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Perceived Racism and Blood Pressure in Foreign-Born Mexicans

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ABSTRACT

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Studies have identified perceived racism as one type of social stress that is believed to contribute to hypertension, though no studies to date have examined the relationship between perceived racism and blood pressure among foreign-born Mexicans living in the United States (U.S.). In addition, studies have shown that acculturation may increase levels of perceived discrimination among foreign-born Mexicans living in the U.S. The primary purpose of this study was to examine the relationship between perceived racism and ambulatory blood pressure among a convenience sample of 332 foreign-born Mexicans living in Utah County, Utah controlling for age, gender, body mass index (BMI), and acculturation. This was done through the use of several multiple regression analyses using archival data collected at Brigham Young University. The Perceived Ethnic Discrimination Questionnaire—Community Version (Brief PEDQ—CV) was used to measure perceived racism. The Acculturation Rating Scale for Mexican Americans (ARSMA-II) was used to measure both language and general acculturation. Four blood pressure variables, including waking systolic blood pressure (WSBP), waking diastolic blood pressure (WDBP), sleeping systolic blood pressure (SSBP), and sleeping diastolic blood pressure (SDBP) were used as outcome variables in the regression analyses. A relationship between perceived racism and any of the ambulatory blood pressure variables used in this study was not found. In addition, English-language acculturation was not found to moderate the relationship between perceived racism and blood pressure in the sample of first generation Mexicans participating in this study. A moderating effect of general acculturation on the relationship between perceived racism and blood pressure was found when controlling for age, BMI, and gender, though this moderating effect disappeared when WDBP was included in the regression model. Implications of findings, limitations, and directions for future research are discussed.

Keywords: perceived racism, Perceived Ethnic Discrimination Questionnaire—Community Version (Brief PEDQ—CV), acculturation, Acculturation Rating Scale for Mexican Americans (ARSMA-II), ambulatory blood pressure, immigrants, Mexican, foreign-born.

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Race and Hypertension

Research has firmly established racial disparities in various cardiovascular factors (Anderson et al., 1992; Hertz, Unger, & Cornell, 2005; National Institute of Health, 2000; Redmond & Baer, 2011). One of the cardiovascular factors shown to be disparate among racial groups is blood pressure (Hertz et al., 2005; Redmond & Baer, 2011). Studies have shown that racial minorities living in the United States (U.S.) are more likely to have higher prevalence rates of hypertension than Caucasians, with African-Americans having the highest prevalence rates of hypertension (Hertz et al., 2005; Redmond & Baer, 2011). Interestingly, studies have also shown that migrant and immigrant minority groups who enter the U.S. tend to develop higher blood pressure over time (Marmot & Syme, 1976; Shaper, Leonard, & Jones, 1969; Vaeth & Willet, 2005; Wilson, Hollifield, & Grimm, 1991).

Perceived Racism and Blood Pressure

Over the past several years, researchers have hypothesized perceived racism as one psychosocial stressor that may contribute to elevated rates of blood pressure among various immigrant populations (Anderson et al., 1992; Brondolo et al., 2003; Clark, 2000). One of the pioneering and well-documented empirical authors in the field, Elizabeth Brondolo, has defined perceived racism as the perception that one is being targeted for negative treatment because of ethnicity, where one's ethnic identity refers to one's classification based on race or culture of origin (Brondolo et al., 2003; Contrada, Ashmore, & Gary, 2001).

Although the exact mechanisms through which perceived racism is thought to be related to blood pressure is still unclear in the existing literature, several theoretical models connecting perceived racism to general cardiovascular health have been proposed. One example of a theoretical model outlining a plausible path through which the experience of perceived racism may affect cardiovascular health is the Reserve Capacity Model proposed by Gallo and Matthews (Gallo & Mathews, 2003). Gallo and Mathews' (2003) model suggests that, by requiring greater use of psychological resources, chronic exposure to social stressors, such as perceived racism, may deplete a person's reserve capacity to cope with future stressors (Gallo & Mathews, 2003). This combination of chronic stress exposure and diminished coping resources with which to resolve future stressors may subsequently result in chronically higher levels of negative affect. Gallo and Mathews (2003) subsequently cite medical research showing that chronic experiences of negative affectivity have been demonstrated to increase risk for various cardiovascular diseases including hypertension (Blumenthal, & Kaplan, 1999; Gallo & Mathews, 2003; Rozanski, Suls & Bunde, 2005; Whiteman, Deary, & Fowkes, 2000). Despite the established connection between blood pressure and stress and the proposed theoretical connections between perceived racism, as a specific stressor, and cardiovascular diseases, few studies have examined the direct relationship between blood pressure and perceived racism (Brondolo et al., 2003).

The limited number of studies to date that have examined the relationship between perceived racism and blood pressure have yielded mixed results (Broman, 1996; Brondolo et al., 2003; Brondolo et al., 2008; Hill et al., 2007; James et al., 1984; James et al., 1994; Dressler, 1996; Singleton et al., 2008; Steffen et al., 2003). Some early studies on the relationship between perceived racism and blood pressure have indicated little or no relationship between perceived racism and blood pressure (Broman, 1996; Dressler, 1996; James et al., 1984; James et al., 1994). For example, in one of the early cross-sectional studies of perceived racism and blood pressure, Broman (1996) asked a random sample 312 African American adults from the Detroit, Michigan area whether or not they had experienced discrimination and whether or not they had ever been diagnosed with hypertension (Broman, 1996). After controlling for SES, reports of discrimination were not found to predict health status in this study. In addition to this cross-sectional study, a number of results from a number of work-related studies examining the relationship between perceived blood pressure and racism have also indicated little or no relationship between blood pressure and perceived racism.

One work-related study of perceived racism and blood pressure conducted by Dressler (1996), for example, examined the relationship between blood pressure and perceived racism at work in a sample of 90 African Americans. A four –item measure, whose psychometric properties were not reported, was used to ascertain the participants' perceived racism on the job while a standard sphygmomanometer was used to measure resting blood pressure in this study. Dressler did not find a relationship between work-related perceived racism and blood pressure (Dressler, 1996).

In another work-related perceived racism study involving African Americans, James and his colleagues examined the relationship between perceived racism and blood pressure in a sample of 112 African American men (James et al., 1984). In this study, perceived racism was measured as a dichotomous variable (i.e. "Being Black has hindered me at work"; "Being Black has helped me at work"). James and his colleagues found no main effect of perceived racism on blood pressure (James et al., 1984).

While the studies conducted by James et al. (1984) and Dressler (1996) examined the relationship between work-related perceived racism and blood pressure among samples of African Americans, James and his colleagues (1994) examined the relationship between work-related perceived racism and blood pressure using a more diverse sample of participants (James et al., 1994). They studied perceived discrimination on the job and resting blood pressure in a sample of 89 African American (18.1%) and Mexican American (64%) employees. A psychometrically sound 16-item organizational prejudice-discrimination measure was used to measure perceived racial discrimination and prejudice at the work-site. Statistical analysis revealed a significant, but small correlation between blood pressure and perceived racial discrimination and prejudice controlling for weight, age, organization type, and self-esteem (James et al., 1994). Together, the studies conducted by Dressler (1996), Broman (1996), James and his colleagues (James et al., 1984), and James and his colleagues (James et al., 1994), indicated little or no significant relationship between perceived racism and blood pressure in work-related settings. One possible reason for the lack of findings of a relationship between perceived racism and blood pressure in work settings in these early studies may be that employees may have inaccurately reported their experiences of perceived racism due to a fear of work-related consequences for reporting racial discrimination at work.

Although the few early studies just described indicated little or no relationship between work-related perceived racism and blood pressure, other studies have established a relationship between perceived racism and blood pressure. For example, in a study conducted by Krieger and Sydney (1996), a group of 4,086 African American and Caucasian men and women were asked about their experiences with racial discrimination and had blood pressure assessed. Participants were divided into sub-groups depending on their exposure to zero, one, two, three, or more incidents of exposure to racial discrimination and within distinct levels of socio-economic status (SES), racial group, and gender. Comparisons across and within categories and groups were made. Interestingly, Krieger and Sydney (1996) found that among African American men and women who were classified as working class and African American women who were classified as professional class, those who reported no incidents of racial discrimination tended to have higher systolic and diastolic blood pressure than those who reported moderate levels of exposure to racial discrimination. However, members in these groups who reported the highest levels of exposure to racial discrimination tended to have higher average blood pressure than those who reported moderate levels of racial discrimination (Krieger & Sidney, 1996). Taken together, the results of Krieger and Sidney's (1996) indicated that although there may be a positive relationship between perceived racism and blood pressure, this relationship may complicated by many important social factors such as SES (Krieger & Sidney, 1996).

More recent studies using standardized and psychometrically sound measures of perceived racism have also found a relationship between perceived racism and ambulatory blood pressure. For example, Steffen and his colleagues (2003) examined the relationship between blood pressure and perceived racism in a sample of 69 African American men and women using the Perceived Racism Scale (PRS), one of only two psychometrically sound measure of perceived racism used in recent literature (McNeilly et al., 1996; Steffen et al., 2003). In this study, perceived racism was found be correlated with increased ambulatory blood pressure during waking hours (Steffen et al., 2003).

Elizabeth Brondolo and her colleagues (2008) examined the relationship between ambulatory blood pressure and perceived racism in a sample of primarily African American and Puerto Rican subjects (Brondolo et al., 2008). Perceived racism was measured using the Perceived Ethnic Discrimination Questionnaire—Community Version (PEDQ-CV), the second of only two psychometrically sound measure of perceived racism in the recent literature (Brondolo et al., 2003). Brondolo and her colleagues (2008) found that perceived racism was positively correlated with nocturnal blood pressure controlling for SES and a variety of personality factors (Brondolo et al., 2008).

In addition to the studies conducted by Steffen and his colleagues (2003) and Brondolo and her colleagues (2008), two other recent studies investigated the relationship between perceived racism and blood pressure among African Americans. Singleton and his colleagues (2008) examined the relationship between perceived racism and blood pressure in a sample of African American adults using the Perceived Racism Scale (McNeilly et al., 1996) and found that ambulatory blood pressure levels were significantly higher in African Americans with higher PRS scores. Hill and his colleagues (2007) also used the Perceived Racism Scale (McNeilly et al., 1996) to investigate the relationship between perceived racism and blood pressure in a sample of African American college students and found that perceived racism predicted higher sleeping and waking ambulatory diastolic blood pressure controlling for gender and body mass index (BMI). Together, the studies conducted by Krieger and Sydney (1996), Steffen (2003), Brondolo (2008), Singleton (2008), and Hill (2007) indicate a positive relationship between perceived racism and blood pressure, particularly among African Americans.

