Enhancing Health Message Framing With Metaphor and Cultural Values: Impact on Latinas' Cervical Cancer Screening

Melissa Spina, MA[1] • Jamie Arndt, PhD[2] • Mark J. Landau, PhD[3] • Linda D. Cameron, PhD[4]

Abstract

Background An integration of message framing and sociocultural literature suggests that ethnic health disparities may be reduced by incorporating minority groups' cultural values into persuasive health messages. Framing messages with metaphors represents one promising strategy for harnessing cultural values to change health outcomes. Still, the effectiveness of metaphoric health messages in minority populations has received virtually no empirical attention.

Purpose To fill this gap, the present study tested whether a health message using a cancer-screening metaphor targeting collectivism and familism values would engage individual differences in these values to predict Papanicolaou (Pap) smear intentions among Latinas.

Methods Latina women ($N = 168$) completed an online survey including measures of collectivism and familism. They were randomized to read a message about Pap smears featuring the metaphor *the body is a family* or no metaphor before reporting their Pap smear intentions.

Results Regression analyses revealed a pattern of interactions suggesting metaphoric messages engage targeted cultural values: For Latinas reading the *family* metaphor message, collectivism and familism positively predicted Pap smear intentions, whereas for Latinas reading the no-metaphor message, these values did not predict intentions.

Conclusions This study offers a foundation for further examination of the potential for metaphoric health messages that connect to cultural values to reduce ethnic health disparities. Implications and directions for future research are discussed.

Keywords Conceptual metaphor • Message framing • Health disparities • Health communication • Pap smears

Introduction

Racial and ethnic health disparities continue to be widespread in the USA and other countries. Although all disparities merit attention, those involving Latinos are particularly alarming given their rate of population growth in the USA. Latinos accounted for 17% of the national population in 2015 [1]. Latino health disparities include higher incidence rates of cancer, later stage diagnosis, and premature deaths associated with cancer [2]. Indeed, compared with non-Latino Whites, Latinos have higher incidence and mortality rates for stomach, liver, uterine, cervix, and gallbladder cancer [3]. They are also less likely to take advantage of screenings. Latina women have the lowest rates of mammography tests compared with both Black and White women [4] and receive screenings for breast and cervical cancer less often than White women [5].

Among a complex interplay of contributing factors, cultural influences play an important role [6]. For example, underutilization of cancer prevention

Jamie Arndt
arndtj@missouri.edu

1   Department of Counseling, San Francisco State University, CA, USA

2   Department of Psychological Sciences, University of Missouri, MO, USA

3   Department of Psychology, University of Kansas, KS, USA

4   Psychological Sciences, University of California Merced, CA, USA

screenings and other prevention measures is especially prevalent for Latinos who are less acculturated to the attitudes, values, and behavior of American culture [7, 8]. Such findings have led to the suggestion that extant public health messages may exacerbate ethnic health disparities by ignoring differences in recipients' cultural backgrounds [9]. The implication is that if health communications are to change health attitudes and behavior, it is imperative to frame messages in ways that connect to recipients' cultural values.

The present report examines whether framing a health message with a culturally relevant metaphor can achieve this goal depending on the cultural values the recipient endorses. Despite the growing evidence that metaphoric messages uniquely influence attitudes [10–12], and the prevalence of metaphors in health discourse [13, 14], little if any research has explored using metaphors to change health outcomes in minority populations. The present study fills this gap by testing whether Latinas' intentions to receive a Papanicolaou (Pap) smear are differentially influenced by the interaction between their cultural values and exposure to a message that uses a metaphor to frame cancer prevention as an expression of Latino cultural values.

Framing Health Messages With Culturally Relevant Metaphors

Over the last two decades, evidence has accumulated that health messages are more effective when framed in ways that match recipients' motivational, affective, and cognitive orientations [15, 16]. Early research focused on how messages framed in terms of gains or losses interacted with characteristics of the health context and individual differences in self-regulation. Going further, recent research highlights the importance of framing messages in ways that align with the cultural values of the targeted group or individual [6, 17]. Messages framed as congruent with a recipient's cultural values more effectively direct health attitudes and behavior, including attitudes pertaining to prevention and screening [18, 19].

Sociocultural research converges with this conclusion. With regard to Latinos, efforts to communicate the nature and importance of a health issue have been more successful when connecting with the values, beliefs, and customs of their cultural background [20–24]. Even brief messages with cultural relevance have encouraged productive Latino health attitudes and behavior [25–27]. For example, a message that conveyed risk information in the context of a story about a Latino family, and thus took advantage of Latino cultural appreciation for the medium of storytelling with relatable characters, was more effective than a fact-filled message in increasing Latinos' colorectal cancer prevention intentions (e.g., consumption of vegetables, physical exercise, colonoscopy screenings [28]). One challenge, then, is how to effectively frame health messages to connect with Latino values.

The present research examines the potential of providing vivid metaphors as a message-framing strategy in the context of ethnic minority health attitudes. According to the conceptual metaphor theory, metaphors are cognitive tools that people can use to understand one concept—the *target*—in terms of a superficially dissimilar concept called the *source* [10, 29]. Targets are typically abstract or complex, and people find them difficult to comprehend. Sources are well known and based on concrete, familiar experiences. Metaphor use applies schematic knowledge of the source as a template to make sense of what the target is and how one should relate to it, even though the two concepts are superficially unrelated.

