



Beyond fatalism: Information overload as a mechanism to understand health disparities



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ABSTRACT

Background: Fatalism – beliefs about the causes and controllability of disease – has been negatively associated with prevention behaviors. Fatalism has been suggested as a mechanism for health disparities because ethnic minorities are especially likely to hold fatalistic beliefs. However, the construct has been criticized: Fatalism fails to account for structural barriers to health faced by vulnerable populations that also score highly on measures of fatalism. Another critique suggests that operationalizations of fatalism expose communication failures: “Fatalism” rather reflects information overload from an environment riddled with misinformation and contradictions. This study aimed to expand understanding of one mechanism through which communication may contribute to disparities by considering the context of nutrition among bicultural Latinas, who face increased risk from dietary acculturation.

Method: Mixed-methods (semi-structured in-depth interview, survey) with Mexican-American women ages 18–29 ($n = 24$) in rural California.

Results: Contrary to previous studies, the majority of this sample of Mexican-American women did not endorse fatalistic beliefs; most demonstrated clear understanding of the link between diet and risk of diseases: Diabetes and heart disease were understood to result from behaviors within one's control. Yet despite articulating links between diet and disease, participants felt overloaded and confused about conflicting information from public and interpersonal sources. Moreover, despite reporting feeling inundated with information, participants noted critical information gaps, distinguishing between information *available* and information *needed*.

Conclusions: We found minimal support for fatalistic beliefs among a sample of Mexican-American women, but considerable information overload and confusion, together with a desire for specific knowledge and skills. Results extend understanding of how communication may influence disparities: Information overload may be conflated with fatalism, challenging the notion that fatalism is a cultural belief. Moreover, inequalities in access to and ability to process information compound overload effects. We discuss opportunities to improve the clarity of communication about nutrition science and dietary recommendations.

1. Introduction

Fatalism (in reference to health) refers to beliefs about the causes and controllability of disease: specifically, the beliefs that individuals are powerless to influence health or illness, since these are controlled by external forces. Fatalism can be characterized by three domains: predestination, pessimism, and attribution of one's health to luck (Shen et al., 2009). Studies have largely focused on cancer fatalism, beliefs that developing cancer is beyond one's control and that death is inevitable upon diagnosis (Powe and Finnie, 2003). The negative relationship between fatalism and cancer prevention behaviors, and the prevalence of fatalistic beliefs among underserved populations, has led to hypotheses that fatalism contributes to cancer disparities (Beeken

et al., 2011; Haile et al., 2012). For example, individuals who hold fatalistic beliefs have lower rates of cancer screening, are less likely to engage in healthy behaviors such as regular exercise and fruit and vegetable consumption, and have lower levels of cancer prevention knowledge (Chavez et al., 1996; Niederdeppe and Levy, 2007). Latinos, African-Americans, and immigrant populations are more likely to hold fatalistic beliefs compared with Non-Latino Whites (Espinosa de Los Monteros and Gallo, 2011; Flórez et al., 2009; Perez-Stable et al., 1991; Powe and Finnie, 2003).

Among Latinos specifically, fatalism (*fatalismo*) has been considered a cultural trait associated with religiosity, health locus of control, destiny, and other cultural and individual personality traits (Abraído-Lanza et al., 2007; Flórez et al., 2009). Fatalism has been primarily

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associated with Latino immigrant and Spanish-speaking populations (Abraído-Lanza et al., 2007; Cuéllar et al., 1995; Flórez et al., 2009). However, some research has found that fatalistic beliefs are retained even as Latinos appear to acculturate on behavioral measures (Moran et al., 2017; Ramírez, 2014).

Critiques of fatalism fall into two camps (Ramondt and Ramírez, 2017). The first critique specifies that “fatalism” reflects an accurate appraisal of the opportunities available for medical treatment and lower survival rates among the usually low-income, un- or under-insured, structurally vulnerable populations, which have exhibited high rates of “fatalism” (Abraído-Lanza et al., 2007; Audet et al., 2017; De Jesus and Miller, 2015; Straughan and Seow, 1998). The second critique is methodological: Researchers have argued that typical operationalizations of fatalism have confounded feelings of being overwhelmed is associated with exposure to too much information (Jensen et al., 2014). This study adds nuance to critiques of fatalism and expands understanding of one mechanism through which communication may contribute to health disparities, by considering the context of nutrition communication and obesity.

