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Communal and Exchange Relationships in Marriage and Their Effects on Ambulatory Blood Pressure in Caucasians and Foreign-born Mexican Americans

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ABSTRACT

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Research shows Mexican Americans typically have better cardiovascular health than European Americans, despite being relatively economically disadvantaged. Given research indicating the importance of relationship quality on one's health, the present study examined whether certain relationship orientations (e.g. communal or exchange) were more prevalent in different ethnic groups and if these orientations could help explain this Hispanic Paradox. 582 adults were recruited from the community. Participants were primarily European American (40%) and foreign-born Mexican Americans (55%). A cross-sectional designed was used where participants wore 24-hour ambulatory blood pressure (ABP) monitors and completed self-report measures of relationship satisfaction and relationship orientation. Results indicated that, contrary to predictions, European Americans tended to have more of a communal relationship orientation compared to foreign-born Mexican Americans. As expected however, communal orientation was predictive of higher relationship satisfaction, $\beta = .29$, SE $= .07$, $p < .001$, 95% CI [.15, .43], and while higher relationship satisfaction predicted lower systolic blood pressure, $R^2 = .02$, $\beta = -.16$, SE $= .07$, $p < .05$, 95% CI [-.31, -.01], when ethnicity was added into the model this relationship was eliminated and foreign-born Mexican Americans had higher ABP compared to European Americans, $\beta = 4.72$, SE $= 2.25$, $p < .05$, 95% CI [.29, 9.14]. While there were these important differences, communal and exchange orientations had minimal direct or indirect effects on ABP. Even though communal and exchange relationship orientation don't seem to give us any more information to unravel the Hispanic Paradox, there are important ethnic differences in how we engage in marriage relationships and future research may consider other approaches to examine the health effects of these differences.

Keywords: ambulatory blood pressure, Mexican American, communal, exchange, marriage

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The ethnic structure of the United States is changing dramatically. Projections estimate

that by 2050 minority groups will comprise over half the national population (U.S. Census

Bureau, 2008). Not only have Hispanics surpassed African Americans as the largest ethnic

minority in America but the Hispanic population is expected to almost triple in size from 46.7

million to 132.8 million by 2050. This shift for Hispanics will result in their share of the national

population doubling from 15 percent to 30 percent (U.S. Census Bureau, 2008). Of the many

Hispanic subgroups, Mexican Americans account for 67 percent of the Hispanic population and

25 percent of the foreign-born population (Ramirez & de la Cruz, 2002). In light of these

demographic shifts there needs to be better understanding about the factors that influence

Hispanic health.

The Social Gradient and Hispanic Paradox

Health research took a new form after a landmark study by Adler and colleges (1994)

demonstrating systematic decreases in socioeconomic status (SES) were associated with

subsequent increases in morbidity and mortality. This has led to over a decade of research trying

to understand how SES variables such as income, education, work status, and social status are

associated with the social gradient and their impact health. Research still is consistently finding

that the negative social circumstances tied to having low SES are associated with more stress,

general negative health outcomes, and greater risk for mortality (Rask, O'Malley, & Druss,

2009). However, this social gradient is not seen in all ethnicities.

Mexican Americans have consistently shown an inverse social gradient. Overall

Mexican Americans, especially those foreign-born, experience a disproportionate amount of

unemployment, access to health care, education, and income (Gallo, Penedo, Espinosa, & Arguelles, 2009)—they experience low SES. Yet even while being socioeconomically disadvantaged, compared to Caucasians, foreign-born Mexican Americans typically have better health and lower mortality rates (Franzini, Ribble, & Keddie, 2001; Wei et al., 1996). One aspect of health where this paradox has received considerable attention is cardiovascular disease (CVD).