Research inspired by conceptual metaphor theory tests the effects of situationally activated metaphors on interpretation of a target. One method is to expose people to a *metaphoric framing*—a message that compares a target to a superficially dissimilar source—and compare their attitudinal responses to those exposed to a similar message using a different metaphor or no metaphor. Studies show that exposure to a metaphoric framing leads people to judge a target in ways that correspond to their source knowledge. For example, Thibodeau and Boroditsky [11] showed that participants who read an article comparing a city's crime problem to an aggressive *beast* spontaneously generated more aggressive and punitive-crime-reduction strategies, whereas those who read an article framing the same facts in *disease*-metaphoric terms recommended addressing the root causes of crime. In both metaphor activation conditions, participants applied knowledge of the respective source to determine how to solve the target problem.

Metaphoric framing similarly influences behavioral intentions. In one study [12], some students were exposed to imagery framing an abstract academic goal as a destination on a physical path. This prompted them to apply their experience with motion along paths to visualize how that distant-future goal connects to academic activities in the present. Consequently, they were more intent on working hard in their classes and taking advantage of resources designed to help them achieve.

Based on these findings, it is possible that metaphors used in health messages uniquely influence attitudes toward health-related concepts, particularly those that, like many cancers, are abstract and difficult to visualize concretely. This possibility has been examined in qualitative analyses of cancer discourse [13]. Sontag [14], for example, proposed that popular military metaphors (e.g., "*Fight back* against cancer") bias attitudes toward cancer treatments and survivors. Inspired by these analyses,

researchers have begun testing the impact of metaphoric health messages experimentally. For example, a health message framing the flu virus metaphorically (as a *beast*, *riot*, *army*, or *weed*) more effectively promoted flu vaccination intentions than a message framing the flu as a literal virus [30]. Furthermore, a message-framing cancer prevention as military combat decreased intentions to make restrictive lifestyle changes (e.g., limit alcohol consumption) that, as restraint behaviors, are stereotypically ill-suited to fighting a battle [31].

The present research considers the potential of culturally relevant metaphors to promote Latino screening intentions. When used in a health message, a metaphor can compare a health concept to ideas that minority group members value. In this way, the metaphor may transfer those values to the health concept, helping recipients to appreciate the relevance of the recommended health behavior to their own well-being. Empirically assessing this reasoning requires identifying Latino values with which to metaphorically frame a health message and that vary across individuals.

Two intertwined facets of Latino culture hold particular promise for use in health communication. One is a collectivist orientation characterized as the experience of the self as situated in a web of binding, self-defining relationships [32]. Whereas individualist orientations privilege the independent person as the fundamental unit of analysis within his or her social networks, collectivist orientations regard the individual as fundamentally interdependent on his or her social groups [33, 34]. Of particular interest is collectivists' valuing of shared norms and prosocial goals over egocentric goals [33, 34]. The self and relationships are defined in terms of the individual's responsibilities within a particular group, which for Latino culture is often the family. Indeed, the second facet of Latino culture relevant to the present research is the value of familism, or *familismo*, which prescribes how the (often extended) family can take precedence over individual interests [35, 36]. Familism directs Latino decision-making in a number of health domains [37], and health messages that express familism strongly appeal to Latino audiences [38]. The present study thus focused on the values of collectivism and familism.

Present Study

The foregoing integration of conceptual metaphor theory with sociocultural and message framing approaches to health communication points to an unexamined possibility: A metaphor featured in a health message can appeal to a minority group by framing health concepts in terms of ideas that, although superficially unrelated, connect to that group's cultural values. The present study tested this possibility in the context of Latina women's underutilization of Pap smear screening [39]. Because

of the importance Latino culture places on collective familism [35–37], the present study assessed a message that uses metaphor to frame the body as a family and Pap smear screening as an act of family support.

Notably, the current theorizing posits that the familial metaphor will not be persuasive for all Latinas. Landau et al. [40] developed a source resonance hypothesis predicting that the impact of a cued metaphor depends on the extent to which its source (again, the concept used to frame the target) resonates with the values endorsed by the individual. As applied to the present investigation, this suggests that the effect of a cued metaphor that likens cancer screening to family support will be moderated by individual differences in endorsement of the cultural values of collectivism and familism that constitute this metaphor's source. A metaphor for cancer screening that is oriented toward collective-familial values should more effectively engage Latinas who are more (vs. less) collectivistic and who strongly value familism. Specifically, when screening is framed metaphorically as family support, greater endorsement of collectivism and familism should positively predict screening intentions; in contrast, when screening is not framed with the *family* metaphor, these individual differences should not predict intentions.

Method

Sample

Participants were recruited through four sources. For all recruitment sources, eligibility criteria were specified as female, Latina, and over the age of 21. A brief description of a study called "Views on Health Issues" and an associated link were posted once on university-wide listservs at (a) The University of California-Merced and (b) Texas A&M University-Kingsville. The 20 student participants from Texas A&M–Kingsville were compensated with extra credit for a course. The 30 student participants from University of California-Merced were compensated with entry into a raffle with a 5% chance of winning a $50 Visa gift card. (c) The same information and link were posted once on the National Latino/a Psychological Association (NLPA) listserv along with a request to forward it to potentially interested persons. The NLPA listserv posting generated 26 respondents who were also compensated with entry into a raffle with a 5% probability for a $50 Visa gift card. (d) Ninety-two participants were recruited through a double opt-in panel operated by Qualtrics software that recruits from various online sources (e.g., customers who join the panel in exchange for points to their favorite retail outlet). Participants recruited from Qualtrics received monetary compensation between $2.00 and $3.00, depending on algorithms that Qualtrics uses. Demographic characteristics are reported in Table 1.