This study explores fatalistic beliefs about diet and disease risk and perceptions of the nutrition information environment among bicultural Latinas. Since the pan-ethnic term “Latino” comprises multiple cultures with distinct food traditions, the focus is on Mexican-Americans as the largest Latino subgroup in the country (U.S. Census, 2017). Additionally, Latinas in general, and Mexican-American women specifically, face increased risk from dietary acculturation – that is, acculturation (whether measured as immigrants' increased time in the US or across generations of immigrants' descendants) is a risk factor for poor dietary behaviors including eating fewer fruits and vegetables and more high-fat foods (Batis et al., 2011; Kasirye et al., 2005; Langellier et al., 2014; Neuhauser et al., 2004; Pérez-Escamilla, 2011; Van Hook et al., 2016).

1.1. The information environment, fatalism, and information overload

Critiques of fatalism as information overload are grounded in the fact that the public information environment is vast, and, for complex topics, riddled with misinformation and contradictory advice from sources of varying trustworthiness (Nagler, 2014; Rodney, 2018). The nutrition information environment is especially confusing, owing to the complex nature of the science: Nutrition science advances incrementally, focused on a single food or nutrient at a time, making reports ripe for sensationalism when communicated to lay publics (Freeland-Graves and Nitzke, 2013; Ioannidis, 2018; Throsby, 2018). Further, advances appear to or actually contradict previous knowledge (Ioannidis, 2018). The nature of nutrition science means that a key principle for effective health communication is regularly violated: It is difficult to have a single, consistent message (National Cancer Institute, 2004).

Commercial food marketing adds to the difficulties in communicating effectively about nutrition by introducing information that may not represent the best science. Food advertising has been shown to contradict dietary guidelines (Taillie et al., 2017). Marketing tactics beyond advertising include claims about the nutrient content and health outcomes that might be derived from consuming the product, which consumers perceive as healthier than foods without such claims (Williams, 2005). Minimally regulated by the US Food and Drug Administration, nutrient claims have proliferated to target health-conscious consumers (Hasler, 2008). Marketing nutrient claims defies clinical nutrition communication guidance (Freeland-Graves and Nitzke, 2013); such marketing adds noise to the nutrition information environment.

Compounding the challenges of communicating about complex science amidst commercial information are known biases in information processing that make it difficult for individuals to sort through too much contradictory information. Such biases include the stable

encoding that occurs upon exposure to and processing of new information (Gilbert et al., 1993). New nutrition information may include news about a new scientific study demonstrating health effects of a particular nutrient or food or health-related claims on food packaging. Encoded information forms knowledge bases and belief systems, which individuals are predisposed to support when encountering new information (Lewandowsky et al., 2012). These facts or beliefs are disseminated across populations through social networks and mass media (Southwell and Thorson, 2015). Correction of widely-adopted misinformation or beliefs is difficult once it has become widely accepted, not only because it challenges existing beliefs at the individual level, but also because it is difficult to reach large populations with the level of exposure needed to effectively counteract deeply-encoded information (Southwell and Thorson, 2015).

These biases may be especially problematic among audiences comprising structurally vulnerable populations, who experience “communication inequality” – the lack of access to relevant health information or the ability to make sense of information (Viswanath et al., 2012). Populations at risk of communication inequality comprise groups with low educational attainment and incomes, ethnic minorities, and residents of rural areas (Molina et al., 2017; Viswanath et al., 2012). These same populations are disproportionately targeted by marketers of unhealthy products (Abbatangelo-Gray et al., 2008; Fleming-Milici et al., 2013; Herrera and Pasch, 2017). The result is that communities with more exposure to negative health information also have fewer opportunities to correct misinformation (Southwell, 2013).

