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Examining The Role Of Perceptual Biases In Health Care Utilization Among Adults

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Dedication

This academic accomplishment could not have been possible without the unconditional love of my parents, Valente Oviedo and Leticia Ramirez, who decided to leave everything behind 24 years ago in search of a better life for their children. Without your sacrifices, love, and endless support, I would not have been able to pursue and achieve this amazing milestone. This academic achievement and degree are not just mine, but yours as well. I love you both more than words can describe. I am so proud to be your daughter. Thank you for everything. We did it! I would also like to dedicate this accomplishment to *my little shooting star*. You will forever be my favorite could have been. Thank you for being the purest love I have ever felt in my life. Thank you for becoming that extra little motivation I needed to complete this milestone. This is for you, *my little shooting star*. I loved you then. I love you still…Always have…always will.

EXAMINING THE ROLE OF PERCEPTUAL BIASES IN HEALTH CARE UTILIZATION AMONG ADULTS

by

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Abstract

A large body of literature has identified significant racial and ethnic disparities in health care and health outcomes. In an effort to gain an understanding of how to achieve health equity, it is crucial that we broaden our search for factors beyond access factors that may explain these observed disparities. The present study examined how cultural differences related to attention (context vs. focal) and attribution (internal vs. external) influence individuals' propensity to identify symptoms as potential markers of poor health, and ultimately, report less utilization of professional health care services. Using a community sample of 252 (n = 134 Latinos and n = 118 non-Latino Whites) adult community members from the El Paso region, we tested a model in which people's attentional orientation toward context is related to lower utilization of professional health care services. This is because attentional orientation toward context encourages people to attribute symptoms of illness to external/environmental factor and attributing symptoms of illness to external/environmental factors is associated with less utilization of professional health care services. Results demonstrated partial support for ethnic differences in the measures of attention and attribution. Differences in health care utilization between Latinos and Whites were partially attributable to differences in attributional biases. Inconsistent with predictions, external symptom attributional bias did not mediate the association between contextual attentional bias and health care utilization.

Keywords: health disparities, Latinos, health care utilization, attribution, attention

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Overview

Health disparities are defined as a particular type of health difference that is closely linked with social, economic, and/or environmental disadvantage (U.S. Department of Health and Human Services, 2010). Health disparities adversely impact groups of people who have systematically experienced greater obstacles to health based on their racial or ethnic group; religion; socioeconomic status; gender; age; mental health; cognitive, sensory, or physical disability; sexual orientation or gender identity; geographic location; or other characteristics historically linked to discrimination or exclusion (U.S. Department of Health and Human Services, 2010). Over the past two decades, a large body of literature has identified significant racial and ethnic disparities in health care and health outcomes (Smedley, Stith & Nelson, 2003). Studies have examined barriers to health care utilization, with the majority conducted in the context of specific populations and diseases. On the other hand, there is less research investigating factors beyond demographic and access that may influence individuals' intentions to seek professional health care.

In order to gain a better understanding of how to achieve health equity, it is crucial that we broaden our search for factors other than health care access factors that influence people's decisions related to the utilization health care services. In the present study, we examined how cultural factors related to perceptual biases (i.e., attention and attribution biases) influences individuals' tendency to identify symptoms as potential indicators of poor health. Ultimately, these perceptual biases affect individuals' decision to use professional health care services.

Introduction

Health Disparities and Minorities

According to the 2010 U.S. Census Bureau, just over one-third of the United States' population identified themselves as being something other than non-Latino White alone. Because of this, addressing minorities' health continues to be an important public policy goal such that it is part of the Centers for Disease Control and Prevention's (CDC) aims to achieve health equity, eliminate health disparities, and improve health in the United States (CDC, 2013). The United States has made significant progress toward meeting these goals. For example, life expectancy among people living in the US has increased. In 1960, the average life expectancy was just under 70 years. As of 2012, the life expectancy has increased to approximately 79 years (Arias, Heron, & Xu, 2016). Thus, it is believed that people are living longer and healthier lives. Unfortunately, this upward and positive trend has not been as rapid as it should be nor uniformly experienced by all the people residing in the United States. Many people from minority groups are still experiencing a disproportionate burden of preventable disease, death, and disability compared to non-minorities (CDC, 2013).

Health disparities between minorities and Whites in the United States are at an alarming level (CDC, 2009; National Cancer Institute [NCI], 2010). For example, cardiovascular disease is the leading cause of death in the United States and non-Hispanic black adults are at least 50% more likely to die of heart disease or stroke prematurely compared to their White counterparts (CDC, 2013). Moreover, the prevalence of adult diabetes is higher among Latinos, non-Latinos Blacks, and those of other or mixed races than among Asians and Whites (CDC, 2013).Similarly, research has found that racial and ethnic minorities are more likely to develop cancer and die from it when compared to their White counterparts (American Cancer Society, 2015). Notably,

data from a national survey from the CDC (2015) focused on Latino health found that Latinos have different degrees of illness or health risks compared to Whites such as being 24% more likely to have poorly controlled high blood pressure, 23% more likely to be obese, and 28% less likely to receive colorectal screening. Moreover, data also indicates that Latinos of Mexican – origin are nearly twice as likely to die from chronic liver disease and cirrhosis in comparison to Whites (CDC, 2015).

The Utilization of Professional Health Care Services among Minorities

Research has shown that the use of professional health care services reduces health disparities and improves health outcomes (Agency for Health care Research and Quality [AHRQ], 2008; Nelson, 2002). Data from the National Center for Health Statistics (2014) found that approximately one third of Latino adults under the age of 65 in the U.S. lack a usual source of health care. Moreover, studies have demonstrated that Latinos, Mexican-Americans in particular, are the least likely of all of the major ethnic groups in the U.S. to have a regular source of professional health care, make regular visits to a health care professional, or use preventative services (CDC, 2009; Guendelman & Wagner, 2000).

Although it is tempting to attribute minorities' underutilization of professional health care services solely to factors associated with access (e.g. insurance, language, income), studies show that access factors, are not the sole cause for ethnic group differences in health care utilization (Bustamante, Fang, Rizzo, & Ortega,2009; Callahan, Hickson, & Cooper, 2006; MacNaughton, 2008). For example, a study by Blendon and colleagues (2007) found ethnic differences in use of health care, even after controlling for demographic characteristics such as income, education, age, and sex. More specifically, Blendon and colleagues' conducted a telephone survey of 4,157

randomly selected adults in the United States and found that fewer Caribbean- and African-born Blacks received any care compared to U.S.- born African Americans in the past year. Moreover, specific Latino American groups (i.e. Mexican and Central/South American Hispanic) and Asian American groups (i.e. Chinese, Korean, and Vietnamese) reported also receiving significantly less health care in the last year compared with Whites, Native Americans also received less care compared with Whites. Moreover, Zheng and Zimmer (2009) showed that after controlling for family income, Latinos remain less likely to make regular visits to a health care professional. Furthermore, after controlling for educational attainment, Mexican-Americans displayed significantly higher risk of never having had contact with a health care professional compared to Whites (Callahan, Hickson, & Cooper, 2006). Lastly, studies have shown that Latinos' underutilization of professional health care persists even after insurance status is taken into account. More specifically, Latinos, who are insured, are still less likely to visit a physician's office or seek preventative services (Lillie-Blanton, Martinez, & Salganicoff, 2001; Wallace & Villa, 2003).

Collectively, these results suggest that Latinos' lower use of professional health care services cannot be entirely attributed to service accessibility. More importantly, these results highlight the need to broaden our search for the factors that influence the use of professional health care services among Latinos (Bustamante et al., 2009; Kirby, Taliaferro, & Zuvekas, 2006).

Psychological Model Used to Explain Health Behaviors Related to Utilization of Professional Health Care Services

The occurrence of symptoms (e.g. headaches, nausea, etc.) can affect all people, including individuals who are healthy. How one responds to the symptom(s) – whether to ignore it, worry about it, take some medication, or seek professional medical services (i.e. visit a doctor) – is thought to be largely dependent on what one believes to be the cause of such symptom(s) (Robbins & Kirmayer, 1991). In other words, one's decision related to the utilization of professional health care services may be related and dependent on one's process of evaluating symptoms including identifying the cause of the symptoms (i.e., causal attributions).

Causal attributions are defined as post-hoc interpretations or re-definitions of what caused a particular illness and/or the accompanying symptoms (Sensky, 1997). These attributions play a key role in 'subjective illness theories', which help us understand the cognitions people, use to explain how to maintain a healthy state and why they become ill.

Of interest to the present research is the Common- Sense Model of Self-Regulation of Illness and Health proposed by Leventhal and colleagues (1992). This model provides a foundation to understanding behaviors related to the utilization of professional health care services and or the lack thereof. The key construct within the common-sense model of self-regulation is the idea of illness representations or 'lay' beliefs about illness. According to the common-sense model of self-regulation model, people actively develop both cognitive and emotional representations of their illness. These representations of illnesses help individuals make sense of their experience and provide a basis as to how to respond accordingly. For example, individuals make distinctions between causes of symptoms that are internal (e.g., a

predisposition to a disease) and causes of symptoms that are external (e.g., toxins in the environment). Importantly, these representations may draw upon illness information available in an individual's culture or information obtained in contact with other people. Leventhal and colleagues (2012) describe five components of these illness representations, including identity, cause, timeline, consequences, and controllability. Identity and cause are relevant for present study here. *Identity* is described as the label or name given to the condition and the symptoms that 'appear' to go with the condition. *Cause* is the individualistic ideas about the perceived cause of the condition, which may not be completely biomedically accurate.

Leventhal and colleagues (2012) note that such representations will be based on information gathered from multiple sources including but not limited to personal experiences, opinions, discourses of significant others, health professionals and media sources, reflecting issues such as stress, environmental pollution and other pathogens. Representations reflecting the above dimensions have been shown to influence people's decision to seek medical help, to determine compliance with recommended management, coping behavior, as well as disease outcome (Leventhal et al., 1984; Robbins & Kirmayer, 1991; Roesch & Weiner, 2001). Moreover, studies have demonstrated that attributing symptoms of illness to external factors is associated with lower levels of health care seeking (Gulec, 2008; Sensky, MacLeod, & Rigby, 1996). Thus, it becomes important to study how groups attribute their illness symptoms.