Of the 183 women who were recruited, those who were under the age of 21 (for whom Pap smears are not recommended; $n = 1$), identified as multiracial (so that responses could be more confidently tied to Latino culture; $n = 13$), or had received 20 Pap smears in the past 5 years (suggesting a medical condition likely to have a dominating influence on future Pap smear intentions; $n = 1$) were excluded, leaving a final sample of 168.

Materials and Procedure

The materials and procedure described below were approved by the applicable Institutional Review Board. Materials were introduced as soliciting opinions on health issues and presented online in English. The study adopted an experimental design, with the online survey used to collect baseline data on individual differences in cultural values before assigning participants to one of two experimental message-framing conditions. Following the experimental manipulation, participants completed measures of their screening intentions. Informed consent was obtained from all individual participants. Abbreviated versions of several measures (described below) were used in the interest of minimizing participant burden and maximizing complete responses to the materials.

Cultural orientation scale

Four items from the Cultural Orientation Scale [41], rated on a 9-point scale (1 = *Never* or *definitely no*, 9 = *Always* or *definitely yes*), assessed the value of collectivism (e.g.,

Table 1 Demographic characteristics and descriptive statistics of primary variables

Variable	Total $n = 168$	T-A&M $n = 20$	UCM $n = 30$	NLPA-list $n = 26$	Qualtrics $n = 92$	p value
Age (year), mean (SD)	30.58 (10.62)	23.95a	26.17ab	29.62bc	33.50c	<.001
Immigrant generation (%)						<.001
First	28	5	20	53.8	28.3	
Second	41.1	30	66.7	34.6	37	
Third or more	24.9	55	10	11.5	27.2	
Unsure	6	10	3.3	0	7.6	
Ethnic origin (%)						.008
Mexican	67.3	94.7	76.7	50	63.3	
All other	32.7	5.3	23.3	50	36.7	
Puerto Rican						
Cuban						
Dominican						
Salvadoran						
Other/more than one						
Education (%)						<.001
< High school	2.4	0	0	0	4.4	
High school diploma	20.8	30	10	0	28.3	
Some college or other	37.5	30	53.4	15.3	40.2	
Bachelor's degree	24.4	35	26.7	26.9	20.7	
Advanced degree	14.9	5	10	57.7	6.5	

Analytic variables	Total Mean (SE)	T-A&M Mean (SE)	UCM Mean (SE)	NLPA Mean (SE)	Qualtrics Mean (SE)	p value
Collectivism	7.56 (1.14)	7.25a (0.25)	7.15a (0.20)	7.18a (0.22)	7.87b (0.12)	<.001
Familism	6.87 (1.52)	7.19a (0.31)	6.17b (0.25)	5.77b (0.27)	7.34a (0.15)	<.001
Pap smear intentions	3.87 (0.78)	3.97a (0.17)	3.59a (0.14)	3.84a (0.15)	3.95a (0.08)	.158
Interest in learning	3.56 (1.27)	3.73a (0.28)	3.38ab (0.23)	2.89b (0.24)	3.78a (0.13)	.011

p values refer to overall differences between groups. Within rows, means that do not share a subscript differ at *p* < .05. For ethnic origin, low-frequency categories are collapsed to meet the assumptions of chi-square tests.

"It is my duty to take care of my family, even when I have to sacrifice what I want."; α = .64).

Attitudinal familism scale

Endorsement of familism was measured with eight items from the Attitudinal Familism Scale (e.g., "A person should live near his or her parents and spend time with them on a regular basis." 1 = *Strongly disagree*, 10 = *Strongly agree*; α = .80; [42]). Familism and collectivism were correlated at $r = .48$, $p < .001$, suggesting they are related but nonredundant constructs.

Message type manipulation

Participants were asked to read some basic information about a Pap smear test (e.g., "It is performed by most healthcare providers during a gynecologic checkup."; "If detected early, cervical cancer can be cured."). They were then randomly assigned to read either a *family* metaphor message ($n = 86$) or a no-metaphor message ($n = 82$). The *family* metaphor message read:

> ### "Why should you get a Pap Smear?
> One way to consider this question is to think about the connection between your body and a family. You know that a family is made up of lots of people, like a father, mother, children, aunts, uncles, cousins, and grandparents. And you know that what keeps a family strong is that they all work together and depend on each other. When each family member is cared for, a family is stronger as a whole. Your body works in the same way. It is made up of many parts that all work together. Like a family, they communicate back and forth and rely on each other to keep your body well. So you can think about it like this: Getting a Pap smear every three years is like making sure that a member of your family is cared for. And that's what it takes to keep the whole "family" of your body healthy, safe, and strong for years to come."

The no-metaphor message read:

> ### "Why should you get a Pap Smear?
> One way to consider this question is to think about the connection between the parts of your body. You know that a body is made up of many organs, like a heart, brain, kidneys, liver, stomach, lungs, and pancreas. These organs belong to what are called *body systems.* You may have heard of the digestive system, respiratory system, and circulatory system. Others include the endocrine and lymphatic systems. What keeps the body healthy is when all those systems function properly, and that depends

on each organ being healthy. For example, in your circulatory system, blood is pumped by the heart, cleaned by kidneys, and receives chemicals from the pancreas. So you can think about it like this: Getting a Pap smear every three years is one way to make sure that a part of your body is healthy. And that's what it takes to keep body systems functioning properly and your whole body healthy, safe, and strong for years to come."