As the leading cause of death in the United States, CVD effects one in three American adults (Lloyd-Jones et al., 2010). Compared to Caucasians and U.S. born Mexican Americans, foreign-born Mexican Americans have significantly lower CVD mortality (Stern & Wei, 1999; Sundquist & Winkleby, 1999). Foreign-born Mexican Americans also have fewer heart attacks, lower cholesterol, smoke less tobacco, and drink less alcohol compared to Caucasians (Wei et al., 1996). Blood pressure (BP) is another risk factor for CVD that has demonstrated a fairly consistent paradoxical pattern. Comparing Caucasian adults and other ethnic minority groups on hypertension prevalence Borrell and Crawford (2008) found that foreign-born Mexican Americans have significantly lower self-reported hypertension compared to Caucasians and Mexican Americans. These findings were confirmed, not accounting for place of birth, by the National Health and Nutrition Examination Survey (Cutler et al., 2008). In addition, the most recent update on CVD statistics cites the prevalence of high BP to be substantially lower for Mexican American men compared to Caucasian men (Lloyd-Jones et al., 2010).

To understand what could account for this paradox it is recognized that health disparities are not purely genetic; rather they are a function of multiple social factors (Adler & Rehkopf, 2008). Gallo and Matthews (2003) have proposed the reserve capacity model as an integrative

framework to examine the multiple social, cultural, and physiological connections between SES and health.

Reserve Capacity and Social Support

The reserve capacity model starts with the assumption that having low SES brings significantly more stress and fewer positive events into one's life. This chronic exposure to stress is detrimental to health. Individuals with low SES do not have adequate resources available for coping and generally cannot replenish resources fast enough before experiencing another stressor. Resources for coping with stress can be seen as material (e.g., money and time) or psychological (e.g., social support and optimism). It is the "bank" of these resources that are referred to as reserve capacity. Factors that have shown to mediate or moderate the association between SES and health such as optimism, perceived control, self-esteem, and social support (Taylor & Seeman, 1999) are just some of the important reserve capacity resources that individuals with low SES lack (Gallo et al., 2009). During times of stress individuals can call upon these resources to cope, but if someone is overexposed to stressors, has limited reserve capacity, and lacks time to replenish used resources they are at a much greater risk for illness. This is what places ethnic minorities with low SES at an increased risk for mortality (Gallo & Matthews, 2003). How then do foreign-born Mexican Americans have a lower risk for cardiovascular mortality? One avenue suggests that specific forms of reserve capacity could be more important than others.

One powerful form of reserve capacity is social support. Social support is a vital factor for one's cardiovascular health (Uchino, 2006) and lack of social support is a risk factor for mortality comparable to the effects of cigarette smoking, obesity, or lack of physical activity (Holt-Lunstad, Smith, & Layton, 2010; House, Landis, & Umberson, 1988). Humans live in a

social environment where interacting with other people is necessary and the subsequent stress or affirmations experienced within those relationships can have powerful influences on our health. This is one area that researchers suggest might account for the Hispanic paradox—the Mexican value of familism. Mexicans typically have larger nuclear families, closer relationships with extended family, and place family goals ahead of individual goals (Gallo et al., 2009). If foreign-born Mexican Americans have an increased reserve capacity in the form of social support due to their cultural values this could help account for the Hispanic Paradox.

Marriage and health. Arguably, one of the most central adult social relationships is marriage. There is demonstrated support that the marital relationship influences health (Eaker, Sullivan, Kelly-Hayes, D´Agostino & Benjamin, 2007; Gottman, 1998; Holt-Lunstad, Birmingham & Jones, 2008; Kaplan & Kronick, 2006; Kiecolt-Glaser & Newton, 2001). The general view has been that those who are married fair better than their unmarried peers (Kaplan & Kronick, 2006; Kiecolt-Glaser & Newton, 2001). But recent studies suggest the relationship between marriage and health could be moderated by the quality of the relationship (Grewen, Girdler & Light, 2005; Holt-Lunstad et al., 2008).

Evidence supporting the idea that marital quality moderates the marriage-health relationship has found marital quality to significantly impact cardiovascular reactivity, BP, and overall mortality. Having a high-quality marital relationship seems to buffer against having high BP; where these benefits seem to disappear in low-quality marriages. Also, compared to those who are unmarried, married individuals with low-quality relationships actually show higher ambulatory blood pressure (ABP; Holt-Lunstad et al., 2008). Negative marital interactions in general are linked to negative cardiovascular reactivity (Nealey-Moore, Smith, Uchino, Hawkins & Olson-Cerny, 2007). Longitudinal analysis also indicates that married women who feel they

cannot express their feelings to their husbands have a four percent higher chance of mortality at 10-year follow-up (Eaker et al., 2007). This evidence gives strong reason to suggest that marriage isn't protective in itself, but it is the quality of the relationship that can have a positive influence on overall health and BP.