The Association between Attentional and Attributional Biases and Culture

Latinos show a preference for external symptom attributions

Studies have shown that Latinos commonly attribute illness to forces that are external to the body (Cabassa, Lester, & Zayas, 2007; Cabassa & Zayas, 2007; Weisman, Gomes, & López,

2003). For example, a study by Weisman et al. (2003) examining attributions for illness made by a sample of recent U.S. immigrants from Mexico and Central America. Results from a content analysis of structured interview responses revealed that 90% of the sample perceived interpersonal problems (e.g. divorce) or other external environmental stressors (e.g., work stress) as causing or exacerbating illness. In a similar but different study conducted by Cabassa and Zayas (2007), they examined the illness attributions made by recent U.S. immigrants from Mexico when they were asked to imagine experiencing depressive symptoms. Their results showed that when asked to imagine experiencing depressive symptoms and asked what they believed caused the symptoms, participants attributed such symptoms to external forces such as interpersonal problems, social isolation, or lack of emotional support. In contrast, participants did not attribute depressive symptoms to internal mechanisms such as biological, genetic, or chemical factors. Similarly, Santos and colleagues (2009) found that Latino college students identified three external beliefs of diabetes illness causation: *emotionality* – experiencing strong negative emotions (stress, anger, and anxiety); *punitive* – a punishment for sinning, behavioral excesses or indulgences; *cultural/folk beliefs* - God's will, accidental forces, bad blood, or exposure to hot/cold drafts.

Together, these findings demonstrate that the tendency to attribute symptoms of illness to external factors is associated with lower levels of professional health care seeking and that Latinos have a tendency to attribute symptoms of illness to external factors. In addition, and perhaps more importantly, these findings highlight the need to identify the factor(s) that cause people to make external illness attributions in the first place.

Attribution of causality differ across cultures

The attributions of causality made by an individual will vary across cultures. According to Hofstede (1983), collectivistic cultures emphasize interdependence between people and prioritize group goals over individual goals. On the other hand, individualistic cultures emphasize independence between people and prioritize individual goals over group goals. Given this, studies have found that individuals immersed in collectivistic cultures (e.g., East Asians) are more likely to attribute causality to influences that are external to an animal or person than are individuals immersed in individualistic cultures (Markus & Kitayama, 1991; Nisbett, Peng, Choi, & Norenzayan, 2001). Moreover, Morris and Peng (1994) also found that individuals from collectivistic cultures endorsed situational or external attributions more so than dispositional or internal attributions, whereas, individuals immersed in individualistic cultures responded in the opposite manner. In a recent study, De Jesus and Xiao (2014) also found a relationship between external causal attributions and health care use among Latinos. More specifically, respondents with external causal beliefs were 21% less likely to see a doctor compared with those with internal causal beliefs. Thus, one question concerns how attention to context influences these processes.

Attentional bias and attributions of causality

Attention in the current study is operationalized as a processing orientation toward or preference for focal versus contextual objects (Chua, Boland, & Nisbett, 2005; Masuda & Nisbett, 2001, 2006). Moreover, focal objects are central items located in the foreground, whereas contextual objects are the physical location where the item is located and might be considered background information. Researchers argue that collectivists' tendency to attribute

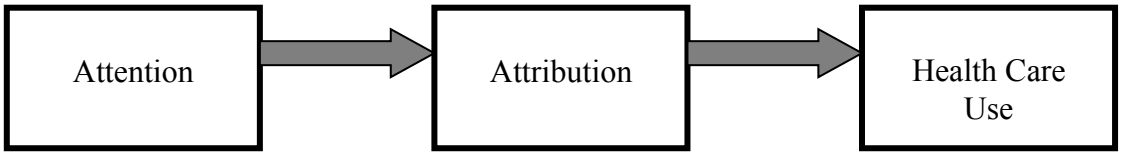
causality to external influences may be explained by their tendency to pay greater attention to the contextual field and toward associations between objects and the contextual field (Markus & Kitayama, 1991; Nisbett et al., 2001; Chua, Boland, & Nisbett; Masuda & Nisbett, 2006). Moreover, various experimental studies have shown that attention to context exerts a causal influence on attributions of causality related to behavior (see Jones & Nisbett, 1972; McArthur & Post, 1977; Storms, 1973; Choi & Nisbett, 1998; Choi, Nisbett, & Norenzayan, 1999; Masuda & Kitayama, 2004). Collectively, these findings suggest that individuals immersed in collectivist cultures are more endorsing of external attributions for behavior and are more attentionally oriented toward context in comparison to individuals immersed in individualistic cultures. More importantly, these findings suggest a possible causal link between attention and attribution such that orienting individual's attention toward context results in individuals being more endorsing of external attributions for behavior.

Attention, attribution, and health care seeking

The literature reviewed in the previous sections demonstrates that in the context of social behavior, individuals' tendency to attribute causality to the external environment is driven by attention to context. In the context of health behavior, individuals' tendency to attribute causality to the external environment is shown to be related to decreased use of professional health care services. Given these observed relationships, Rivera (2011) proposed that attentional processes might play a role in the use of professional health care services among Latinos and non-Latino White- Americans. More specifically, Rivera proposed and tested a model in which people's attentional orientation toward context versus focal objects influences their propensity to identify

symptoms as potential markers of poor health and influences their probability to seek professional health care (see Figure 1).

Figure 1



Rivera's (2011) Proposed Model

Across two studies, results demonstrated that increases in contextual attention predicted decreases in seeking professional health care (Experiment 1) and orienting people's attention toward context decreased their willingness to seek professional health care services (Experiment 2). Inconsistent with predictions, ethnic differences were not observed (Experiment 1) and external symptom attributions did not mediate the negative association between attentional orientation toward context and the willingness to seek professional health care services (Experiment 1 and 2).

Rivera (2011) noted various limitations that may have contributed to the lack of support for the proposed model. First, Rivera (2011) recruited college students for both experiments. College students are generally both healthy and young. The goal of the current project was to test how attention to context influences health care utilization, using an older community sample. Second, Rivera (2011) noted that the predicted mediation was not observed because of the way symptom attributions were measured. That is, instructions did not indicate whether this question was to be answered with regard to how often, various factors cause *people in general* to experience symptoms of illness or with regard to how often various factors cause *the participant*

in particular to experience the varying symptoms of illness in the SAQ. As a result, this lack of specification in the instructions of the measure may have introduced random error in the measurement of symptom attributions that may have been responsible for the lack of support for the mediational role of symptom attributions. To address this limitation, the current study modified the instructions and some of the items for participants so that ambiguity was removed and each participant answered the items in the SAQ in relation to their *own personal experiences*.

Overview of the Proposed Research Aims and Hypotheses

The focus of this research was to examine basic psychological processes that may elicit cultural differences and to investigate how these differences influence our behaviors. More specifically, we examined the extent to which basic perceptual biases may drive people to behave differently. Moreover, we sought to understand how these differences might be contributing factors to the existing health disparities observed among Latinos in the U.S. The present study tested the following hypotheses:

- H_1: Contextual attention, external symptom and behavioral attributions will be positively associated with each other and negatively associated with health care utilization measures

- H2: Attributional and/or attentional biases will partially account for differences in health care utilization measures between Latinos and Whites after controlling for known health care covariates: (a) sex (b) health insurance (c)income, and (d)health status score

- H3: External symptom attribution bias will mediate the association between contextual attentional bias and health care utilization measures

Method

Power Analysis

The power analysis for the present study was conducted using G * Power (Faul, Erdfelder, Lang, & Buchner, 2007). The results from Rivera (2011) were used to inform the effect size estimates. Results from Rivera (2011), showed that the total anticipated proportion of health care seeking variability explained by the set of covariates and contextual changes was $p_a^2 = .14$ and the anticipated increase in the proportion explained due to the addition of contextual changes was $sr_a^2 = .0289$. Using the procedure described in Cohen, Cohen, Aiken, and West (2003), it was estimated that a sample size of $N = 227$ was needed to achieve a power level of .95 for the current study ($\alpha = .05$, $k_b = 2$, $L_{.95} = 9.64$, $f^2 = .0348$).

Participants

A total of 256 participants adult community members from El Paso region were recruited for the present study. Participants were recruited if they met the following criteria: (a) between the ages of 26 to 64; (b) self-identified as Latino or White, (c) currently not a college student, (d) reported no significant vision impairments, and (e) able to read and understand either English or Spanish. The age range was selected because 26 is the age most individuals are no longer allowed to be under their parents'/guardian's medical insurance plan. In contrast, the age of 64 was set as a cut-off because individuals over the age of 65 qualify to receive Medicare, a federal health insurance program open to Americans over the age of 65. Moreover, we wanted to recruit participants that were older than the typical college sample, but also not of an advanced age in which they would not be able to complete the visual task. Four participants were excluded because they were under the age of 26 ($n = 2$) or over the age of 64 ($n = 2$). After excluding

these participants, the final sample consisted of 252 (145 females, 107 males) participants. Participants ranged in age from 26 to 64 years (M = 39.36, SD = 11.07).

Procedure

Participants were recruited via flyers posted in the various locations in the region of El Paso including restaurants, coffee shops, and supermarkets. Participants were also recruited at local farmer's markets in El Paso, Texas and Las Cruces, New Mexico, coffee shops, and word of mouth from other participants. Before participating in the study, all interested participants were asked to complete a brief screening questionnaire in their preferred language- English or Spanish. Eligible participants who met the inclusion criteria listed above and who agreed to participate were be given the opportunity to complete the study on campus in-lab or in the booth our research team set up at the local farmer's markets. Once informed consent was provided, participants completed the change identification task, the various measures, and, lastly, completed the demographic information. Upon completion of the study, participants were compensated for their time with $10 cash with funds provided by the Dodson Research Grant awarded by the Graduate School. This study was approved by the Institutional Review Board (IRB) at the University of Texas at El Paso.

Materials

All study materials (i.e., flyers and measures in the study) were modified to make sure that the reading level would not be greater than 8th grade. This was done by using the readability statistics (i.e., the Flesch-Kincaid Grade Level) provided by Microsoft Word. Furthermore, many of the materials were revised after receiving feedback from participants who were recruited in the pilot phase (N = 20). Importantly, all materials were translated to Spanish by a certified

translator. Below each measure used is described in detail; however, Table 1 provides a summary of each measure.

Health care service access factors assessment

Participants were asked to indicate the following demographic information: (a) their sex (*female* = 1, *male* = 0), (b) whether or not they currently have health insurance coverage (*yes* = 1, *no* = 0), (c) whether or not they currently have a primary medical doctor (*yes* = 1, *no* = 0), (d) to estimate their total household income range between 1 (*Below $20,000*) to 9 (*$90,000 or more*), (e) how many years (in total) they have lived in the U.S., and (g) years of education completed (in total).