Cancer screening intentions and interest

After reading one of these two messages, participants were asked four questions regarding their intentions to receive a Pap smear test adapted from Jennings-Dozier [43] and Kahn et al. [44]: "Do you plan to get a Pap smear test in the coming year?"; "How often in the future do you intend to receive a Pap smear test?"; "How sure or unsure are you that you will get a Pap smear test every three years?"; and "Please rate your intentions to obtain a Pap smear test every three years." Responses were made on a 5-point scale with slightly varying anchor labels (e.g., 1 = *Definitely not*, 5 = *Definitely*; α = .73).

Three additional questions with similar scaling gauged participants' interest in learning more about Pap smears and being contacted with more information (e.g., "How interested are you in learning more about the benefits of Pap smear tests in detecting cancer early?"; α = .90). The composite measures of intentions and interest were correlated at $r = .49$, $p < .001$, suggesting that although related, they are not redundant constructs. This is consistent with theoretical models of factors motivating intentions and actions, which specify that interest does not necessarily lead to intentions, and factors other than interest motivate intentions [45].

Demographic characteristics

Participants provided demographic information at the end of the survey.

Data Analysis

Analyses were guided by the following hypotheses: Among participants exposed to a *family* metaphor message, individual differences in familism and collectivism will positively predict Pap smear intentions (e.g., higher levels of the individual differences should predict greater intentions), whereas among participants exposed to a no-metaphor message, familism and collectivism will not predict Pap smear intentions. These hypotheses were examined with multiple regression analyses conducted in accordance with recommendations by Aiken and West [46]. Significant interactions were examined with post hoc analyses of simple slopes.

Results

As can be seen in Table 1, there were significant differences between recruitment sites on age, education, immigrant generation, ethnic origin, familism, collectivism, and interest in learning about Pap smear and cervical cancer. Overall, the sample recruited by Qualtrics Software Company tended to be older, less educated, more collectivistic, and higher in familism. The sample recruited through the NLPA tended to have a greater proportion of first-generation respondents, more evenly represented ethnic origins other than Mexican, and was less interested in learning about Pap smears. Thus, after the main analyses are presented, additional analyses will determine if recruitment site moderated, or accounted for, the effects subsequently reported.

Collectivism

Analyses in which Pap smear intentions and interest were each regressed on message type condition, collectivism, and their interaction revealed no main effects of message type (all $p > .25$; see Table 2). For Pap smear intentions, higher collectivism was generally associated with higher intentions. As predicted, the Collectivism × Message type interaction contributed significantly to the total variance explained, $\Delta R^2 = .14$ (see Fig. 1). Examination of simple slopes showed that when participants read the *family* metaphor message, collectivism positively predicted their Pap smear intentions, $\beta = 0.49$, $SE_b = 0.071$, $t(164) = 4.76$, $p < .001$. In contrast, when participants read the no-metaphor message, this relationship was nonsignificant, $\beta = 0.18$, $SE_b = 0.07$, $t(164) = 1.72$, $p = .09$.

For interest in learning about Pap smears and cervical cancer, collectivism was generally associated with greater interest. Although the interaction between message type and collectivism did not contribute significantly to the variance explained ($p = .10$), the pattern was in the same direction as with intentions.

Familism

Regression analysis of Pap smear intentions revealed that, in general, higher familism was associated with higher intentions. In addition, the predicted Familism × Message type interaction effect on Pap smear intentions contributed to the variance explained, $\Delta R^2 = .05$; all other $p > .46$; see Fig. 2. After reading the *family* metaphor message, participants' familism positively predicted their Pap smear intentions, $\beta = 0.32$, $SE_b = 0.05$, $t(164) = 3.34$, $p = .001$. However, this relationship was not evident among participants who read the no-metaphor message ($p = .95$).

Analyses testing familism as a moderator of message type effects on interest in learning about Pap smears and cervical cancer revealed no significant effects (all $p > .40$).

Analyses Accounting for Recruitment Site Differences in Personal Characteristics

To determine whether recruitment site moderated the Individual difference × Message type interactions, regression models were run that included recruitment site (dummy coded with the Qualtrics sample as the reference group), all two-way interactions, and the following three-way interaction term: Recruitment site ×

Table 2 Summary of regression analyses for Pap smear intentions and interest in learning of Pap smears

| | Pap smear intentions | | | | | | Interest in learning | | | | | |
| | Model 1 | | | Model 2 | | | Model 1 | | | Model 2 | | |
Variable	B	SE	β	B	SE	β	B	SE	β	B	SE	β
Collectivism	0.23	0.05	0.33***	0.23	0.05	0.33***	0.29	0.08	0.26**	0.29	0.08	0.26**
Message	−0.03	0.06	−0.04	−0.03	0.06	−0.04	0.02	0.10	0.02	0.02	0.10	0.26
Collectivism × Message				0.12	0.05	0.16*				0.14	0.08	0.12
R^2		0.11			0.14			0.07			0.08	
F		10.37***			4.73*			6.03**			2.71	
Familism	0.10	0.04	0.20**	0.09	0.04	0.16*	0.24	0.06	0.28***	0.23	0.07	0.28***
Message	−0.03	0.06	−0.04	−0.03	0.06	−0.04	0.02	0.10	0.01	0.02	0.10	0.01
Familism × Message				0.08	0.04	0.16*				0.01	0.07	0.02
R^2		0.04			0.07			0.08			0.08	
F		3.64*			4.06*			7.14**			0.04	