There are a number of plausible explanations that may account for the variability of results of studies examining the relationship between blood pressure and perceived racism. One plausible factor that may account for the mixed results of studies on perceived racism and blood pressure is the variability of measures that have been used in these studies. For example, only five studies to date have used reliable measures to measure perceived racism (Brondolo et al., 2008; Hill et al., 2007; James et al., 1994; Singleton et al., 2008; Steffen et al., 2003). All five of these studies found a significant correlation between perceive racism and blood pressure, suggesting that unreliable measures of perceived racism may have contributed to the lack of correlations between perceived racism and blood pressure in other studies. Additionally only four studies measured ambulatory blood pressure, and all four of these studies found a significant correlation between perceived racism and blood pressure (Brondolo et al., 2008; Hill et al., 20007; Singleton et al., 2008; Steffen et al, 2003). This is important to note since research has shown that ambulatory blood is more closely related to cardiovascular morbidity and mortality than resting blood pressure (Pickering, Shimbo, & Haas, 2006; Staessen et al., 1999). Using measures of resting blood pressure may have contributed to the lack of correlations between perceived racism and blood pressure in other studies. In short, the small body of available research on the relationship between perceived racism and blood pressure suggests that the most effective way to examine the relationship between perceived racism and blood pressure is by using a psychometrically sound measures of perceived racism and by measuring ambulatory blood pressure either in conjunction with or in place of resting blood pressure (Pickering et al., 2006; Staessen et al., 1999). A second plausible factor that may account for the mixed results of studies on perceived racism and blood pressure is that one or more social variables may moderate the relationship between perceived racism and blood pressure. Although other social variables may also moderate the relationship between perceived racism and blood pressure, acculturation to western society has become a focus of research in recent years (Cuellar, 1997; Dawson, 2009).

Acculturation

While acculturation has been defined in a number of specific ways across various studies, a review of the existing literature on acculturation suggests that a general definition of acculturation is the adaptation from one type of culture to another including adaptation to westernization, a more industrialized environment, or adaptation to a specific geographical culture (Berry, 1989). The process of acculturation may include various aspects of the human experience, including behavioral, cognitive, and affective processes among others (Cuellar, Arnold, & Maldonado, 1995). Behavioral aspects of acculturation, for example, commonly include cultural customs, food, media use, language use, and other overt behaviors related to a specific culture (Cellar et al., 1995). Cognitive components of acculturation include such examples as culturally-related beliefs about gender roles and identity, fundamental values, and organizational aspects of language development (Cuellar et al., 1995). The affective level acculturation includes emotions related to a specific culture including, for example, emotional reactions to culturally-related experiences and the way one feels about his or her identity within a given culture (Cuellar et al., 1995). Importantly, studies have demonstrated that language acculturation (adapting to language use) accounts for the majority of variance in acculturation (Cuellar et al., 1995; Finch et al., 2000; Vega, Zimmerman, Gil, Warheit, & Apospori, 1993).

Acculturation and perceived racism among Mexicans. Researchers have hypothesized that there may be a relationship between level of acculturation and the perception of racism among immigrants and migrants of minority populations in the U.S. (Cuellar, 1997; Dawson 2008; Finch et al., 2000). This developing area of interest is reasonable to consider, given both the logically and empirically supported notion that social experiences are likely to influence the degree to which a person experiences racism (Finch et al., 2000; Vega & Gil, 1998). Of particular interest for the purposes of this study, a few studies in the past several years have recently began investigating the relationship between acculturation and perceived racism among Mexicans living in the U.S. (Finch et al., 2000; Fraily, 1997; Montoya, 2005; Rivera, 1997; Shibazaki, 1999).

Studies on the relationship between the perception of racism and acculturation among Mexicans living in the U.S. have yielded mixed results. Some studies in the social psychology literature, using comprehensive measures (i.e. including multiple aspects) of acculturation, have found a negative correlation between levels of acculturation and perceived racism (e.g. Fraily, 1997; Shibazaki, 1999). Other studies in the social psychology literature, including the most recent study (Montoya, 2005), have found a positive correlation between levels of acculturation and perceived racism (e.g. Montoya, 2005; Rivera, 1997). An important epidemiological study conducted by Finch and his colleagues (2000) may add clarification to the small body of mixed results on the relationship between perceived racism and acculturation among Mexicans residing in the U.S. (Finch et al., 2000).

As part of a comprehensive health study of Mexicans living in Fresno, California (Mexican American Prevalence and Services Study), Finch and his colleagues (2000) examined the relationship between acculturation and perceived discrimination among a sample of both U.S. and foreign-born Mexicans ($N = 3{,}012$). In their study, Finch and his colleagues found that among U.S.-born Mexican-Americans, increased acculturation to U.S. culture, as measured by a modified measure of acculturation assessing language-acculturation (Cuellar Scale; Cuellar, Harris, and Jasso, 1980), was associated with decreased self-ratings of discrimination on a brief Likert-based scale of perceived discrimination (Finch et al., 2000). Conversely, Finch and his colleagues (2000) found that among foreign-born Mexicans, increased acculturation to U.S. culture was associated with increased perceived racism (Finch et al., 2000). Finch and his colleagues' results (2000) suggest that the relationship between perceived racism and acculturation among Mexicans living in the U.S. depends largely on country of origin. That is, in contrast to U.S.-born Mexican-Americans, foreign-born Mexicans are more likely to perceive racism as their level of acculturation increases (Finch et al., 2000).

One possible explanation of the positive relationship between acculturation and perceived racism among foreign-born Mexicans in the U.S. offered by Finch and his colleagues (2000) is that the likelihood that foreign-born Mexicans experience racism may depend specifically on their English-language acculturation. Foreign-born Mexicans migrants and immigrants living in the U.S. with a low mastery and use of the English-language are less likely to be aware of racist and discriminatory comments made by others around them who are speaking English, and therefore perceive less racism, than foreign-born Mexicans who have a firmer mastery of English. This hypothesis seems reasonable, and has been shared by at least one other author in the literature (Vega & Gil, 1998). English-language acculturation may thus moderate the relationship between perceived racism and blood pressure among foreign-born Mexicans such that a positive relationship between perceived racism and blood pressure may only be observed for foreign-born Mexicans with high levels of English-language acculturation. The role of English-language acculturation in moderating the relationship between perceived racism and blood pressure among foreign-born Mexicans living in the U.S. was examined in this study. Additionally, given that both comprehensive and language-based measures of acculturation have been used to examine the relationship between perceived racism and acculturation among Mexicans in previous studies, an examination of the role of acculturation as a comprehensive process in moderating the relationship between perceived racism and blood pressure among foreign-born Mexicans living in the U.S. was also examined in this study. A comparison between English language-acculturation and a more comprehensive process of acculturation in moderating the relationship between perceived racism and blood pressure was examined in this study.

Rational and Purpose of Study

As referenced above, Gallo and Mathews (2003), among others, have hypothesized a theoretical connection between various types of stress and various health problems, including hypertension (Gallo & Mathews, 2003). There are few empirical studies in the literature that have examined the relationship between perceived racism and blood pressure. Most studies examining the relationship between blood pressure and perceived racism to date have involved African American sample populations and none of the studies to date have examined the relationship between blood pressure and perceived racism among foreign-born Mexicans living in the U.S. This is surprising considering that the most recent U.S. census projected the Hispanic population, many of whom are Mexican immigrants, to reach approximately 60 million by the year 2020 (United Sates Census Bureau, 2010). In light of the scarcity of research examining the relationship between blood pressure and perceived racism in general and especially considering the lack of research examining the relationship between blood pressure and perceived racism among foreign-born Mexicans, a growing sub-population currently living in the U.S., the primary purpose of this study was to examine the relationship of blood pressure and perceived racism in a sample of foreign-born Mexicans currently living in the state of Utah.

A secondary purpose of this study was to examine the potential role of acculturation as a moderator in the relationship between perceived racism and blood pressure among Mexicans currently living in Utah County, Utah. Researchers have hypothesized a relationship between acculturation and the perception of racism among ethnic minorities living in the United States (Cuellar, 1997; Dawson 2008; Finch et al., 2000). More specifically, the available literature examining the relationship between degree of acculturation and the perception of racism among foreign-born Mexicans suggests that the perception of racism among foreign-born Mexicans is more likely to be observed among foreign-born Mexicans with high English-language acculturation than among foreign-born Mexicans with lower levels of English-language acculturation, possibly due to their ability to understand more racist comments in their social environment (Finch et al., 2000; Montoya, 2005Rivera, 1997; Vega & Gil, 1998). Given the expected positive relationship between English-language acculturation and level of perceived racism among foreign-born Mexicans with higher levels of English-language acculturation, and the hypothesized positive relationship between perceived racism and blood pressure, this study included an investigation of English-language acculturation as a potential moderator of the relationship between perceived racism and blood pressure among foreign-born Mexican residents of Utah County, Utah. Additionally, given that some previous studies have examined acculturation among Mexicans in the U.S. as a more comprehensive process (e.g. media use, food preferences, language use, and social contact), the role of acculturation as a more thorough and comprehensive process in moderating the relationship between perceived racism and blood pressure acculturation was examined in this study. A comparison between the role of English-language acculturation and a more comprehensive process of acculturation in moderating the relationship between blood pressure and perceived racism among foreign-born Mexicans in Utah County was included in this study.

Hypotheses

Based on the most recent studies using reliable measures of ambulatory blood pressure and perceived racism among African American, Puerto Rican, and racially mixed populations (Brondolo et al., 2008; Hill et al., 2007; Singleton et al., 2008; Steffen et al., 2003), I hypothesized that perceived racism would be significantly positively related to ambulatory blood pressure among a Utah County sample of foreign-born Mexicans controlling for demographic variables found to correlate with blood pressure. Secondly, I hypothesized, based on studies of acculturation and perceived racism among foreign-born Mexicans living in the U.S. (Finch et al., 2000; Fraily, 1997; Montoya 2005; Rivera, 1997; Shibazaki, 1999; Vega & Gil, 1998) that level of English-language acculturation would moderate the relationship between perceived racism and blood pressure such that the relationship between perceived racism and BP would be strongest among those that speak more English. I further hypothesized, based on the most recent studies on the relationship between acculturation and perceived racism among Mexicans (Finch, 2000; Montoya, 2005) that while a more comprehensive level of acculturation (i.e. including language use; media; social contact, etc.) would also be found to positively moderate the relationship between perceived and blood pressure in the study sample, English-language acculturation would be found to moderate the relationship between perceived racism and blood pressure to an equal or greater degree, given that this is a sample of foreign-born Mexicans.

Methods

Participants

Power analysis based on previous studies investigating blood pressure and perceived racism (standard deviation of blood pressure = 10 mmHg; statistically meaningful differences of 5 mmHg) indicated that a sample size of 200 subjects would be appropriate for this study. A convenience sample of 333 male and female participants of a study on Mexican acculturation was collected. All of the participants involved in this analysis were between the ages of 18 and 75 and born in Mexico and living in the Utah at the time of data collection. Participants were recruited for participation in the acculturation study through voluntary responses to local radio, television commercials, newspaper advertisements, flyers, and local English classes. Participants received $175 for their participation in this study. Participants were told that the general purpose of the study in which they would participate was to investigate various aspects of health among Mexican people. Participants who were pregnant, currently smoking, diagnosed with diabetes, taking blood pressure medication, or who were diagnosed with a heart condition were excluded from participation. Participants who responded to the advertisements and did not meet any of the exclusionary criteria were invited to come to the laboratory on the BYU campus for participation in this study over the course of four years. Upon their arrival to the laboratory, participants' blood was drawn by a professional phlebotomist for the purpose of acquiring various blood data that was not used in this study. Participants blood pressure readings were taken manually (using an occlusion cuff mercury column sphygmomanometer) and a packet of questionnaires used for multiple purposes in this and other studies was then given to participants to complete. The measures pertinent to this study are described below.