Number of professional health care visits

Participants were asked a single question regarding their frequency of professional health care visits. More specifically, participants used an open-ended scale to estimate the number of visits they made to a professional health care provider in the last year.

Use of professional health care services measure

The original measure used by Rivera (2011) to assess people's willingness to seek treatment was created using WebMD's (2005) symptom checklist. This measure assesses people's willingness to seek professional health care services for 20 somatic symptoms. The WebMD measure was partially modified. Specifically, the instructions and some items were revised, three additional items were added based on feedback from participants, and the response anchors were changed. In the original measure, participants were asked to indicate how willing they would be to seek help from a licensed health care professional if they experienced each of the different symptoms

listed using a scale ranging from 1 (*very unwilling*) to 8 (*very willing*). In the present study, participants were asked to indicate their level of agreement or disagreement with the following statement: "I would go see a healthcare provider if I experienced the following symptoms such as shortness of breath/difficulty breathing, chest pain, and nausea ($\alpha = .94$; for detailed list see Appendix A). Participants were asked to respond using a 5-point Likert type scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*).

Current health status survey.

The 12-item short-form Health Survey SF-12 (Ware, Kosinski, & Keller, 1996) was originally intended to be used to assess participants' current health status. The SF-12 assesses four domains of current health functioning which include the following: (a) Physical Functioning, (b) Role Limitations Due to Physical Functioning, (c) Bodily Pain, and (d) General Health. However, after receiving feedback from pilot study participants, this survey was shortened to a single-item question that asked participants to rate their health from 1 (Poor) to 5 (Excellent). This question was included in the demographics portion of the survey.

Symptom attribution measure

The Symptom Attribution Questionnaire (SAQ; Lundh & Wangby, 2002) was utilized to examine participants' attributions for various symptoms of illness. The SAQ is a 39-item questionnaire that consists of thirteen symptoms of illness (e.g., a prolonged headache), each followed by three potential causal factors: a somatic or internal factor (i.e., a physical illness or disease), a psychological factor (i.e., a psychological or emotional abnormality), and a normalizing or external factor (i.e., a situational or environmental stressor). The SAQ's

instructions were modified twice to ensure that participants answer items in relation to their personal experiences with the listed symptoms.

During the pilot phase, participants were asked the following: "In your opinion, how often is each factor the root cause of each symptom that YOU may have experienced throughout the last 30 days?" These instructions were modified to the following: "Listed below are different symptoms you may or may not have ever experienced. For each symptom, please indicate how much each reason might explain your symptoms." Participants rated each item using a 4-point Likert-type scale 1(none at all) to 4 (a great deal) Only an index for each of the somatic ($\alpha = .86$) and external subscales ($\alpha = .83$) was created by aggregating the ratings for each factor. Scores on each subscale were averaged such that higher numbers on each subscale were indicative of an individual's greater tendency to attribute symptoms of illness to each type of factor. That is, scores on the somatic subscale were used to index the tendency to make internal symptom attributions and scores on the normalizing subscale were used to index the tendency to make external symptom attributions. Finally, a measure of external symptom attributional bias was created by dividing the index of external symptom attributions by the index of internal symptom attributions. This measure can be found in Appendix B.

Behavioral attribution measure.

The revised Causal Dimensions Scale (CDS-II; McAuley, Duncan, & Russell, 1992) was used to assess behavioral attributions. Participants were asked to think about the last negative experience during ANY type of performance (e.g., an exam, an interview, a job evaluation, a date, etc.) in their life and to identify the primary cause of this experience. Once participants identified the primary cause, they were instructed to answer questions about their impressions/opinions of the

cause they provided. Originally, participants were asked to answer each question using a 9-point unipolar scale, with the scale ends representing the extent to which the cause was attributable to something inside of them versus outside of them (internality/externality subscale), something under their control versus not under their control (personal control subscale), something that was stable versus not stable over time (stability subscale), or something that was under someone else's control versus not under someone else's control (external control subscale). However, after receiving feedback from participants, the scale was modified to a 5-point Likert type scale ranging from 1 (strongly disagree) to 5 (strongly agree). In addition, to help reduce participant fatigue, questions that did not pertain to the internality/externality subscale of this measure were removed since the hypothesis for this measure centered on only this subscale. Therefore, only six items remained as part of this measure. Average scores on the internality/externality items were used to examine participants' tendency to make internal ($\alpha = .84$) or external behavioral attributions ($\alpha = .73$). This measure can be found in Appendix C.

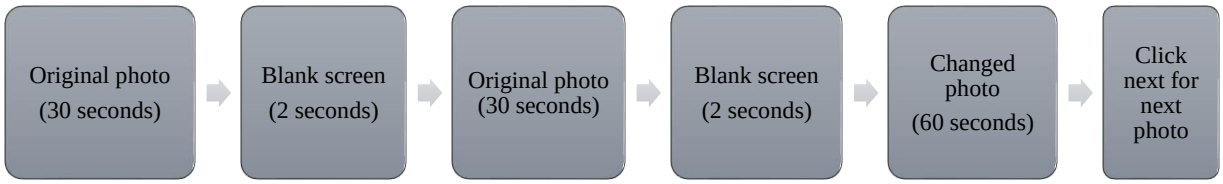
Change identification task

This task was used to examine differences in participants' attentional orientation. The task was based on a measure created by Masuda and Nisbett (2001, 2006). Eight original color photographs (1280 x 1024 pixels) of animals in a natural outdoor environment were collected from an Internet photograph-sharing site. Each original photograph was edited using Adobe Photoshop CS3 to create a corresponding changed photograph that had three changes to the animal or animals in the foreground (i.e., focal changes). For example, some focal changes include altering a giraffe's fur pattern and lengthening a deer's body. Similarly, three changes to

the environmental elements in the background were made (i.e., contextual changes). Some of the contextual changes made include cutting off a mountaintop and extending tree's branches.

Appendix D contains the eight original and changed photographs that were used in this study along with a listing of all of the focal and contextual changes made to each original photograph.A change identification task was created wherein participants were instructed to view each original and changed photograph in sequence and then asked to identify the changes they noticed between each photograph. All of the images were presented on the online survey. Each sequence consisted of (a) the presentation of an original photograph for 30 seconds, (b) a blank screen for 2 seconds, (c) the repeated presentation of an original photograph for 30 seconds, (d) a blank screen for 2 seconds, and (e) the presentation of a changed photograph was presented for 60 sec. As soon as the changed photograph was presented, participants were instructed to type all of the changes they observed between the original and change photograph. Importantly, participants were not informed of how many changes are present in each image or informed that both focal and contextual changes occurred between the photographs. After the 60 seconds, a blank screen appeared and participants were instructed to press a key when they were ready to complete the next sequence of photographs.

Figure 2



Visual Representation of Change Identification Task Procedure

The change identification task provides the following three indices of attentional processing. The first index that was computed is the average number of focal changes reported (α

= .69) with higher numbers indicating greater attention to focal information. The second index relates to the average number of contextual changes reported (α = .8), with higher numbers indicating greater attention to contextual information. Lastly, an index of contextual attentional bias was created by dividing the average number of contextual changes identified by the average number of focal changes identified [average contextual changes +1 / average focal changes +1]. As noted, in the equation, a 1 was added to the contextual attentional bias coefficient to prevent possible computing errors (i.e., division by zero error).

Results

Participant Characteristics

Descriptive statistics for all participant characteristics are shown in Table 2. Of the 252 participants included in the analyses, 242 completed the study in English and only 10 completed the study in Spanish. A total of 134 Latino and 118 White participants were included in the analyses. As shown in Table 2, within the Latino sample, the majority of the participants were female (63.4%), reported being married (51.5%), and working full-time (71.6%). The mean age for Latinos was about 39 years (*SD*= 10.68). For Whites, the gender distribution was approximately equal (50.9% females and 49.2% males). Similar to the Latino sample, the majority of White participants (44.1%) were married, working full-time (72.9%) and about the same age (*M* =39.67, *SD* = 11.52). Results from cross-tabulations and chi-square analyses showed that White and Latino participants significantly differed in level of education completed, $X^2(1) = 26.581$, $p = .014$. Whites were more likely to indicate having obtained a higher level of education in comparison to Latinos. Moreover, Whites also reported a greater family income (*M* = 5.79, *SD* = 2.75 versus *M* = 4.59 *SD* = 2.80, t (248) = -3.385, $p = .001$).

In regards to health-related characteristics, Whites were more likely to report having medical insurance in comparison to Latinos, X^2 (1) = 15.619, $p < .001$. Participants did not differ on any of the other health-related questions such as being having a primary health care provider, diagnoses of different medical conditions, or in how they rated their current health status (see Table 3).

Health Care Utilization

Descriptive statistics for all indices of health care utilization are shown in Tables 4 and 5. Overall, participants reported making an average of 3 (*SD* = 2.77) professional health care visits in the last year. It should be noted that this variable was truncated to a maximum of 10 visits per year because the vast majority of participants (*n* = 233) provided responses between 0 to 10 visits a year. In regards to their level of agreement to using professional health care services if experiencing different symptoms, on average, participants were in the mid-point (*M* = 3.63, *SD* = 0.68). To examine health care utilization differences as a function of ethnicity, two separate ANOVAs were conducted on both measures as a function of ethnicity. For number of professional health care visits, Whites reported making more visits in the past year (*M* = 3.44, *SD* =2.99) compared to Latinos (*M* = 2.58, *SD* = 2.51), (*F (*1, 248) = 6.22, *p* = .013, *d* =0.311. On average, Whites also indicated a higher agreement to going to see a health care provider if they experienced symptoms (*M* = 3.72, *SD* = 0.57) compared to Latinos (*M* = 3.55, *SD* = 0.74), however, this difference was marginal, *F (*1, 249) = 3.85, *p* = .051, *d* =0.257.