The interplay between the complex nature of nutrition science, social factors that affect access to information, individual cognitive factors that affect information processing, and potentially misleading commercial information demonstrates a critical need to improve understanding of how to communicate about healthy diets. This study thus answers recent calls for research on the health effects of conflicting and confusing information (Carpenter et al., 2016; Kerr et al., 2018). We examined the extent to which a specific group of bicultural Latinas – Mexican-American young adult women – endorse fatalistic beliefs about diet and disease, and find that information overload predominates.

2. Method

The embedded mixed-methods approach incorporated qualitative in-depth interviews and closed-ended surveys to explore fatalistic beliefs about diet and disease risk and nutrition information sources (Creswell and Plano Clark, 2011). The qualitative component comprised semi-structured interviews ($N = 24$) with Mexican-American women ages 18–29. The interview guide was developed using the Integrated Model of Behavior (Fishbein and Cappella, 2006), and assessed participants' diet and food preparation behaviors, knowledge and perceptions of nutrition, and ethnic identification. This paper focuses on themes relating to fatalism about disease prevention and perceptions of the nutrition information environment. The embedded quantitative closed-ended survey assessed demographics, fatalism (Shen et al., 2009), and information overload (Jensen et al., 2014; Ramondt and Ramírez, 2018). Students who met the inclusion criteria pre-tested the survey instrument. Participants filled out the survey just before the interview to minimize potential bias in responses to the quantitative component as a result of the interviews (Creswell and Plano Clark, 2011).

Participants were recruited from a variety of public locations around the Central California community, including beauty salons, coffee shops, and flea markets, during Fall 2016. Eligible participants were 18–29-year-old self-identified Latina, Chicana, Hispanic, Mexican, or Mexican-American women. The ability to complete the interview and survey in English was used as a proxy indicator of acculturation for the purposes of recruitment (Park et al., 2015). Further recruitment details are described elsewhere (Ramírez et al., 2018). The University of

California, Merced Institutional Review Board approved this study.

Two bilingual, Mexican-American female research assistants conducted interviews in English; they had been previously certified by the lead author to conduct qualitative data collection. Certification included a 2-week training program in qualitative data collection and research ethics, 3–5 mock in-depth interviews, and a final mock interview that was audio recorded, observed, and evaluated.

Interviews were audio recorded and professionally transcribed. Although the study was conducted in English, bilingual transcriptionists with experience transcribing Mexican Spanish were used because some participants used Spanish words or concepts without direct American English equivalents.

2.1. Analysis

The qualitative and quantitative data were analyzed separately, then integrated through comparisons at the interpretation stage (Creswell and Plano Clark, 2011).

Qualitative analysis was informed by grounded theory (Charmaz, 2014). The lead author conducted multiple close readings of the participant interviews as complete narratives, without consideration of coding or other abstraction process, drafting memos about patterns that appeared to emerge from the data across participants. An initial set of codes was applied to the data, with more reading and additional coding. After several iterations, the codes were formally defined in a codebook. The data were coded using NVivo 11.4.1 (Bazeley and Jackson, 2013).

First, two coders independently coded a single transcript. They met to discuss the codes, resulting in clarification of definitions and the addition and deletion of some codes. Training and codebook refinement was repeated with 10 transcripts, until reaching a pre-determined level of agreement (fewer than five disagreements). Disagreements were resolved through discussion; where consensus was not possible, the first author served as the final arbiter. The two coders coded the remaining 14 transcripts independently; achieving high inter-coder reliability (Cohen's $\kappa = 0.91$). Five codes fell below the generally accepted reliability standard of 0.8 (food production, $\kappa = 0.64$; balance as a way of eating, $\kappa = 0.69$; feeling, $\kappa = 0.73$; time management as a skill; $\kappa = 0.77$; consequences of eating, $\kappa = 0.78$). The final codebook comprised 19 major codes and 26 sub-codes, representing four theme groups: categories of healthy diet, language and acculturation, nutrition information sources, nutrition information needs. This manuscript reports on themes from the latter two.

Quantitative results include frequencies only since the small sample precluded statistical testing. Results are presented thematically, interweaving qualitative and quantitative evidence. Pseudonyms protect participants' identities.