One important gap in the literature is data on how marital relationship factors affect Mexican Americans' health. It cannot be assumed that similar relationships between marriage and health will translate to all cultures. While some research suggests that Mexican Americans and Caucasians don't differ on the quality of their marital relationship, when looking at specific behaviors in marriage Mexican Americans report fewer marital problems (Bulanda & Brown, 2007). It is also important to note that the use of single item instruments to measure marital satisfaction could have confounded these results (Bulanda & Brown, 2007). Due to the lack of research focusing on Mexican American marital satisfaction and the potential problems with the previous literature in measuring marital satisfaction it is necessary for more research using multiple item scales to properly measure martial satisfaction. It will also be important to examine factors that could account for any differences in marital satisfaction between Mexican Americans and Caucasians. If marital satisfaction is a function of behaviors and attitudes, one area to further explore could be a couple's orientation to engage in communal or exchange relationship.

Communal and Exchange Relationships

Clark and Mills' (1979) theory of communal and exchange relationships assumes that all relationships involve the giving and receiving of benefits. Exchange relationships work under the assumption that as one gives a benefit there is a debt incurred in the relationship with an expectation of re-payment. In essence, exchange relationships focus on the importance of

reciprocity and the balancing of a hypothetical "benefits ledger". On the other hand, communal relationships operate under the assumption that benefits are given out of a genuine care for the others well-being. Communal friendships expect that relationships will be long-term; they don't differ on the basis of giving benefits, but rather the goals behind the giving.

In laboratory settings, individuals experience less liking when they expect a communal relationship but receive an exchange relationship and vice versa. Liking is maximized when individuals exchange benefits in accordance to the norms they expect from the relationship (Clark & Mills, 1979). Relationship satisfaction then could potentially be a function of concordant norms and expectations of exchange being met in the relationship.

More recent work suggests that exchange relationships could be damaging to our health. The reciprocal norms within exchange relationships pose a threat because people seek to maintain a balance between closeness and rejection in relationships. One would not request too much of a casual friend because that relationship is more volatile than close relationships (Beck & Clark, 2009). The risk management in these relationships and subsequent decision making about whether to seek for help in a relationship could be a significant stressor. This "reciprocity stress" could have deleterious effects on marital satisfaction, BP, and cardiovascular functioning. Reciprocity norms could also be a source of conflict within marital relationships. As previously mentioned, women who report high levels of marital strain (not able to communicate negative feelings to spouse) are at greater risk for mortality (Eaker et al., 2007). Similarly, marital conflict has shown to alter cardiovascular functioning and put one at greater risk for cardiac disease (Fincham, 2003). Marital conflict could be considered a trademark of exchange relationships because negative behavior increases during conflict which is generally reciprocated and results in a downward spiral—often referred to as negative reciprocity (Fincham, 2003;

Gottman, 1998). This suggests that reciprocity norms coupled with negative affect could lead to aversive cardiovascular outcomes.

Seeing the potentially aversive health effects of exchange relationships, what might be the effects of communal relationships on health within marriage? Since communal relationships operate under norms of giving out of genuine care for the other's well-being one would assume to see greater marital satisfaction, positive affect, and positive interaction in communal relationships. But previous findings on the relationship between health and marriage indicate that negative behaviors have a more potent effect on health than do positive behaviors (Kiecolt-Glaser & Newton, 2001). It is likely then that the potentially deleterious effects of exchange relationships on health will have a more powerful, and statistically noticeable, effect than the potentially positive impact of communal relationships.

Present Study

The current study seeks to help unravel the Hispanic Paradox and add important understanding to the association between marriage and health by examining the marriage-health relationship through the communal/exchange framework. These marital relationships should serve as an important reserve capacity to help buffer against stress. This study examines the potential interaction effects between one's orientation to engage in communal or exchange relationships, marital satisfaction, and ABP. We also compare the health outcomes between foreign-born Mexican Americans and Caucasians based on marital status and having a communal or exchange relationship. Surprisingly these associations have not yet been examined in the literature. Therefore, four main hypotheses were tested. First, we predict that if marital satisfaction is related to communal and exchange relationships, those with communal relationships would report higher satisfaction in marriage. Second, based on the Mexican value

of familism, foreign-born Mexican Americans will report their relationships being more communal than Caucasians. Third, based on the Hispanic Paradox Mexican Americans will have lower ABP than Caucasians. Lastly, one's communal or exchange orientation will moderate the effects of marital satisfaction on ABP.