*$p < .05$, **$p < .01$, ***$p < .001$.
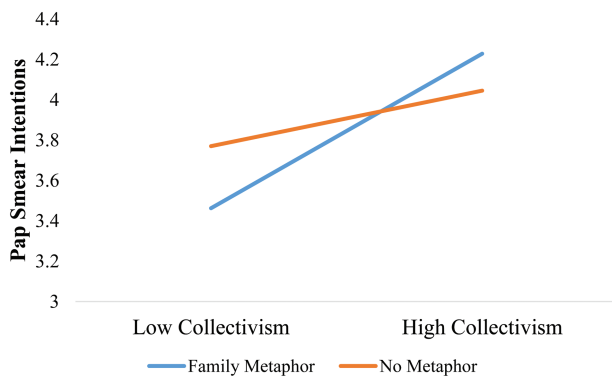
Fig. 1 Collectivism × Message type interaction on Pap smear intentions

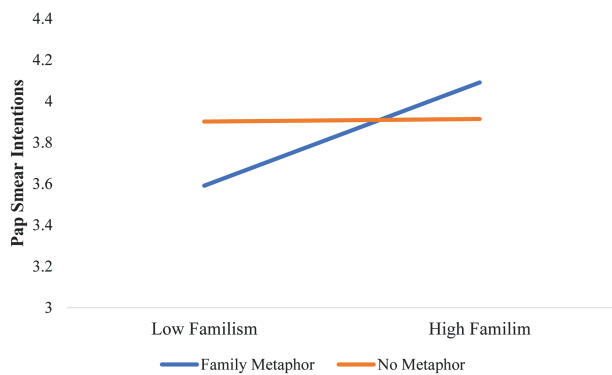**Fig. 2** Familism × Message type interaction on Pap smear intentions

Individual difference × Message type. These analyses revealed no significant three-way interactions on Pap smear intentions or interest in learning about Pap smears and cervical cancer (all p > .22). These null findings must be interpreted with caution, however, as the study was not powered to test these interactions. An alternative approach was used in which we examined recruitment site as a control variable in the regression equations presented in Table 2. Recruitment site was not a significant covariate in predicting intentions in these models (p = .158). Thus, the effects on intentions appear robust with respect to the sample diversity introduced by the differing recruitment sites. Although recruitment site was a significant covariate in predicting interest in learning about Pap smears (p = .011), including it as a covariate did not alter the nonsignificance of the Individual difference × Message type interactions on interest (p > .15).

The regression models presented in Table 2 were also subjected to additional analyses in which we examined each demographic characteristic to show significant differences across recruitment site as a covariate. Education, immigrant generation (with second generation as the dummy-coded reference group), and ethnic origin (with Mexican dummy-coded as the reference group) were not significant covariates with intentions (p > .19). Age was a significant covariate (p = .002). Controlling for

age reduced the significance of the Individual difference × Message type interactions on intentions slightly ($p ≤ .07$), though critically, it did not change the significance of the simple slopes of Familism and Collectivism predicting intentions within the metaphor condition ($p ≤ .005$).

Additional analyses on interest in learning about Pap smears and cervical cancer revealed that age and immigrant generation were not significant covariates (p > .23). Education and ethnic origin were marginally significant as covariates (p < .09). Including education as a covariate did not alter the nonsignificance of the Individual differences × Message type interactions (p > .21). Including ethnic origin as a covariate did not alter the nonsignificance of the Familism × Message type interaction on interest (p = .698), but it did render the Collectivism × Message type interaction significant (p = .036). The pattern was the same as that observed previously. After reading the *family* metaphor message, participants' collectivism positively predicted their interest in learning more, $β = 0.41$, $SE_b = 0.12$, $t(160) = 3.86$, $p < .001$. However, this relationship was not evident among participants who read the no-metaphor message (p = .40). Taken together, demographic characteristics of the samples do not explain the Individual difference by Message type interactions, and if anything, controlling for them in certain cases strengthens this influence.

Discussion

The present study examined a message-framing strategy that integrated a sociocultural approach to health communication with conceptual metaphor theory. This integration led to the hypothesis that a message that frames cancer screening metaphorically in terms of family support would interact with variability in Latina women's collective-familial orientations to predict intentions to receive a Pap smear. Results provided novel insights that were largely in accordance with this guiding hypothesis. The more Latinas endorsed collectivistic and familial values, the stronger their intentions were to get a Pap smear after reading the *family* metaphor message. If the message presented the same essential information without a metaphor, cultural values did not significantly predict intentions. These findings are consistent with the theoretical tenet that activating the metaphor *body-as-family* engaged individual differences in that metaphor's source, namely collective-familial values, facilitating a transfer of supportive intentions from the domain of family relationships to the domain of bodily care. There was a marginal trend for collectivism, but not familism, to interact with message type to influence interest in learning more about Pap smears and cervical cancer, and it was strengthened by controlling for ethnic origin. That

this interaction did not reach significance in the absence of this covariate may suggest that intentions and interest are indeed distinct constructs, at times influenced by separate factors.