Measures

Demographic questionnaires. Participants were given questionnaires inquiring about a number of demographic variables including age, height, weight, physical activity (International Physical Activity Questionnaire; IPAQ), gender, number of years living in the United States, education, and income earned over the past year. These questionnaires were written in Spanish and administered by bilingual research assistants so as to ensure that the participants understood the questions being asked. Participants were asked to fill-out these questionnaires in the laboratory immediately after their blood was drawn. All of the demographic variables were entered as continuous variables in the data analysis with the exception of gender, which was entered as a dichotomous dummy variable (female = 0; male = 1).

Blood pressure. Participants were fitted with the Accutracker II blood pressure monitor, which has been shown to be a reliable instrument in measuring blood pressure (Staessen et al., 1999; Pickering et al., 2006). The Accutracker II was then programmed automatically to take blood pressure readings three times per hour for a period of 24 hours. As a fidelity check, the initial Accutracker II blood pressure readings were conducted immediately after participants were fitted with the Accutracker II blood pressure monitor. These initial Accutracker II readings were calibrated with the initial sphygmomanometer blood pressure readings (± 5 mm Hg). Participants were asked to wear this apparatus until returning to the laboratory the morning after they initially put on the apparatus. Participants were given an electronic diary, which they were asked to fill out during each automatic blood pressure reading. The electronic diary included ratings on their current levels of physical activity at each blood pressure reading (Ratings: 1 = none, 2 = low, 3 = moderate, 4 = high, 5 = very high). Participants were also asked to record their sleeping and waking times, which were used to calculate blood pressure during both waking and sleeping periods. Participants returned to the lab 24-hours after their initial blood pressure readings, at which time trained laboratory assistants removed the Accutracker II blood pressure monitors and the data from these monitors was immediately reviewed and entered into the laboratory computers. The average waking systolic blood pressure (WSBP), waking diastolic blood pressure (WDBP), sleeping systolic blood pressure (SSBP), and sleeping diastolic blood pressure (SDBP) were provided by the Accutracker II blood pressure monitor. Accutracker II readings were checked for artificial readings according to established guidelines (Hinderliter, Light, & Willis, 1991) at the time of data entry. Artificial readings were not included in the statistical analysis.

Perceived racism. Perceived racism was measured using a brief version of the Perceived Ethnic Discrimination Questionnaire—Community Version (Brief PEDQ—CV) designed by Brondolo and her colleagues (Brondolo et al., 2005). The Brief PEDQ—CV is the most recent form of the Perceived Ethnic Discrimination Questionnaire (PEDQ), which was a measure originally designed by Contrada (2001) to measure perceived racism in an ethnically diverse sample of adults (Contrada et al., 2001). The Brief PEDQ—CV is comprised of twenty Likert-type questions. In response to each item, subjects are asked to provide ratings ranging from 1 (Never) to 5 (Many Times) to indicate how often they have experienced various incidences of racial discrimination over the past 3 months. The Brief PEDQ—CV score is obtained by calculating the total number of points across items. Analysis of the Brief PEDQ—CV has revealed good internal consistency reliability ($\alpha = .87$) and good construct validity when compared to the PRS (McNeilly et al., 1996; Brondolo et al., 2005).

A Spanish translated version of the Brief PEDQ—CV was used to measure perceived racism in this study to ensure that the participants in this study understood the questions asked on the Brief PEDQ—CV questionnaire. The English to Spanish translation was originally conducted by a team of native Spanish speakers who were fluent in both English and Spanish using the translate/back translation method. None of the participants reported any difficulty understanding any of the questions.

English-language acculturation. English-language acculturation was measured using the Spanish version of the revised edition of the Acculturation Rating Scale for Mexican Americans (ARSMA-II; Cuellar et al., 1995). The ARSMA-II is the most recent version of the Acculturation Rating Scale for Mexican Americans (Cuellar et al., 1980). Items from the original ARMSA (Cuellar et al, 1980) that were pertinent only to Mexicans were eliminated from the ARSMA-II and some of the questions on the ARSMA-II were altered so as to reference "Hispanics" rather than just "Mexicans" (Cuellar et al., 1995).

The ARSMA-II is comprised of thirty Likert-type questions based on a 5-point rating scale (0 = Not At All; 1 = Very Little/Not Very Often; 2 = Moderately; 3 = Much/Very Often; 4 = Extremely Often/Almost Always). The questions are designed to include questions assessing three aspects of acculturation including language, ethnic identity, and ethnic interaction (Cuellar et al., 1995). The ARSMA-II includes two scales. The first scale (Scale 1) is considered to be the primary scale and can be used to derive two primary scores (i.e. Anglo Orientation Score; Mexican Orientation Score). The Anglo Orientation Score (AOS; 13 items) and Mexican Acculturation Score (MOS; 17 items) are designed to assess an individual's orientation towards Anglo and Mexican culture, respectively, where Anglo orientation is based on orientation to U.S. culture (Cuellar et al., 1995). The AOS and MOS. are independently derived scores, and are each an average of the number of the points endorsed for the items in each sub-scale. The AOS and MOS have both been found to have good internal consistency reliabilities (Cronbach's Alpha = .86 and .88 for the AOS and the MOS, respectively; Cuellar et al., 1995). Subsequent analysis of the two primary scales also revealed good construct validity (Cuellar et al., 1995). The second scale of the ARSMA-II (Scale 2) is an experimental scale that can be used to assess other aspects of acculturation that are not pertinent to the purposes of this particular study and therefore was not be utilized in this study (see Cuellar et al., 1995 for a further description of Scale 2 if desired).

Item #2 from the ARSMA-II (i.e., "Yo Hablo Ingles"/"I Speak English") was used to assess the degree to which English-language acculturation moderates the relationship between perceived racism and blood pressure in this study. This decision seems reasonable given the theory that the degree to which Mexicans and other immigrants and migrants living in the U.S. may perceive racism may depend largely on their adaptation to the English language, and similar methods to measure English-language acculturation among Mexicans have been used in previous studies (Finch et al., 2000; Vega & Gil, 1998). It is also important to note, as mentioned, that language acculturation in general seems to account for the majority of acculturation across studies (Cuellar et al., 1995; Finch et al., 2000; Vega et al., 1993).

Acculturation (comprehensive). The level of comprehensive acculturation was measured using the AOS sub-scale of the ARSMA-II (Cuellar et al., 1995). This decision seems reasonable given that the most recent study in the psychological literature examining the relationship between perceived racism and acculturation also used the AOS of the ARSMA-II to measure acculturation (Montoya, 2005).

Results

Reliability of Spanish ARSMA-II AOS Subscale and Brief PEDQ—CV

Given that the ARSMA-II and Brief PEDQ—CV questionnaires used in this study were translated from their original English versions, a reliability analysis of the ARSMA-II AOS subscale (Cuellar et al., 1995) and Spanish version of the Brief PEDQ—CV (Brondolo et al., 2005) was conducted using Cronbach's alpha, a measure of internal consistency. Cronbach's alpha values indicated strong reliability for the Spanish versions of the ARSMA-II AOS subscale ($\alpha = .89$) and BRIEF PEDQ—CV ($\alpha = .87$) used in this study.

Participant Characteristics

As previously indicated, the total sample used in this study was comprised of 333 Mexican immigrants, including 147 (44%) men and 186 (56%) women. Their ages ranged from 18 to 75 years of age. Demographic information, Brief—PEDQ CV Total scores (Brondolo et al., 2005), and ARSMA-II AOS scores (Cuellar et al., 1995) were reviewed for all participants. Waking blood pressure data (i.e., WDBP; WSBP) was available and entered for all participants; however, sleeping blood pressure data (i.e., SDBP and SSBP) was not obtained for 102 (31%) of the participants in this study because some of the participants failed to wear their blood pressure monitors during sleep. A description of the demographic characteristics of the sample participants is provided in Table 1.

Table 1

Means and Standard Deviations for Demographic Variables

Dependent Variable	*M*	*SD*
Age	36.44	11.61
Years of Education	12.73	4.18
Annual Income	40,500.00	19,500.00
BMI	28.36	5.39
IPAQ	3.57	0.67
Years living in the U.S.	7.92	7.01

Note. For simplicity, annual income has been provided in U.S. dollars; however, in the data set used for statistical analyses, income was provided in units of $10,000 increments starting, with 0$ to $10,000 representing a value of "1."

Descriptive statistics for each of the participants' blood pressure variables, Brief—PEDQ CV Total scores (Brondolo et al., 2005), and ARSMA-II AOS scores (Cuellar et al., 1995) is given in Table 2 shown below. Compared to the normative sample for the Brief—PEDQ CV, the participants in this study had average levels of perceived racism (Brondolo et al., 2005). The participants in this study, as a group, had low levels of acculturation compared to the ARSMA-II AOS normative sample of 1st generation Mexicans (Cuellar et al., 1995).

Table 2

Descriptive Statistics for Blood Pressure Variables, Brief PEDQ—CV, and ARSMA-II AOS

Variable	Min	Max	*M*	*SD*
WSBP	92.00	162.00	121.47	12.73
WDBP	55.00	108.00	71.41	8.12
SSBP	84.00	168.00	111.84	15.72
SDBP	46.00	109.00	63.18	10.64
Brief PEDQ—CV	20.00	96.00	33.22	10.21
ARSMA-II AOS	0.10	4.00	2.18	0.82

Preliminary Correlations

Bivariate Pearson *r* correlations between each of the originally obtained demographic variables (i.e., BMI scores; age; gender, number of years living in the United States; annual income; years of education; IPAQ scores) and each of the four blood pressure variables used as outcome variables in this study (i.e., WSBP; WDBP; SSBP; SDBP) were conducted in order to determine which of the provided demographic variables to include as control variables in subsequent multiple regression analyses. Prior to conducting these correlations, the histograms of each of the demographic and blood pressure variables were produced and evaluated in order to ensure that each variable was reasonably normally distributed. The correlations obtained during the preliminary correlation analysis are shown in Table 3.

Table 3

Correlations between Demographic Variables and Blood Pressure Variables

Variable	WSBP	WDBP	SSBP	SDBP
Age	.23**	.31**	.26**	.26**
Gender	.34**	.27**	.20**	.21**
Years of Education	.04	.05	-.08	-.07
Annual Income	.07	.03	.13	.02
BMI	.26**	.23**	.29**	.26**
IPAQ	-.02	.02	-.01	-.02
Years living in U.S.	.07	.09	.08	.07

Note. A review of the scatter plots produced for each of these bivariate correlations indicated that all demographic variables were linearly related to each of the blood pressure variables. No extreme bivariate outliers were observed in any of the scatter plots produced; $**p < .01$.

As indicated, participant age, gender, and BMI were each significantly correlated with each of the four blood pressure outcome variables ($p < .01$). These correlations were expected given the current state of the medical literature on hypertension (Chobanian et al., 2003; Rosamond et al., 2008). None of the other demographic variables obtained in this study (i.e., education; annual income; years living in the U.S.; IPAQ scores) were found to significantly correlate with any of the blood pressure variables used in this study, and were therefore excluded from the subsequent multiple regression analyses. The absence of significant correlation between the physical activity variable used in this study (i.e., IPAQ scores) and blood pressure variables was also counterintuitive give the well-established relationship between physical exercise and blood pressure in the medical literature (Chobanian et al., 2003; Rosamond et al., 2008). The lack of detected correlations between the physical activity variable used in this study (i.e., IPAQ scores) and blood pressure variables may have partly been due to the limited variability of IPAQ scores (*M* = 3.57; *SD* = 0.67). Based on the results of the preliminary correlation analysis, only age, gender, and BMI were included as controlling predictor variables in the subsequent multiple regression analyses.

