acculturation/language, hence a comparison would include the less-acculturated Latina population.

[53] For reporting purposes, the results shown pool the samples across the two experiments (e.g., Latinas in both the Pap test and breast cancer experiments). ANOVA tests indicated no significant differences in basic demographic characteristics (age, education, income) across the randomized conditions across the two experiments within stratification groups.

27.6% versus 19.8; Table 6.3). Aside from these differences, the samples match their general

populations in terms of average age and education. As in the general population, sampled

Latinas are younger than NHW: The average age of Latinas in the sample was 38.5 years

(SD=5.86), while that of NHW was 40.9 years (SD=5.92). Approximately two-thirds of both

groups had at least some college experience (Latinas: 66.3%, NHW: 65.8%).

Because the two samples to some extent reflected the populations from which they

were drawn, and the two groups are different from each other, it was important to control for

these demographic differences when considering differences across ethnicities (H1 and H2) to

ensure that observed differences in perceived effectiveness are not a function of age, education,

or income.

Table 6.3. Sample Characteristics by Stratification Group (Ethnicity), Pooled Across Experiments.

	Main Study* (N=1,419)			General Population†	
	Latina (N=715)		*NHW (N=704)*	*Latina*	*NHW*
	Mean (SD) or Proportion	*n*	Mean (SD) or Proportion	Mean or Proportion	Mean or Proportion
Age, mean	38.5 (5.86)		40.9 (5.92)	38.6	39.4
Education, mean years	13.5 (1.96)		13.8 (2.10)	13.6	14.1
Income, mean $	49,641 (30,031)		52,564 (31,264)	60,767	58,407
% of Latinas:					
Mexican	43.0	*286*		58.6	
1st Generation (Born in Latin America)	27.6	*193*		19.8	
2nd Generation (Born in U.S. to foreign-born parents)	37.3	*261*		37.7	
3rd Generation (Born in U.S. to U.S.-born parents)	35.1	*245*		42.5	

* Note. Includes subjects recruited during the Pilot Study (n=132).

†Note. The general population estimates for Latinas are based on Pew Hispanic Health Survey data. The general population estimates for NHW are based on ANHCS data. Estimates from Pew and ANHCS are weighted to the Current Population Survey in order to reflect population estimates. Additional details about those surveys can be found in Chapter 2.

The hypotheses proposed in this study were tested using a single OLS regression

equation (and a separate one for the mediation hypotheses). I illustrate these results in more

detail by hypothesis below, using t-tests of the raw means. However, because of the redundancy

of that analysis, the formal tests of the overarching hypotheses (that ethnic targeting of

messages is more effective for Latinas, and this effect is mediated by identification) are the

controlled regression equations, which I present at the end of this section to summarize the set

of individual hypothesis tests.

The covariate-adjusted means for each cell for both experiments are presented in Table

6.4, and results are discussed in detail by hypothesis. Given the comparative nature of my

hypotheses, I do not discuss the specific means in detail; they are relevant for this study only in

relation to each other.

Table 6.4. Perceived Effectiveness and Identification by PSA and Stratification Group (Ethnicity).

		Perceived Effectiveness (Range 0-15)		Identification (Range 2-12)	
		Latina	NHW	Latina	NHW
	Targeted PSA	**12.13**	**11.56**	**6.18**	**6.07**
	SD	2.39	2.39	2.35	2.32
	95% CI	(11.80,12.45)	(11.19,11.92)	(5.86,6.50)	(5.72,6.43)
Experiment 1: Breast Cancer	N	208	165	208	165
	Mainstream PSA	**11.38**	**11.55**	**5.74**	**5.94**
	SD	2.49	2.49	2.34	2.08
	95% CI	(11.01,11.76)	(11.2,11.9)	(5.38,6.10)	(5.64,6.24)
	N	169	184	169	184
	Targeted PSA	**11.86**	**10.95**	**6.58**	**5.80**
	SD	2.46	2.41	2.43	2.29
	95% CI	(11.47,12.25)	(10.60,11.31)	(6.20,6.96)	(5.46,6.14)
Experiment 2: Pap Test	N	157	176	157	176
	Mainstream PSA	**12.10**	**11.48**	**6.09**	**5.96**
	SD	2.13	2.24	2.38	2.21
	95% CI	(11.79,12.41)	(11.15,11.81)	(5.74,6.44)	(5.63,6.29)
	N	181	179	181	176

Are general-market messages perceived less effective by highly-acculturated Latinas compared with NHW?

To answer the first research question, I compared the effectiveness of general-market messages and Latina-targeted messages among Latinas and NHW. First, I considered the mean effectiveness of general-market messages among Latinas and NHW (H1). I then tested the mean effectiveness of Latina-targeted messages among Latinas and NHW (H2).

The first experiment, the breast cancer message, does not support the first hypothesis. The general-market breast cancer message is equally effective for NHW (m=11.55, SD=2.49) and for Latinas (m=11.38, SD=2.49; t(351)=0.52,n.s.). Moreover, the hypothesis was refuted in the second experiment, the Pap test message: the general-market message is more effective for Latinas (m=12.10, SD=2.13) than for NHW (m=11.48, SD=2.24; t(358)=-2.68, p<0.01). Results for both experiments are presented visually in Figure 6.9.

Fig. 6.9. H1 Test Results:
Perceived Effectiveness of the general-market
PSA across ethnicity.

■ Latina ■ NHW

	Latina	NHW
Breast Cancer General-Market PSA	11.38	11.55
Pap Test General-Market PSA	12.10	11.48
Hypothesis		
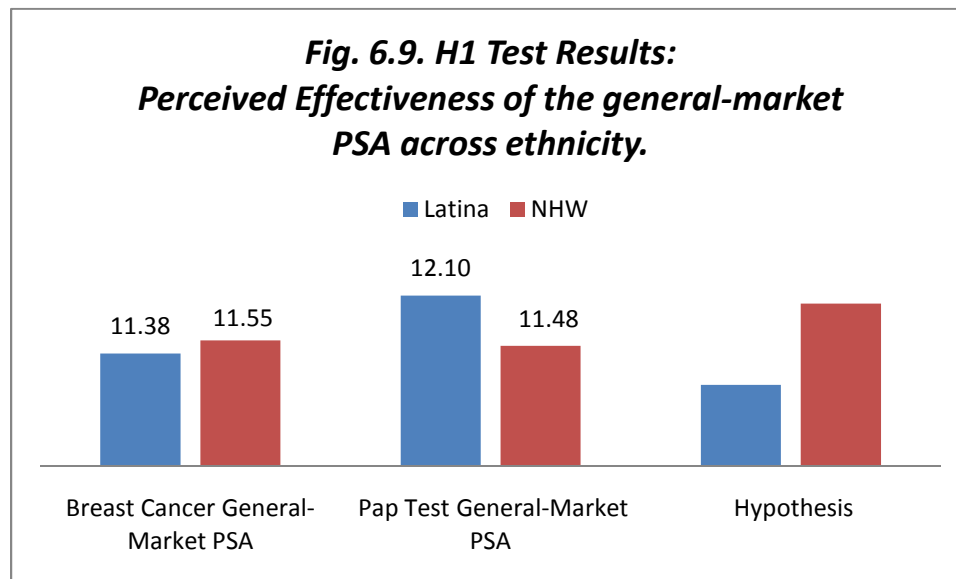
The second hypothesis was supported by both experiments. The targeted breast cancer message was more effective for Latinas (m=12.13, SD=2.39) than for NHW (m=11.56, SD=2.35;

t(371)=-2.28, p<0.05). The targeted Pap test message also was more effective for Latinas (m=11.86, SD=2.46) than for NHW (m=10.95, SD=2.41; t(331)=-3.39, p<0.001). Results are presented visually in Figure 6.10.

Fig. 6.10. H2 Test Results:
The Latina-targeted message is more effective
for Latinas than for NHW.

Latina | NHW

Breast Cancer Targeted PSA: Latina 12.13, NHW 11.56
Pap Test Targeted PSA: Latina 11.86, NHW 10.95
Hypothesis
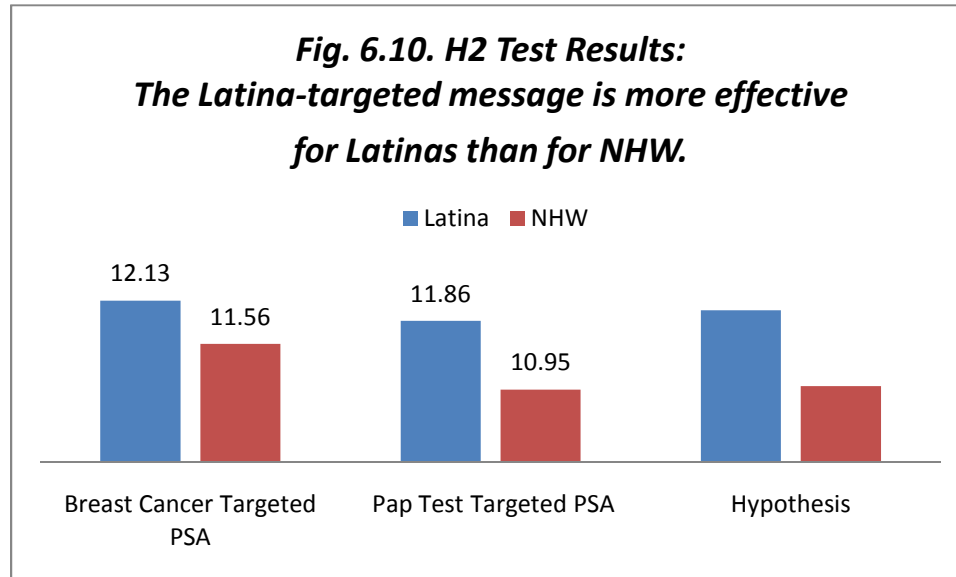
Are ethnically-targeted messages perceived more effective than general-market messages by highly-acculturated U.S. Latinas?

In the second research question, I considered the relative effectiveness of differently-targeted messages within each of the stratification groups. These analyses use the same information as was used for hypotheses 1 and 2 but organized differently. This redundancy of analysis issue is addressed below. Hypothesis three considered the relative effectiveness of targeted versus general-market messages among Latinas, and hypothesis four considered the relative effectiveness of the two kinds of messages among NHW. There was partial support for both hypotheses. With regards to H3, Latinas perceived the ethnically-targeted breast cancer message as more effective (m=12.13, SD=2.39) than the general-market message (m=11.38, SD=2.49; t(375)=-2.94, p<0.01). While the opposite appeared to be true for the Pap test messages (experiment 2), this difference was not statistically significant (general-market

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message m=12.10, SD=2.13; targeted message m=11.86, SD=2.46; t(336)=0.96, n.s.). The results

are illustrated in Figure 6.11.

Fig. 6.11. H3 Test Results:
Perceived Effectiveness of targeted vs. general-market messages among Latinas.
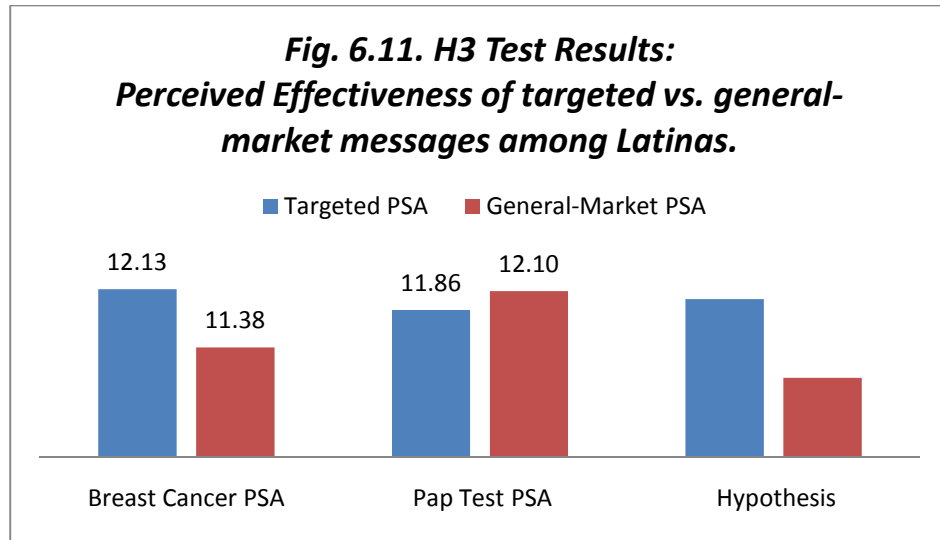
The final hypothesis was supported with the Pap test, but not with the breast cancer

experiment. The general-market and targeted breast cancer messages were equally effective for

NHW (t(347)=-0.03, n.s.). The general-market Pap test message was more effective (m=11.48,

SD=2.24) than the targeted message (m=10.95, SD=2.41), as hypothesized (t(353)=2.13, p<0.05).