3. Results

Sample characteristics are summarized in Table 1. The 24 participants' ages ranged from 18 to 29. The majority of participants ($n = 17$) reported living with children under the age of 17, including their own children, siblings, and other relatives. Over one-third of participants did not attend college. Food insecurity was a problem for many: Nearly 40% of participants ($n = 9$) reported having received food assistance in the past year or running out of food before the end of the month.

Three primary themes that emerged from the integrated analyses can be summarized under two umbrella themes: lack of evidence for fatalistic beliefs and information overload.

3.1. Mexican-American women mostly did not endorse fatalistic beliefs

3.1.1. Rejection of fatalistic beliefs in favor of clear explanation of link between behaviors and disease

In contrast to prior literature, the sense of powerlessness that

Table 1
Demographic characteristics.

	n (%)
Mexican ancestry	24 (100)
Age, years	
18–21	11 (46)
22–25	5 (21)
26–29	8 (33)
Education, highest level	
≤ High School	10 (42)
Some college/technical training	9 (38)
College degree	5 (21)
Employment status	
Full-time	5 (21)
Part-time	11 (46)
Not employed	8 (33)
Received food assistance in past year	6 (25)
Run out of food before end of month	6 (25)
Children ages 0–17 in household	17 (71)

characterizes fatalism and prevents individuals from engaging in prevention behaviors was largely missing among participants in this study. Whereas fatalism may manifest as a lack of knowledge about disease prevention (Ramírez, 2014), participants were quick to define core principles of a healthy diet, including the major food groups, nutrients, and portion sizes. Additionally, many participants articulated familiarity with official food guides including MyPlate and the food pyramid and emphasized the avoidance of unhealthy foods. We report this finding in more detail elsewhere (Ramírez et al., 2018); here, we consider how the articulation of principles of nutrition and of control over dietary choices demonstrates evidence against fatalistic beliefs.

Beyond knowing key principles of nutrition, most participants seemed to understand that diet is associated with disease and generally within one's control. These results were consistent across quantitative and qualitative methodologies. For example, more than three-quarters of participants disagreed with a statement commonly used to assess fatalism, "If someone is meant to get a serious disease, it doesn't matter what kinds of foods they eat, they will get the disease anyway" (Table 2). Participants similarly rejected fatalism about cancer: More than three-quarters disagreed that "There's not much people can do to lower their chances of getting cancer". These findings support the rejection of fatalism by showing that there are circumstances in which individuals they can reduce their chances of getting cancer or certain diseases.

Consistent with quantitative results, instead of endorsing fatalistic beliefs, in interviews, participants described how individual behaviors (i.e., diet) were associated with disease (i.e., diabetes, heart disease, and cancer). When discussing healthy diets, many participants described the health outcomes of dietary choices. For example, they emphasized the importance of eating in a particular way, or of consuming specific foods, to maintain health and prevent disease. The way that Paula, a 29-year-old mother of a young child, described her motivation to eat healthfully was typical, "Because of all the diseases that elders have. I don't want my children growing up having diabetes or having to worry about all the problems that come with eating processed foods or sugary foods on a daily basis." Dalia (age 19) was even more to the point, "[Eating a healthy diet is] taking moderation... It's like you don't want to eat too much of anything because it will literally kill you."

The most commonly mentioned dietary risk factor was sugar, and most participants clearly understood that excess consumption of sugar was a cause of diabetes. This knowledge is consistent with the high burden of diabetes among Mexican and Mexican-American populations (Bello-Chavolla et al., 2017; Schneiderman et al., 2014). Obesity was similarly well understood to be a direct function of diet (Ramírez et al., 2018); it may also reflect the high incidence of overweight and obesity among Latinos (Ogden et al., 2017).

Whereas most participants clearly articulated that diet behaviors

Table 2
Perceptions of fatalism and information overload among 24 bicultural Latinas.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
	<i>n</i>	<i>n</i>	<i>n</i>	<i>n</i>	<i>n</i>
Fatalism^a					
If someone is meant to get a serious disease, they will get it no matter what they do.	0	2	8	11	3
If someone is overweight, that's the way they were meant to be.	0	0	2	7	15
If someone is meant to get a serious disease, it doesn't matter what kinds of food they eat, they will get that disease anyway.	0	2	3	14	4
There's not much people can do to lower their chances of getting cancer.	0	0	4	14	6
Information Overload^{b,c}					
It seems like everything causes cancer.	4	7	6	6	1
There are so many recommendations about eating a healthy diet, it's hard to know which ones to follow.	1	11	2	8	2
There are so many recommendations about preventing cancer, it's hard to know which ones to follow.	0	12	6	4	2

^a Adapted from (Niederdeppe and Levy, 2007; Shen et al., 2009).