The more consistent moderation of intentions by collective-familial values contributes to research attesting to the importance of familism for understanding Latino health decision-making. Over the years, familism has evidenced a complex relationship with health status, serving not only as a beneficial source of social support but also as a barrier whereby individual (vs. perceived family) interests are relegated to the backseat (e.g., Latinos may eschew health procedures for fear they inconvenience family dynamics [37]). Yet recognizing familism as an important cultural value offers a pathway for productively engaging Latino audiences. For example, Graham et al. [38] examined internet advertisements for smoking cessation programs and found that Latinos preferred advertisements featuring familism versus other values. Although this suggests that appealing to familism has the potential to attract Latinos, it stops short of showing whether such messages are actually effective, and if so, for whom.

The present study adds insights for understanding this potential. First, the moderation effects suggest it is important to consider variability in minority value endorsement when examining the efficacy of messages that feature minority cultural values. Second, it invites consideration of featuring vivid metaphors as a viable strategy for communicating culturally relevant values to ethnic populations. Third, the findings suggest that at least with respect to types of health communications that emphasize the collective aspect of familial relations, the cultural value of collectivism can similarly predict outcomes. Indeed, whereas prior findings that nativity of Latinos is associated with lower screening rates [47] might be taken to imply that traditional cultural values undermine detection behavior, the present findings suggest this need not be the case. Not only were familism and collectivism positively associated with screening intentions and interest overall, but a metaphoric message drawing on these values led to stronger positive associations between these values and intentions.

Taken together, the present findings complement recent research indicating metaphors in health messages may be differentially effective depending on whether they engage pertinent characteristics of the individual. For example, Landau et al. [40] recently articulated a source resonance hypothesis and found that the effects of sun protection metaphors invoking enemies and combat in motivating sun protection depended on individuals' propensity to fear enemy combatants. The message was only effective to the extent it engaged a source concept with which participants resonated. Such associations raise an interesting implication: When people lack characteristics

relevant to the theme featured in the cued health metaphor, a message featuring that metaphor may have an attenuated impact on health outcomes. In this way, the present findings extend the idea that if the associations of a metaphor do not "fit" what may be recommended or desired courses of action [31, 48], or in the present case, the characteristics of the target audience, a metaphor can engender unintended consequences. Such implications offer both promise and caution in how metaphors are used in health communication.

Limitations, Contributions, and Additional Future Directions

Although the present study used a *body-as-family* metaphor and targeted associated collective-familial values, Latino identity is not reducible to just endorsing collective or family values, but includes a variety of facets (e.g., *respeto*, valuing the curtesy owed to elders [49]). Future research would thus benefit from examining how other (Latino) cultural values can be utilized in metaphoric health messaging. It will also be important to consider whether similar effects emerge for samples that vary more on levels of acculturation. American and Latino acculturation reflect a bidirectional process in which a person shifts both toward and away from the origin and new culture in different areas (e.g., language, social events) [50]. In the present sample, highly Latino-acculturated individuals were likely underrepresented. For instance, only 27.3% of Latinas reported that Spanish was their primary language, and requiring participants to complete the study in English may have further limited the sample.

The lack of a more diverse Latina sample is one limitation of the present project, as is the inclusion of only participants who were able to read English and the recruitment of a fairly educated sample. Although the present findings were not substantively changed when controlling for education, future research should more programmatically examine whether health messages featuring metaphors differentially influence audiences across education levels. It is also worth noting that participants completed the cultural value measures prior to being exposed to the metaphor and subsequent behavioral intention measures. This could be important, inasmuch as it might have primed a cultural mindset, perhaps especially for those who endorsed the values of familism and collectivism, that was then matched by the family-oriented metaphor message [18].

Another limitation may stem from the possibility that, because the dependent variables of intentions and interest are correlated and there were multiple analyses with related predictors, findings may be inflated due to family-wise error. Future research is needed to ascertain the replicability of the findings and the extent to which this limits the conclusions that can be drawn from

the data. However, the largest set of analyses were conducted examining simple slopes within the interactions. Accordingly, applying the Bonferroni correction to the post hoc simple slope analyses reveals that the critical relationships (e.g., between collectivism-familism and intentions in the metaphor condition) remain significant.

The present study relied on self-report measures of behavioral intentions. Although health intentions are potent predictors of health behaviors and particularly for behaviors such as screenings that require effortful decision-making and planning [51], future research would do well to explore behavioral effects of metaphoric communications, both on their own and in combination with established strategies for translating intentions into actions. For example, metaphoric messages could be paired with strategies such as implementation intentions, mental contrasting, and goal selection [52–54]. Furthermore, research is needed to examine the generalizability of metaphoric communication effects, ascertaining if such processes would similarly extend to other cancers, men, other minorities, and specific Latina subgroups. Indeed, the present investigation should not be taken to imply a lack of differences among Latino subgroups [7] and is clearly but a first step in this direction of inquiry.

Despite these ambiguities, the findings provide encouraging evidence that metaphors can be utilized in health messages to make health information more culturally relevant for Latinas. In addition, the present study converges with prior research [40, 48] to suggest that metaphors can be effective at promoting beneficial health behavior primarily when taking into account for whom they are most relevant. This study thus provides initial evidence for the use of metaphors within the sociocultural approach to health communication to be an effective mechanism in promoting cancer prevention for individuals of different cultural backgrounds. As future research unfolds, metaphors may prove to be one useful tool in the toolbox of health communication campaigns hoping to redress ethnic disparities.