The results are presented visually in Figure 6.12.

Fig. 6.12. H4 Test Results:
Perceived Effectiveness of targeted vs.
general-market messages among NHW.
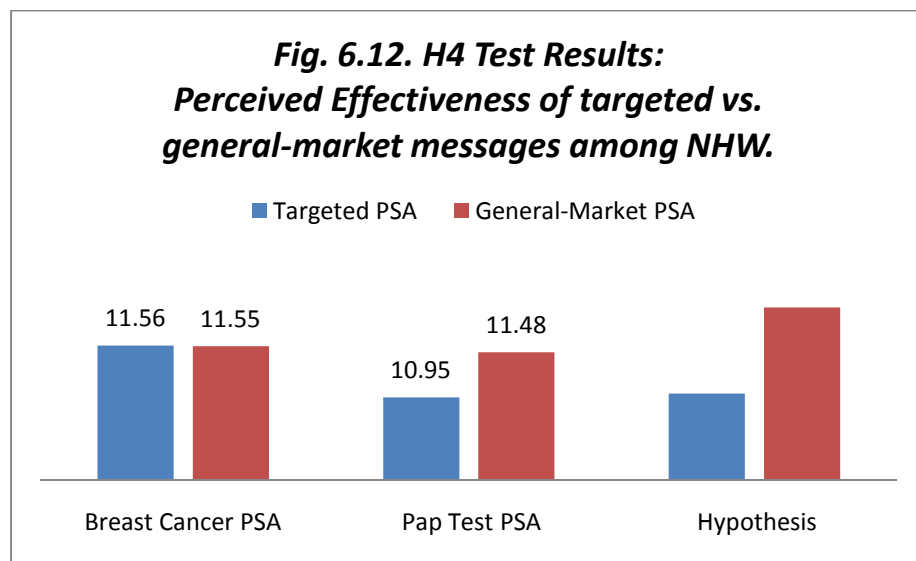
Does ethnicity interact with message targeting in its effects on perceived effectiveness? A summary of Hypotheses 1-4.

The results presented above to answer hypotheses one through four relied on the same information, raw mean perceived effectiveness scores. The results were presented as above for the sake of clarity. However, given the redundancy that such an approach necessitates, I now present the demographics-controlled regression results. The formal test of hypotheses one through four, then, is the interaction of ethnicity and message targetedness.

In the first experiment (breast cancer PSAs), the coefficient of the interaction term was significant (β=0.14, $p<0.05$, Table 6.5a), demonstrating support for the hypothesis. The uncontrolled means comparison test showed the same pattern but the difference did not reach statistical significance.

The coefficient of the interaction term was not significant for Experiment two (Pap test PSAs) (Table 6.5a). However, the main effects of ethnicity and message targetedness were significant. Thus, although the means comparison tests described above supported the hypothesis that the targeted message would be more effective for Latinas versus NHW, the definitive test of the hypothesis (the coefficient of the interaction term in a controlled regression model) indicates a failure to support this hypothesis.

Table 6.5a. Effects of the Interaction of Ethnicity and Message Targetedness on Perceived

Effectiveness.

	Perceived Effectiveness (0-15)	
	Experiment 1: Breast Cancer	Experiment 2: Pap Test
	β	β
Ethnicity (Latina=1)	-0.03	**0.14****
Message Targetedness (Targeted=1)	0.00	**-0.11***
Ethnicity * Targetedness	**0.14***	0.05
Age	0.06	0.01
Education (Number of years)	0.01	-0.02
Income	0.02	0.01
N	723	687
R^2	0.02	0.04
F	2.27	4.42

In light of the pattern of results from the means-comparisons tests of H1 and H2, which failed to support the overall hypothesis that the general-market message would be more effective for NHW versus Latinas, yet supported the hypothesis that the targeted message would be more effective for Latinas versus NHW, I decided to test for the overall hypothesis separately. These tests were done to explore the data *post hoc* and are not intended to replace the crucial test of the hypothesis described above. To do this, I ran separate models by condition (to test H1/H2, which compared the relative effectiveness of targeted and general-market messages for Latinas versus NHW) and by ethnicity (to test H3/H4, which compared the relative effectiveness of targeted versus general-market messages within ethnic groups). These models did not have an interaction term or ethnicity/condition, but only the following independent variables: ethnicity or message targetedness, age, income, and education. The variable of interest became ethnicity or message targetedness. The results demonstrate conditional support for the overall hypothesis: Latina-targeted messages are less effective than general-market messages for NHW (Table 6.5b), and the targeted message is more effective for Latinas than for NHW (Table 6.5c). However, contrary to expectations, the general-market message was more effective for Latinas than for NHW (Table 6.5c) (this is the same pattern that the t-tests demonstrated).

Table 6.5b. Effects of Message Targetedness on Perceived Effectiveness, by Ethnicity.

	Perceived Effectiveness (0-15)	
	Experiment 2: Pap Test-Latinas only	Experiment 2: Pap Test-NHW only
	β	β
Message Targetedness (Targeted=1)	-0.05	**-0.12***
Age	0.05	-0.03
Education (Number of years)	-0.02	-0.03
Income	-0.07	0.09
N	336	351
R^2	0.01	0.02
F	0.78	2.10

Table 6.5c. Effects of Ethnicity on Perceived Effectiveness, by Message Targetedness.

	Perceived Effectiveness (0-15)	
	Experiment 2: Pap Test Targeted PSA	Experiment 2: Pap Test General-Market PSA
	β	β
Ethnicity (Latina=1)	**0.20*****	**0.13***
Age	0.07	-0.06
Education (Number of years)	0.00	0.01
Income	-0.04	0.02
N	330	357
R^2	0.04	0.03
F	4.06	2.15

Identification as a Mediator of Message Effects

To answer the third research question, I first sought to establish that Latinas identified more with the targeted messages (H6, H7) and that NHW identified more with the general-market message (H5, H8). Using the same procedure as for the first four hypothesis tests, I show the raw means for each cell in Table 6.4. However, for this analysis, I do not compare the means because what I seek to establish is that overall, Latinas identify relatively more with the targeted message compared with NHW. I substituted identification for PE as the outcome variable and regressed it on ethnicity, message targetedness, their interaction, and demographic controls[54]. Since I cannot ensure that the intrinsic identifiability of each PSA is the same, nor that Latinas and NHW are comparable in their likelihood to identify (indeed, it may be expected that Latinas more readily identify, given identity theory), the identification comparison necessary to establish a mediation path can only be established by looking at the coefficient of the interaction of targetedness and ethnicity in the regression analysis. The coefficient is not significant in either experiment (Table 6.6). This means that the second criterion in the mediation test process has not been satisfied, and there is no evidence for moderated mediation. No further tests of the mediation hypothesis (e.g., Sobel) are warranted.

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[54] I conducted these analyses even where the initial hypothesis (H1-H4) was not supported in order to consider possible evidence of suppression effects.

Table 6.6. Effects of the Interaction of Ethnicity and Message Targetedness on Identification.

		Identification (Range 2-10)	
		Experiment 1: Breast Cancer	Experiment 2: Pap Test
		β	β
Ethnicity (Latina=1)		-0.03	0.05
Message Targetedness (Targeted=1)		0.03	-0.03
Ethnicity * Targetedness		0.06	0.12†
Age		0.06	**0.04***
Education (Number of years)		0.04	0.03
Income		-0.01	0.00
	N	723	687
	R^2	0.01	0.03
	F	1.21	2.85

Note. * indicates $p<0.05$, †indicates $p<0.10$.

Limitations

Hypotheses about message effects lend themselves well to testing by experimental methods because it is possible to manipulate specific messages, show them to different groups of people in a controlled environment, and immediately assess their effects. The controlled nature of experiments buys internal validity (Shadish, Cook & Campbell, 2002), such that it is clear that exposure to the message was the cause of the effects. The experiment would be able to claim that ethnically (ir)relevant messages influence outcomes differentially (if the hypotheses are supported) in a way that Study 2 could not demonstrate because of the studies' different designs.

However, the nature of this experiment and of experimental methods in general warrants some discussion about potential limitations, and an explanation of how I attempted to overcome these limitations. First, like all experiments, the manipulation described herein is an artificial setting and as such sacrifices some external validity (Shadish, Cook & Campbell, 2002). Care was taken to disguise the purpose of the study and the real manipulation (e.g, the PSA) by embedding it within a clip from a real newscast, with instructions that respondents would be asked about the news stories and/or format. This procedure was useful in two ways: first, embedding the PSA within a news story provided a more naturalistic environment: PSAs (like other kinds of advertisements) are likely to be viewed unintentionally, in the context of some other content; the experiment simulated that experience. This structure helped to ensure that individuals are potentially distracted during the airing of the PSA (or not), as they might be if they were watching the news at home as usual. A newscast was selected over other kinds of content because it is relatively easy to clip a short amount that is nevertheless a complete story (or stories), and it is quite reasonable to interrupt the series of stories with advertisements. The external validity of this study also was strengthened through the use of real messages, both the

newscasts and the PSAs, which have the benefit of high production values that made the manipulation seem more "real."

Another kind of limitation relates to the nature of the effects that are expected given the kind of manipulated exposure. It is clearly unreasonable to expect that individuals will change their behaviors (or even certain kinds of behavioral intentions) following a single exposure to a message. Media affects behavior through a complex process of repeated exposures from multiple sources, over time, not through a single thirty-second PSA (Hornik, 2002; Smith, 2002). As such, this study did not attempt to assess or claim behavioral change, even though that is certainly the underlying goal. Rather, the outcome measured in this study was limited to perceived effectiveness, which can be assessed after a single exposure; however, although PE is predictive of actual effectiveness (Dillard, Weber and Vail, 2007), it nonetheless falls short of establishing behavioral change effects.

An additional concern with this particular design – showing a single exposure to a message – is the case-control confound (Cox & Reid, 2000): that is, I am claiming that a single stimulus used for exposure will be exemplary of an entire category of messages (targeted versus not targeted). In fact, it is possible that any effects I find may be attributable to some unique feature of the PSA that is selected. To avoid this confound, experiments often use multiple stimuli for each condition (Jackson, 1992). In this case, to show multiple exposures of the same underlying manipulation to the same subjects may have sensitized subjects to the purpose of the experiment. Since the logic of this experiment is that individuals will not pay attention to materials that are not relevant for them, exposing subjects to multiple PSAs would increase the chances that they begin to pay attention to messages that they otherwise would not. Despite this logic, it was important to control for this potential confound by thorough pre-testing of the messages that were ultimately selected, such that they are both effective and perceived as

targeted to Latinos or the general market (see discussion above, and Appendix A, for pre-testing

procedures). Additionally, the design is strengthened by its inclusion of two examples of each

type of message (on the topics of breast cancer and Pap tests). Controlling for the overall PE,

and considering differences across the two replications, further strengthened this design.

Mediation tests are particularly sensitive to measurement error in the hypothesized

mediator. In this experiment, the hypothesized mediator, identification, was operationalized as

a two-item scale measuring similarity and identification. That the scale demonstrated high

internal reliability (r=0.85) in this study and has been validated extensively in the literature

(Slater, Rouner, & Long, 2006) serve to minimize concerns about measurement error. I discuss

the implications of the study's results in the following section.

Discussion

In general, one of the two main effects hypotheses proposed in this study was

supported. The overall conclusion to draw from this study is that ethnically-targeted messages

are more effective for Latinas, and may not be less effective for NHW. However, identification

with the message was not supported as the causal mechanism for this association. Support for

these findings was not universal; it varied somewhat by experiment. There was strong support

in both experiments for H2, that targeted messages are more effective for Latinas compared

with NHW, and partial support for the other hypotheses proposed in this study. In general, the

first experiment, using the strongest pair of messages (breast cancer), as rated in the pre-test,

supported the hypotheses (except H4). The experiment using the second-highest-rated pair of

messages (Pap test) demonstrated support for just two of the four hypotheses. The lack of

complete consensus across the two experiments points to one of the major limitations of this

design, the case-control confound, as discussed above.