^b Adapted from (Jensen et al., 2014; Ramondt and Ramírez, 2018).

^c Adapted from (Jensen et al., 2014; Ramondt and Ramírez, 2018).

were generally within the domain of individual choice, many noted that their ability to eat healthfully was constrained by internal factors (i.e., cooking skills, food preferences, lack of motivation) and by external barriers including the lack of physical or financial access to healthy foods. This finding is consistent with the critique of fatalism as an accurate appraisal of the structural barriers to health that exist for vulnerable populations (Abraído-Lanza et al., 2007; De Jesus and Miller, 2015; Straughan and Seow, 1998). These results suggest that enough is known about how some specific nutrients and foods affect health – whether specific diseases like diabetes or conditions like obesity, that in turn affect disease risk – such that participants felt confident articulating the role of individual dietary choices on health. These results are a clear rejection of fatalism. Yet despite this awareness, most participants recognized the important role of factors beyond their control that influence their dietary behaviors. The information environment was one of the recognized structural barriers, and is described below.

3.2. Mexican-American women felt overwhelmed by the nutrition information environment

3.2.1. There is too much information about diet, and it is confusing

Participants expressed feeling overwhelmed and confused by the vast amount of information about diet and disease risk. For example, Alejandra (age 19):

“When you go on the news, like on Facebook, or – they always say everything causes cancer. And then – I don't know, it's hard to believe because I forgot what foods they are. But they always come out like, don't eat this, it causes cancer. Or don't eat that, it causes cancer. Maybe some of the things are true but some of them are not because there's so much – maybe if it's on Facebook, maybe I won't believe it. But might if it was done in a research or a study, or if my doctor told me about it...”

Alejandra's reference to foods causing cancer was an interesting outlier, because although most participants had a good understanding of basic nutrition principles and clearly described some negative consequences of eating unhealthy foods, cancer was generally not mentioned as one of the negative outcomes of a poor diet. Still, her sense of confusion and frustration with conflicting information from different sources was representative of others' comments.

The perceived conflict in the public information environment surrounding nutrition had two negative outcomes: First, perceiving the information environment as consisting of contradictory knowledge engendered mistrust in public information sources for nutrition knowledge. Echoes of this outcome can be heard in Adriana's (age 24) description of mass media as a dubious source of information about food and disease risk: “Probably on TV when you hear all those stuffs

but you don't really know if it's true.” This mistrust in public information sources can have long-term consequences for using such sources to disseminate critical health information. The second outcome pertains to behaviors: The contradictions reported in the news and other public sources sow confusion about the “right” healthy course of action. Such confusion could lead to inaction or a rejection of advice on the grounds that it might change in the future, just as the prior messages have changed (Nagler, 2014).

3.2.2. The media compounds perceptions of confusion and overwhelm about diet information

The problem of too much and contradictory information sowing confusion was specifically related to the public information environment – that is, to various types of media.

There was some dissonance between the interviews and the surveys pertaining to participants' ability to respond to the abundance of nutrition information. While qualitative analysis indicated that most participants were very confused about nutrition related-information, they appeared somewhat less confused in their responses to the survey questions. For example, half of participants disagreed with two statements assessing information overload: “There are so many recommendations about [preventing cancer]/[eating a healthy diet], it's hard to know which ones to follow” (Table 2). These somewhat conflicting findings may constitute a methodological artifact: Even among those who disagreed with the above statements (disagreement indicating less information overload), when probed about nutrition information and sources for such information during semi-structured interviews, participants made clear that they, like most other participants, were overwhelmed and confused by both the volume of the information available, and by the apparent contradictions across sources.