Attributional Processing

In general, participants indicated a greater tendency to attribute symptoms of illness to external factors (*M* = 2.48, *SD* = .53) than to internal factors (*M* = 1.93, *SD* = .56). To examine

differences between ethnic groups, two separate ANOVAs were conducted on all symptom attribution measures as a function of ethnicity. Results show no ethnic differences in regards external symptom attributions (F (1, 249) = .21, p = .647). However, there were marginal ethnic differences in internal symptom attributions such that White participants' scores were slightly higher (M= 1.99, SD= 0.58) compared to Latinos (M =1.85, SD = 0.56), F (1, 249) = 3.68, p = .056, d = .246. Similarly, a marginal ethnic difference was observed for external symptom attributional bias. Results suggest that Latinos' external symptom attributional bias (M = 1.42 SD = .38) was slightly higher than Whites' bias, (M = 1.30, SD = .30), F (1, 249) = 3.38, p = .067, d =.351. That is, this bias suggests that Latinos had a slightly higher tendency to attribute their symptoms to external factors rather than to internal factors.

With regard to behavioral attributions, overall, participants responded were at the mid-point for both internal (M = 3.43, SD = .98) and external (M = 3.09, SD = .90) behavioral attributions. Results showed that the tendency to make external behavioral attributions did not differ by ethnicity, F (1, 240) = 1.96, p = .163. In contrast, internal behavioral attributions did differ by ethnicity, F (1, 250) = 6.46, p = .012, d =.290. More specifically, Whites, on average, had a higher tendency to make internal behavioral attributions (M = 3.59, SD = .82) compared to Latinos (M = 3.32 SD = 1.03).

Attentional Processing

Overall, all participants identified more focal changes (M =.80, SD = .36) than contextual changes (M = .60, SD = .50). Latinos and Whites identified about the same number of focal changes (M = 0.81, SD = .36, M = 0.79, SD = .36), respectively. Latinos and Whites reported similar levels of contextual changes (M = .65, SD = .50) (M = 0.54, SD = .51) and this difference

was marginally significant, F (1, 250) = 2.95, p = .087, d = .218. Furthermore, results showed a marginal difference in contextual attentional bias between Whites (M = .87, SD = .23) and Latinos (M = .92, SD = .23), F (1, 250) = 3.27 p = .072, d = .217. That is, Latinos', on average, had a slightly higher tendency towards noticing contextual changes.

Differences by Gender

Of the 252 participants included in the analyses, there were 145 females and 107 males. To determine if there were differences in the measures as a function of gender, a series of ANOVAs were conducted. Results indicate a marginal gender difference in external symptom attributional bias such that female participants' scores were slightly higher (M = 1.41, SD = 0.536) compares to males (M = 1.33, SD = 0.34), F (1, 249) = 3.12, p = .079, d = .228. There was also asiginificant gender difference in external behavioral attributions, F (1, 240) = 3.91, p = .049, d =.258. More specifically, males, on average, had a higher tendency to make external behavioral attributions (M = 3.44, SD = 1.0) compared to females (M = 2.99 SD = .94). Finally, there was a marginal significant difference in utilization of professional health care services, F (1, 249) = 3.85, p = .051, d =0.204.That is, females indicated a higher agreement to going to see a health care provider if they experienced symptoms (M = 3.69, SD = 0.58) compared to their male counterparts (M = 3.55, SD = 0.77).

Correlation Analyses for Entire Sample

Zero order bivariate correlations were conducted to address the first hypothesis. That is, it was hypothesized that contextual attention, external symptom and behavioral attributions would be positively associated with each other and negatively associated with utilization of professional health care services.

As expected, increases in the average number of contextual changes identified were significantly associated with increases in external symptom attributional bias, r (251) = .152, p = .016. Moreover, increases in external symptom attributions were associated with increases in external behavioral attributions, r (241) = .162 p =.012. Contrary to predictions, increases in the number of contextual changes identified was unrelated to increases in external symptom attributions (r (251) = .066, p = .299) and external behavioral attributions (r (251) = .040, p = .535);. A similar pattern was observed for contextual attentional bias.

Consistent with expectations, increases in external symptom attributional bias were significantly associated with decreases in use of professional health care services, r (251) = -.210, p = .001 and with decreases in the number of professional health care visits in the last 12 months, r (249) = -.172, p =.007. As expected, increases in the average number of contextual changes identified were only related to a significant decrease in the use professional health care services, r (251) = -.128, p =.041. Inconsistent with expectations, increases in external behavioral attributions were related to increases in professional health care use, r (251) = .130, p = .045 and marginally related with the number of professional health care visits in the last 12 months, r (240) = .107, p =.100. Table 6 provides detailed information on the association of all measures.

Hierarchical Multiple Regression Analyses for Entire Sample

Follow-up hierarchical multiple regression analyses were conducted to test the second hypothesis. That is, we wanted to examine the extent to which, after controlling for known covariates, attributional (i.e., external symptom attribution bias) and attentional (i.e., contextual attentional bias) processes would account for unique variability in the health care utilization measures. Due to the significant differences found between those who completed the survey in

Spanish versus those who completed the survey in English, it was decided that language of survey would be included as a covariate.

Utilization of Professional Health Care Services

The regression analyses are shown in Tables 7 and 8. The set of covariates was entered in the first step and external symptom attributional bias was entered in the second step. Results of the first linear regression indicated a non-significant effect? between the covariates (income, insurance, health status, sex, language of survey, and ethnicity) and the utilization of professional health care services (F (6, 242) = 1.65, p=. 133, R^2= .039). Once external symptom attributional bias was included into the model, there was a significant effect between the covariates, external symptom attributional bias, and the utilization of professional health care services (F (7, 241) = 3.19, p =.002, R^2= .085). After examining the individual predictors, both gender and external symptom attributional bias accounted for a significant amount of unique variability in the utilization of professional healthcare services. More specifically, male participants' scores on the utilization of professional health care services were lower compared to female participants, B = -0.198, SE = .88, B = -.145, t (248) = -2.26, p = .025. Moreover, increases in external symptom attributional bias were associated with decreases in the utilization of professional healthcare services, B = -.420, SE = .12, B = -.219, t (248) = -3.46, p = .0001. The amount of variance in the utilization of professional health care visits accounted for by external symptom attributional bias was significant, R^2 change = .045, F change (1, 241) = 11.94, p = .001. With regards to contextual attentional bias, results from the first step of the linear regression indicated a non-significant relationship between the covariates (income, insurance, health status, sex, language of survey, and ethnicity) and the utilization of professional health care services (F (6, 242) = 1.65, p =. 133, R^2= .039). Once contextual attentional bias was included into the model, the model was

still not significant, (F (7, 242) = 1.50, p=. 168, R^2= .042). Moreover, the amount of variance in the utilization in professional health care services accounted for by contextual attentional bias was not significant, R^2 change = .002, F change (1, 241) = .593, p = .442.

Number of Professional Health Care Visits

The regression analyses are shown in Tables 9 and 10. The set of covariates was entered in the first step and external symptom attributional bias was entered in the second step. Results of the first linear regression indicated a significant effect between the covariates (income, insurance, health status, sex, language of survey, and ethnicity) and the number of professional health care visits (F (6, 240) = 2.60, p =. 018, R^2= .061). The individual predictors were examined further and indicated that ethnicity and language of survey were significant predictors in the model. That is, Latinos' number of professional health care visits was lower than Whites, B = -.767, SE = .37, B = -.138, t (246) = -2.074, p = .039. Moreover, participants who completed the survey in English reported more professional health care visits than those who completed the survey in Spanish, B = 1.98, SE = .92, B = .140, t (246) = 2.131, p = .034. Once external symptom attributional bias was included into the model, there was a significant effect between the covariates, external symptom attributional bias, and the number of professional health care visits (F (7, 239) = 3.39, p =.002, R^2= .090). After examining the individual predictors, language of survey continued to be a significant predictor along with external symptom attributional bias. More specifically, increases in symptom attributional bias were associated with decreases in the number of professional health care visits, B = -1.38, SE = .50, B = -.175, t (246) = -2.75, p = .006. The amount of variance in the number of professional health care visits accounted for by external symptom attributional bias was significant, R^2 change = .029, F change (1, 239) = 7.59, p = .006. With regard to contextual attentional bias, results of the first linear regression are

similar to those described previously. That is, results showed a significant effect between the covariates (income, insurance, health status, sex, language of survey, and ethnicity) and the number of professional health care visits (F (6, 241) = 2.60, p =. 018, R^2= .061). Once contextual attentional bias was included into the model, there was a significant effect between the covariates, contextual attentional bias, and the number of professional health care visits (F (7, 240) = 2.36, p =.024, R^2= .064). After examining the individual predictors, language of survey continued to be a significant predictor along with ethnicity. However, contextual attentional bias was not a significant predictor and results indicated the amount of variance in the number of professional health care visits accounted for by contextual attentional bias was not significant, R^2 change = .004, F change (1, 240) = .907, p = .342.

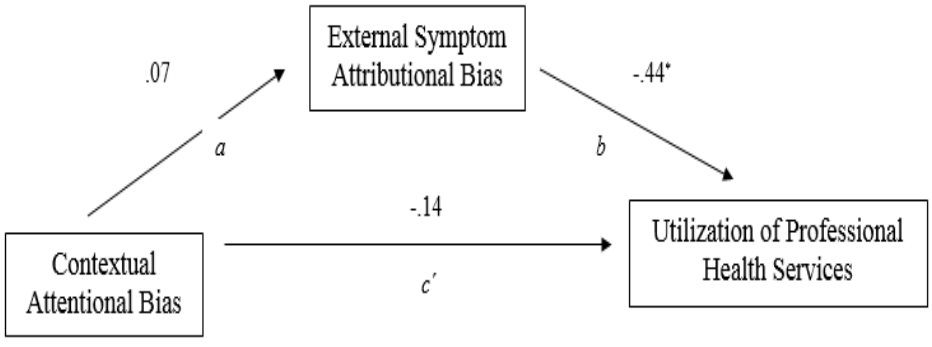
Mediation Analyses for Entire Sample

Two mediational models were estimated to test the third hypothesis of the present study (see Figure 2). More specifically, we tested the indirect effect of contextual attentional bias on health care utilization measures, through external symptom attributional bias. These models were assessed using the nonparametric bootstrapping procedure developed by Preacher and Hayes (2008). This procedure involved repeated sampling (with replacement) from the original data set until ten thousand random samples were obtained. The indirect effect (ab) was computed for each sample and a 95% bias-corrected confidence interval based on the resulting sampling distribution. Both of these models were tested with known predictors of health care use included as covariates.