Multiple Regression Analyses

Based on the methodology used in recent studies of blood pressure and perceived racism, a series of multiple regression analyses were used to test the hypotheses in this study. Data for the full sample of participants was included in waking blood pressure regression analyses, while data from only 231 participants was included in sleeping blood pressure regression analyses due to missing sleeping blood pressure data. Given that separate multiple regression analyses for waking and sleeping blood pressure were utilized to test the hypotheses in this study, paired *t*-tests were used to examine the differences between the predictor variable values (i.e., age; gender; BMI; Brief PEDQ—CV Total score; ARSMA-II Item #2; ARSMA-II AOS score) of the general sample and those participants without sleeping blood pressure data. This preliminary analysis revealed a statistically significant difference in average BMI scores between all of the participants as a whole and the portion of participants for whom sleeping blood pressure was not provided (t = 2.04; p = .04). The average BMI score of participants without sleeping blood pressure data was significantly higher than the average BMI of the sample population as a whole. No other statistically significant differences between the predictor variable values of the entire sample and group participants with missing sleep blood pressure data were found. Statistical assumptions necessary to run multiple regression analysis were verified.

Blood pressure, racism, and language acculturation. Four multiple regression analyses, each corresponding to one of the blood pressure outcome variables (i.e., WSBP;

WDBP; SSBP; SDBP) were used to test the first two hypotheses of this study, which were that 1) perceived racism would be significantly and positively related to ambulatory blood pressure in the study sample controlling for the demographic variables that were found to correlate with blood pressure during the preliminary correlational analysis (i.e., age; gender; BMI; 2) level of English-language acculturation would moderate the relationship between perceived racism and blood pressure such that the relationship between perceived racism and blood pressure would be found among those participants that speak English.

Steps were taken to ensure that any significant predictive relationships between the predictor and sleeping blood pressure outcome variables were not attributed to generally high baseline blood pressure levels. Other studies have used blood pressure dipping (i.e., calculated difference between waking and sleeping blood pressure) in order to investigate the predictive relationship of perceived racism to sleeping blood pressure (Brondolo et al., 2008; Steffen et al., 2003). However, for the purposes of this study, the regression equations using sleeping blood pressure outcome variables were each produced with and without the corresponding (i.e., diastolic; systolic) daytime blood pressure variable as a predictor variable in the regression model in order to control for baseline blood pressure.

All predictor variables were entered simultaneously. Brief PEDQ—CV (Brondolo et al., 2005) scores, age, and BMI were entered as continuous predictor variables. Ratings from item #2 of the ARSMA-II (Cuellar et al., 1995) were entered as dummy-coded categorical variables (i.e., Not At All - Moderately = 0; Much/Very Often - Extremely Often/Almost Always = 1). For regressions using waking blood pressure outcome variables (i.e., WSBP; WDBP), 32.9% of the participants were categorized as “0” (i.e., not able speak English) on ARSMA-II item #2 (Cuellar et al., 1995) while 67.1% of the participants were categorized as “1” (i.e., able to speak

English) on ARSMA-II item #2 (Cuellar et al., 1995). For regressions using SSBP and SDBP as outcome variables, 31.4% of the participants were categorized as "0" (i.e., not able speak English) on ARSMA-II (Cuellar et al., 1995) item #2 while 68.6% of the participants were categorized as "1" (i.e., able to speak English) on ARSMA-II item #2 (Cuellar et al., 1995). Gender was also entered into the first four multiple regression equations as a dummy-coded categorical variable (i.e., Women = 0; Men = 1). An interaction term (Brief PEDQ—CV score and ARSMA-II item #2) was included in each of the first four multiple regression analyses in order to assess whether level of language acculturation moderated the statistical relationship between perceived racism and blood pressure (Hypothesis #2). Given that Brief PEDQ—CV (Brondolo et al., 2005) raw scores and ARSMA-II item #2 (Cuellar et al., 1995) scores were originally provided in different metrics, Brief PEDQ—CV (Brondolo et al., 2005) raw scores were converted to *z*-scores before being entered into the regression equations. Only subjects with values for all of the multiple regression variables were included in the analysis. Effect sizes were also calculated.

Waking systolic blood pressure. The results of the multiple regression analysis predicting waking systolic blood pressure from age, gender, BMI, Brief PEDQ—CV (Brondolo et al., 2005) score, and ARSMA-II (Cuellar et al., 1995) item #2, with an interaction term (Brief PEDQ—CV and ARSMA-II item #2) included, are shown in Table 4. The overall regression model was statistically significant, $R = .49$, $R^2 = .24$, adjusted $R^2 = .22$, $F\ (6, 276) = 14.50$, $p < .001$, accounting for 22% of the variance in waking systolic blood pressure.

Table 4

Results of Standard Multiple Regression to Predict Waking Systolic Blood Pressure from Age, Gender, BMI, Brief PEDQ—CV, and ARSMA-II item #2

Predictor Variable	*B*	sr^2	t – ratio
Age	0.22	.04	3.92***
Gender	0.36	.12	6.70***
BMI	0.21	.05	3.90***
Brief PEDQ—CV	- 0.16	<.01	-1.26
ARSMA-II item #2	-0.10	<.01	-0.47
Interaction Term	0.25	<.01	1.01

Note. sr^2 = squared part correlations (obtained during multiple regression analysis); *B* = standardized coefficient; Interaction Term = Brief PEDQ—CV × ARSMA Item #2;***$p < .001$.

Age was shown to be significantly predictive of waking systolic blood pressure $t\ (276) = 3.92$, $p < .001$, uniquely accounting for 4% of the variance in waking systolic blood pressure when controlling for gender, BMI, Brief—PEDQ CV score (Brondolo et al., 2005), and ARSMA-II item #2 (Cuellar et al., 1995). The predictive relationship between gender and waking systolic blood pressure was in the positive direction, indicating that predicted waking systolic blood pressure increased with age.

Gender predicted waking systolic blood pressure $t\ (276) = 6.70$, $p < .001$ and uniquely accounted for 12% of the variance in waking systolic blood pressure after controlling for age, ARSMA-II item #2 (Cuellar et al., 1995), Brief—PEDQ CV score (Brondolo et al., 2005), and BMI. As a group, men were predicted to have higher waking systolic blood pressure than women.

Like age and gender, BMI was also found to significantly predict WSBP t (276) = 3.90, $p < .001$, individually accounting for 5% of the variance in WSBP when Brief—PEDQ CV score (Brondolo et al., 2005), gender, ARSMA-II item #2 (Cuellar et al., 1995), and age were controlled. The predictive relationship between BMI and waking systolic blood pressure was positive. In other words, higher BMI predicted higher waking systolic blood pressure in the regression model.

Neither the Brief—PEDQ CV (Brondolo et al., 2005) nor ARSMA-II item #2 (Cuellar et al., 1995) significantly predicted waking systolic blood pressure, and there was not a statistically significant interaction between the Brief—PEDQ CV (Brondolo et al., 2005) and ARSMA-II item #2 (Cuellar et al., 1995), showing that the statistical relationship between perceived racism and waking systolic blood pressure was not statistically moderated by level of English-language acculturation.

Waking diastolic blood pressure. Table 5 below depicts the results produced from the multiple regression analysis predicting waking diastolic blood pressure from age, gender, BMI, Brief PEDQ—CV (Brondolo et al., 2005) score, and ARSMA-II (Cuellar et al., 1995) item #2, including a Brief PEDQ—CV (Brondolo et al., 2005) and ARSMA-II item #2 (Cuellar et al., 1995) interaction term. This overall regression model was also statistically significant, $R = .46$, $R^2 = .21$, adjusted $R^2 = .19$, F (6, 276) = 12.31, $p < .001$. The predictors in the model as a whole accounted for 19% of the variance in WDBP.

Table 5

Results of Standard Multiple Regression to Predict Waking Diastolic Blood Pressure from Age, Gender, BMI, Brief PEDQ—CV, and ARSMA-II item #2

Predictor Variable	B	sr^2	t – ratio
Age	0.31	.09	5.49***
Gender	0.26	.06	4.75***
BMI	0.16	.02	2.86**
Brief PEDQ—CV	0.02	<.01	0.19
ARSMA-II item #2	0.04	<.01	0.19
Interaction Term	0.03	<.01	0.12

Note. sr^2 = squared part correlations (obtained during multiple regression analysis); B = standardized coefficient; Interaction Term = Brief PEDQ—CV Total × ARSMA Item #2; ***p* < .01; ****p* < .001.

As shown in the table above, age significantly predicted WDBP t (276) = 5.49, p < .001, and it uniquely accounted for 9% of the variance in waking diastolic blood pressure when controlling for gender, Brief—PEDQ CV Total score (Brondolo et al., 2005), BMI, and ARSMA-II item #2 (Cuellar et al., 1995). The revealed prediction between gender and waking diastolic blood pressure was in the positive direction and indicated that increased age predicted higher WDBP.

As with age, gender was found to predict waking diastolic blood pressure t (276) = 4.75, p < .001. Gender accounted for 6% of the variance in WDBP while controlling for age, BMI, Brief—PEDQ CV Total score (Brondolo et al., 2005), and ARSMA-II item #2 (Cuellar et al., 1995) in the regression analysis. The regression analysis showed that men, as a group, were predicted to have higher WDBP than women.

As would be expected, BMI predicted waking diastolic blood pressure *t* (276) = 2.86, $p <$ .01, uniquely accounting for 2% of the variance in waking diastolic blood pressure when all other predictor variables in the regression model were controlled. The predictive relationship between BMI and waking diastolic blood pressure was statistically positive. Higher BMI was associated with higher WDBP.

As shown, neither the Brief—PEDQ CV (Brondolo et al., 2005) nor ARSMA-II item #2 (Cuellar et al., 1995) were found to be significantly predictive of waking diastolic blood pressure. There was not a statistically significant interaction between the ARSMA-II item #2 (Cuellar et al., 1995) and Brief—PEDQ CV score (Brondolo et al., 2005), revealing that the statistical relationship between perceived racism and waking systolic blood pressure did not depend on how well participants spoke English.

Sleeping systolic blood pressure. Table 6 below represents the regression model predicting sleeping systolic blood pressure from age, ARSMA-II (Cuellar et al., 1995) item #2, gender, BMI, and Brief PEDQ—CV (Brondolo et al., 2005) score, with the perceived racism (i.e., Brief PEDQ—CV) and language acculturation (i.e., ARSMA-II item #2) statistical interaction term included in the model. The regression model was statistically significant, R = .43, R^2 = .19, adjusted R^2 = .16, F (6, 203) = 7.61, $p < .001$, and it accounted for 16% of the variance in sleeping systolic blood pressure.