Yet, despite reporting having too much nutrition information, participants felt that they did not have the right information, or the information that they needed to adopt healthy behaviors. For example, participants were unable to provide specific details about how to eat healthfully, and instead turned to our interviewers to provide them with guidance. This exchange illustrates the dynamic:

Cristina (age 26): “What about the shakes they sell in the store that it says it's complete meal? Then if [he] doesn't eat in the morning, you can give that to him, and that will be like a complete meal. Is it healthy? Does that mean it's healthy?”

Interviewer: I don't know. It depends on how do you see it. Do you believe it's healthy? Cristina: “I don't think it's healthy because it's too sweet. So I don't know if it's healthy. Sometimes I give it to them, but I don't feel really comfortable doing that. Because I feel like it's too much sugar that they have in it. I don't know.”

Table 3
Key themes, illustrative evidence from qualitative interviews and quantitative surveys, and integrated interpretation.

Subtheme	Qualitative Evidence	Quantitative Evidence	Integrated Interpretation
Diet and Disease Perceptions	<p>“What causes diseases is the excessive amount of food that we eat, and sugar. Sugar I think is the number one thing that causes these effects. High blood pressure, obesity.” (Marina, 26)</p> <p>“I know the fattening foods...can cause, I don't know, clogging of arteries and stuff like that. Also, sugars. Too much sugar is not good. It is always good to have it balanced.” (Veronica, 28)</p> <p>Specific codes referring to existing knowledge:</p> <ul style="list-style-type: none"> ● Food groups ($n = 15$) ● Portion size ($n = 14$) ● Ways of eating ($n = 22$) ● Balance ($n = 12$) <p>Specific codes referring to diet and disease:</p> <ul style="list-style-type: none"> ● Consequences of eating ($n = 16$) ● Disease as an outcome of diet ($n = 13$) 	<p>Participants generally did not adhere to fatalistic beliefs as traditionally measured.</p> <p>The majority of participants disagreed that:</p> <ul style="list-style-type: none"> ● Cancer is inevitable (“There's not much people can do to lower their chances of getting cancer.”) ($n = 20$) ● Obesity is preordained (“If someone is overweight, that's the way they were meant to be.”) ($n = 22$) ● Disease is not influenced by diet (“If someone is meant to get a serious disease, it doesn't matter what kinds of food they eat, they will get that disease anyway.”) ($n = 18$) 	<p>Avoidance of unhealthy foods, balance, and ways of eating were emphasized as contributing to health promotion and disease avoidance.</p> <p>Poor diet was recognized as a major contributor to diseases such as diabetes, hypertension, and cardiovascular disease, but not cancer.</p> <p>Diseases were mostly understood to be a function of diet and within one's control.</p>

Theme 2: Information Overload

Subtheme	Qualitative Evidence	Quantitative Evidence	Integrated Interpretation
Multiple information sources	<p>“I think now that I'm more informed about it, I've gotten it from coworkers, I've gotten it from going to the gym, talking to trainers, just getting information online, looking up recipes on Pinterest and stuff like that.” (Rocto, 27)</p> <ul style="list-style-type: none"> ● Most participants ($n = 14$) reported more than one nutrition information source ● The most common information sources were those described as least trustworthy: <ul style="list-style-type: none"> ● Mass media ($n = 11$) ● Interpersonal ($n = 10$) ● School ($n = 10$) 	<p>Half of participants agreed, “there are so many recommendations about preventing cancer and eating a healthy diet that it is hard to know which ones to follow.”</p>	<p>Participants described the vast nutrition information environment comprised of multiple distinct channels – including mass media, school, and social networks – with different messages that appeared to conflict at times.</p>
Confusion	<p>“I think having more information about it, I know that would help a lot more. I started to read my mom's book and that's when you kind of – like oh, I could eat this with this or this with is what I should be eating. Sometimes you don't really know. Or you're eating – you say you're on a diet but you're eating the wrong things or the wrong way.” (Amanda, 22)</p> <ul style="list-style-type: none"> ● Information ($n = 14$) 	<p>Almost half ($n = 11$) agreed, “It seems like everything causes cancer”, indicating confusion resulting from information overload.</p>	<p>Participants perceived the nutrition information environment as cluttered with dueling messages; this lack of message concordance creates confusion.</p> <p>Compounding the uncertainty and confusion is participants' inability to differentiate between credible and unreliable sources.</p>