The first meditational model focused on the use of professional health care services As depicted in Table 11, the total effect of contextual attentional bias on use of professional health

care services was not significant, *b* = -.17, *SE* = .19, *t* (248) = -.931 *p* = .352. The direct effect of contextual attentional bias on use of professional health care services was not significant, *b* = -.14, *SE* = .18, *t* (248) = -.784, *p* = .434. Inconsistent with the proposed model, the bootstrapped indirect effect (ab) of contextual attentional bias on use of professional health care services through external symptom attributional bias, was in the expected direction, but not significant, *Point Estimate* = -.03, *SE* = .040, 95% CI [-.113, .050]. That is, the positive association between contextual attentional bias and external symptom attributional bias (the *a* effect) and the negative association between external symptom attributional bias and use of professional health care services (the *b* effect) combined did not produce a significant negative indirect effect (the *ab* effect) of contextual attentional bias on the use of professional health care services (see Figure 3). Therefore, the association between contextual attentional bias and use of professional health care services was not mediated by external symptom attributional bias, as originally hypothesized.

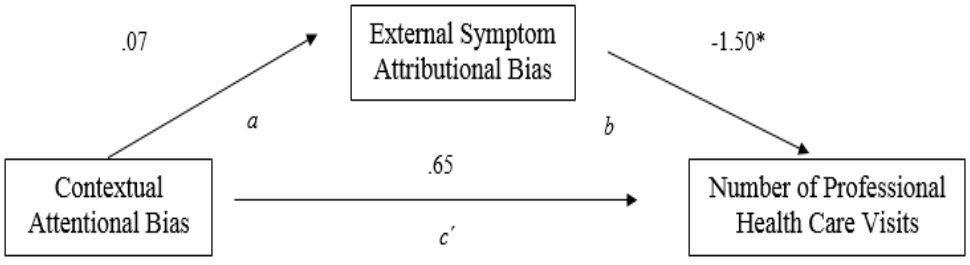
Figure 3



Mediation Model 1

The second meditational model focused on the number of professional health care visits reported by participants in the last 12 months. Results are similar to the previous model (see Table 11). More specifically, neither the total nor direct effect of contextual attentional bias on number of professional health care visits were significant, b = .55, SE = .76, t (246) = .731, p = .466 and b = .65, SE = .75, t (246) = .883, p = .378, respectively. Similarly, to previous meditation model, inconsistent with the proposed model, the bootstrapped indirect effect (ab) of contextual attentional bias on the number of professional health care visits, through external symptom attributional bias, was also in the expected direction but was not significant, *Point Estimate* = -.11, SE = .152, 95% CI [-.455, .163]. The positive association between contextual attentional bias and external symptom attributional bias (the *a* effect) and the negative association between external symptom attributional bias and the number of professional health care visits (the *b* effect) combined did not produce a significant negative indirect effect (the *ab* effect) of contextual attentional bias on the number of professional health care visits. Thus, the association between contextual attentional bias and the number of professional health care visits was not mediated by external symptom attributional bias, as originally hypothesized (Figure 4).

Figure 4



Mediation Model 2

Discussion

The present study sought to examine the role of perceptual biases and their impact health care utilization among a community sample of adults who self-identified as Latinos and Whites. We tested a model in which people's attentional orientation toward context discourages them from health care utilization because (a) attentional orientation toward context encourages people to attribute symptoms of illness to external/environmental factors and (b) attributing symptoms of illness to external/environmental factors is associated with less utilization of professional health care services.

Conceptually consistent with proposed model, increases in the average number of contextual changes identified and contextual attentional bias were positively associated with increases in external symptom attributional bias; however, only average number of contextual changes identified was significantly related to external symptom attributional bias. Moreover, consistent with the proposed model, there was a significant negative association between external symptom attributional bias and use of professional health care services and the number of professional health care visits in the last 12 months. Findings show that Latinos identified more contextual changes in comparison to their White counterparts did, but this difference was marginal. Similarly, there was a marginal difference in contextual attentional bias by ethnicity. That is, Latinos displayed a slight tendency toward contextual attention. There was a marginal ethnic difference in external symptom attributional bias such that Latinos reported a tendency to attribute the cause of various symptoms of illness to external factors. This is in line with what previous studies have shown that Latinos commonly attributed illness to external causes/forces (Cabassa, Lester, & Zayas, 2007; Cabassa & Zayas, 2007; Weisman, Gomes, & López, 2003). Present findings found partial support for the hypothesis that differences in health care utilization

between Latinos and Whites are partially attributable to differences in attentional and attributional processes. This was limited to external symptom attributional bias as contributing unique variability for the utilization of professional health care services, after controlling for covariates (income, insurance, health status, sex, language of survey, and ethnicity). Inconsistent with the proposed model, the association between contextual attentional bias and health care utilization measures was not mediated by external symptom attributional bias, as originally hypothesized.

Studies have shown that Latinos, especially Mexican- Americans, are least likely of all of the major ethnic groups in the U.S. to make regular visits to a health care professional, or use professional health care services (CDC, 2009; Guendelman & Wagner, 2000; Zheng & Zimmer, 2009. Our findings provide further evidence for this noted health disparity. Latinos reported significantly less number of professional health care visits in the past year and had marginal lower scores on the utilization of professional health care services if they experienced different symptoms compared to Whites. Research has found that Latinos have lower levels of income and higher levels of economic instability, both of which consistently predict reduced access to health care services (Auchincloss, Van Nostrand, & Ronsaville, 2001; Reid, Vittinghoff & Kushel, 2008). Similarly, research has demonstrated that Latinos in the United States are more likely to be uninsured throughout adulthood compared to non-Latino individuals (Kirby & Kaneda, 2010; Lillie-Blanton & Hoffman, 2005). Without insurance coverage, individuals may face considerable challenges in receiving health services because many health care providers require insurance coverage from their patients or charge a high fee (co-pay) in order to provide services (Sohn, 2017). Taken all of this together, it is possible that the differences in health care utilization between Latinos and Whites in the present study could be explained by the significant

differences in income and insurance status. Our findings showed that Whites reported a greater family income and were more likely to report having medical insurance in comparison to Latinos.

The lack of support for the proposed mediation model with regard to health care utilization measures is difficult to interpret. One possibility is that the effect of contextual attentional bias on use of professional health care services and number of professional health care visits is not mediated by external symptom attribution bias. This possibility suggests the need to identify other potential mediators or the need re-evaluate Rivera's proposed model and consider to the role of potential moderators in this relationship. Given this, future studies may want to consider testing other components from the Common- Sense Model of Self-Regulation of Illness and Health proposed by Leventhal and colleagues (1992) as possible moderators. As previously noted, this model provides a foundation to understanding behaviors related to health care utilization and or the lack thereof. Leventhal and colleagues (2012) describe five components of these illness representations: 1) *Identity*: the label or name given to the condition and the symptoms that 'appear' to go with the condition; 2) *Cause*: the individualistic ideas about the perceived cause of the condition, which may not be completely biomedically accurate; 3) *Timeline*: the predictive belief about how long the condition might last (i.e. acute versus chronic). These beliefs will be re-evaluated as time progresses; 4) *Consequences*: the individual beliefs about the consequences of the condition and how this will have an impact on them physically and socially. These representations may only develop into more realistic beliefs over time; and 5) *Curability/controllability*: the beliefs about whether the condition can be cured or kept under control and the degree to which the individual plays a role in achieving this action. Moderation and mediation can occur together in the same model (i.e., moderated mediation, see

Muller, Judd, & Yzerbyt, 2005; Preacher, Rucker, & Hayes, 2007). Therefore, it is possible that the effect of contextual attentional bias on health care utilization is mediated by external symptom attributions but differs depending on the level of a moderator. For example, this relationship could be moderated by one's beliefs on the consequences of their symptoms and how this condition will affect other aspects of their life. Individuals who perceive low consequences may differ from those who perceive the consequences of their symptoms as more severe in their decision related to health care utilization. Studies have shown that incorporating other components from the Common- Sense Model of Self-Regulation of Illness and Health impact people's decision to seek medical help, to determine compliance with recommended treatment management, coping behavior, as well as improve disease outcomes (Leventhal et al., 1984; Robbins & Kirmayer, 1991; Roesch & Weiner, 2001).

Other Considerations and Implications for Future Research

The present study had several limitations worth discussing such as testing the proposed model using a healthy sample. The majority of our participants (83.7%) self-reported their current health as being favorable. That is, participants indicated that their health was *good, very good, and excellent* . Moreover, the majority of our participants reported no previous medical condition diagnoses (see Table 3).Therefore; it is unclear if results would have differed if we had recruited an unhealthy sample or people with medical conditions. For example, people with diabetes experience thirst as a common symptom. For many people who do not have diabetes, experiencing thirst may be attributed to an external cause (i.e., hot weather, too much exercise, etc.); however, people with diabetes are more likely to attribute the symptom of thirst to an internal factor (i.e., their medical diagnosis). Given this, it may be beneficial for future research

to explore how the proposed model could be applied to understanding the role of attentional and attributional biases in health care utilization among people with existing medical conditions and/or predisposed to certain medical condition due to family history. Moreover, the present study used a use of a convenience sample. We sought to recruit participants in the community at locations not related to health care utilization. However, the majority of our recruitment occurred at local at farmer's markets, which may make our sample different from others. One study found that individuals who attend and shop at farmer's markets are more likely to consume five or more fruits and vegetables daily (Pitts, Wu, McGuirt, Crawford, Keyserling, & Ammerman, 2013). A different study notes that shopping at farmer's markets can also affect people's long-term purchasing behavior, such as purchasing more organic or locally produced foods, which can ultimately result in more positive health outcomes (Carson, Hamel, Giarrocco, Baylor, & Mathews, 2016). Therefore, location of recruitment is something that future researchers may want to consider.

There were also unexpected gender differences that warrant some attention. More specifically, there was a marginal gender difference in external symptom attributional bias such that female participants' scores were slightly higher compares to males. In addition, there was a marginal difference in utilization of professional health care services. That is, females indicated a higher agreement to going to see a health care provider if they experienced symptoms compared to their male counterparts. Taken together, this suggests that females had a tendency to attribute the causes of illness to external factors, but reported being more in agreeance to use professional health care services if they experience symptoms, which is opposite of what we would expect in the proposed model. Given this, future studies may want to consider the role of gender when developing models aimed at understanding individuals' health behaviors.