Table 6

Results of Standard Multiple Regression to Predict Sleeping Systolic Blood Pressure from Age, Gender, BMI, Brief PEDQ—CV, and ARSMA-II item #2

Predictor Variable	B	sr^2	t – ratio
Age	0.19	.03	2.86**
Gender	0.20	.04	3.01**
BMI	0.27	.07	4.13***
Brief PEDQ—CV	-0.08	<.01	-0.51
ARSMA-II item #2	-0.21	<.01	-0.90
Interaction Term	0.20	<.01	0.64

Note. sr^2 = squared part correlations (obtained during multiple regression analysis); B = standardized coefficient; Interaction Term = Brief PEDQ—CV × ARSMA Item #2;**p < .01; ***p < .001.

As can be seen from the t-ratio values shown above, gender significantly predicted sleeping systolic blood pressure t (203) = 3.01, p < .01, uniquely accounting for 4% of the variance in sleeping systolic blood pressure when controlling for age, Brief—PEDQ CV Total score (Brondolo et al., 2005), BMI, and ARSMA-II item #2 (Cuellar et al., 1995). The indicated direction of the relationship between gender and sleeping systolic blood pressure was positive, which indicates that men, as a group, were predicted to have higher sleeping systolic blood pressure compared to women.

Age also predicted sleeping systolic blood pressure t (203) = 2.86, p < .01. Age individually accounted for 3% of the variance in sleeping systolic blood pressure when gender, BMI, Brief—PEDQ CV Total score (Brondolo et al., 2005), and ARSMA-II item #2 (Cuellar et al., 1995) were statistically controlled. The analysis indicated that an increase in participants' age predicted higher sleeping systolic blood pressure.

In this regression analysis, BMI was also found to significantly predict sleeping systolic blood pressure t (203) = 4.13, p < .001. BMI accounted for 7% of the variance in sleeping systolic blood pressure when the other predictor variables (i.e., age, gender, Brief—PEDQ CV Total score, ARSMA-II item #2) were all statistically controlled. Higher BMI was associated with higher sleeping systolic blood pressure.

Language acculturation, measured by the ARSMA-II item #2 (Cuellar et al., 1995), and perceived racism, measured by the Brief—PEDQ CV (Brondolo et al., 2005) did not significantly predict sleeping systolic blood pressure and there was not a statistically significant interaction between these two variables in the analysis, which indicates that the statistical relationship between perceived racism and sleeping systolic blood pressure was independent of English acculturation level.

When WSBP was added to the previous regression model, the results shown in Table 7 below were produced. As expected, the model, as a whole, was statistically significant, R = .65, R^2 = .42, adjusted R^2 = .40, F (7, 202) = 20.61, p < .001 and accounted for a greater portion of the variance in sleeping systolic blood pressure than the previous model. The newly generated regression analysis accounted for 40% of the variance in sleeping systolic blood pressure.

Table 7

Results of Standard Multiple Regression to Predict Sleeping Systolic Blood Pressure from Waking Systolic Blood Pressure, Age, Gender, BMI, Brief PEDQ—CV, and ARSMA-II item #2

Predictor Variable	B	sr^2	t – ratio
Age	0.08	<.01	1.30
Gender	0.01	<.01	0.12
WSBP	0.55	.23	8.94***
BMI	0.14	.02	2.48*
Brief PEDQ—CV	-0.04	<.01	-0.28
ARSMA-II item #2	-0.20	<.01	-1.00
Interaction Term	0.14	<.01	0.54

Note. sr^2 = squared part correlations (obtained during multiple regression analysis); B = standardized coefficient; Interaction Term = Brief PEDQ—CV × ARSMA Item #2;*p < .05; ***p < 001.

As expected, waking systolic blood pressure predicted sleeping systolic blood pressure $t(202) = 8.94$, $p < .001$, and it uniquely accounting for 23% of the variance in sleeping systolic blood pressure when the other variables in the model were statistically controlled. The relationship between waking and sleeping systolic blood pressure was in an expected positive direction, such that higher waking systolic blood pressure was predictive of higher sleeping systolic blood pressure.

In this multiple regression model, age did not significantly predict sleeping systolic blood pressure ($p > .05$) when controlling for all of the other variables in the model. Gender also failed to predict sleeping systolic blood pressure ($p > .05$) when controlling for age, BMI, WSBP, Brief—PEDQ CV Total score (Brondolo et al., 2005), and ARSMA-II item #2 (Cuellar et al., 1995).

BMI, however, still predicted SSBP *t* (202) = 2.48, $p < .05$). BMI uniquely accounted for 2% of the variance in SSBP when age, gender, WSBP, Brief—PEDQ CV Total score (Brondolo et al., 2005), and ARSMA-II item 2 (Cuellar et al., 1995) were statistically controlled. Higher BMI predicted higher SSBP.

As in the previous regression model, perceived racism, indicated by Brief—PEDQ CV score (Brondolo et al., 2005), and language acculturation, indicated by ARSMA-II item #2 (Cuellar et al., 1995), did not predict sleeping systolic blood pressure, and there was not a significant interaction between Brief—PEDQ CV score (Brondolo et al., 2005) and ARSMA-II item #2 (Cuellar et al., 1995), demonstrating that the predicative effects of the Brief—PEDQ CV score (Brondolo et al., 2005) and ARSMA-II item #2 (Cuellar et al., 1995) on SSBP were independent of one another.

Sleeping diastolic blood pressure. The regression analysis used to predict sleeping diastolic blood pressure from age, gender, BMI, ARSMA-II (Cuellar et al., 1995) item #2, Brief PEDQ—CV (Brondolo et al., 2005) score, and the interaction of Brief PEDQ—CV with ARSMA-II item #2 was statistically significant, $R = .42$, $R^2 = .18$, adjusted $R^2 = .15$, F (6, 203) = 7.15, $p < .001$, and 15% of the variance in sleeping diastolic blood pressure was predicted by the regression model. The results of this regression model are provided in Table 8 below.

Table 8

Results of Standard Multiple Regression to Predict Sleeping Diastolic Blood Pressure from Age, Gender, BMI, Brief PEDQ—CV, and ARSMA-II item #2

Predictor Variable	B	sr^2	t – ratio
Age	0.19	.03	2.80**
Gender	0.21	.04	3.17**
BMI	0.24	.05	3.63***
Brief PEDQ—CV	0.16	<.01	0.94
ARSMA-II item #2	0.07	<.01	0.30
Interaction Term	-0.14	<.01	-0.43

Note. sr^2 = squared part correlations (obtained during multiple regression analysis); B = standardized coefficient; Interaction Term = Brief PEDQ—CV × ARSMA Item #2;**p < .01; ***p < .001.

Sleeping diastolic blood pressure was significantly predicted from age t (203) = 2.80, p < .01, and 3% of the total variance in SDBP was attributable to age when all of the other predictor variables in the model were controlled. Sleeping diastolic blood pressure increased with age. Gender was also found to be significantly predictive of sleeping diastolic blood pressure t (203) = 3.17, p < .01 and accounted for 4% of the variance in sleeping diastolic blood pressure when controlling for BMI, age, Brief—PEDQ CV Total score (Brondolo et al., 2005), and ARSMA-II item #2 (Cuellar et al., 1995). The predictive relationship between gender and predicted sleeping diastolic blood pressure was positive in value, which means that men, as a group, were predicted to have higher sleeping diastolic blood pressure than women.

Along with age and gender, BMI predicted waking diastolic blood pressure t (203) = 3.63, p < .001, uniquely accounting for 5% of the variance in sleeping diastolic blood pressure while controlling for all of the other predictor variables in the regression model. BMI and sleeping diastolic blood pressure were positively related, such that higher BMI predicted higher sleeping diastolic blood pressure.

There was not a statistically significant interaction between Brief—PEDQ CV Total score (Brondolo et al., 2005) and ARSMA-II item #2 (Cuellar et al., 1995), showing that the statistical relationship between perceived racism and sleeping diastolic blood pressure did depend on the study participants' ability to speak and/or understand the English language. Neither term (i.e., Brief—PEDQ CV Total score; ARSMA-II item #2) statistically predicted sleeping diastolic blood pressure as an individual term in the analysis.

Table 9 below shows the results produced when WDBP was added to the regression above. As anticipated, the regression model was statistically significant, R = .59, R^2 = .35, adjusted R^2 = .33, F (7, 202) = 15.37, p < .001 and indicated that 33% of the variance in sleeping diastolic blood pressure was accounted for by the predictors in the regression model.

Table 9

Results of Standard Multiple Regression to Predict Sleeping Diastolic Blood Pressure from Waking Diastolic Blood Pressure, Age, Gender, BMI, Brief PEDQ—CV, and ARSMA-II item #2

Predictor Variable	B	sr^2	t – ratio
Age	0.06	<.01	0.87
Gender	0.03	<.01	0.51
WDBP	0.49	.17	7.32***
BMI	0.15	.02	2.42*
Brief PEDQ—CV	0.15	<.01	1.02
ARSMA-II item #2	0.05	<.01	0.24
Interaction Term	-0.14	<.01	-0.51

Note. sr^2 = squared part correlations (obtained during multiple regression analysis); B = standardized coefficient; Interaction Term = Brief PEDQ—CV × ARSMA Item #2;*p < .05; ***p < 001.

As anticipated, WDBP was found to predict sleeping diastolic blood pressure $t(202) = 7.32$, $p < .001$, and it individually accounted for 17% of the variance in SDBP controlling for ARSMA-II item #2 (Cuellar et al., 1995), age, gender, BMI, and Brief—PEDQ CV Total score (Brondolo et al., 2005). The higher the participants' WDBP, the higher their SDBP was predicted to be.

In contrast to the previously produced regression model, neither age nor gender significantly predicted SDBP ($p > .05$) when controlling for the other predictors in the analysis. However, SDBP was significantly predicted from BMI t (202) = 2.42, $p < .05$), even when all other predictor variables in the analysis were controlled. BMI was predicted to uniquely account for 2% of the total variance in SDBP.

As individual predictor variables, neither Brief—PEDQ CV score (Brondolo et al., 2005) nor ARSMA-II item #2 (Cuellar et al., 1995) significantly predicted SDBP, and the interaction between Brief—PEDQ CV score (Brondolo et al., 2005) and ARSMA-II item #2 (Cuellar et al., 1995) was not statistically significant ($p > .05$). This indicates that the predictive relationship between perceived racism and SDBP did not depend on English-language acculturation.

Blood pressure, perceived racism, and general acculturation. My third planned hypothesis was that a more comprehensive level of acculturation (i.e., including language use; media; social contact, etc.) would also positively moderate the relationship between perceived and blood pressure, though not as effectively as English-language acculturation. In order to evaluate the role of general acculturation in moderating the relationship between perceived racism and ambulatory blood pressure, four additional standard multiple regression analyses were utilized, each using one of the blood pressure variables (i.e., WSBP; WDBP; SSBP; SDBP) as the outcome variable. The two regression equations using sleeping blood pressure outcome variables were each produced with and without the corresponding (i.e., diastolic; systolic) daytime blood pressure variable as a predictor variable in the regression model. This was done in order to ensure that any significant predictive relationships between the predictor and blood pressure outcome variables were not attributed to generally high blood pressure levels.