A summary of the hypothesis test results is provided in Table 6.7. Experiment one

indicates support for all hypotheses except H4/H8: That NHW would perceive as more effective

(would identify more strongly with) the general-market message more than the Latina-targeted

message. Although these hypotheses were refuted, the pair was consistent, such that overall,

the model of effects was supported. In other words, even though NHW did not perceive the

general-market message as more effective than the Latina-targeted message, they also did not

identify more with that message. This is consistent with the explanation that identification

mediates the relationship between ethnicity/targetedness and perceived effectiveness, even

though the formal mediation testing path did not show such an effect. In the same way, the lack

of support for H1/H5 observed in experiment two does not indicate an overall lack of support

for the model of effects. Here again, the general-market message failed to be more attractive to

NHW, this time in comparison to Latinas. Yet overall, the model of effects was supported (for

NHW only) in the Pap test experiment (although again, not in the formal mediation tests).

Table 6.7. Hypothesis Test Summary.

	Experiment 1: Breast Cancer Supported?	Experiment 2: Pap Test Supported?
H1: The general-market message will be more effective for NHW than for Latinas.		
Step 1 (H1, Perceived Effectiveness):	Yes	No
Step 2 (H5, Identification):	No	No
H2: The Latina-targeted message will be more effective for Latinas than for NHW.		
Step 1 (H2, Perceived Effectiveness):	Yes	Yes
Step 2 (H6, Identification):	No	No
H3: Latinas will be more persuaded by the Latina-targeted message than by the general-market message.		
Step 1 (H3, Perceived Effectiveness):	Yes	No
Step 2 (H7, Identification):	No	No
H4: NHW will be more persuaded by the general-market message than by the Latina-targeted message.		
Step 1 (H4, Perceived Effectiveness):	No	Yes
Step 2 (H8, Identification):	No	No
H9: Mediation		
Step 3 (H9, Mediation of H1-H4):	N/A	N/A

The lack of support for the hypotheses in experiment two – to which the overall failure may be attributed – may indicate an example of the case-control confound, as discussed earlier. It may also be that the two messages in the Pap test pair are simply not equally good. Although I controlled for overall effectiveness in the comparison tests, the Pap test messages appear to be less equally matched than the breast cancer messages used in experiment one. That is one reason why the breast cancer message pair was ranked first in the pre-test (Appendix A).

What these results imply is that ethnic targeting may be useful, but if that message is not good enough, it will not be more effective than a non-targeted message. This is not the same as concluding that messages simply need to be good, and not targeted, in order to be effective. The rest of the results clearly point to better results when ethnic targeting is done well, and in an overall good message. The point is also relative: it is not necessarily the case that the Latina-targeted message was not good, just that it was not better than its general-market comparison. It is also important to note that the details of the message matter: the general-market comparison PSA ("Happy Pap Day," Appendix D) can be considered a "rainbow" message. That is, the cast included a range of ethnicities and the central character could be considered ambiguously Latina (or NHW). It is true that Latinas identified more with the Latina-targeted PSA than with this one, but it is also telling that Latinas identified slightly more strongly than did NHW with the general-market Pap PSA (Table 6.4). In this case, it may be that the comparison was simply untenable.

It is impossible to make a generalized claim that ethnicity-based targeting must be effective on the basis of these two experiments. Nevertheless, this study provides some compelling evidence in support of ethnicity-based targeting that moves beyond language considerations to consider how to communicate health information more effectively to highly-acculturated Latinas.

Chapter 7: Conclusions

I began this dissertation with two observations: first, that while communication can improve health disparities, important health information often fails to reach U.S. Latinos; second, that research on media, Latinos, and health behaviors is woefully sparse. This dissertation sought to improve the former situation by contributing a body of evidence to the latter. The objective of this dissertation was to contribute to an improved understanding of how communication can be used to educate U.S. Latinos about healthy lifestyles and health risks. Of specific interest was the diversity within the U.S. Latino population relating to both media use and health behaviors and outcomes, as defined by the concept of acculturation.

To realize the overall objective, I sought to accomplish three specific goals, each of which formed a distinct study. First, I examined differences in general and health-specific media use by ethnicity and within acculturation-based subgroups of Latino ethnicity. I then considered how ethnicity and acculturation interact with exposure to health content from the media to influence behavior and knowledge. Finally, using an experimental framework, I considered whether the perceived persuasiveness of Latino-targeted health messages was higher than for general-market messages for highly-acculturated Latinos. The following section provides a brief review of each study and its findings.

Summary of Findings

Study one tested the ethnic and acculturative differences in general and health-specific information exposure from various media across three different data sets, using a variety of exposure measures. This study was intended to fill a basic research gap by providing descriptive research about ethnic/acculturative differences in media use patterns that would be a first step to understanding whether and how ethnicity and acculturation influence media effects. The

results of this study provide some evidence that the three comparison groups use media

differentially, although not necessarily in the ways hypothesized. Results indicate that NHW and

HAL are differentially exposed to general content from the media, with NHW reporting reading

newspapers and magazines more than HAL, and HAL reporting more exposure to television and

radio. Additionally, HAL report less exposure than NHW to health information from print sources

and more from television. There were differences between LAL and HAL as well, generally

consistent with expectations based on the uses and gratifications framework (Katz, Blumler, &

Gurevitch, 1974). Less-acculturated Latinos reported heavier general use of television and radio,

but spent less time reading newspapers and magazines and using the internet compared with

HAL. Higher overall exposure to broadcast sources is consistent with both hypothesized

functions of these sources. First, that minority broadcast media (e.g., Spanish-language) serve a

connective function by providing news and information about U.S. Latinos' homelands.

Mainstream broadcast media may serve to assist individuals with acculturation, by exposing

less-acculturated individuals to the language, accents, and norms in the mainstream culture's

programs (Berry, 2003). The same differences were observed with regards to health-specific

exposures, although these comparisons proved unstable across the type of information

exposure (i.e., the opposite pattern was observed with regard to deliberate information seeking)

and by data set (i.e., ANHCS versus Pew and HINTS). These two related sources of influence on

the differences in media exposures prevent definitive statements about specific

ethnic/acculturative media use differences and can be ascribed to methodological differences in

the way the samples were collected and the surveys conducted. I will return to this argument

below, for it points to an important, unintended contribution of this dissertation.

Study two tested the joint effects of exposure and ethnicity/acculturation on health

behaviors and knowledge using two national survey data sets. The central hypothesis underlying

this study was that Latinos and NHW differ in their reactions to media content, with a goal of

providing evidence about the need for ethnicity-based targeted communications. After a large

number of tests, there was very limited support for any of the specific hypotheses. However,

this study was plagued by the same dataset-based methodological limitations as study one,

namely the possible misinterpretation of the seeking measure (the key independent variable) in

the Spanish-language version of the questionnaire (cf. Chapter 3), in addition to other

methodological and conceptual limitations that made it exceedingly difficult to detect any

effects. For example, the exposure measures were not specific ("health information seeking"

versus "seeking about a specific topic") and did not correspond to the dependent variables,

which were quite specific behaviors and knowledge. Additionally, the documented effects of

seeking on outcomes, even where there is stronger correspondence in the measures, are not

large (Kelly et al., 2010; Ramírez et al., 2009), making it even more difficult to detect moderating

effects. Interaction effects are difficult to detect under the best circumstances (McClelland &

Judd, 1993), and this study did not provide optimal conditions for such examination. Taken

together, these limitations make it difficult to reject with confidence the hypotheses proposed

in this study, even while the study failed to provide convincing evidence in support of the

hypotheses.

Study three sought to address the limitations of study two, including the fundamental

problem with testing a hypothesis that is essentially about message effects using non-specific

(i.e., not campaign-based) observational data. In this online experiment, NHW and more-

acculturated Latinas were exposed to cancer prevention messages that were intended for the

general market or targeted to Latinas and asked to rate their perceived effectiveness. This

design allowed for much better control of the correspondence between exposure and its

outcome. In addition, the outcome tested, perceived effectiveness, set a much more reasonable

threshold for effects than behavior change. This study sought to answer two research questions: (1) Are targeted messages perceived to be more effective by highly-acculturated Latinas than by NHW? and (2) Are targeted messages perceived to be more effective than general-market messages by highly-acculturated Latinas? Results show some support for the conclusion that ethnically-targeted messages are more effective for Latinas, and may not be less effective for NHW. There was no support for the hypothesized mechanism of effects, identification with the message.

This study included two sets of messages (i.e., two experiments) with the idea that the results would be stronger if replicated across topics or messages. Unfortunately, this did not happen. The hypotheses were generally supported in the first set of messages, which was selected for inclusion in the study because it received the highest ratings in pre-tests of potential message pairs. However, the other set of messages, which was ranked second in those pre-tests, provided only partial support for the hypotheses. These results illustrate perhaps the most powerful limitation of this design, the case-control confound (cf. Chapter 6). The third study therefore provides some crucial support for the hypothesis that NHW and HAL react differently to the same exposure, but with a strong caveat that the specific messages matter.

The lack of support in the second experiment may be a function of the quality of the pair of messages. The two messages in the Pap test pair are simply not equally good, rendering the comparison somewhat unfair to begin. Moreover, looking at the details of the messages in each pair critically reveals additional information about why one message pair may not have worked as hypothesized: the details of the message matter. The general-market PSA in the second pair ("Happy Pap Day," Appendix D) was a "rainbow" message, in that the cast included a range of ethnicities. The central character could be considered ambiguously Latina (or NHW). This may have confounded the experiment, since part of my argument rests on the assumption

that general-market messages generally feature the majority ethnicity (e.g., NHW). These characteristics may explain why Latinas identified slightly more strongly than did NHW with this message (Table 6.4).

The two tested message pairs were selected from a small universe of message pairs that included targeted, English-language messages and general-market messages about the same topic. This was a study design decision intended to maximize the external validity of the experiment. An alternate approach would have been to create two messages that were identical except for the ethnicity of the casts (or otherwise produce a targeted message). This would have ensured the intrinsic comparability of the messages, but at the cost of some external validity, a compromise I was unwilling to make.

In summary, the three studies comprising this dissertation provide some evidence that HAL differ from both LAL and NHW in the media they use for general purposes as well as to obtain health information. There is also some evidence that NHW and HAL are differentially influenced by targeted and mainstream messages. This project did not provide definitive answers to any of the research questions posed, and any conclusions are troubled by substantial methodological challenges. Nevertheless, the studies provide enough evidence that warrants additional research. I turn now to a summary of a few of the implications of this research for communicating health information to U.S. Latinos as well as a discussion of the additional contributions this dissertation makes to communication science, and close with suggestions for future research based on the questions left unanswered by this dissertation.

Implications for communicating health information to U.S. Latinos

The issues examined in this dissertation have implications for how health communication campaigns attempt to reach Latinos. Study one was intended to provide quite specific guidance about how to segment and reach U.S. Latinos across the acculturation

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spectrum, while studies two and three were intended to provide empirical support about the theoretical proposition that ethnicity-based targeting would be more effective for more-acculturated Latinos. In this section I review some of the implications of the studies' results on communicating with U.S. Latinos.

Study one findings provide some validation for communication strategies to reach Latinos and also provide some guidance for research methods to understand Latinos. First, by showing that Latinos engage in different media behaviors across the acculturation spectrum and in comparison to NHW, this study validated traditional language-based audience segmentation strategies. Clearly, reaching Spanish-dominant Latinos through broadcast (Spanish-language) channels remains crucial. However, it is clear from this study that such approaches are simply not going to reach HAL, who have different media use habits. It is also clear that HAL and NHW have different media use habits. What is less clear from this project is whether HAL and NHW react differentially to similar content. Study two attempted to test this proposition; however, severe methodological failings preclude any satisfactory answers. Study three provides at least some evidence that HAL and NHW are differentially influenced by some types of exposure; however, that study too is limited by its nature and the lack of replication.

Some practical implications can be derived from these studies, particularly from the first. As expected, less-acculturated Latinos are far less likely to access health information online, even after controlling for general use of the internet. As mentioned earlier, this finding raises the question of whether the efforts to make cancer prevention and other health information available in Spanish online are the best use of limited resources, particularly compared with other sources, including radio and television, that LAL report already using to obtain health information. On the other hand, if (and this is a large "if," given the documented concerns about the data set) LAL are actively seeking more health information compared with

the other two groups, then it seems fair to believe that some of that information could be found

online, providing justification for those efforts.