Additionally, participants distinguished between nutrition information *available* and nutrition information *needed*, and expressed a desire for deeper knowledge and specific skills. For example, Lucy (age 20) mentioned needing help with meal planning: “What I’ve been wanting to do is talking to a nutritionist, [learning] what I can do to find more meals that don’t take as much time to cook or what not.” Other interviewees also mentioned a need for specific guidance in the form of nutrition information ($n = 14$), cooking skills ($n = 4$), motivation ($n = 4$), and time management ($n = 13$) (Table 3).

4. Discussion

This study expands understanding of how communication contributes to health disparities. Among a sample of bicultural Mexican-American women, this study finds that rather than expressing fatalistic beliefs, most were well aware of the links between diet and disease, but confused about how to operationalize a healthy diet. This confusion was identified as stemming from the overwhelming and contradictory information environment, comprising diverse sources including family lore and the mass media. While in theory disseminating nutrition information across diverse sources should increase awareness and ultimately improve diet, such comments suggest that too much information from multiple sources may be overwhelming, sowing confusion.

Findings reiterate calls for improved conceptualization of “culture” in health promotion and research (Kagawa Singer et al., 2016). Greater disaggregation of ethnic groups and attention to the social, political, and historical contexts of diverse communities is essential to broaden understanding of the social determinants of health. Through a focus on bicultural Mexican-American women – a group at high risk of obesity yet rarely studied – the present study challenges existing understandings of culture, communication, and health. Specifically, results extend critiques of fatalism as a trait, suggesting that survey responses traditionally characterized as fatalistic (and culturally-based) may instead reflect an unwieldy public information environment. While previous studies have criticized the construct and measurement of fatalism (Abraído-Lanza et al., 2007; Jensen et al., 2014), these mostly quantitative studies have not been designed to understand the mechanisms that contribute to fatalism, nor the subtle ways in which fatalism shapes behavior. The mixed-methods approach allowed for a comparison of how qualitative and quantitative questioning may result in differing levels of fatalism or information overload; these findings advance theoretical understanding for how information overload may affect health behaviors.

One of the mechanisms that appears to link fatalism and disease risk is information overload – that is, exposure to excessive and conflicting information from the media, friends/family, and health care providers and little guidance on how to determine relative value. Information overload, sometimes mischaracterized as fatalism, may lead to confusion that negatively impacts the adoption of preventive behaviors including healthy diets, ultimately contributing to health disparities. A more indirect route through which information overload may contribute to disparities reflects the nature of the nutrition information environment and its perceived relevance for specific subgroups. In this study, Mexican-American women simultaneously described having too much *and* not enough (of the right kind) of nutrition information, and wanted specific types of information. This desire for deeper knowledge and specific skills may be attributable to structural barriers such as education, income, and occupation that limit the ability to access appropriate information (Viswanath et al., 2012), as well as to low media literacy skills and limited budgets to counteract powerful marketing (Britigan et al., 2009). Some of that information may be objectively missing or obscured in the current nutrition information environment; however, it is also possible that the information available is not appropriate – or at least not perceived as appropriate – for bicultural Latinas.

That these particular women described such information access

challenges suggests another level of communication inequality. Specifically, the nutrition education messages participants had been exposed to may be outside their experiences as bicultural Latinas. This lack of identification with the message may lead to shallow and less effective message processing (Davis et al., 2016; Ramírez, 2013). The cognitive overload experienced from too much information may also produce shallow processing (Schofield and Mullainathan, 2008). Shallow processing of nutrition information resulting from either cognitive overload or lack of identification (or in combination) may account for the observed desire for deeper nutrition knowledge and specific skills.

4.1. Limitations

Results from this study should be interpreted within the context of several limitations. To begin, the study took place in California, where the context surrounding cancer and diet may be different than in other parts of the country: The state's Proposition 65 requires all products that contain any substances “known to the State of California to cause cancer or reproductive toxicity” to be labeled as such (American Cancer Society, 2015). Additionally, Latinos are the state's largest ethnic group, potentially affecting popular culture more deeply than in other states or nationally.