Brief PEDQ—CV scores (Brondolo et al., 2005), ARSMA-II AOS scores (Cuellar et al., 1995), age, and BMI were entered as continuous predictor variables. Gender was entered as a dummy-coded categorical variable (i.e., Women = 0; Men = 1). An interaction term (Brief PEDQ—CV and ARSMA-II AOS) was included in each of the multiple regression analyses in order to assess whether general acculturation moderated the statistical relationship between perceived racism and blood pressure. Given that Brief PEDQ—CV (Brondolo et al., 2005) raw scores and ARSMA-II AOS (Cuellar et al., 1995) raw scores were originally provided in different metrics, Brief PEDQ—CV (Brondolo et al., 2005) and ARSMA-II AOS (Cuellar et al., 1995) raw scores were converted to *z*-scores before being entered into the regression models. All multiple-regression terms were entered simultaneously. Only subjects with values for all of the multiple regression variables were included in the analysis. Effect sizes were also calculated.

Waking systolic blood pressure. Table 10 provided below corresponds to the multiple regression analysis predicting waking systolic blood pressure from age, gender, perceived racism (i.e., Brief PEDQ—CV), BMI, general acculturation, (i.e., ARSMA-II AOS), and interaction term (Brief PEDQ—CV and ARSMA-II AOS). The regression model accounted for 21% of the total variance in waking systolic blood pressure and was statistically significant, R = .48, R^2 = .23, adjusted R^2 = .21, F (6, 278) = 13.77, p < .001.

Table 10

Results of Standard Multiple Regression to Predict Waking Systolic Blood Pressure from Age, Gender, BMI, Brief PEDQ—CV, and ARSMA-II AOS

Predictor Variable	B	sr^2	t – ratio
Age	0.20	.03	3.55***
Gender	0.36	.12	6.63***
BMI	0.22	.05	4.01***
Brief PEDQ—CV	-0.02	<.01	-0.39
ARSMA-II AOS	0.02	<.01	0.42
Interaction Term	-0.00	<.01	-0.08

Note. sr^2 = squared part correlations (obtained during multiple regression analysis); B = standardized coefficient; Interaction Term = Brief PEDQ—CV × ARSMA AOS; ***p < .001.

Gender was shown to predict waking systolic blood pressure t (278) = 6.63, p < .001. Gender accounted for approximately 12% of the total variance in waking systolic blood pressure when controlling for Brief—PEDQ CV Total score (Brondolo et al., 2005), ARSMA-II AOS (Cuellar et al., 1995), and the demographic variables (i.e., BMI; age) in the regression model. The mathematical sign of the slope coefficient of the gender term was positive, showing that men, as a group, were predicted to have higher waking systolic blood pressure than women.

Age also significantly predicted waking systolic blood pressure t (278) = 3.55, p < .001 and uniquely accounted for about 3% of the variance in waking systolic blood pressure when controlling for the other predictor variable terms. The predicted association between age and waking systolic blood pressure was in the expected positive direction, as waking systolic blood pressure was predicted to increase with age.

BMI predicted waking systolic blood pressure t (278) = 4.00, p < .001 in the regression. It uniquely accounted for 5% of the variance in waking systolic blood pressure when the other predictor variables were statistically controlled. Higher BMI predicted higher waking systolic blood pressure.

As was the case for previously described regression models, neither the Brief—PEDQ CV Total score (Brondolo et al., 2005) nor ARSMA-II AOS (Cuellar et al., 1995) significantly predicted waking systolic blood pressure. Additionally, the results of the regression model indicated that the interaction term in the model was not statistically significant. On an interpretive level, the insignificance of the interaction term in the model indicates that the statistical relationship between perceived racism and waking systolic blood pressure did not significantly vary by general acculturation level.

Waking diastolic blood pressure. The regression model predicting waking diastolic blood pressure from demographic variables (i.e., gender, BMI, age), ARSMA-II AOS (Cuellar et al., 1995), Brief PEDQ—CV (Brondolo et al., 2005) score, and interaction term (Brief PEDQ—CV and ARSMA-II AOS) was statistically significant, R = .42, R^2 = .21, adjusted R^2 = .20, F (6, 278) = 12.47, p < .001. The regression model, as a whole, was shown to account for 20% of the variance in WDBP. The results of the regression model are depicted in Table 11 below.

Table 11

Results of Standard Multiple Regression to Predict Waking Diastolic Blood Pressure from Age, Gender, BMI, Brief PEDQ—CV, and ARSMA-II AOS

Predictor Variable	B	sr^2	t – ratio
Age	0.31	.08	5.41***
Gender	0.26	.06	4.68***
BMI	0.16	.02	2.90**
Brief PEDQ—CV	0.04	<.01	0.74
ARSMA-II AOS	0.04	<.01	0.78
Interaction Term	-0.05	<.01	-0.83

Note. sr^2 = squared part correlations (obtained during multiple regression analysis); B = standardized coefficient; Interaction Term = Brief PEDQ—CV × ARSMA AOS; **p < .01; ***p < .001.

Age t (278) = 5.41, p < .001, BMI t (278) = 2.90, p < .01, and gender t (278) = 4.68, p < .001, each significantly predicted waking diastolic blood pressure. Age uniquely accounted for 8% of the total variance in waking diastolic blood pressure when controlling for the other predictor terms in the model, while BMI and gender accounted for 2% and 6% of the total variance in WDBP, respectively, when controlling for other predictor variables in the regression model. Age, BMI, and gender were each positively related to WDBP, such that WDBP was predicted to be higher for older participants, men, and those with higher BMI.

Brief—PEDQ CV Total score (Brondolo et al., 2005) and ARSMA-II AOS (Cuellar et al., 1995) did not statistically predict WDBP, and there was no statistically significant interaction between these two terms, showing that WDBP was not statistically moderated by level of general acculturation.

Sleeping systolic blood pressure. Tables 12 below shows the results of the regression analysis where sleeping systolic blood pressure is predicted from Brief PEDQ—CV (Brondolo et al., 2005) score, age, gender, BMI, and ARSMA-II AOS (Cuellar et al., 1995), with an interaction term (Brief PEDQ—CV and ARSMA-II AOS). The regression model accounted for 16% of the variance in sleeping systolic blood pressure and was statistically significant, R = .43, R^2 = .18, adjusted R^2 = .16, F (6, 205) = 7.64, p < .001.

Table 12

Results of Standard Multiple Regression to Predict Sleeping Systolic Blood Pressure from Age, Gender, BMI, Brief PEDQ—CV, and ARSMA-II AOS

Predictor Variable	B	sr^2	t – ratio
Age	0.20	.03	2.96**
Gender	0.19	.03	2.88**
BMI	0.27	.07	4.13***
Brief PEDQ—CV	-0.02	<.01	-0.35
ARSMA-II AOS	0.04	.01	0.54
Interaction Term	-0.08	.01	-1.23

Note. sr^2 = squared part correlations (obtained during multiple regression analysis); B = standardized coefficient; Interaction Term = Brief PEDQ—CV × ARSMA AOS; **p < .01; ***p < .001.

Gender t (205) = 2.88, p < .01, and age t (205) = 2.96, p < .01 both predicted sleeping systolic blood pressure at a statistically significantly level, both uniquely accounting for 3% of the variance in sleeping systolic blood pressure when other predictor variables were controlled. Gender was positively related to sleeping systolic blood pressure, such that male participants had higher predicted SSBP than female participants. Age was also positively related to SSBP. Older participants were predicted to have higher SSBP than younger participants.

Additionally, BMI was found to be significantly predictive of SSBP t (205) = 4.13, p < .001, and BMI individually accounted for 7% of the total variance in sleeping systolic blood pressure when age, gender, Brief—PEDQ CV Total score (Brondolo et al., 2005), and ARSMA-II AOS (Cuellar et al., 1995) were statistically controlled. Higher participant BMI predicted higher participant sleeping systolic blood pressure.

As had been the case with the previous two regression models, both Brief—PEDQ CV (Brondolo et al., 2005) and ARSMA-II AOS (Cuellar et al., 1995) failed to significantly predict sleeping systolic blood pressure in this regression model, and the statistical interaction between Brief—PEDQ CV (Brondolo et al., 2005) and ARSMA-II AOS (Cuellar et al., 1995) was not significant. Thus, the participants' level of general acculturation to U.S. culture (ARSMA-II AOS score) did not moderate the relationship between level of perceived racism (Brief—PEDQ CV score) and sleeping systolic blood pressure.

Values pertaining to the multiple regression analysis identical to the one above with waking systolic blood pressure added as an additional predictor variable are shown in Table 13 below. The general model, itself, was statistically significant, R = .64, R^2 = .41, adjusted R^2 = .39, F (7, 204) = 20.33, p < .001 and accounted for 39% of the variance in sleeping systolic blood pressure.

Table 13

Results of Standard Multiple Regression to Predict Sleeping Systolic Blood Pressure from Waking Systolic Blood Pressure, Age, Gender, BMI, Brief PEDQ—CV, and ARSMA-II AOS

Predictor Variable	B	sr^2	t – ratio
Age	0.10	.01	1.59
Gender	-0.001	.00	-0.01
BMI	0.14	.02	2.47*
WSBP	0.55	.23	8.89***
Brief PEDQ—CV	-0.01	<0.01	-0.23
ARSMA-II AOS	0.04	<0.01	0.70
Interaction Term	-0.07	0.01	-1.33

Note. sr^2 = squared part correlations (obtained during multiple regression analysis); B = standardized coefficient; Interaction Term = Brief PEDQ—CV × ARSMA AOS; *$p < .05$; ***$p < .001$.

Waking systolic blood pressure, which was found to significantly predict sleeping systolic blood pressure t (204) = 8.89, $p < .001$, uniquely accounted for 23% of the variance in sleeping systolic blood pressure when controlling for ARSMA-II AOS (Cuellar et al., 1995), age, BMI, Brief—PEDQ CV Total score (Brondolo et al., 2005), and gender. As might be expected, higher waking systolic blood pressure predicted higher sleeping systolic blood pressure.

Unlike the previous regression model, in this multiple regression model, age did not significantly predict sleeping systolic blood pressure ($p > .05$) when controlling for WSBP, gender, BMI, Brief—PEDQ CV Total score (Brondolo et al., 2005), and ARSMA-II AOS (Cuellar et al., 1995). Gender also failed to predict sleeping systolic blood pressure at a statistically significant level ($p > .05$) when age, BMI, WSBP, Brief—PEDQ CV Total score (Brondolo et al., 2005), and ARSMA-II AOS (Cuellar et al., 1995) were statistically controlled.

BMI, however, still significantly predicted sleeping systolic blood pressure t (204) = 2.47, $p < .05$) in this multiple regression model. BMI was found to uniquely account for 2% of the total variance in sleeping systolic blood pressure when controlling for the other predictors. Higher BMI was associated with higher sleeping systolic blood pressure.

ARSMA-II AOS (Cuellar et al., 1995) score did not significantly predict sleeping systolic blood pressure, and Brief—PEDQ CV score (Brondolo et al., 2005) also failed to predict sleeping systolic blood pressure. As in the preceding regression, there was not a statistically significant interaction between Brief—PEDQ CV score (Brondolo et al., 2005) and ARSMA-II AOS (Cuellar et al., 1995). The statistical relationship between Brief—PEDQ CV score (Brondolo et al., 2005) and sleeping systolic blood pressure did not vary according to participants' ARSMA-II AOS (Cuellar et al., 1995) score.