Additionally, with regards to the effects of information seeking, there are practical

suggestions for health communicators. I argued that the mechanism for the differential effects

of seeking by ethnicity (where NHW are compared with HAL) is that HAL are going to obtain less

useful information from media. This is because the English-language sources from which they

seek do not include information that is targeted to them and therefore is not perceived as

relevant, in contrast with LAL, whose Spanish-language sources may be considered inherently

targeted. In light of results showing that LAL are more likely than HAL to be influenced by

information they sought, one lesson for health communicators is that care must be taken to

ensure that information is perceived as relevant for all target audiences. Practically speaking,

this implies that "mainstream" media messages must include Latinos explicitly, or separate,

specific messages for Latinos should be created. Including Latinos explicitly in mainstream

communications is not such a radical notion given the size of this population, and would be an

example of multi-dimensional acculturation: the minority culture influencing the dominant one.

Study three was intended to provide evidence about that mechanism. The results

suggest that ethnic targeting has the potential to be useful, but if the targeted message is not

good enough, it will not be more effective than a non-targeted message. As I discussed earlier

(cf. Chapter 6), this is not the same as concluding that messages simply need to be good, and

not targeted, in order to be effective. The results of study three's tests show that when ethnic

targeting is done well, perceived effectiveness is higher among the intended audience (HAL) and

not necessarily lower among the majority (NHW). This pattern makes sense in the context of

distinctiveness theory (McGuire, 1984), which posits that traits that make a group the minority

are most salient to that group. In this case, NHW may not notice, or pay attention to, the fact

that a given message is intended for a different audience. If it is otherwise deemed relevant (for

example, a message about breast cancer screening resonates among NHW women because they

identify with the female character), then the ethnicity-based targeting may go unnoticed and

the message may achieve the same overall effectiveness among that group. One sensitive

caveat to this recommendation is its applicability to other racial/ethnic groups, where a longer

history of racism or institutionally-supported "difference" may thwart identification even on

other characteristics.

Contributions of this Dissertation

The explicit objective of this dissertation was to contribute to an understanding of how

to communicate health information to U.S. Latinos. Although, as discussed earlier,

methodological limitations preclude many of the clear directives I had hoped to provide with

this project, there was sufficient evidence to provide some guidance about communicating with

U.S. Latinos, outlined above. In addition to those conclusions, this project contributed methods

to improve communication research with Latinos and more generally to the field of health

communication through its unique focus on the U.S. Latino population.

Methodological contributions of this dissertation include validation of a measure of

acculturation that does not include media behaviors, which can be used to further study media,

Latinos, and health. As discussed in Chapters two and three, using language of interview as an

indicator of behavioral acculturation is a unique contribution. The fact that more than half of

Latinos elect to respond in Spanish when given the choice of language is an important finding in

itself, but also has practical methodological implications. Surveys that do not offer Latinos the

choice of responding in Spanish cannot claim to represent the entire U.S. Latino population. This

research points out the need for national surveys to offer a Spanish-language response in order

to be able to make accurate inferences about the U.S. Latino population. Moreover, given the

demonstrated differences in the use of media and in the health content obtained from media,

analyses about how Latinos learn about health that consider the two acculturative groups

together would be misleading.

A related contribution has to do with survey sampling issues. Part of the reason for the

limited research on ethnicity, media and health is that it is just plain difficult to include Latinos in

research. One problem is identifying the population and generating an appropriate sampling

frame. This project sought to deal with that issue by using three different data sets (and

recruiting a fourth), each of which used a slightly different approach to sampling, recruitment,

and survey procedure. Yet this approach failed to provide consistent answers, even though the

samples appeared on the surface to be relatively comparable across demographics (Table 2.1).

One of the primary concerns limiting conclusions from studies one and two was the ANHCS

online panel, which used two separate sampling strategies, both based on RDD techniques, to

recruit "representative" panels of English-responding Latinos and Spanish-responding Latinos.

Although the panels indeed seem to match Pew and/or HINTS (each of the three samples

matches with at least one of the other samples on some of the demographics, although there is

no pair of samples that match perfectly), their responses on media use outcomes are so

different from these other samples that it is difficult to believe they can be accurate. This is true

even after controlling for the demographic covariates on which they differ from the other

samples. As I suggested in Chapters 3 and 5, three possible explanations for the differences may

be: differences in the translation/interpretation of the questions; the timing of the survey

compared with changes in the media behaviors themselves and/or in the make-up of the Latino

populations; and the survey administration procedures (internet versus phone; panel versus

single survey participation). It is not clear which of these explanations is primarily responsible

for the differences across data sets, although the evidence suggests that it is likely a combination of the three (Chapter 3). These issues are important not only in the context of understanding how to conduct future research with Latinos, but can also be extended to other groups that are similarly difficult to recruit using traditional RDD-based strategies.

Perhaps the most important contribution this dissertation makes is its focus on Latinos. The literature, as described in the review (Chapter 1), is noteworthy in its lack of previous health communication research incorporating ethnicity as a variable of interest. Moreover, virtually no academic research has considered the moderating role of acculturation in understanding media effects, despite the absolute size and projected growth of the U.S. Latino population, and by extension, its growing segment of the more-acculturated population. By focusing on better understanding the relationships between ethnicity/acculturation, media, and health behaviors, this dissertation calls attention to a neglected area of inquiry. Although this study failed to provide solid evidence about the relationships among these variables, it serves nonetheless to generate attention to the issues and to present a case to warrant additional research in this area. It may be that the hypotheses proposed herein will be rejected after more research is done. Although this project was expansive, it was nevertheless insufficient to warrant closing the book on this area of research. Given the serious methodological challenges identified in each study, it is too early to give up on the idea that there are differences in message interpretation between NHW and HAL, and between HAL and LAL. There is too much anecdotal evidence (e.g., from within the Latino community) , not to mention attention reaped by marketers and politicians, and increasingly, health communicators, suggesting the existence of the hypothesized differences, that requires more research to provide more solid evidence for or against these hypotheses.

Perhaps the central question left unanswered by this research project – aside, of course, from the original hypotheses – has to do with media content. Studies one and two proposed to test for differences in media exposures and their effects, but failed to consider just what kind of content individuals were exposed to, or put another way, what kind of content is contained in the sources individuals report exposure to. A logical next step is to examine that content of each source. A first step may be to extend the types of analyses tested using Pew data in study two to understand the influence of language of information exposure on knowledge, and also to understand when and what kind of LAL may turn to English-language information rather than Spanish-language (or HAL, vice versa). This may help in understanding the nature of ethnic targetedness as well. I argued throughout this project that language of exposure could be considered a proxy for targetedness, but clearly that is a simplification of the potential for message targeting. One possible finding, as I suggested in Chapter 3, could be that the content found by HAL and LAL on the internet is more detailed and relevant than that which is available through more traditional, passive sources like radio and television. If this is the case, health information from the internet would not substitute for health information from other sources, but would serve a unique function, more similar to hotlines or other interactive information sources. Content analyses combined with more definitive studies of media exposure and its effects would help campaign planners better understand what is missing in the media environment. In addition, understanding what individuals perceive they are learning from which media may help to guide health communication strategies.

In addition to the content, it is important to consider the role that access to Spanish-language media plays in influencing the amount of information that Latinos obtain in Spanish. As discussed in Chapter 3, geographic areas where great numbers of new Latino immigrants have recently settled (e.g., the South) have not had long to establish Spanish-language media outlets,

in contrast to metropolitan markets with long histories of large Latino populations (e.g., Los

Angeles, Miami, New York, Chicago). Understanding the extent and sources from which LAL in

those regions have access to health information will be important for health communicators

who want to reach this group.

Appendix A: Study 3 Pre-test Analyses

Selection of the pair of messages that were selected for use in the main experiment was based upon a combination of results. I decided a priori that any pair would be disqualified for inclusion into the final experiment if: the Latina-targeted message was not perceived as targeted to Latinas by Latinas; Latinas did not report identifying more with the Latina-targeted message compared with the general-market message; and one or both messages fail(s) to meet a basic threshold of perceived effectiveness. Conversely, the ideal pair of messages would meet the following four criteria: (1) be substantially identical in the message and focal behavior; (2) be composed of a Latina-targeted message that is identified as such by both Latinas and NHW and a general-market message that is perceived as targeted to all women or NHW more than to Latinas by both Latinas and NHW; (3) the Latina-targeted message should inspire identification more by Latinas than by NHW, and NHW should identify more with the mainstream message than should Latinas; and (4) meet a basic threshold of perceived effectiveness. Below I describe the procedure and analytic strategies I used to evaluate how well each message pair rated against these criteria.

Procedure

Respondents were recruited via email and provided with a link to the survey hosted on the SurveyGizmo.com website. After a short series of demographic questions, respondents were shown the first PSA, followed by a page of questions to assess technical issues (e.g., were they able to see and hear the message, what kind of computer operating system and internet browser, etc…). They were then asked several closed-ended questions to measure identification and targetedness of the PSA. The closed-ended questions were followed by optional open-ended questions designed to provide further insight into how respondents were interpreting the questions. The final sets of questions measured the perceived effectiveness of the PSA. The

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complete series of questions was repeated for the next PSA. The full questionnaire is estimated to have taken approximately 35 minutes to complete.

Sample

Pre-test respondents were recruited through two methods: snowball sampling from acquaintances of graduate students at the University of Pennsylvania (N=28) and through random sampling of a panel maintained by Survey Sampling, International (N=74). The SSI sample was added because the snowball sampling did not yield the proposed 60 respondents. The total analyzed sample included 57 Non-Hispanic White women and 45 Latinas, between eighteen and fifty years of age. The average age of the combined sample was 37 years (Latina: 37.7; NHW: 36.3). Most respondents had at least some college education. A description of the sample can be found in Table 6.8.

Only data from respondents who were able to see at least one PSA was included in this analysis (e.g., those who did not have the necessary plug-ins to view and/or hear the videos were excluded). The majority (84%) of respondents were able to view and hear all six PSAs.

Given the small sample size, I did not expect to find any statistically significant results. Rather, I was looking for a general directional pattern of results that supported my expectations as above, in order to make a decision about which PSA pair to select for the full experiment.

Table 6.8. Pre-test Sample Characteristics.

	Combined Sample (N=102)			
	Latina (N=45)		*Non-Hispanic White (N=57)*	
Age, years				
18-24	2.2	*1*	0.0	*0*
25-29	17.8	*8*	28.1	*16*
30-34	13.3	*6*	12.3	*7*
34-39	22.2	*10*	24.6	*14*
40-50	44.4	*20*	35.1	*20*
Education, mean years	14.5 (2.4)		15.0 (2.6)	
Education				
Less than H.S.	2.2	*1*	1.8	*1*
High School or GED	24.4	*11*	22.8	*13*
Some College	28.9	*13*	19.3	*11*
Bachelor Degree or higher	44.4	*20*	56.1	*32*
% who saw each ad				
Pap Test - Targeted	77.8	*35*	89.5	*51*
Pap Test - Mainstream	92.3	*36*	96.1	*49*
Breast Cancer - Targeted	86.1	*31*	95.9	*47*
Breast Cancer - Mainstream	96.9	*31*	93.6	*44*
Colon Cancer - Targeted	80.0	*24*	97.9	*46*
Colon Cancer - Mainstream	86.7	*26*	89.4	*42*

Measures

Targetedness was assessed in two different ways. First, a "felt targetedness" scale was constructed to measure whether respondents felt personally targeted by the message. Secondly, respondents were asked to indicate the extent to which the PSA was targeted to each of a list of groups.

Felt Targetedness. A three-item felt targetedness scale was used to assess this construct: (1) I feel the advertisement was intended for people like me; (2) I don't believe I was in the target market the company created the advertisement for" [reverse coded]; (3) "The advertiser made that advertisement to appeal to people like me" (Aaker, Brumbaugh, & Grier, 2000). The three questions were assessed in a grid format using a five-point scale anchored with "Strongly Disagree" and "Strongly Agree." The midpoint of the scale was "Neither Agree nor Disagree." The order of the questions was rotated randomly so as to minimize order effects. The final scale was constructed by adding the responses to each item, for a possible range of 0-12. The scale had a mean Cronbach's alpha of 0.77 across the six PSAs.

Targetedness of PSA to Different Groups. Respondents were asked to indicate the extent to which the PSA was meant for each of several different groups. The question was, "To what extent was the ad targeted to each of the following groups? By 'targeted' we mean who was the main intended audience of the ad." The possible target groups were (in order): Mothers of daughters, Mothers of sons, Latina/Hispanic women, African-American women, White women, Women with a family history of cancer, Women under the age of 40, Women over the age of 50, and All women. Responses were on a five-point scale anchored by (5) "Very Much" and (1) "Not at all". Responses were dichotomized such that ratings of 4 or 5 indicated that respondents thought the message was targeted to that group, and ratings of 3 or lower indicated the ad was

not targeted to that group. The percentage of respondents who indicated the message was targeted to that group was compared across possible target groups and by respondent ethnicity.