Compliance with Ethical Standards

Disclosure of Potential Conflicts of Interest: The authors declare no conflicts of interest.

Ethical Approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Research Involving Human Participants: The required statement regarding ethical approval is included in the manuscript before the reference section.

Informed Consent: Informed consent was obtained from all individual participants included in the study.

References

1. Quick facts. https://www.census.gov/quickfacts/table/PST045215/00. Accessed September 3, 2016.
2. Siegel R, Ward E, Brawley O, Jemal A. Cancer statistics, 2011: the impact of eliminating socioeconomic and racial disparities on premature cancer deaths. *CA Cancer J Clin*. 2011;61(4):212–236.
3. Siegel R, Naishadham D, Jemal A. Cancer statistics, 2012. *CA Cancer J Clin*. 2012;62(1):10–29.
4. Selvin E, Brett KM. Breast and cervical cancer screening: sociodemographic predictors among White, Black, and Hispanic women. *Am J Public Health*. 2003;93(4):618–623.
5. Adams EK, Breen N, Joski PJ. Impact of the National Breast and Cervical Cancer Early Detection Program on mammography and Pap test utilization among white, Hispanic, and African American women: 1996–2000. *Cancer*. 2007;109(suppl 2):348–358.
6. Kreuter MW, McClure SM. The role of culture in health communication. *Annu Rev Public Health*. 2004;25(1):439–455.
7. Lara M, Gamboa C, Kahramanian MI, Morales LS, Bautista DE. Acculturation and Latino health in the United States: a review of the literature and its sociopolitical context. *Annu Rev Public Health*. 2005;26(1):367–397.
8. Suarez L. Pap smear and mammogram screening in Mexican-American women: the effects of acculturation. *Am J Public Health*. 1994;84(5):742–746.
9. Smith RA, Cokkinides V, Brawley OW. Cancer screening in the United States, 2012: A review of current American Cancer Society guidelines and current issues in cancer screening. *CA Cancer J Clin*. 2012;62(2):129–142.
10. Kövecses Z. *Metaphor: A Practical Introduction*. New York, NY: Oxford University Press; 2010.
11. Thibodeau PH, Boroditsky L. Metaphors we think with: the role of metaphor in reasoning. *PLoS One*. 2011;6(2):e16782.
12. Landau MJ, Oyserman D, Keefer LA, Smith GC. The college journey and academic engagement: how metaphor use enhances identity-based motivation. *J Pers Soc Psychol*. 2014;106(5):679–698.
13. Harrington KJ. The use of metaphor in discourse about cancer: a review of the literature. *Clin J Oncol Nurs*. 2012;16(4):408–412.
14. Sontag S. *Illness as Metaphor*. New York, NY: Farrar, Straus & Giroux; 1978.
15. Gallagher KM, Updegraff JA. Health message framing effects on attitudes, intentions, and behavior: a meta-analytic review. *Ann Behav Med*. 2012;43(1):101–116.
16. Rothman AJ, Salovey P. Shaping perceptions to motivate healthy behavior: the role of message framing. *Psychol Bull*. 1997;121(1):3–19.
17. Betsch C, Böhm R, Airhihenbuwa CO, et al. Improving medical decision making and health promotion through culture-sensitive health communication: an agenda for science and practice. *Med Decis Making*. 2016;36(7):811–833.
18. Uskul AK, Oyserman D. When message-frame fits salient cultural-frame, messages feel more persuasive. *Psychol Health*. 2010;25(3):321–337.

19. Uskul AK, Sherman DK, Fitzgibbon J. The cultural congruency effect: culture, regulatory focus, and the effectiveness of gain- vs. loss-framed health messages. *J Exp Soc Psychol*. 2009;45(3):535–541.

20. Resnicow K, Baranowski T, Ahluwalia JS, Braithwaite RL. Cultural sensitivity in public health: defined and demystified. *Ethn Dis*. 1999;9(1):10–21.

21. Elder JP, Ayala GX, Parra-Medina D, Talavera GA. Health communication in the Latino community: issues and approaches. *Annu Rev Public Health*. 2009;30(1):227–251.

22. Fernández ME, Gonzales A, Tortolero-Luna G, et al. Effectiveness of Cultivando la Salud: a breast and cervical cancer screening promotion program for low-income Hispanic women. *Am J Public Health*. 2009;99(5):936–943.

23. Scarinci IC, Bandura L, Hidalgo B, Cherrington A. Development of a theory-based (PEN-3 and Health Belief Model), culturally relevant intervention on cervical cancer prevention among Latina immigrants using intervention mapping. *Health Promot Pract*. 2012;13(1):29–40.

24. Navarro AM, Senn KL, McNicholas LJ, Kaplan RM, Roppé B, Campo MC. Por La Vida model intervention enhances use of cancer screening tests among Latinas. *Am J Prev Med*. 1998;15(1):32–41.

25. Fox SA, Stein JA, Sockloskie RJ, Ory MG. Targeted mailed materials and the Medicare beneficiary: increasing mammogram screening among the elderly. *Am J Public Health*. 2001;91(1):55–61.