Furthermore, research has shown that among Latinos, those with a preference for Spanish significantly reported less access to health care (including preventative care) than those with a preference for English (DuBard & Gizlice, 2008). Also English proficiency has been associated with health care use such that adults with limited English proficiency report significantly poorer access to health care compared to adults who are proficient in English (Ponce, Hays, & Cunningham, 2006). Given this, we wanted to test for language effects, but were unable to because almost all of the participants (n = 242) completed the study in English. Only ten participants selected to complete the study in Spanish.. Based on this, when developing models aimed at understanding individuals' health behaviors, future researchers should consider the role of participants' language preference, proficiency, and its relationship with health outcomes of interests

The current research examines basic psychological mechanisms through which "culture" influences individuals' decisions related to health care utilization among a community sample of adults. Importantly, the results from the current research shed light on the importance and need for collaboration across the fields of psychology (i.e., social, cultural, and health) to answer critical questions related to human behavior that could help us tackle health disparities from different. Collaborative efforts may allow us to view health disparities with different lenses; thus, we can gain a better idea of how different aspects of individuals' lives affects their beliefs and, ultimately, their behaviors.

Although the proposed model is in initial stages of testing, future work could have important implications for research. For example, results could provide a foundation to encourage more research aimed at investigating specific professional health care seeking behaviors where there are significant ethnic disparities in treatment utilization and seeking such

as alcohol misuse (Chartier & Caetano, 2010) and mental health (Vega, 2005; Hwang, Myers, Abe-Kim, & Ting, 2008).

Lastly, the present study, effect sizes varied from small to large. Given the magnitude of some of the reported effect sizes in the present study, it is tempting to make comments as to what these findings may suggest for development of future health interventions; however, we are far from this and more research is needed before any consideration on the implications for health interventions are made.

Conclusion

Health disparities adversely affect groups of people who have systematically experienced greater obstacles to health based on factors including race and ethnicity. By the year 2050, persons representing ethnic and racial minority groups will comprise nearly half of all Americans (Cohn & Caumont, 2016). Given that the population in the United States is becoming increasingly racially and ethnically diverse, it is critical that we continue to examine and broaden our scope in order to search for other underlying processes that have an impact on individuals' behaviors. It is our duty, as scientists, to continue to explore other factors beyond demographic information that could help us gain a better understanding of other possible underlying processes that may influence people's decisions related to the utilization of health care that may further be perpetuating the existing health disparities in the United States.

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Appendix A

Utilization of Professional Health Care Services

Please indicate your level of agreement or disagreement with the following.

Strongly disagree (1) Disagree Neither agree nor disagree Agree Strongly agree (5)

I would go see a healthcare provider if I experienced the following symptoms

1. Shortness of breath/ breathing problems
2. Chest pain
3. Feeling nauseous
4. Feeling dizzy
5. Feeling always too hot or too cold
6. Unexplained weight loss
7. Unexplained weight gain
8. High or persistent fever
9. Severe abdominal pain
10. Blurry vision/vision problems
11. Sleeping problems
12. Feeling tired all the time
13. Severe headache
14. Swelling in one or both legs
15. Problems with frequent urination or difficulty urinating
16. Unexplained bleeding
17. Consistent cough
18. Difficulty paying attention
19. Frequent thoughts of suicide
20. Legs or arms going numb
21. Feeling weak or numb on one side of your body
22. Consistent heartburn
23. Losing a lot of hair

Appendix B

Symptom Attribution/Questionnaire (SAQ)

Listed below are different symptoms you may or may not have ever experienced. For each symptom, please indicate how much each reason might explain your symptoms.

Not at all (1)	Somewhat(2)	Quite a bit (3)	A great deal (4)

If I had a **headache** that lasted longer than usual, I would probably think it is because:

- I am emotionally upset
- There is something wrong with my muscles, nerves, or brain.
- A loud noise, bright light, or something else has irritated me

If I was **sweating a lot**, I would probably think it is because

- I must have a fever or infection.
- I am anxious or nervous.
- The room is too warm, I have too many clothes on or I am working too hard.

If I got **dizzy all of a sudden**, I would probably think that it is because:

- There is something wrong with my heart or blood pressure.
- I'm not eating enough or I got up too quickly.
- I must be under a lot of stress.

If I noticed my **mouth was dry**, I would probably think that it is because:

- I must be scared or anxious about something.
- I need to drink more water.
- There is something wrong with my glands that make saliva.

If I felt my **heart was beating really fast,** I would probably think that it is because

- I drank too much coffee.
- I must be really excited or afraid.
- There must be something wrong with my heart.

If I felt **really tired,** I would probably think it is because:

- I am emotionally tired or discouraged.
- I have been pushing myself too hard or not exercising enough.

- I am anemic or my blood is weak.

If I noticed my **hand was shaky**, I would probably think it is because:

- I might have some problem with my nervous system.
- I'm very nervous.
- I have tired out the muscle in my hand.

If I had **trouble sleeping**, I would probably think it is because:

- Some kind of pain of physical discomfort is keeping me awake.
- I'm not tired or I had too much caffeine.
- I am worrying too much or I must be nervous about something.

If I had a **stomachache,** I would probably think it is because:

- I was worrying too much.
- I have the flu or stomach indigestion.
- I ate something that was bad for me.

If I lost my **appetite (not being hungry)**, I would probably think it is because:

- I've been eating too much or my body doesn't need as much food as before.
- I'm worrying so much that food doesn't taste good anymore.
- I have some stomach or intestinal problem.

If I kept **losing my breath,** I would probably think it is because:

- My lungs are congested from an infection, irritation, or having heart problems.
- The room is stuffy or there is too much pollution in the air.
- I'm really excited or anxious.

If I noticed **numbness or tingling in my hands or feet**, I would probably think it is because:

- I am under emotional stress.
- There is something wrong with my nerves or blood circulation.
- I am cold or my hand/foot fell asleep.

If I was **constipated or irregular**, I would probably think it is because:

- There is not enough fruit or fiber in my diet.
- Tightness of the nerves or muscles is keeping me from being regular.
- There is something wrong with my bowels or intestines.

Appendix C

Revised Causal Dimension Scale (CDS-II)

Think about the last time you had a negative experience during any type of activity where you were being judged such as being interviewed, taking an exam, or being evaluated at your job. In your opinion, what was the ***main reason*** for this negative experience? Share your answer in the space below.

_____

_____

Now think about the ***main reason*** that you just shared. In the questions below tells us what your thoughts are about the reason for this negative experience.

Is the main reason for this negative experience you shared something that reflects something

	Strongly disagree	Disagree	Neither agree not disagree	Agree	Strongly agree
about you	○	○	○	○	○
about the situation	○	○	○	○	○

Is the main reason for this negative experience you shared something that is

	Strongly disagree	Disagree	Neither agree not disagree	Agree	Strongly agree
inside of you	○	○	○	○	○
outside of you	○	○	○	○	○

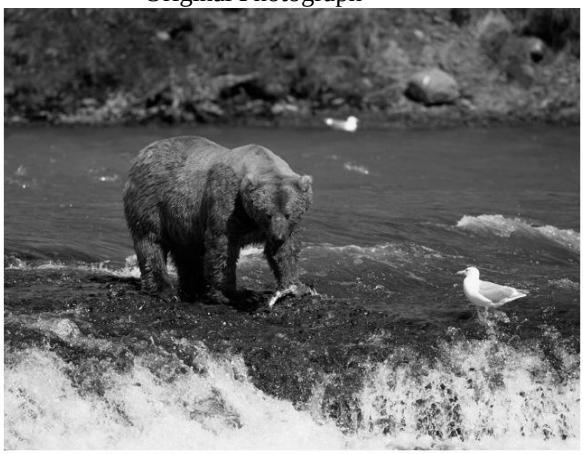
Is the main reason for this negative experience you shared something

	Strongly disagree	Disagree	Neither agree not disagree	Agree	Strongly agree
about you	○	○	○	○	○
about others	○	○	○	○	○

Appendix D

Change Identification Task-Bear

Original Photograph



Change Photograph

Below the changes in both focal and context are indicated:

Focal Changes

- fish in other paw
- neck is lower or hunched over
- hump on back is larger

Contextual Changes

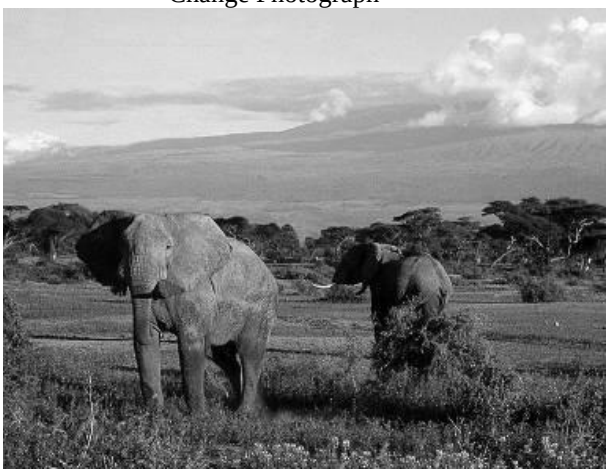
- bird to the right of the bear is facing other way
- bird in background is further to the right
- rock in background moved farther left

Appendix D (continued)

Change Identification Task-Elephant

Original Photograph

Change Photograph



Below the changes in both focal and context are indicated:

Focal Changes

- tusks missing on left elephant
- trunk missing on right elephant
- tail missing on left elephant

Contextual Changes

- mountain top on left removed
- clouds now covering mountain top on right
- middle tree is missing

Appendix D (continued)

Change Identification Task-Sitting giraffe

Original Photograph

Change Photograph

Below the changes in both focal and context are indicated:

Focal Changes

- eye is closed
- brown patch on body is larger
- neck is shorter

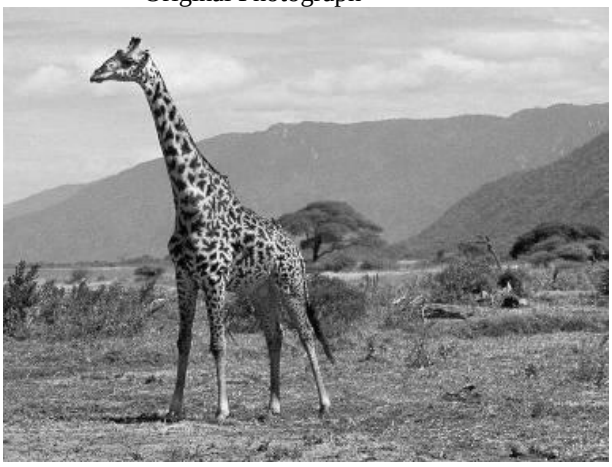
Contextual Changes

- rock on right side moved down
- tucan in tree
- blacked out/less trees in background