Identification. Identification was a two-item scale of validated measures of similarity and identification (Slater, Rouner & Long, 2006). Similarity: "How similar do you think you are to the characters in the ad?" Identification: "How much do you identify with the characters in the ad?" The two questions were assessed in a grid format using a five-point scale anchored with "Not at all" and "Very Much." The order of the questions was rotated randomly so as to minimize order effects. The mean correlation between the items was 0.90 across the six PSAs.

Two different measures of perceived effectiveness were pre-tested.

Perceived Effectiveness, Effectiveness Statements. A four-point scale measuring perceived effectiveness was used (Dillard & Ye, 2008): (1) This ad was convincing; (2) This ad exaggerated the problem [reverse coded][55]; (3) This ad got my attention; (4) This ad said something to me. Respondents were asked, "Please indicate how much you agree or disagree with the following statements," and six response options were provided: a five-point scale anchored with "Strongly Agree" and "Strongly Disagree," and the option to indicate the item was "Not applicable." This scale had a mean Cronbach's alpha of 0.87 across the six PSAs.

Perceived Effectiveness, Integrated Model Style. The second measure of perceived effectiveness is in the style of the Integrated Model (Fishbein, Hall-Jamieson, Zimmer, von Haeften & Nabi, 2002), and was composed of three to five items tailored to the subject of the PSA. For example, the questions for PSA #1, about Pap testing, were: (1) Would the ad be helpful in getting women

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[55] This item was consistently the least correlated with the other items in the scale. Because of this, and because the question itself seemed irrelevant for the two Pap smear PSAs, it was removed from the scale for these two PSAs only. For the other topics, the question was relevant and the scale demonstrated sufficiently high levels of reliability, even with this comparatively poor-performing item, that it was left in. The removal of this item did not affect the direction of the findings with regards to the criteria for selecting the final PSA pair.

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to get regular Pap tests?; (2) "Was the ad convincing?" These two questions were presented in a grid with five possible answers: a 4-point scale anchored by "Definitely Yes" and "Definitely No," and an option to check that the question was "Not applicable." (3) Would women who had never gotten regular Pap tests be more or less likely to ask for a Pap test at their next doctor's appointment after seeing this ad? This question was presented with six response options: a 5-point scale anchored by "Much more likely" and "Much less likely," with a midpoint of "Neither more nor less likely," and "Not applicable." (4) How confident do you think the ad would make women feel about asking their doctors for a yearly Pap test? Response options again included "Not applicable" and a five-point scale anchored by "Extremely confident" and "Not at all confident." The midpoint was "No effect." The items in this scale showed poor distributions across the six PSAs. This scale had a mean Cronbach's alpha of 0.87 across the six PSAs.

Results

To meet the first criterion for message selection, I selected pairs of messages that seemed, on face value, to be about the same topic. All three message pairs met this criterion.

The second criterion was evaluated by looking at the measures of targetedness. Targetedness of each message to Latina or mainstream audiences (e.g., the manipulation) was demonstrated by separate tests. First, I tested that Latinas would feel more targeted by the Latina-targeted message compared with NHW, and vice versa for the general-market message. For this analysis, I compared the mean felt targetedness scores for Latinas and NHW within each PSA (Table 6.9). I found the expected pattern for all three PSA pairs, although it was most pronounced in the case of the breast cancer PSAs. Latinas scored an average of 7.9 out of 12 on felt targetedness of the Latina-targeted PSA, compared with 6.9 for NHW. NHW scored an average of 8.5 compared with Latinas' mean of 6.7 on the general-market breast cancer PSA.

I also looked across messages within ethnic groups to consider whether Latinas would feel more targeted by the Latina-targeted message compared with the general-market message, and whether NHW would feel more targeted by the mainstream message compared with the Latina-targeted message. Here I looked within Latina and NHW groupings for each pair of PSAs and found the expected pattern generally supported, but again, strongest[56] for the breast cancer PSAs (Table 6.9).

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[56] It is important to reiterate that due to a small sample size, I did not expect to find statistically significant results, and indeed rarely did so. This evaluation therefore relied on judgment about how different the estimates appeared, and how much overlap there was in the confidence intervals.

Table 6.9. Manipulation Check: Identification and Felt Targetedness, by Ethnicity and PSA.

| | | Mean Identification Score (Range, 0-8) | | Mean Felt Targetedness Score (Range, 0-12) | |
		Latina	NHW	Latina	NHW
Pap Test	**Targeted PSA**	**5.1**	**4.0**	**7.9**	**6.8**
	95% CI	(4.20,5.92)	(3.28,4.68)	(6.85,9.03)	(5.88,7.65)
	N	35	47	35	47
	Mainstream PSA	**3.9**	**4.0**	**7.7**	**8.3**
	95% CI	(3.00,4.75)	(3.32,4.64)	(6.72,8.69)	(7.59,9.08)
	N	32	49	34	51
Breast Cancer	**Targeted PSA**	**5.1**	**4.0**	**7.9**	**6.9**
	95% CI	(4.25,5.94)	(3.32,4.68)	(6.81,8.93)	(6.03,7.80)
	N	31	47	31	47
	Mainstream PSA	**4.3**	**4.7**	**6.7**	**8.5**
	95% CI	(3.36,5.22)	(4.03,5.38)	(5.75,7.74)	(7.69,9.22)
	N	31	44	31	44
Colon Cancer	**Targeted PSA**	**3.5**	**3.0**	**6.1**	**5.7**
	95% CI	(2.47,4.44)	(2.24,3.67)	(4.96,7.20)	(4.9,6.49)
	N	24	46	24	46
	Mainstream PSA	**3.9**	**3.6**	**5.8**	**6.3**
	95% CI	(2.71,5.06)	(2.93,4.31)	(4.69,6.92)	(5.47,7.19)
	N	26	42	26	42

Finally, I expected that the Latina-targeted message would be identified as targeting Latinas more than White or African-American women by both Latinas and NHW, and that the general-market message would be identified as targeting White women or all women more than Latinas. For this analysis, I compared the percentage of Latinas and NHW who reported that each PSA was targeted to the different groups of women (Table 6.10). The Pap test pair was most clearly identified as being targeted to Latinas and NHW, respectively. The breast cancer pair of PSAs also met the criterion. Among a possible range of target audiences, the Latina targeted PSA was perceived by both Latinas and NHW as being most targeted for women with a family history of cancer (90.3% and 93.6%, respectively), and indeed the message of the ad was to share family histories. However, Latinas were overwhelmingly selected as the target ethnic audience of the PSA (83.9% of Latinas and 89.4% of NHW, compared with less than half of Latinas and NHW who believed the PSA was targeted to African-American women and about half who believed the PSA was targeted to White women). The general-market breast cancer PSA was identified by nearly three-quarters of Latinas and NHW as targeted to White women, compared with half or less who believed it was intended for Latinas or African-American women. The results for the colon cancer PSA were not as clear-cut. The Latina-targeted colon cancer PSA was identified as targeting Latinas more than White or African-American women by both Latinas and NHW, but there was no overwhelming majority indicating the mainstream PSA was targeted to any one group.

In summary, the second criterion for selecting the final PSAs for the experiment, that the targeted PSAs should feel more targeted to Latinas and the general-market PSAs should feel more targeted to NHW, generally indicated that both the Pap test and breast cancer PSA pairs would be acceptable for use in the experiment.

The third criterion for PSA selection has to do with identification with the message. I expected that Latinas would identify more than NHW with the Latina-targeted messages, and that NHW would identify more than Latinas with the general-market message[57]. The expected pattern was supported for all three Latina-targeted PSAs but not for the general-market messages about Pap tests or colon cancer (Table 6.9; comparing the mean identification scores within each row). I further expected that Latinas would identify more with the Latina-targeted message than with the general-market message, and that NHW would identify more with the general-market message than with the Latina-targeted message. The expected pattern was found for Latinas with the Pap test and breast cancer PSAs: Latinas scored an average of 5.1, of a possible high of 8, on the identification scale for the Latina-targeted versions of those PSAs, compared with 3.9 and 4.3 on the mainstream PSAs about Pap tests and breast cancer, respectively (Table 6.9; comparing the mean identification scores for each pair of ads within Latinas or NHW). The pattern also held up for NHW on the breast and colon cancer PSAs, but not the Pap test PSAs, where NHW were equally likely to identify with the targeted and mainstream versions.

The third criterion was fully satisfied only by the breast cancer PSA pair.

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[57] Although the general-market message is ostensibly intended for all audiences, in practice, this often means that NHW are the default audience for whom such messages are most relevant (Stevens, 2009). For the purposes of this dissertation, it was important to establish that NHW identified more with the mainstream message than with the Latina-targeted message.

Table 6.10. Manipulation Check: Who was the target audience of each PSA?

	Pap Test				Breast Cancer				Colon Cancer			
	% Indicating PSA targeted to this group				% Indicating PSA targeted to this group				% Indicating PSA targeted to this group			
	Targeted PSA		Mainstream PSA		Targeted PSA		Mainstream PSA		Targeted PSA		Mainstream PSA	
	Latina	NHW	Latina	NHW	Latina	NHW	Latina	NHW	Latina	NHW	Latina	NHW
	N=34	N=47	N=31	N=45	N=31	N=47	N=30	N=44	N=24	N=46	N=26	N=42
Mothers of Daughters	64.7	63.8	51.6	40.0	83.9	83.0	60.0	72.7	75.0	56.5	42.3	47.6
Mothers of Sons	50.0	46.8	35.5	26.7	54.8	44.7	53.3	61.4	66.7 [a]	37.0 [b]	42.3	40.5
Latina/Hispanic Women	**76.5**	**78.7**	48.4	57.8	**83.9**	**89.4**	43.3	52.3	**70.8**	**71.7**	50.0	52.4
African American Women	35.3	42.6	45.2	57.8	48.4	38.3	43.3	52.3	37.5	39.1	42.3	50.0
White Women	44.1	61.7	**74.2**	**73.3**	51.6	44.7	**73.3**	**72.7**	62.5	50.0	**57.7**	**50.0**
Women with a family history of cancer	55.9	48.9	54.8	57.8	90.3	93.6	73.3	86.4	87.5	73.9	46.2	54.8
Women under the age of 40	58.8	46.8	67.7	73.3	83.9	89.4	60.0	75.0	50.0	41.3	46.2	54.8
Women over the age of 50	67.7	74.5	48.4	46.7	87.1	80.9	60.0	75.0	87.5	82.6	65.4	64.3
All Women	76.5	66.0	74.2	73.3	83.9	76.6	70.0	84.1	62.5	54.4	57.7	64.3

In addition to testing whether the manipulation was successful (e.g., targeting and identification), I sought to establish that each of the PSAs stood a good chance of being effective in its goal. Perceived effectiveness was the final criterion for message selection, and it was important to establish because if I fail to find a difference in relative effectiveness of a message across ethnic groups (e.g., no support for H1 or H2), I will need to know that the failure was in the interaction term, and not in the main effect of the message, that is responsible for the failure to find effects. Perceived effectiveness measures (Dillard, Weber & Vail, 2007) were used to establish that the messages are likely to be effective. Two different measures of perceived effectiveness were pre-tested, with the additional goal of determining which set of measures to include in the final experiment.

I judged perceived effectiveness both in absolute and relative terms. In absolute terms, ineffective messages would have scored below the midpoint of the respective scale[58]. No message (single or pair) was judged as wholly ineffective, using either measure of perceived effectiveness[59]. Across both measures of perceived effectiveness, the breast cancer message pair was rated as more effective than the other two pairs (Table 6.11).

Having established the basic effectiveness of each message, I then compared the perceived effectiveness of each ad within a pair to each other. Ideally, the targeted and general-market message would be rated approximately equally in effectiveness. Thus, message pairs in which one message was judged far more effective than the other were considered for disqualification. Here, the results varied depending on which measure of perceived effectiveness I used. The Integrated Model measure showed that both PSAs in all three pairs were about

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[58] This was a somewhat arbitrary standard set *a priori.*

[59] Importantly, I do not compare perceived effectiveness scores by ethnicity in this pre-test. As this is the primary hypothesis to be tested in the main, I did not want to bias my results by selecting a pair based on the likelihood of finding this effect.

equally effective. However, as discussed above, this measure did not demonstrate adequate

variation and therefore is less trustworthy. The other measure of perceived effectiveness

indicates identical responses for the targeted and general-market Pap test PSAs, but also shows

that for both breast and colon cancer PSA pairs, the Latina-targeted PSA is slightly more

effective. However, in both cases, the confidence intervals overlap, and the estimates are well

within expectations.