Sleeping diastolic blood pressure. The next regression analysis predicted sleeping diastolic blood pressure from age, gender, BMI, Brief PEDQ—CV (Brondolo et al., 2005) score, and ARSMA-II AOS (Cuellar et al., 1995), including a Brief PEDQ—CV and ARSMA-II AOS interaction term. Results of this multiple regression analysis are provided in Table 14 below. The regression model was statistically significant, $R = .45$, $R^2 = .20$, adjusted $R^2 = .18$, F (6, 205) = 8.61, $p < .001$. Together, the predictors in this regression model accounted for 18% of the variance in sleeping diastolic blood pressure.

Table 14

Results of Standard Multiple Regression to Predict Sleeping Diastolic Blood Pressure from Age, Gender, BMI, Brief PEDQ—CV, and ARSMA-II AOS

Predictor Variable	B	sr^2	t – ratio
Age	0.23	.04	3.34**
Gender	0.19	.03	2.91**
BMI	0.25	.06	3.78***
Brief PEDQ—CV	0.04	.02	0.59
ARSMA-II AOS	0.09	.02	1.30
Interaction Term	-0.13	.02	-2.07*

Note. sr^2 = squared part correlations (obtained during multiple regression analysis); *B* = standardized coefficient; Interaction Term = Brief PEDQ—CV × ARSMA AOS; *$p < .05$; **$p < .01$; *** $p < .001$.

BMI significantly predicted sleeping diastolic blood pressure t (205) = 3.78, $p < .001$, as it uniquely accounted for 6% of the variance in sleeping diastolic blood pressure after controlling for ARSMA-II AOS (Cuellar et al., 1995), age, gender, and Brief—PEDQ CV score (Brondolo et al., 2005). The predictive relationship between BMI and sleeping diastolic blood pressure was in the positive direction, and those participants with higher BMI were predicted to have higher sleeping diastolic blood pressure.

Like BMI, age and gender both significantly predicted sleeping diastolic blood pressure ($p < .01$). Age individually accounted for roughly 4% of the variance in sleeping diastolic blood pressure when controlling for gender, BMI, Brief—PEDQ CV Total score (Brondolo et al., 2005), and ARSMA-II AOS (Cuellar et al., 1995), and predicted SDBP increased with age. Gender, as a predictor in the model, accounted for 3% of the variance in the model when Brief—

PEDQ CV Total score (Brondolo et al., 2005), BMI, age, and ARSMA-II AOS (Cuellar et al., 1995) were controlled, and men (when compared to women) were predicted to have higher SDBP.

A significant moderating interaction between the Brief PEDQ—CV (Brondolo et al., 2005) and ARSMA-II AOS (Cuellar et al., 1995) was found, t (205) = - 2.073, $p< .05$, indicating that the statistical relationship between the Brief PEDQ—CV score (Brondolo et al., 2005) and sleeping diastolic blood pressure depends upon the value of the ARSMA-II AOS (Cuellar et al., 1995) in this regression analysis. As shown above, however, neither the Brief—PEDQ CV score (Brondolo et al., 2005) nor ARSMA-II AOS (Cuellar et al., 1995) score individually predicted changes in sleeping diastolic blood pressure.

Generated statistical values for the multiple regression model generated when WDBP was added to the previous regression analysis are shown in Table 15 below. The overall regression model maintained its statistical significance, R = .60, R^2 = .36, adjusted R^2 = .34, F (7, 204) = 16.51, $p < .001$ and accounted for a greater percentage of the variance in sleeping diastolic blood pressure (34%) than the previous regression model.

Table 15

Results of Standard Multiple Regression to Predict Sleeping Diastolic Blood Pressure from Waking Diastolic Blood Pressure, Age, Gender, BMI, Brief PEDQ—CV, and ARSMA-II AOS

Predictor Variable	B	sr^2	t – ratio
Age	0.09	.01	1.45
Gender	0.02	<.00	0.34
BMI	0.15	.02	2.58*
WDBP	0.47	.16	7.16***
Brief PEDQ—CV	0.03	.01	0.54
ARSMA-II AOS	0.06	.02	1.02
Interaction Term	-0.11	.02	-1.89

Note. sr^2 = squared part correlations (obtained during multiple regression analysis); B = standardized coefficient; Interaction Term = Brief PEDQ—CV × ARSMA AOS; *p < .05; ***p < .001.

Sleeping diastolic blood pressure t (204) = 7.16, p < .001 was significantly predicted from waking diastolic blood pressure. WDBP individually accounted for 16% of the variance in sleeping diastolic blood pressure when the other predictors in the analysis (i.e., age, gender, BMI, Brief—PEDQ CV Total score, and ARSMA-II AOS) were all statistically controlled. As expected, higher waking diastolic blood pressure predicted higher sleeping diastolic blood pressure.

In this version of the regression analysis, age did not significantly predict sleeping diastolic blood pressure (p > .05) when controlling for WDBP, Brief—PEDQ CV Total score (Brondolo et al., 2005), ARSMA-II AOS (Cuellar et al., 1995), gender and BMI. Paralleling the lack of demonstrated predictive effect of age, gender did not significantly predict sleeping diastolic blood pressure ($p > .05$) when controlling for age, BMI, WDBP, Brief—PEDQ CV Total score (Brondolo et al., 2005), and ARSMA-II AOS (Cuellar et al., 1995).

In contrast to age and gender, BMI was still found to be significantly predictive of sleeping diastolic blood pressure t (204) = 3.78, $p < .05$ when WDBP was added to the previous regression model. BMI individually accounted for 2% of the total variance in sleeping diastolic blood pressure, and the predictive relationship between BMI and sleeping diastolic blood pressure remained positive, such that higher BMI predicted higher sleeping diastolic blood pressure.

The interaction between Brief PEDQ—CV Total score (Brondolo et al., 2005) and ARSMA-II AOS (Cuellar et al., 1995) neared statistical significance, t (204) = - 1.89, $p < .10$. However, as in the prior regression model, neither the Brief—PEDQ CV score (Brondolo et al., 2005) nor ARSMA-II AOS (Cuellar et al., 1995) individually predicted sleeping diastolic blood pressure ($p > .05$). The overall results of this final multiple regression analysis produced for this study disconfirm the results of the previous multiple regression analysis.

Summary of Results

A summary of the multiple regression results predicting blood pressure from age, gender, BMI, perceived racism (i.e., Brief PEDQ—CV), and language acculturation (i.e., ARSMA-II Item #2) is provided in Table 16 below.

Table 16

Summary of Regression Results for Regression Models using ARSMA-II Item #2 (Language Acculturation)

Predictor Variable	WSBP	WDBP	SSBP	SDBP
Age	Yes	Yes	No	No
Gender	Yes	Yes	No	No
BMI	Yes	Yes	Yes	Yes
Brief PEDQ-CV	No	No	No	No
ARSMA-II #2	No	No	No	No
Interaction Term	No	No	No	No
WSBP	----	----	Yes	----
WDBP	----	----	----	Yes

Note. "Yes" indicates significant prediction of blood pressure outcome variable; "No" indicates absence of significant prediction of blood pressure outcome variable; Interaction Term = Brief PEDQ—CV × ARSMA Item #2; SSBP and SDBP columns refer to sleeping blood pressure analyses with daytime blood pressure predictor variables in the regression model.

As shown, age and gender were found to uniquely predict ambulatory blood pressure in most of these regression models, while BMI predicted blood pressure in all of the regression models, and neither perceived racism (i.e., Brief PEDQ—CV) nor English-language acculturation (i.e., ARSMA-II Item #2) were found to uniquely predict blood pressure controlling for other predictors. English-language acculturation (i.e., ARSMA-II Item #2) did not moderate the relationship between perceived racism (i.e., Brief PEDQ—CV) and blood pressure.

Table 17 below summarizes the results of the of the multiple regression analyses predicting blood pressure from age, gender, BMI, perceived racism (i.e., Brief PEDQ—CV), and general acculturation (i.e., ARSMA-II AOS).

Table 17

Summary of Regression Results for Regression Models using Brief PEDQ—CV and ARSMA-II AOS (Comprehensive Acculturation)

Predictor Variable	WSBP	WDBP	SSBP	SDBP
Age	Yes	Yes	No	No
Gender	Yes	Yes	No	No
BMI	Yes	Yes	Yes	Yes
Brief PEDQ-CV	No	No	No	No
ARSMA-II AOS	No	No	No	No
Interaction Term	No	No	No	No*
WSBP	----	----	Yes	----
WDBP	----	----	----	Yes

Note. “Yes” indicates significant prediction of blood pressure outcome variable; “No” indicates absence of significant prediction of blood pressure outcome variable; Interaction Term = Brief PEDQ—CV × ARSMA AOS; SSBP and SDBP columns refer to sleeping blood pressure analyses with daytime blood pressure predictor variables in the regression model; *Near significance.

As can be seen from table, gender and age were both generally found to predict ambulatory blood pressure. BMI predicted blood pressure in all of the regression models, and neither perceived racism (i.e., Brief PEDQ—CV) nor general acculturation (i.e., ARSMA-II AOS) uniquely predicted blood pressure when other predictors were controlled. General acculturation (i.e., ARSMA-II AOS) did not moderate the relationship between perceived racism (i.e., Brief PEDQ—CV) and ambulatory blood pressure.

Discussion

The purpose of this study was to investigate the relationship between ambulatory blood pressure and perceived racism in a sample of first generation Mexicans residing in Utah and to assess whether English-language and general acculturation moderated the relationship between perceived racism and blood pressure in this study sample. It was hypothesized that perceived racism would predict blood pressure in this sample controlling for age, gender, BMI, and acculturation. As indicated in the results section, perceived racism, as measured by the Brief PEDQ—CV Total score (Brondolo et al., 2005), was not found to predict any of the waking or sleeping blood pressure outcome variables when controlling for age, gender, BMI, and acculturation, as measured by the ARSMA-II AOS (Cuellar et al., 1995).

There are a number of plausible explanations as to why my hypothesized relationship between perceived and ambulatory blood pressure in this sample of foreign-born Mexicans living in Utah County, Utah was not produced. It is possible that ethnic differences between the sample of participants used in this study and sample populations used in previous studies demonstrating a positive relationship between perceived racism (Brondolo et al., 2008; Hill et al., 2007; Singleton et al., 2008; Steffen et al., 2003) may have contributed to the differences in results. Three of the four previously aforementioned studies that found a relationship between perceived racism and blood pressure were conducted with samples of African Americans (Hill et al., 2007; Singleton et al., 2008; Steffen et al., 2003). In comparison, this study included a sample of foreign-born Mexicans. Ethnic disparities in other physiological or cultural/environmental factors may have partially accounted for the differences between this and study and previous studies that found perceived racism to predict blood pressure in African Americans. Thus, one possible reason that a relationship between perceived racism and blood pressure was not found in this study is that the relationship between perceived racism and blood pressure commonly seen among African Americans (Brondolo et al., 2008; Hill et al., 2007; Singleton et al., 2008; Steffen et al., 2003) may not, in fact, be observed among foreign-born Mexicans, perhaps partially as a result of ethnic differences.