26. Murray-Johnson L, Witte K, Liu WY, Hubbell AP, Sampson J, Morrison K. Addressing cultural orientations in fear appeals: promoting AIDS-protective behaviors among Mexican immigrant and African American adolescents and American and Taiwanese college students. *J Health Commun*. 2001;6(4):335–358.

27. Yancey AK, Tanjasiri SP, Klein M, Tunder J. Increased cancer screening behavior in women of color by culturally sensitive video exposure. *Prev Med*. 1995;24(2):142–148.

28. Larkey LK, Gonzalez J. Storytelling for promoting colorectal cancer prevention and early detection among Latinos. *Patient Educ Couns*. 2007;67(3):272–278.

29. Lakoff G, Johnson M. Conceptual metaphor in everyday language. *J Philos*. 1980;77(8):453–486.

30. Scherer AM, Scherer LD, Fagerlin A. Getting ahead of illness: using metaphors to influence medical decision making. *Med Decis Making*. 2015;35(1):37–45.

31. Hauser DJ, Schwarz N. The war on prevention: bellicose cancer metaphors hurt (some) prevention intentions. *Pers Soc Psychol Bull*. 2015;41(1):66–77.

32. Adams G, Plaut V. The cultural grounding of personal relationship: friendship in North American and West African worlds. *Pers Relatsh*. 2003;10(3):333–347.

33. Oyserman D, Coon HM, Kemmelmeier M. Rethinking individualism and collectivism: evaluation of theoretical assumptions and meta-analyses. *Psychol Bull*. 2002;128(1):3–72.

34. Triandis H. The self and social behavior in differing cultural contexts. *Psychol Rev*. 1989;96(3):506–520.

35. Cauce A, Domenech-Rodríguez M. Latino families: myths and realities. In: Contreras JM, Kerns KA, Neal-Barnett AM, eds. *Latino Children and Families in the United States*. Westport, CT: Praeger Press; 2002:5–25.

36. Zinn M. Familism among Chicanos: a theoretical review. *Humboldt J Soc Relat*. 1982;10(1):224–238.

37. Katiria Perez G, Cruess D. The impact of familism on physical and mental health among Hispanics in the United States. *Health Psychol Rev*. 2014;8(1):95–127.

38. Graham AL, Fang Y, Moreno JL, et al. Online advertising to reach and recruit Latino smokers to an internet cessation program: impact and costs. *J Med Internet Res*. 2012;14(4):e116.

39. Mann L, Foley KL, Tanner AE, Sun CJ, Rhodes SD. Increasing cervical cancer screening among US Hispanics/Latinas: a qualitative systematic review. *J Cancer Ed*. 2015;30(2):374–387.

40. Landau MJ, Arndt J, Cameron LD. Do metaphors in health messages work: Exploring emotional and cognitive mechanisms. *J of Exp Soc Psych* 2018; 74:135–149.

41. Triandis H, Gelfand M. Converging measurement of horizontal and vertical individualism and collectivism. *J Pers Soc Psychol*. 1998;74(1):118–128.

42. Steidel A, Contreras J. A new familism scale for use with Latino populations. *Hisp J Behav Sci*. 2003;25(3):312–330.

43. Jennings-Dozier K. Predicting intentions to obtain a Pap smear among African American and Latina women: testing the theory of planned behavior. *Nurs Res*. 1999;48(4):198–205.

44. Kahn JA, Goodman E, Slap GB, Huang B, Emans SJ. Intention to return for Papanicolaou smears in adolescent girls and young women. *Pediatrics*. 2001;108(2):333–341.

45. Ajzen I, Brown TC, Carvajal F. Explaining the discrepancy between intentions and actions: the case of hypothetical bias in contingent valuation. *Pers Soc Psychol Bull*. 2004;30(9):1108–1121.

46. Aiken L, West S. *Multiple Regression: Testing and Interpreting Interactions*. Thousand Oaks, CA: Sage Publications; 1991.

47. Rodríguez MA, Ward LM, Pérez-Stable EJ. Breast and cervical cancer screening: impact of health insurance status, ethnicity, and nativity of Latinas. *Ann Fam Med*. 2005;3(3):235–241.

48. Keefer L, Landau M, Sullivan D, Rothschild Z. Embodied metaphor and abstract problem solving: testing a metaphoric fit hypothesis in the health domain. *J Exp Soc Psychol*. 2014;55:12–20.

49. Arredondo P, Toporek R, Brown SP, et al. Operationalization of the multicultural counseling competencies. *J Multicult Couns D*. 1996;24(1):42–78.

50. Marín G, Gamba R. A new measurement of acculturation for Hispanics: the Bidimensional Acculturation Scale for Hispanics (BAS). *Hisp J Behav Sci*. 1996;18(3):297–316.

51. Sheeran P, Conner M, Norman P. Can the theory of planned behavior explain patterns of health behavior change? *Health Psychol*. 2001;20(1):12–19.

52. French DP, Darker CD, Eves FF, Sniehotta FF. The systematic development of a brief intervention to increase walking in the general public using an "extended" theory of planned behavior. *J Phys Act Health*. 2013;10(7):940–948.

53. Loft MH, Cameron LD. Using mental imagery to deliver self-regulation techniques to improve sleep behaviors. *Ann Behav Med*. 2013;46(3):260–272.

54. Loy LS, Wieber F, Gollwitzer PM, Oettingen G. Supporting sustainable food consumption: Mental Contrasting with Implementation Intentions (MCII) aligns intentions and behavior. *Front Psychol*. 2016;7:607.