Table 6.11. Perceived Effectiveness of Each PSA.

		Perceived Effectiveness, Effectiveness Statements (Range 0-4.8)		Perceived Effectiveness, IM-Style Measures (Range, 0-4.8)	
		Latina	NHW	Latina	NHW
	Targeted PSA	**3.7**	**3.2**	**3.7**	**3.5**
	95% CI	(3.43,3.94)	(2.93,3.49)	(3.42,3.89)	(3.25,3.67)
	N	34	47	34	47
Pap Test	**Mainstream PSA**	**3.3**	**3.4**	**3.3**	**3.4**
	95% CI	(2.98,3.65)	(3.12,3.69)	(2.94,3.62)	(3.25,3.59)
	N	31	45	31	45
	Targeted PSA	**4.0**	**3.6**	**4.0**	**3.6**
	95% CI	(3.78,4.28)	(3.37,3.82)	(3.75,4.16)	(3.44,3.81)
	N	30	47	30	47
Breast Cancer	**Mainstream PSA**	**3.8**	**3.5**	**3.8**	**3.7**
	95% CI	(3.50,4.04)	(3.30,3.74)	(3.60,4.09)	(3.47,3.87)
	N	30	44	30	44
	Targeted PSA	**3.6**	**3.3**	**3.7**	**3.4**
	95% CI	(3.33,3.88)	(3.04,3.50)	(3.36,3.97)	(3.22,3.62)
	N	24	46	24	46
Colon Cancer	**Mainstream PSA**	**3.2**	**3.2**	**3.7**	**3.5**
	95% CI	(2.81,3.59)	(2.90,3.46)	(3.31,4.00)	(3.24,3.70)
	N	26	42	26	42

Appendix B: Study 3 Pilot Study Instrument

Version A was administered to Latinas and is included below. Version B was administered to

NHW; it is the same as Version A with the exception of questions about language and country of

origin.

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Media & Health Pre-test (A version)
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==============================================
 Welcome
==============================================


1. By checking this box, I acknowledge that I have read the consent
form above, and voluntarily agree to become a participant in this
research study.

      ( ) I agree


==============================================
 Familism
==============================================


2. Please indicate how strongly you agree or disagree with the
statements below.

                                Strongly agree    Agree Somewhat
disagree    Strongly disagreeNo Opinion
When someone has problems s/he can count on help from his/her
relatives. _____      _____      _____      _____      _____
A person should rely on his or her family if the need arises.

      _____      _____      _____      _____      _____
One can count on help from his/her relatives to solve most problems.

      _____      _____      _____      _____      _____


==============================================
 Intro to PSAs
==============================================


Now you will be asked to watch a video newscast. After watching the
video, you will be asked several questions about it. The video
should begin playing as soon as you click to the next page.
Therefore, before proceeding, PLEASE MAKE SURE THAT THE VOLUME ON
YOUR COMPUTER IS TURNED TO HIGH. Please watch the video in its
```

entirety. When it has finished, click to the next page to answer the survey questions about it.

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=============================================
 VIDEO
=============================================
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After viewing the entire video, please click "Continue."

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=============================================
 Technical Check
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3. Were you able to see and/or hear the video adequately?
     ( ) Yes, I could see and hear the video fine.
     ( ) No, I couldn't see and/or hear the video adequately.

4. Please describe any other technical issue you experienced (e.g., the video did not display completely, some was cut off, the sound was intermittent, etc...).
         _____
         _____
         _____
         _____
         _____

```
=============================================
 Manipulation Check
=============================================
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5. The video you just saw contained two news segments and an ad or public service announcement. A news segment features a single presenter (a newscaster) and is more fact-based. An ad or public service announcement is more entertaining or story-based, and includes actors rather than reporters. Please think about the order in which you saw these clips. What was the order of the video you just saw?

      ( ) A news segment, then an ad, and then another news segment
      ( ) An ad, then a news segment, and then another news segment
      ( ) Two news segments, then an ad
      ( ) I don't remember

6. What was the topic of the first news segment (with a newscaster or reporter)?

      ( ) Colon cancer
      ( ) Breast cancer
      ( ) Eating healthfully

      ( ) Women and heart attacks
      ( ) Pap tests
      ( ) Other

7. What was the topic of the second news segment (with a newscaster or reporter)?
      ( ) Colon cancer
      ( ) Breast cancer
      ( ) Eating healthfully
      ( ) Women and heart attacks
      ( ) Pap tests
      ( ) Other
8. What was the topic of the ad or public service announcement (with actors telling a story)?
      ( ) Colon cancer
      ( ) Breast cancer
      ( ) Eating healthfully
      ( ) Women and heart attacks
      ( ) Pap tests
      ( ) Other

===
 Perceived Effectiveness
===

9. Please indicate how much you agree or disagree with the following statements.

                 Strongly Agree   Agree Neither Agree nor Disagree
     Disagree   Strongly Disagree

This ad got my attention.   _____   _____   _____
      _____   _____
This ad was convincing.   _____   _____   _____
      _____   _____
This ad said something to me.   _____   _____   _____
      _____   _____

10. Please select the position on the scale that best describes how persuasive the ad was.

      ( ) Not Persuasive
      ( )
      ( )
      ( )
      ( )
      ( )
      ( ) Persuasive

11. Please select the position on the scale that best describes how effective the ad was.

      ( ) Ineffective
      ( )
      ( )

( )
        ( )
        ( )
        ( ) Effective

12. Please select the position on the scale that best describes how compelling the ad was.

        ( ) Not Compelling
        ( )
        ( )
        ( )
        ( )
        ( )
        ( ) Compelling

==
  Identification & Felt Targetedness
==

13. Please rate your responses to the following questions, where 1 is 'Not at all' and 5 is 'Very Much'.

                                         1   Not at
all   2   3   4   5   Very much
How much do you identify with the characters in the ad?   _____
        _____   _____   _____   _____
How similar do you think you are to the characters in the ad? _____
        _____   _____   _____   _____

14. How much do you agree or disagree with the following statements?
                                        Strongly disagreeDisagree
      Neither agree nor disagree   Agree Strongly agree
I feel the advertisement was intended for people like me.
        _____   _____   _____   _____   _____
I don't believe I was in the target market the company created the
advertisement for.   _____   _____   _____   _____
        _____
The advertiser made that advertisement to appeal to people like me.
        _____   _____   _____   _____   _____

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================================================
 Breast Cancer Screening Behavior & Knowledge
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15. A mammogram is an x-ray of each breast to look for breast
cancer. Have you ever had a mammogram?
      ( ) Yes
      ( ) No

16. Please indicate whether each of the following statements is true
or false.

      True False I don't know
Getting regular and early checkups for breast cancer is more
important for people who have breast cancer in their families
because they have a higher risk of getting cancer. _____   _____
      _____
If some of your relatives have had breast cancer, you have a higher
risk of getting it.   _____
      _____   _____
Having a family history of breast cancer makes no difference in the
age you should first get a mammogram.
      _____   _____   _____
Making a family health history is an important step to knowing your
cancer risk.   _____
      _____   _____

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===============================================
 Cervical Cancer Screening Behavior & Knowledge
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17. A Pap smear is a test for cancer of the cervix. Have you ever had a Pap smear?
        ( ) Yes
        ( ) No

18. When did you have your most recent Pap smear?
        ( ) Less than 12 months ago
        ( ) Between 1 year and less than 2 years ago
        ( ) Between 2 years and less than 5 years ago
        ( ) More than 5 years ago

19. When do you expect to have your next Pap smear?
        ( ) A year or less from now
        ( ) More than 1 but not more than 3 years from now
        ( ) More than 3 but not more than 5 years from now
        ( ) Over 5 years from now
        ( ) I am not planning to have another
        ( ) If I have symptoms
        ( ) When a doctor/health provider recommends

20. Which one of the following is most likely to be associated with an increased risk of cervical cancer?
        ( ) Human papilloma virus, or HPV, the sexually transmitted virus that can cause genital warts
        ( ) One or more abortions
        ( ) High blood pressure
        ( ) A history of obesity
        ( ) Breastfeeding one or more children
        ( ) Don't know

21. Please indicate whether each of the following statements is true or false.

                                True False I don't know
Regardless of your age, you should get a Pap test every year.
        _____   _____   _____
A routine Pap test can save your life.   _____
        _____   _____
A Pap test can detect cervical cancer while it's treatable and curable.   _____   _____   _____

```
================================================
 Exercise & Nutrition Behavior and Knowledge
================================================
```

22. In a typical week, how many days do you do any moderate-intensity physical activity or exercise comparable to walking as if you were in a hurry?

_____

23. On the days that you do any moderate physical activity or exercise, how long are you typically doing these activities? (Please answer in minutes per day)

_____

24. How many days per week of physical activity or exercise are recommended for the average adult to stay healthy?

_____

25. On those days, how long should the average adult be physically active to stay healthy? (Please answer in minutes per day)

_____

26. During the past 30 days, have you tried to lose weight?
    ( ) Yes
    ( ) No

27. In the past week, on average, how many servings of fruit did you eat or drink per day? Please include 100% fruit juice, and fresh, frozen or canned fruits.
    ( ) Less than one serving per day
    ( ) 1 serving per day
    ( ) 2 servings per day
    ( ) 3 servings per day
    ( ) 4 servings per day
    ( ) 5 or more servings per day

28. In the past week, on average, how many servings of vegetables did you eat or drink per day, not counting potatoes? Please include green salad, 100% vegetable juice, and fresh, frozen or canned juices.
    ( ) Less than 1 serving per day
    ( ) 1 serving per day
    ( ) 2 servings per day
    ( ) 3 servings per day
    ( ) 4 servings per day
    ( ) 5 or more servings per day

29. What is the recommended combined number of servings of fruits and vegetables individuals should eat per day?
- ( ) 5
- ( ) 7
- ( ) 10
- ( ) It depends on your height and weight
- ( ) I don't know

```
=============================================
 Cancer Fatalism
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30. Please indicate how much you agree or disagree with the following statements.

Strongly Agree   Somewhat Agree   Somewhat Disagree   Strongly Disagree   No Opinion

There's not much you can do to lower your chances of getting cancer.
_____   _____   _____   _____   _____

There are so many different recommendations about preventing cancer that it's hard to know which ones to follow. _____   _____   _____   _____   _____

Cancer develops over a period of several years.
_____   _____   _____   _____   _____

There are ways to slow down or disrupt the development of cancer.
_____   _____   _____   _____   _____

31. Please indicate how much you agree or disagree with the following statements.

Strongly Agree   Somewhat Agree   Somewhat Disagree   Strongly Disagree   No Opinion

Cancer is most often caused by a person's behavior or lifestyle.
_____   _____   _____   _____   _____

It seems like almost everything causes cancer.
_____   _____   _____   _____   _____

I am reluctant to get checked for cancer because I fear I may have it. _____   _____   _____   _____   _____

Getting checked regularly for cancer increases the chances of finding cancer when it's easy to treat. _____   _____   _____   _____   _____

People with cancer would have pain or other symptoms prior to being diagnosed. _____   _____   _____   _____   _____

32. Which of the following statements comes closest to your view?
- ( ) I think staying healthy is a matter of God's will more than anything else
- ( )

( )
( ) My health largely depends on how well I take care of myself.

==
 Debriefing Open-Ended
==

33. What do you think the purpose of this study was?

_____
_____
_____
_____
_____

==
 Debriefing Closed-Ended
==

34. How much do you agree or disagree with the following statements?
                                      Strongly Agree
      Somewhat Agree   Somewhat DisagreeStrongly DisagreeNo Opinion
This study was testing how to target ads to different ethnic groups.
              _____   _____   _____   _____   _____
I felt like I had to answer the questions in a way that represented
my ethnic identity.   _____   _____   _____   _____
      _____
I consciously tried to avoid thinking about my ethnicity when
responding to questions about the ad.   _____   _____   _____
      _____   _____

35. How much do you agree or disagree with the following statements?
                                      Strongly Agree
      Somewhat Agree   Somewhat DisagreeStrongly DisagreeNo Opinion
I tried to think about how all women, not just those of my
ethnicity, would respond to the ad.   _____   _____
      _____   _____   _____
I wasn't fooled by the news stories; it was clear the purpose of the
study was to look at the ad. _____   _____   _____   _____
      _____
I tried to think about how women most like me would think about the
ad.   _____   _____   _____   _____   _____

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=============================================
 Health Information Exposure
=============================================


36. How much information about health and health care did you get
from each of the following sources over the past year?
                              A lot Some  A little   None at all
From a doctor or other medical professional  _____       _____
   _____        _____
From family or friends              _____       _____       _____
   _____
On the radio                        _____       _____       _____
   _____
On the internet                   _____     _____     _____     _____
On television                     _____     _____     _____     _____
From newspapers or magazines       _____       _____       _____
   _____
From a church or community organization       _____       _____
   _____        _____




=============================================
 Health Information Exposure Latina Language
=============================================


37. You said you heard [%%545:How much inform %%] health information
on the radio. Was that information mainly in Spanish or in English
or in both languages?
     ( ) Mostly in Spanish
     ( ) Mostly in English
     ( ) Both Spanish and English
     ( ) I don't remember


38. You said you read [%%546:How much inform %%] health information
on the internet. Was that information mainly in Spanish or in
English or in both languages?
     ( ) Mostly in Spanish
     ( ) Mostly in English
     ( ) Both Spanish and English
     ( ) I don't remember


39. You said you heard [%%547:How much inform %%] health information
on television. Was that information mainly in Spanish or in English
or in both languages?
     ( ) Mostly in Spanish
     ( ) Mostly in English
     ( ) Both Spanish and English
     ( ) I don't remember
```