Appendix D (continued)

Change Identification Task-Standing girafee

Original Photograph



Change Photograph

Below the changes in both focal and context are indicated:

Focal Changes

- neck is longer
- tail is longer
- there is more white fur on leg

Contextual Changes

- tree has more branches / is larger
- mountain continues in background
- patch of dirt on bottom right is larger / grass is gone

Appendix D (continued)

Change Identification Task-Deer

Original Photograph

Change Photograph

Below the changes in both focal and context are indicated:

Focal Changes

- antler is missing
- deer is longer / extended
- belly has more white fur

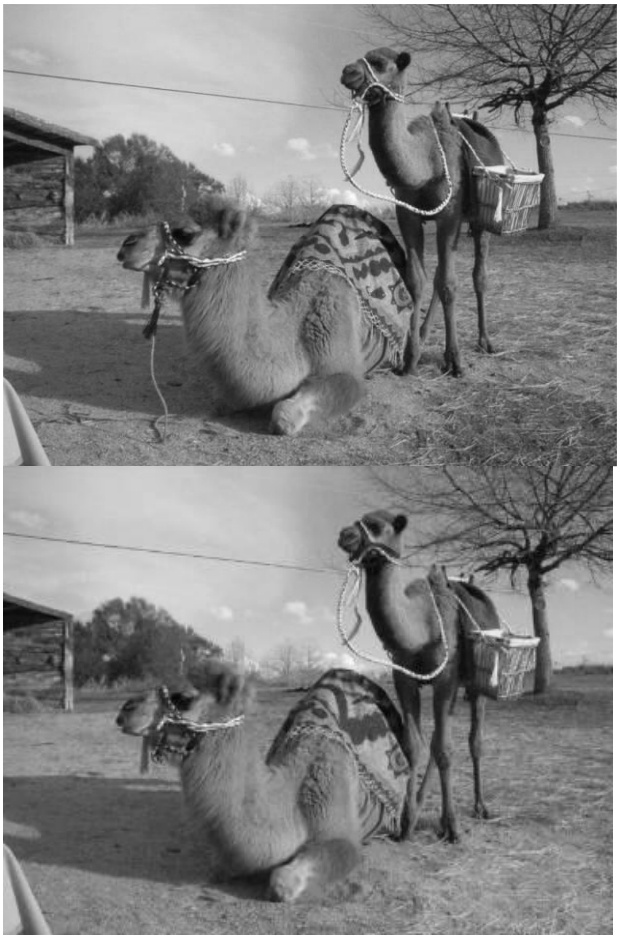
Contextual Changes

- plant on left side moved up
- plant on right side moved down
- plants in background continue / no gap in plants

Appendix D (continued)

Change Identification Task-Camels

Original Photograph Change Photograph



Below the changes in both focal and context are indicated:

Focal Changes

- rope / red tassel on sitting camel removed
- cloth pattern on sitting camel changed
- harness on standing camel changed color

Contextual Changes

- power line in background is cut off
- house roof has been removed

- dark patch of dirt next to camels is lighter / removed

Appendix D (continued)

Change Identification Task-Rhinoceros

Original Photograph

Change Photograph

Below the changes in both focal and context are indicated:

Focal Changes

- rhinoceros turned opposite direction
- rhinoceros on left is missing horn
- rhinoceros on left is missing a leg

Contextual Changes

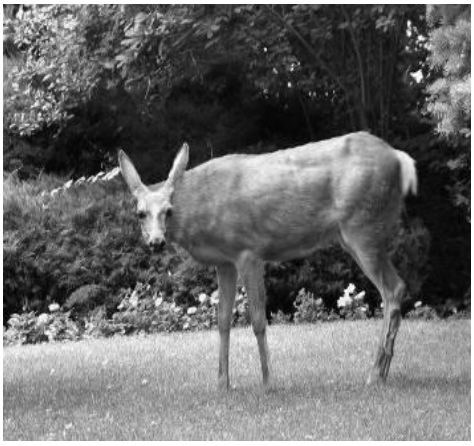
- mountain rocks removed, hidden, or not lit up
- tree trunk added on left
- clouds over mountains disappeared

Appendix D (continued)

Change Identification Task-Doe

Original Photograph

Change Photograph



Below the changes in both focal and context are indicated:

Focal Changes

- head is lower
- tail is whiter
- black mark on forehead is removed

Contextual Changes

- branch on right side is missing
- flowers on left side turned purple
- purple and white flowers under doe switched sides

Table 1: Summary of Measures

Measure Name	# of items	α	Sample Item
Use of professional health care services	23	.94	*I would go see a healthcare provider if I experienced the following symptoms: Shortness of breath/ breathing problems*
Number of Professional Health Care Visits	1	-	*How many visits did you make to a professional health care provider in the last year?*
Current health status survey	1	-	*In general would you say your health is:* • *Poor, Fair, Good, Very Good, Excellent*
Symptom attribution • Internal • External • Psychological (not used)	39	(internal) (α = .86) external (α = .83)	*If I had a **headache** that lasted longer than usual, I would probably think it is because:* • *I am emotionally upset (psychological)* • *There is something wrong with my muscles, nerves, or brain (internal)* • *A loud noise, bright light, or something else has irritated me (external)*
Behavioral attribution • Internal • External	6	(internal) (α = .86) external (α = .83)	*Is the main reason for this negative experience you shared something that reflects something* • *about you? (internal)* • *about others? (external)*

Table 2: Participant Characteristics

	Latino (n = 134) % (n)	**Whites (n = 118) % (n)**
Gender		
Male	36.6 (49)	49.2(58)
Female	63.4(85)	50.8 (60)
Marital Status		
Single	26.1 (35)	31.4 (37)
Married	51.5 (69)	44.1 (52)
Divorced	7.5 (10)	11.0 (13)
Widowed	3.7 (5)	1.7 (2)
Living with a significant other	9.0 (12)	11.9 (14)
Separated	2.2 (3)	0 (0)
Employment Status		
Full time	71.6 (96)	72.9 (86)
Part-time	13.4(18)	11.0 (13)
Unemployed and looking for work	3.7 (5)	3.4 (4)
Unemployed and not looking for work	2.2 (3)	0.8 (1)
Home maker	3.7 (5)	3.4 (4)
Retired	2.2 (3)	5.1 (6)
Unable to work or disabled	0.7 (1)	0.8 (1)
Other	2.2 (3)	2.5 (3)
Education*		
No schooling completed	0.0(0)	0.0(0)
Elementary school to 8th grade	0.0 (0)	0.0(0)
Some high school, no diploma	2.2 (3)	5.1 (6)
High school graduate, diploma or the equivalent	9.7 (13)	9.3 (11)
Some college credit, no degree	17.2 (23)	11.0 (13)
Trade/technical/vocational training	4.5 (6)	4.2 (5)
Associate degree	9.0(12)	1.7 (2)
Bachelor's degree	32.8 (44)	43.2 (51)
Master's degree	13.4 (18)	18.6 (22)
Professional degree (e.g. doctor/lawyer, etc.)	3.0 (4)	0.8 (1)
Doctorate degree	1.6 (2)	5.9 (7)
	Mean (SD)	**Mean (SD)**
Age	39.08 (10.68)	39.67 (11.52)
Years in United States	34.36 (12.45)	36.61(12.59)
Income**	4.59 (2.80)	5.79 (2.75)
Health Status	3.49 (.89)	3.47 (1.17)

Note: ** $p < .001$; * $p < .05$ t-tests were conducted for continuous measures and Chi-square tests for categorical measures.

Table 3: Participant Health Related Characteristics

	Latino (N = 134) % (n)	**Whites (N = 118) % (n)**
Insurance		
Yes	74.6 (100)	93.2 (110)
No	25.4 (34)	6.8 (8)
Primary healthcare professional		
Yes	57.5 (77)	63.6 (75)
No	42.5 (57)	36.4(43)
Prediabetes		
Yes	10.4 (14)	8.6 (10)
No	88.8(119)	90.5 (105)
Don't know	0.7(1)	0.9 (1)
Diabetes		
Yes	8.2 (11)	8.6 (10)
No	0.3(121)	90.5 (105)
Don't know	1.5(2)	0.9 (1)
Gestational diabetes		
Yes	2.2(3)	6.0(7)
No	96.3 (129)	93.1(108)
Don't know	1.5 (2)	0.9(1)
High blood pressure		
Yes	16.4(22)	18.1(21)
No	79.9(107)	80.2(93)
Don't know	3.7(5)	2.6(3)
High cholesterol		
Yes	16.4(22)	15.5(18)
No	81.3(109)	81.9(95)
Don't know	2.2(3)	2.6(3)
Kidney disease		
Yes	4.5(6)	8.6(10)
No	93.2 (124)	91.4(106)
Don't know	2.3(3)	0.0 (0)
Heart Disease		
Yes	2.3(3)	6.0(7)
No	96.2(128)	94.0(109)
Don't know	1.6(2)	0.0 (0)
Cancer		
Yes	3.0(4)	6.0 (7)
No	94.7(126)	93.1(108)
Don't know	2.3 (3)	0.9(1)

Note. Chi-Square was used to detect differences in response patterns

Table 4: Descriptives for Indices of Attentional Processing, Attributional Processing, and Health Care Seeking for (Entire Sample)

	M	*SD*	*MIN*	*MAX*	*SCALE*	
Change Identification Task						
Contextual Changes	0.60	0.50	0.00	2.25	0-3	
Focal Changes	0.80	0.36	0.00	2.00	0-3	
Contextual / Focal Changes	0.89	0.23	0.50	1.67		
Symptom Attribution						
Internal	1.92	0.57	1.00	4.00	1-4	
External	2.52	0.55	1.00	4.00		
External / Internal	1.38	0.36	0.53	2.93	-	
Behavioral Attribution						
Internal	3.43	0.98	1.00	5.00		
External	3.09	0.90	1.00	5.00	1-5	
U. Professional Health Care Services	3.63	0.68	1.00	5.00	1-5	
No. of Professional Health Care Visits	2.98	2.77	0.00	10.00	8.00	-

Table 5: Descriptives for Indices of Attentional Processing, Attributional Processing, and Health Care Use by Ethnicity