The recruitment and methodological approaches were intended to allow for in-depth observations about a specific population – bicultural Mexican-American women – that represents a large, growing segment of the U.S. population (Krogstad and Lopez, 2014) with high risk for poor diet and related health outcomes (Martin et al., 2015). Since acculturation is strongly associated with age (Unger et al., 2004), the age range was restricted to minimize heterogeneity in acculturation experiences and maximize understanding of how acculturation influences communication effects.

Additionally, the small sample was recruited from a single community and was not intended to represent the larger Latino population. In particular, differences may exist in perceptions of fatalism, information overload, confidence in obtaining health information, and the sources of information reported as contributing to the former, between residents of rural and urban regions. Previous research has shown that living in rural areas is associated with disparities in access to healthy foods (Blanchard and Matthews, 2007), in diet-related health outcomes (Lutfiyya et al., 2007), and in access to health information (Befort et al., 2013; Carnahan et al., 2016; Ramírez et al., 2017). Moreover, rural residence compounds other forms of inequality including ethnicity, income, education, access to health care and access to information, increasing the risk of poor health among low-income rural residents of color (Kasirye et al., 2005; Neuhauser et al., 2004; Ramírez et al., 2017; Valdez et al., 2012). Although the current study found that even rural residents felt overwhelmed with information – apparently contradicting the suggestion from previous studies that such feelings of being overwhelmed should be scarcer in areas with less access to information – examining how women in areas with even greater access to information and to diverse sources perceive the nutrition information environment may yield additional insights about how communication contributes to health and health disparities.

Another limitation of any study examining exposure to public information is the potential for confounding exposure or its effects (i.e., knowledge) with formal education: In this study, for example, high levels of knowledge about nutrition may be a function of exposure to the information environment or to nutrition education such as that some school or food assistance programs provide. This rival hypothesis was eliminated by thorough examination of potential systematic bias in the sample. While the sample was slightly more educated (58% had some college) than the general population of young adult Latinas (44% enrolled in college in 2016) (U.S. Department of Education, 2018), there was no evidence for a common educational experience or connection to social service programming. The high levels of knowledge

about federal nutrition guidelines are consistent with prior studies reflecting the wide reach of national public communication campaigns (Tagtow and Raghavan, 2017; Wright and Wang, 2011). Moreover, only four of the participants reported having learned about diet or nutrition in a formal setting.

5. Conclusions

This study found minimal evidence of fatalistic beliefs among a sample of Mexican-American women in Central California, but identified considerable confusion and concern about the nature of public and interpersonal communication about diet and nutrition.

Findings advance understanding of how communication may contribute to health disparities. While previous studies have documented negative associations between holding fatalistic beliefs and engaging in preventive behaviors, and particularly among ethnic minority populations, this study found minimal evidence for fatalistic beliefs among young adult Mexican-American women. Instead, participants reported strong understandings of the roles of individually controlled dietary behaviors in disease risk, but reported that too much information about nutrition is confusing and unhelpful for making dietary choices. Thus, health disparities may be at least in part an outcome of an information environment that negatively impacts the adoption of health behaviors, and this environment compounds other communication inequalities in access and skills to obtain accurate, useful information.

In addition to expanding theoretical understanding of communication and health disparities, results suggest practical applications for nutrition communication to improve diet among the growing and at-risk population of bicultural Latinas. Specifically, communication efforts must consider the broader health information environment, comprising conflicting claims from commercial advertising and marketing efforts, the evolving nature of nutrition science, and personal experiences. Nutrition education should move beyond generalist messages to include specific, actionable skills-based training. Additionally, more research is needed to explore the extent to which information and misinformation from various sources could influence diet and nutrition related beliefs and behaviors among bicultural Latinas, and to find ways to cut across the cluttered information environment to disseminate nutrition communication that is perceived as relevant for Latinas across the acculturation spectrum. Finally, findings pertaining to confusion resulting from conflicting or overwhelming messages could be similarly impacting other populations – while this study considered only Mexican-American women in California, research with more diverse populations should examine such potential impacts.

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