40. You said you read [%%548:How much inform %%] health information in newspapers or magazines. Was that information mainly in Spanish or in English or in both languages?
        ( ) Mostly in Spanish
        ( ) Mostly in English
        ( ) Both Spanish and English
        ( ) I don't remember

41. You said you got [%%549:How much inform %%] health information from a church or community organization. Was that information mainly in Spanish or in English or in both languages?
        ( ) Mostly in Spanish
        ( ) Mostly in English
        ( ) Both Spanish and English
        ( ) I don't remember

42. Thinking about the past 30 days, how much have you heard about each of the following issues from the media (including television, radio, newspapers, magazines, and the internet)?

	A lot	Some	A little	None at all
About people being overweight or obese	_____	_____	_____	_____
About cancer	_____	_____	_____	_____
About health care insurance coverage	_____	_____	_____	_____
About HIV or AIDS	_____	_____	_____	_____
About diabetes	_____	_____	_____	_____

==
 Demographics
==

43. Please indicate your gender
    ( ) Male
    ( ) Female

44. What is your age?

    _____

45. What is your race/ethnicity?

        ( ) Caucasian
        ( ) Hispanic/Latino
        ( ) Black/African-American
        ( ) Asian/Pacific Islander
        ( ) Native American/Alaska Native
        ( ) Other/Multi-Racial

46. What is the last grade or class you completed in school?
    ( ) Grade 8 or lower
    ( ) Some high school, no diploma
    ( ) High school diploma or equivalent
    ( ) Technical or vocational school after high school
    ( ) Some college, no degree
    ( ) Associate degree or 2-year college degree
    ( ) Bachelor's degree
    ( ) Master's degree
    ( ) Ph.D. or professional degree (JD, MD, DDS, etc.)

47. Do you have high-speed internet access at home?
    ( ) Yes
    ( ) No
    ( ) I don't know

48. What is your total annual household income from all sources, before taxes?
    ( ) Less than $10,000
    ( ) More than $10,000 but less than $25,000
    ( ) More than $25,000 but less than $35,000
    ( ) More than $35,000 but less than $50,000
    ( ) More than $50,000 but less than $75,000
    ( ) More than $75,000 but less than $100,000
    ( ) $100,000 or more

49. In what region of the United States do you live?
    ( ) North or Northeast
    ( ) North Central (Midwest)
    ( ) South
    ( ) Southwest
    ( ) West

50. How would you describe the immediate city or town where you live?
    ( ) Urban (large city)
    ( ) Suburban (small or medium city near a large city)
    ( ) Rural (small town or farmland, far from a large city)

```
=================================================
 Latina Questions – Country of Origin & Language
=================================================

51.  In what country were you born?
     _____


52.  In what year did you first come to live in the United States?
     _____


53.  In what country were your parents and grandparents born?
             Mother        _____
             Father        _____
Maternal Grandmother      _____
Maternal Grandfather      _____
Paternal Grandmother      _____
Paternal Grandfather      _____

54.  How well do you speak Spanish?
        ( ) I do not speak Spanish.
        ( ) Very poorly
        ( ) Poorly
        ( ) Well
        ( ) Very well

55.  How well do you read and write Spanish?
        ( ) I do not read or write Spanish.
        ( ) Very poorly
        ( ) Poorly
        ( ) Well
        ( ) Very well


=================================================
 Comments
=================================================

56.  Do you have any other comments, or feedback about the survey?


        _____
        _____
        _____
        _____
        _____
```

```
=============================================
  Thank you – Disqualification for Technical Issues
=============================================


Thank you for your interest in this study. Unfortunately, you must
be able to view the video in order to complete this survey. If you
would like to try again, please use a different computer and click
on the original link provided to you..sg_Button_Group
{display:none;}#sg_SNC {display:none;}

Please click on the link below to ensure that you receive credit for
attempting this survey.

http://www.surveyspot.com/thankyou.jsp?mon=755152&stat=12

=============================================
  Thank You!
=============================================


Thank you for taking our survey. Your response is very important to
us. If you have any questions about the study, please contact Susana
Ramirez at sramirez@asc.upenn.edu.




Please click on the link below to ensure that you receive credit for
completing this survey.



http://www.surveyspot.com/thankyou.jsp?mon=755152&stat=10
#sg_SNC {display:none;}
```

Appendix C: Study 3 Main Study Instrument

Version A was administered to Latinas and is included below. Version B was

administered to NHW; it is the same as Version A with the exception of questions about

language and country of origin.

```
=====================================
=====================================
Media & Health – Version A
=====================================
=====================================


=============================================
 Welcome
=============================================

1. By checking this box, I acknowledge that I have read the consent
form above, and voluntarily agree to become a participant in this
research study.

     ( ) I agree

=============================================
 Familism
=============================================

2. Please indicate how strongly you agree or disagree with the
statements below.

                                Strongly agree    Agree Somewhat
disagree    Strongly disagreeNo Opinion
When someone has problems s/he can count on help from his/her
relatives. _____        _____       _____       _____       _____
A person should rely on his or her family if the need arises.
      _____        _____       _____       _____       _____
One can count on help from his/her relatives to solve most problems.
      _____        _____       _____       _____       _____

=============================================
 Intro to PSAs
=============================================

Now you will be asked to watch a video newscast. After watching the
video, you will be asked several questions about it. The video
should begin playing as soon as you click to the next page.
Therefore, before proceeding, PLEASE MAKE SURE THAT THE VOLUME ON
YOUR COMPUTER IS TURNED TO HIGH. Please watch the video in its
entirety. When it has finished, click to the next page to answer the
survey questions about it.
```

```
================================================
 VIDEO
================================================

After viewing the entire video, please click "Continue."

================================================
 Technical Check
================================================

3. Were you able to see and/or hear the video adequately?
      ( ) Yes, I could see and hear the video fine.
      ( ) No, I couldn't see and/or hear the video adequately.


4. Please describe any other technical issue you experienced (e.g.,
the video did not display completely, some was cut off, the sound
was intermittent, etc...).


          _____
          _____
          _____
          _____
          _____



================================================
 Perceived Effectiveness
================================================

5. Please indicate how much you agree or disagree with the following
statements.
                    Strongly Agree    Agree Neither Agree nor Disagree
      Disagree    Strongly Disagree
This ad got my attention.          _____      _____      _____
      _____      _____
This ad was convincing.            _____      _____      _____
      _____      _____
This ad said something to me.      _____      _____      _____
      _____      _____


6. Please select the position on the scale that best describes how
persuasive the ad was.

      ( ) Not Persuasive
      ( )
      ( )
      ( )
      ( )
      ( )
      ( ) Persuasive
```

7. Please select the position on the scale that best describes how effective the ad was.

        ( ) Ineffective
        ( )
        ( )
        ( )
        ( )
        ( )
        ( ) Effective

8. Please select the position on the scale that best describes how compelling the ad was.

        ( ) Not Compelling
        ( )
        ( )
        ( )
        ( )
        ( )
        ( ) Compelling

==
   Identification & Felt Targetedness
==

9. Please rate your responses to the following questions, where 1 is 'Not at all' and 5 is 'Very Much'.

                                         1   Not at
all   2   3   4   5   Very much
How much do you identify with the characters in the ad?   _____
      _____   _____   _____   _____
How similar do you think you are to the characters in the ad? _____
        _____   _____   _____   _____

10. How much do you agree or disagree with the following statements?
                                      Strongly disagreeDisagree
      Neither agree nor disagree   Agree Strongly agree
I feel the advertisement was intended for people like me.
        _____   _____   _____   _____   _____
I don't believe I was in the target market the company created the advertisement for.   _____   _____   _____   _____
        _____
The advertiser made that advertisement to appeal to people like me.
        _____   _____   _____   _____   _____

248

```
================================================
 Cancer Screening Behavior & Knowledge
================================================
```

11. A mammogram is an x-ray of each breast to look for breast
cancer. Have you ever had a mammogram?
      ( ) Yes
      ( ) No

12. A Pap smear is a test for cancer of the cervix. Have you ever
had a Pap smear?
      ( ) Yes
      ( ) No

13. When did you have your most recent Pap smear?
      ( ) Less than 12 months ago
      ( ) Between 1 year and less than 2 years ago
      ( ) Between 2 years and less than 5 years ago
      ( ) More than 5 years ago

14. When do you expect to have your next Pap smear?
      ( ) A year or less from now
      ( ) More than 1 but not more than 3 years from now
      ( ) More than 3 but not more than 5 years from now
      ( ) Over 5 years from now
      ( ) I am not planning to have another
      ( ) If I have symptoms
      ( ) When a doctor/health provider recommends

15. Which one of the following is most likely to be associated with
an increased risk of cervical cancer?
      ( ) Human papilloma virus, or HPV, the sexually transmitted
virus that can cause genital warts
      ( ) One or more abortions
      ( ) High blood pressure
      ( ) A history of obesity
      ( ) Breastfeeding one or more children
      ( ) Don't know

```
================================================
 Exercise & Nutrition Behavior and Knowledge
================================================
```

16. In a typical week, how many days do you do any moderate-
intensity physical activity or exercise comparable to walking as if
you were in a hurry?

_____

17. On the days that you do any moderate physical activity or
exercise, how long are you typically doing these activities? (Please
answer in minutes per day)

_____

18. How many days per week of physical activity or exercise are
recommended for the average adult to stay healthy?

_____

19. On those days, how long should the average adult be physically
active to stay healthy? (Please answer in minutes per day)

_____

20. During the past 30 days, have you tried to lose weight?
     ( ) Yes
     ( ) No

21. In the past week, on average, how many servings of fruit did you
eat or drink per day? Please include 100% fruit juice, and fresh,
frozen or canned fruits.
     ( ) Less than one serving per day
     ( ) 1 serving per day
     ( ) 2 servings per day
     ( ) 3 servings per day
     ( ) 4 servings per day
     ( ) 5 or more servings per day

22. In the past week, on average, how many servings of vegetables
did you eat or drink per day, not counting potatoes? Please include
green salad, 100% vegetable juice, and fresh, frozen or canned
juices.
     ( ) Less than 1 serving per day
     ( ) 1 serving per day
     ( ) 2 servings per day
     ( ) 3 servings per day
     ( ) 4 servings per day
     ( ) 5 or more servings per day

250

23. What is the recommended combined number of servings of fruits
and vegetables individuals should eat per day?
        ( ) 5
        ( ) 7
        ( ) 10
        ( ) It depends on your height and weight
        ( ) I don't know

===
 Cancer Fatalism
===

24. Please indicate how much you agree or disagree with the
following statements.
                                        Strongly Agree
      Somewhat Agree   Somewhat DisagreeStrongly DisagreeNo Opinion
There's not much you can do to lower your chances of getting cancer.
                  _____   _____   _____   _____   _____
There are so many different recommendations about preventing cancer
that it's hard to know which ones to follow. _____   _____
          _____   _____   _____
Cancer develops over a period of several years.
                  _____   _____   _____   _____   _____
There are ways to slow down or disrupt the development of cancer.