	M	*SD*	*MIN*	*MAX*	*SCALE*
			Latinos (*N* = 134)		
Change Identification Task					
Contextual Changes	0.65	0.50	0.00	2.00	0-3
Focal Changes	0.81	0.36	0.00	2.00	0-3
Contextual / Focal Changes	0.92	0.23	0.53	1.67	-
Symptom Attribution					
Internal	1.85	0.56	1.00	4.00	1-4
External	2.51	0.59	1.00	4.00	1-4
External / Internal	1.42	0.38	0.53	2.80	-
Behavioral Attribution					
Internal	3.32	1.03	1.00	5.00	1-5
External	3.05	0.98	1.00	5.00	1-5
U. Professional Health Care Services	3.55	0.74	1.00	5.00	1-5
No. of Professional Health Care Visits	2.58	2.51	0.00	10.00	-
			Whites (*N* = 118)		
Change Identification Task					
Contextual Changes	0.54	0.51	0.00	2.25	0-3
Focal Changes	0.79	0.36	0.00	1.88	0-3
Contextual / Focal Changes	0.87	0.23	0.00	1.47	-
Symptom Attribution					
Internal	1.99	0.58	1.00	4.00	1-4
External	2.48	0.50	1.00	4.00	1-4
External / Internal	1.30	0.30	0.63	2.14	-
Behavioral Attribution					
Internal	3.59	0.82	1.00	5.00	1-5
External	3.17	0.78	1.33	5.00	1-5
U. of Professional Health Care Services	3.72	0.57	1.91	5.00	1-5
No. of Professional Health Care Visits	3.44	2.99	0.00	10.00	-

Table 6: Inter-correlations between Indices of Attentional Processing, Attributional Processing, Health Care Use Measures (Entire Sample)

Variable	1	2	3	4	5	6	7	8	9	10
1. UPHS	-									
2. PHV	.156*	-								
3. SIQ_Internal	.381**	.204*	-							
4. SIQ_External	.239*	.054	.517**	-						
5. ESAB	-.210*	-.172*	-.592**	.337**	-					
6.Behave_Internal	.176*	.089	.230*	.282**	.010	-				
7.Behave_External	.130*	.107	.260**	.162*	-.144*	.012	-			
8. Contextual changes	-.128*	-.027	-.056	.066	.152*	.069	.040	-		
9. Focal changes	-.097	-.094	-.091	.077	.173*	.058	.018	.577**	-	
10. COF	-.060	.044	.030	.033	.036	.041	.047	.749**	-.093	-

Note. *** p <.001; ** p <.05 and * p<.01 UPHS – utilization of professional health care services; PHV- number of professional health care visits in the last 12 months; SIQ_- symptom attributional (internal and external); ESAB – external symptom attributional bias; behave-behavioral attributions (internal and external); COF- contextual attentional bias.

Table 7: Regression on Utilization of Professional Health Care Services, Health Care Covariates and External Symptom Attribution Bias for Entire Sample

Source	B	SE	*B*	*t*	*p*	R^2	R^2 Change
Intercept	3.679	.278		13.251	.000		
Insurance	-.069	.130	.038	.535	.593		
Income	.013	.017	.056	.794	.428	.039[1]	
Health Status	-.029	.042	-.045	-.690	.491		
Sex	.169	.089	.124	1.892	.060		
Language	-.089	.227	-.026	-.393	.694		
Ethnicity	-.163	.091	-.121	-1.803	.073		
Intercept	4.080	.295		13.816	.000		.045[3]
Insurance	-.090	.127	.050	.711	.478		
Income	.013	.016	.053	.769	.443	.085[2]	
Health Status	-.007	.042	-.011	-.172	.863		
Sex	-.198	.088	.145	2.258	.025		
Language	-.036	.223	-.011	-.162	.871		
Ethnicity	-.128	.089	-.095	-1.442	.151		
External Symp. Attrib. Bias	-.420	.122	-.219	-3.456	.001		

Note: $N = 248$.
[1] F (6, 242) = 1.65, p=. 133.
[2] F (7,241) = 3.19, p = .003.
[3] F change (1,241) = 11.94, p = .001.

Table 8: Regression on Utilization of Professional Health Care Services, Health Care Covariates, and Contextual Attentional Bias for Entire Sample

Source	B	SE	*B*	*t*	*p*	R^2	R^2 Change
Intercept	3.679	.278		13.251	.000		
Insurance	-.069	.130	.038	.535	.593		
Income	.013	.017	.056	.794	.428	.039[1]	
Health Status	-.029	.042	-.045	-.690	.491		
Sex	-.169	.089	.124	1.892	.060		
Language	-.089	.227	-.026	-.393	.694		
Ethnicity	-.163	.091	-.121	-1.803	.073		
Intercept	3.804	.322		11.818	.000		.002[3]
Insurance	-.057	.131	.032	.438	.662		
Income	.015	.017	.062	.873	.384	.042[2]	
Health Status	-.030	.042	-.045	-.700	.485		
Sex	-.173	.090	.127	1.932	.054		
Language	-.088	.228	-.026	-.387	.699		
Ethnicity	-.157	.091	-.116	-1.721	.086		
Contextual Attentional Bias	-.143	.186	-.049	-.770	.442		

Note: $N = 248$.
[1] $F(6, 242) = 1.65$, $p = .133$.
[2] $F(7, 241) = 1.50$, $p = .168$.
[3] F change $(1, 241) = .593$, $p = .442$.

Table 9: Regression on Number of Professional Health Care Visits, Health Care Covariates, and External Attribution Bias for Entire Sample

Source	B	SE	*B*	*t*	*p*	R^2	R^2 Change
Intercept	2.694	1.08		2.50	.102		
Insurance	-.246	.530	.033	-.467	.642		
Income	-.001	.069	.002	-.02	.984	.061[1]	
Health Status	-.261	.173	-.095	-1.50	.134		
Sex	-.604	.366	-.103	-1.65	.100		
Language	1.98	.926	.140	2.15	.033		
Ethnicity	-.745	.370	-.138	-2.02	.045		
Intercept	4.16	1.88		3.50	.000		.029[3]
Insurance	-.312	.523	-.042	-.60	.551		
Income	.001	.068	.001	.01	.990	.090[2]	
Health Status	-.179	.173	-.066	-1.03	.303		
Sex	-.684	.363	-.122	1.88	.061		
Language	2.143	.915	.152	2.34	.020		
Ethnicity	-.657	.367	-.118	-1.792	.074		
External Symp. Attrib. Bias	-1.378	.500	-.175	-2.75	.006		

Note: $N = 246$.
[1] F (6, 240) = 2.60, p =.018.
[2] F (7, 239) = 3.39, p =.002.
[3] F change (1, 239) = 7.59, p = .006.

Table 10: Regression on Number of Professional Health Care Visits, Health Care Covariates, and Contextual Attentional Bias for Entire Sample

Source	B	SE	*B*	*t*	*p*	R^2	R^2 Change
Intercept	2.694	1.08		2.50	.102		
Insurance	-.246	.530	.033	-.467	.642		
Income	-.001	.069	.002	-.02	.984	.061[1]	
Health Status	-.261	.173	-.095	-1.50	.134		
Sex	-.604	.366	-.103	-1.65	.100		
Language	1.98	.926	.140	2.15	.033		
Ethnicity	-.745	.370	-.138	-2.02	.045		
Intercept	2.107	1.24		1.70	.091		.004[3]
Insurance	-.308	.534	-.041	-.58	.565		
Income	-.009	.070	-.013	-.13	.897	.064[2]	
Health Status	-.258	.173	-.096	-1.49	.138		
Sex	-.581	.367	-.104	-1.59	.114		
Language	1.980	.926	.141	2.14	.033		
Ethnicity	-.780	.371	-.140	-2.10	.037		
Contextual Attentional Bias	.720	.756	.061	.95	.342		

Note: N = 247.
[1] *F (*6, 241) = 2.60, *p* =.018.
[2] *F (*7, 240) = 2.36, *p* =.024.
[3] *F* change (1, 240) = .907, *p* = .342.

Table 11: Tests for Mediation Using Bootstrapping

Dependent	**Path/effect**	**Regression Results**				**Bootstrap Results**		
		b	*SE*	*t*	*p*	Point Estimate	SE	95% CI
UPHS (Model 1)	*c* (CAB → UPHS)	-.17	.19	-.932	.352			
	a (CAB → ESAB)	.07	.10	.732	.465			
	b (ESAB → UPHS)	-.44	.12	-3.59	.000			
	c´	-.14	.18	-.784	.434			
	a X *b*					-.03	.040	[-.113,.050]
PHV (Model 2)	*c* (CAB → PHV)	.55	.76	.731	.466			
	a (CAB → ESAB)	.07	.10	.731	.466			
	b (ESAB → PHV)	-1.50	.50	-2.99	.003			
	c´	.65	.75	.883	.378			
	a X *b*					-.11	.152	[-.455, .163]

Note: N = 249 for Model 1and *N*=247 for Model 2. Regression estimates are unstandardized. Confidence Intervals are biased corrected. CAB – contextual attentional bias; UPHUS – utilization of professional health care services; PHV- number of professional health care visits in the last 12 months; ESAB – external symptom attributional bias; PHV – number of professional health care visits in last 12 months. All analyses were conducted after controlling for estimated family income, health insurance status, current health status, and sex.; Model 1: $R^2 = .08$, $F(7, 241) = 2.96$, $p = .005$.Model 2: $R^2 = .08$, $F(7, 239) = 3.01$, $p = .005$.

Vita

Sandra Leticia Oviedo Ramirez was born in León, Guanajuato, México. At the age of seven, she and her family migrated to San Diego County, California. Sandra received an Associate's degree in Social Behavioral Sciences from Palomar College located in San Marcos, California. In spring 2013, Sandra completed her Bachelor's degree in Psychology at California State University San Marcos. As an undergraduate, Sandra was a Minority Access to Research Careers (MARC) Scholar. In fall 2013, she entered the doctoral program in Psychology at the University of Texas at El Paso (UTEP). In fall 2018, Sandra began working full-time as a program evaluator for the Office of Research and Sponsored Projects- Research, Evaluation, and Assessment Services (REAS) unit. Sandra is a co-author on three different peer reviewed manuscripts and one book chapter. Throughout her academic career at UTEP, Sandra has also had the opportunity to mentor over 10 undergraduate students. Upon the completion of her PhD, Sandra will continue to pursue program evaluation. Ultimately, her professional goals include working for the Department of Health for the State of Texas to utilize the skills she has developed during her doctoral training in an applied setting. Sandra would also like to assist non-profit organizations whose aim is to promote healthy living among underrepresented populations in order to improve individual and public health, welfare, and safety.

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