Another plausible explanation as to why the hypothesized relationship between perceived racism and blood pressure was not produced may be that the relationship between perceived racism and blood pressure is a complex phenomenon involving various moderating and mediating variables. For example, various researchers have hypothesized that perceived racism may have an indirect effect on blood pressure by increasing the general stress levels of minorities who experience perceived racial discrimination (Clark, 2000; Gallo & Mathews, 2003). It is possible that differences in general stress level or coping skills between the sample of Mexicans that provided data for this study, as a group, and sample populations used in other studies may have contributed to the disparity in findings.

A third possible explanation as to why the hypothesized relationship between perceived racism and blood pressure was not confirmed in this study is that the sample of Mexican participants used in this study may not have yet experienced sufficient discriminatory experiences to develop a detectable relationship between perceived racism and blood pressure. This seems particularly likely given that most of the participants in this study had been living in the U.S. for less than seven years.

Adding to the mixed body of studies on the general relationship between perceived racism and blood pressure, the primary results of this study suggest that the general relationship between perceived racism and blood pressure remains unclear (e.g., Broman, 1996; Brondolo et al., 2008; James et al., 1994; Steffen et al., 2003; Peters, 2004). It is interesting to note, for example, the diversity of findings within studies that have found a significant relationship between perceived racism and blood pressure. Steffen and his colleagues (2003), for example, found that racism and blood pressure in a sample of African Americans was only related to waking blood pressure when controlling for BMI, age, gender, and income, and not sleeping blood pressure. Based on his findings, Steffen and his colleagues proposed that self-perceived experiences of racism may have their largest effect during the daytime, when discriminatory experiences are most immediately experienced (Steffen et al., 2003).

In contrast, Brondolo and her colleagues (2008) found that perceived racism was positively associated with nocturnal diastolic and systolic ambulatory blood pressure, but not waking blood pressure, in a sample of Latinos and African Americans. Based on their findings, Brondolo and her colleagues (2008) concluded that individuals experiencing chronic racism may, in fact, process and ruminate about their negative experiences at night, when there are likely fewer environmental distractions, subsequently contributing to increased physiological arousal during sleep, including nocturnal blood pressure. To further add to the complicated picture of the relationship perceived racism and blood pressure, Hill and his colleagues (2007), in their study of African American college students, found that perceived racism predicted higher waking and sleeping diastolic blood pressure, but not waking or sleeping systolic blood pressure, citing hemodynamic differences between African Americans and Caucasians as a possible explanation for their finding (Hill et al., 2007). More studies are needed to solidify the precise nature of the general relationship between perceived racism and blood pressure.

Based on previous studies, I hypothesized that English-language acculturation and general acculturation would both moderate the statistical relationship between perceived racism and blood pressure among foreign-born Mexicans (Finch et al., 2000; Montoya, 2005). It was further hypothesized, based on previous research (Finch et al., 2000; Vega & Gill, 1998), that English-language acculturation would better moderate the relationship between perceived racism and blood pressure in this study sample of foreign-born Mexican adults compared to general acculturation.

Participants' ARSMA-II question #2 responses did not predict blood pressure in any of the regression analyses and were not shown to moderate the relationship between perceived racism and blood pressure in the study population. This was surprising given the recent literature suggesting a positive relationship between perceived racism and English-language acculturation (Finch et al., 2000; Vega & Gill, 1998) and that most participants in this study were classified as speaking English according to their ARSMA-II question #2 ratings (Cuellar et al., 1995). It is possible that having a more robust measure of language acculturation may have produced different results, though the procedures used in this study closely replicated similar studies on the effects of acculturation (Finch et al., 2000; Vega & Gill, 1998).

My third hypothesis was that a more comprehensive level of acculturation including language acculturation, ethnic identity, and ethnic interaction, would also be found to moderate the statistical relationship between perceived racism and blood pressure, though only to an equal or lesser degree than English-language acculturation. Participants' comprehensive acculturation was found to moderate the relationship between sleeping diastolic blood pressure and perceived racism, as measured by the Brief PEDQ—CV (Brondolo et al., 2005). However the moderating effect size was weak and was not replicated when waking diastolic blood pressure was included in the regression model.

While initially not expected, given the previously cited research on perceived racism and acculturation, the absence of a moderating effect of general acculturation on the relationship between perceived racism and blood pressure fits with the general body of research specific to first-generation Mexicans given the findings of preliminary analyses. The average ARSMA-II AOS score for this study population was low, indicating low general acculturation in this study sample as a whole. It is possible that the lack of a detected moderating effect of acculturation on the relationship between blood pressure and racism among this study sample of foreign-born Mexicans may have been due to the generally low level of acculturation of the participants, particularly since research has shown that the relationship between perceived racism and blood pressure tends to occur for more highly acculturated foreign-born Mexicans (Finch et al., 2000; Vega & Gill, 1998).

Overall, although this study did not produce the expected findings, the findings of this study have important implications. As indicated above, the results of this study suggest that general acculturation may not moderate the relationship between perceived racism and blood pressure among foreign-born Mexicans with low levels of general acculturation. This possibility is bolstered by the fact that the most current and reliable measures of perceived racism, blood pressure, and acculturation were utilized in this study (e.g., Brondolo et al., 2008; Steffen et al., 2003) and that this study had ample size and sufficient power to detect the hypothesized findings. One could also postulate, based on this and other studies (Finch et al., 2000; Vega & Gill, 1998), that the potential moderating effects of acculturation on the relationship between perceived racism and blood pressure may not occur until foreign-born Mexicans are further along in acculturation status. Additionally, although support for a positive relationship between perceived racism and blood pressure was not established for this study sample of foreign-born Mexicans, the general purpose of this study to investigate the relationship between perceived racism and blood pressure among foreign-born Mexicans living in the U.S. is an important one, given that the number of Mexican immigrants living in the U.S. seems to be increasing (U.S. Census Bureau, 2010) and the fact that hypertension is known to be a significant health problem.

Given the mixed body of research examining the relationship between perceived racism and blood pressure (e.g., Brondolo et al. 2008; James et al., 1994; Peters, 2004; Steffen et al., 2003) more studies are needed to clarify the relationship between perceived racism and blood pressure among various ethnic minority groups living in the U.S. In particular, there currently appears to be a dearth of studies examining the relationship between perceived racism and blood pressure among foreign-born Mexican immigrants, a growing subpopulation in the U.S. (United Sates Census Bureau, 2010). To date, this is the only study specifically devoted to examining the association between perceived racism and blood pressure among foreign-born Mexican people, as most studies to date have focused on African Americans (Hill et al., 2007; Singleton et al., 2008; Steffen et al., 2003). While the results of this study suggest that perceived racism may not have the same influence on foreign-born Mexicans with low levels of acculturation as it appears to have on African Americans, more studies specifically examining the relationship between perceived racism and blood pressure among first generation Mexicans are needed before making any definitive conclusions.

Future studies evaluating the relationship between perceived racism and blood pressure among foreign-born Mexicans should build upon the limitations of this study. Given the body of studies demonstrating a positive relationship between perceived racism and acculturation among

Mexicans (Finch et al., 2000; Montoya, 2005; Rivera, 1997) future studies should continue to investigate the potential role of acculturation as a potential moderator of the relationship between perceived racism and blood pressure among first generation Mexicans, particularly among those with high levels of acculturation. Future studies should be sure to incorporate robust measures of both language and general acculturation, a challenge given that limited number of measures examining the construct of acculturation.

Initially, future studies examining the relationship of perceived racism and blood pressure, as well as the potential role of acculturation in moderating the relationship between perceived racism and blood pressure among foreign-born Mexicans, may closely approximate the methodology used in this study. However, as basic knowledge about the relationship between perceived racism and blood pressure among foreign-born Mexicans progresses and is established, it will be important to use more refined and controlled studies, including randomized studies, to better understand the mediating and moderating variables that may influence the relationship between perceived racism and blood pressure among Mexican immigrants, including acculturation. Among studies exploring the relationship between perceived racism and blood pressure among African Americans, for example, a variety of biological, cultural, and environmental factors have been shown to moderate the relationship between blood pressure and perceived racism, such as anger (Steffen et. al., 2003) and stress coping skills (Singleton, Robertson, Robinson, Austin, & Edochie, 1995). Similarly designed studies for Mexican immigrants and other minority group immigrating to the United States may provide particularly useful information about the relationship between perceived racism and blood pressure that could inform both public policy and clinical treatment for Mexican immigrants and other minority groups who experience racism in the U.S.

Limitations

There are a few limitations to this study. First, this was a convenience sample of participants gathered through a number of different strategies (i.e., local radio; television advertisements; newspaper advertisements; flyers; local English classes) who were paid for their participation. This introduces the confound of self-selection bias into the study. It is possible that participants who were more likely to respond to the advertisements may have differed from the general population of foreign-born Mexicans living in Utah or across the U.S. in personality characteristics or circumstantial factors that may have influenced the results of this study. Second, exclusionary criteria included participants who were pregnant, currently smoking, diagnosed with diabetes, taking blood pressure medication, or who were diagnosed with a heart condition, which further limited the generalizability of this study; however, these exclusionary criteria strengthened the internal validity of the study by excluding potential confounding factors known to affect blood pressure (Chobanian et al., 2003; Rosamond et al., 2008).

In addition to the limitations just indicated, another limitation of this study is that both the ARSMA-II (Cuellar et al., 1995) and Brief PEDQ—CV (Brondolo et al., 2005) used to assess acculturation and perceived racism, respectively, are self-report questionnaires. Personal biases and other variables may have affected the accuracy of these self-reports, which may have therefore affected the internal validity and overall results of this study. For example, it is possible that some participants in this study may have biased their responses on the Brief PEDQ—CV (Brondolo et al., 2005) in such a way as to provide what they thought may have been the desired results of the study, though no social desirability measure was included in this study. Conversely, some participants may have underreported their experiences of perceived racism on the Brief PEDQ—CV (Brondolo et al., 2005) for fear of some sort of social retaliation or consequence, especially considering that many of the participants who provided data for this study were undocumented immigrants. In other words, a paradox may have occurred, such that the participants, if experiencing high amounts of perceived racism, may have had fears of being further discriminated against if endorsing high amounts of perceived racism, thereby biasing their responses on the Brief PEDQ—CV (Brondolo et al., 2005). Despite the limitations inherent with using self-report measures, however, it can be argued that personal thoughts and feelings are most accurately portrayed through self-report measures.

Conclusion

In conclusion, this study failed to produce evidence in support of a relationship between blood pressure and perceived racism among a sample of foreign-born Mexicans. This study also failed to produce evidence that the relationship between blood pressure and perceived racism is moderated by degree of English-language acculturation or general acculturation. This was the first study examining the relationship between perceived racism and blood pressure in sample of foreign-born Mexicans in the known literature. Given the steadily increasing population growth of Mexican immigrants in the U.S., more studies are needed in order to further assess whether or not perceived racism predicts blood pressure in foreign-born Mexicans. The information gathered from future studies examining the role of perceived racism in predicting rates of hypertension among Mexican immigrants could potentially add to the growing body of literature suggesting that perceived racism may be related to hypertension among minority groups in general (Brondolo et al., 2008; Hill et al., 2007; Singleton et al., 2008; Steffen et al., 2003). Future studies examining the role of both biological and environmental/social moderators in the relationship between perceived racism and blood pressure in Mexican immigrants could add further valuable knowledge.

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