                  _____   _____   _____   _____
        _____

25. Please indicate how much you agree or disagree with the
following statements.
                                        Strongly Agree
      Somewhat Agree   Somewhat DisagreeStrongly DisagreeNo Opinion
Cancer is most often caused by a person's behavior or lifestyle.
                  _____   _____   _____   _____   _____
It seems like almost everything causes cancer.
        _____   _____   _____   _____   _____
I am reluctant to get checked for cancer because I fear I may have
it.   _____   _____   _____   _____
        _____
Getting checked regularly for cancer increases the chances of
finding cancer when it's easy to treat. _____   _____   _____
          _____   _____
People with cancer would have pain or other symptoms prior to being
diagnosed.   _____   _____   _____   _____
        _____

26. Which of the following statements comes closest to your view?
      ( ) I think staying healthy is a matter of God's will more than anything else
      ( )
      ( )
      ( ) My health largely depends on how well I take care of myself.

===
 General Media Exposure: Latina Version
===

27. Do you currently receive Spanish-language television stations at home?
      ( ) Yes
      ( ) No
      ( ) I don't know

28. On a typical weekday, Monday through Friday, about how many hours do you watch English-language television each day?
      _____

29. On a typical weekday, Monday through Friday, about how many hours do you watch Spanish-language television each day?
      _____

30. On a typical weekend, including both Saturday and Sunday combined, about how many total hours do you watch English-language television?
      _____

31. On a typical weekend, including both Saturday and Sunday combined, about how many total hours do you watch Spanish-language television?
      _____

32. Do you currently receive Spanish-language radio stations at home?
      ( ) Yes
      ( ) No
      ( ) I don't know

33. On a typical weekday, Monday through Friday, about how many hours do you listen to English-language radio each day?
      _____

34. On a typical weekday, Monday through Friday, about how many hours do you listen to Spanish-language radio each day?
      _____

35. On a typical weekend, including both Saturday and Sunday combined, about how many total hours do you listen to English-language radio?
      _____

36. On a typical weekend, including both Saturday and Sunday combined, about how many total hours do you listen to Spanish-language radio?

_____

37. How often do you read newspapers....

	Every day	A few times per week	Once a week	Less than once a week	Rarely or never
...in English?	_____	_____	_____	_____	_____
...in Spanish?	_____	_____	_____	_____	_____

===
 Internet Habits
===

38. Please indicate how often you do each of the following activities online.

	Every day	A few times per week	Once a week	Less than once a week	Rarely or never
Read online versions of English-language newspapers or magazines	_____	_____	_____	_____	_____
Read online versions of Spanish-language newspapers or magazines	_____	_____	_____	_____	_____
Send email to people in another country	_____	_____	_____	_____	_____
Read health information in Spanish	_____	_____	_____	_____	_____
Read health information in English	_____	_____	_____	_____	_____
Shop or read about consumer products	_____	_____	_____	_____	_____
Watch videos or television programs	_____	_____	_____	_____	_____
Read blogs	_____	_____	_____	_____	_____
Write a blog	_____	_____	_____	_____	_____
Read or update a social networking site (e.g., Facebook, LinkedIn, MySpace)	_____	_____	_____	_____	_____

===
 Health Information Exposure
===

39. How much information about health and health care did you get from each of the following sources over the past year?

	A lot	Some	A little	None at all
From a doctor or other medical professional	_____	_____	_____	_____

From family or friends   _____   _____   _____   _____

On the radio   _____   _____   _____   _____

On the internet   _____   _____   _____   _____

On television   _____   _____   _____   _____

From newspapers or magazines   _____   _____   _____   _____

From a church or community organization   _____   _____   _____   _____

```
===============================================
 Health Information Exposure Latina Language
===============================================
```

40. You said you heard [%%545:How much inform %%] health information on the radio. Was that information mainly in Spanish or in English or in both languages?
     ( ) Mostly in Spanish
     ( ) Mostly in English
     ( ) Both Spanish and English
     ( ) I don't remember

41. You said you read [%%546:How much inform %%] health information on the internet. Was that information mainly in Spanish or in English or in both languages?
     ( ) Mostly in Spanish
     ( ) Mostly in English
     ( ) Both Spanish and English
     ( ) I don't remember

42. You said you heard [%%547:How much inform %%] health information on television. Was that information mainly in Spanish or in English or in both languages?
     ( ) Mostly in Spanish
     ( ) Mostly in English
     ( ) Both Spanish and English
     ( ) I don't remember

43. You said you read [%%548:How much inform %%] health information in newspapers or magazines. Was that information mainly in Spanish or in English or in both languages?
     ( ) Mostly in Spanish
     ( ) Mostly in English
     ( ) Both Spanish and English
     ( ) I don't remember

44. You said you got [%%549:How much inform %%] health information from a church or community organization. Was that information mainly in Spanish or in English or in both languages?
     ( ) Mostly in Spanish
     ( ) Mostly in English
     ( ) Both Spanish and English
     ( ) I don't remember

45. Thinking about the past 30 days, how much have you heard about
each of the following issues from the media (including television,
radio, newspapers, magazines, and the internet)?

```
                                 A lot Some  A little    None at all
About people being overweight or obese  _____      _____        _____
       _____
About cancer                        _____      _____     _____     _____
About health care insurance coverage          _____        _____
       _____        _____
About HIV or AIDS                  _____      _____       _____     _____
About diabetes                     _____      _____       _____     _____
About the swine flu                      _____       _____       _____
       _____
```

```
===============================================
 Demographics & Background Information
===============================================
```

46. Please indicate your gender
    ( ) Male
    ( ) Female

47. What is your age?

    _____

48. What is your race/ethnicity?

        ( ) Caucasian
        ( ) Hispanic/Latino
        ( ) Black/African-American
        ( ) Asian/Pacific Islander
        ( ) Native American/Alaska Native
        ( ) Other/Multi-Racial

49. What is the last grade or class you completed in school?
        ( ) Grade 8 or lower
        ( ) Some high school, no diploma
        ( ) High school diploma or equivalent
        ( ) Technical or vocational school after high school
        ( ) Some college, no degree
        ( ) Associate degree or 2-year college degree
        ( ) Bachelor's degree
        ( ) Master's degree
        ( ) Ph.D. or professional degree (JD, MD, DDS, etc.)

50. Do you have high-speed internet access at home?
        ( ) Yes
        ( ) No

```
         ( ) I don't know

51. What is your total annual household income from all sources,
before taxes?
         ( ) Less than $10,000
         ( ) More than $10,000 but less than $25,000
         ( ) More than $25,000 but less than $35,000
         ( ) More than $35,000 but less than $50,000
         ( ) More than $50,000 but less than $75,000
         ( ) More than $75,000 but less than $100,000
         ( ) $100,000 or more


52. In what region of the United States do you live?
         ( ) North or Northeast
         ( ) North Central (Midwest)
         ( ) South
         ( ) Southwest
         ( ) West


53. How would you describe the immediate city or town where you
live?
         ( ) Urban (large city)
         ( ) Suburban (small or medium city near a large city)
         ( ) Rural (small town or farmland, far from a large city)


54. What is your height?
         Feet _____
         Inches _____


55. What is your weight, in pounds?

         _____
```

```
================================================
 Latina Questions – Country of Origin & Language
================================================
```

56. In what country were you born?

   _____

57. In what year did you first come to live in the United States?

   _____

58. In what country were your parents and grandparents born?

Mother	_____
Father	_____
Maternal Grandmother	_____
Maternal Grandfather	_____
Paternal Grandmother	_____
Paternal Grandfather	_____

59. How well do you speak Spanish?
   ( ) I do not speak Spanish.
   ( ) Very poorly
   ( ) Poorly
   ( ) Well
   ( ) Very well

60. How well do you read and write Spanish?
   ( ) I do not read or write Spanish.
   ( ) Very poorly
   ( ) Poorly
   ( ) Well
   ( ) Very well

```
================================================
  Comments
================================================

61. Do you have any other comments, or feedback about the survey?

        _____
        _____
        _____
        _____
        _____



================================================
  Thank you – Disqualification for Technical Issues
================================================


Thank you for your interest in this study. Unfortunately, you must
be able to view the video in order to complete this survey. If you
would like to try again, please use a different computer and click
on the original link provided to you..sg_Button_Group
{display:none;}#sg_SNC {display:none;}


 Please click on the link below to ensure that you receive credit
for attempting this survey.



http://www.surveyspot.com/thankyou.jsp?mon=763947&stat=12




================================================
  Thank You!
================================================

Thank you for taking our survey. Your response is very important to
us. If you have any questions about the study, please contact Susana
Ramirez at sramirez@asc.upenn.edu.



Please click on the link below to ensure that you receive credit for
completing this survey.

http://www.surveyspot.com/thankyou.jsp?mon=763947&stat=10
#sg_SNC {display:none;}
```

Appendix D: Study 3 Script Summaries

The following six messages (3 matched pairs of targeted/mainstream messages) were

pre-tested and were presented to pre-test subjects in the following order. The breast cancer and

Pap test pairs were selected for use in the final experiment. The two news stories summarized

below were used in the final experiment: together without the PSA for the control condition,

with either the targeted or the general-market PSA in between the two stories in each of the

experimental conditions.

Message Pair #1: Pap Smear

Ad 1: "Happy Pap Day" (mainstream)

Produced by the Michigan Department of Community Health

Length: 30 seconds

Summary of script

- Scene: Office cubicle; white woman; multicultural cast of office mates present a
  birthday cake and sing "happy Pap day." Reminder to have a Pap test regularly, for
  women of all ages.
    - http://www.youtube.com/watch?v=qA8IIA_VX58

Ad 2: "Change of Mind" (targeted)

Produced by Redes en Acción

Length: 30 seconds

Summary of script

- Features 3 young middle age Latinas having coffee, 1 is late because she was at the clinic
  getting her routine Pap test. Another says she doesn't get them anymore because her
  kids are grown and besides, they're uncomfortable. The third says they are sometimes,
  but she gets them anyway, and they all agree that it's important to get them regularly to
  be safe. Ends with male voice-over: find out more information about cervical cancer by
  calling the NCI's Cancer Information Service (phone number provided on screen).
    - Goal: Change behavior. Behavior = getting yearly Pap tests
    - Central arguments:
        - Even though it may be uncomfortable, it's important
        - Regular Pap tests should be done yearly for all women

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Message Pair#2: Family history of breast cancer

Ad 3: "I admire them" (targeted)

Produced by Redes en Acción

Length: 30 seconds

Summary of script

- Scene: 3 women in a living room looking at photo albums. Voice-over by a young woman with a Spanish accent: "Since my tía and cousin both got breast cancer, nothing has been the same. Now I know we may have a higher risk in our family. That makes it even more important to have regular and early checkups. Cancer should not happen to young people, but sometimes it does…Know your family history. Please, get screened." One woman is currently going through chemo and is wearing a head scarf. Pictures show both women with cancer going through different treatments. Cuts to male voice-over: find out more information about breast cancer by calling the NCI's Cancer Information Service (phone number provided on screen).

Ad 4: "Breast cancer runs in my family" (mainstream)

Produced by WJLA television station

Length: 30 seconds

Summary of script

- Begins with a drawing of a family tree; 1 White woman (looks like she could be Latina, but her Anglo name is on the screen and she has no accent) describes her family history of breast cancer; another White woman identified as a genetic counselor describes the importance of family history in cancer risk. Message is to find out your family history and share with your doctor.
    - Appears to be sponsored by a genetic counseling organization and a local TV news station.
    - http://www.youtube.com/watch?v=_MyDv-ikN1w

Message Pair #3: Colon cancer awareness

Ad 5: "Now you know" (targeted)

Produced by Redes en Acción

Length: 30 seconds

Summary of script

Ad 6: "NCRF Colorectal Cancer Awareness" (mainstream)

Produced by Canadian province government (Ontario)

Length: 30 seconds

Summary of script

- White woman shopping in a supermarket. Voice-over: "There are no early symptoms for colorectal cancer." Signs on the floor say: "Eat fruits and veggies and exercise to prevent colon cancer." Male voice-over: "Find out about colon cancer; it can save your life."
  - http://www.youtube.com/watch?v=O6ivIykzJno

News Stories

News story 1: The High Cost of Eating Healthy

- Older white male reporter in front of a screen discussing how to eat healthfully for less money. "Healthbeat" segment of news program by station KQAT 7.

- Length: 19 seconds

News story 2: Women and Heart Disease

- Young African-American female reporter: heart disease is a big problem for U.S. women.

- Length: 19 seconds

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