Method

Participants

The sample consists of 582 community dwelling adults recruited through flyers, newspaper, and radio ads. Participants' (male = 29%, female = 71%) were primarily European American (40%) and foreign-born Mexican Americans (55%) ages 18-75 (M = 34). Participants were excluded from participating if they had cardiovascular disease, were taking medications that influenced blood pressure, or were pregnant. See Table 1 for complete demographic information.

Procedure

After meeting the criterion for participation, research assistants scheduled participants to come into the lab for assessment. To assure accurate communication of the procedure all research assistants working with the Mexican American participants spoke fluent Spanish and English. Once informed consent was obtained from the participants, trained research assistants manually measured BP using a sphygmomanometer and stethoscope. BP was measured three times and participants were then instructed on the ambulatory monitoring procedure. Participants were told that the monitor would take readings frequently throughout the day and that if the arm cuff ever caused them pain or interfered with their activity they could manually stop the reading. Following the instruction, research assistants placed the monitors on the participants and calibrated the monitor to be within ±5 mm/Hg of the manual BP readings.

Participants wore the monitor during normal activity for the following 24 hours. During this time participants completed the questionnaire packet. The next day participants returned to the lab and turned in the blood pressure monitor.

Measures

Mexican Americans received versions of the measures translated into Spanish. In order to ensure accurate translation native Spanish speakers who were also fluent in English were employed. The translation process involved three steps. First, one translator would translate the English version into Spanish, and then a different translator would translate the Spanish version back into English and after that, the original English scale was compared to the back translated version. The comparison process involved group discussion among translators and the investigator to resolve any discrepancies.

Relationship quality. Relationship quality was measured on two dimensions: marital adjustment and social support. To assess marital adjustment the revised Dyadic Adjustment Scale (RDAS) was administered. The RDAS is a 14 item revision of Spanier's (1976) original 32 item Dyadic Adjustment Scale (DAS). In developing the RDAS Busby, Christensen, Crane and Larson (1995) intended to maintain much of the original scale while improving the psychometric properties and simplifying the scale from the four factors of dyadic consensus, dyadic satisfaction, dyadic cohesion, and affectional expression to three dimensions of consensus, satisfaction, and cohesion. The RDAS yields a total score, with higher scores indicating better adjustment. The RDAS and DAS have a correlation coefficient of .97 ($p < .01$). The correlation coefficient between the RDAS and Marital Adjustment Test (MAT) is .68 ($p < .01$) where the DAS and MAT have a coefficient of .66 ($p < .01$; Busby et al., 1995). In less than half the items, the RDAS measures the same constructs as the DAS.

To measure social support the Interpersonal Support Evaluation List (ISEL) was administered. The ISEL was designed to assess overall social support. It contains four separate subscales: tangible, belonging, self-esteem, and appraisal to measure the functions of social support. The ISEL yields a total score, coded so that higher scores indicate greater social support. Each item within the subscales has respective mean correlations of .49, .52, .44, and .59 with the internal consistencies of the subscales ranging from .60 to .92. The overall scale also has a test-retest reliability of .87 over a four week period (Cohen & Hoberman, 1983).

Communal or exchange orientation. To assess participants' relationship orientation the Communal Orientation Scale and the Exchange Orientation Scale were utilized. The 14 item Communal Orientation Scale (1-5 likert scale) was designed to measure a person's tendency to look out for other peoples welfare and also if the person has expectations for others to look out for their needs. The scale has demonstrated reliability with a Cronbach's Alpha of .78 as well as a .68 intra-class correlation for 11 week test-retest reliability (Clark, Ouellette, Powell & Milberg, 1987). The Exchange Orientation scale is composed of nine items (also 1-5 likert scale) designed to measure ones exchange orientation on three dimensions: keeping track of joint effort inputs, whether an individual seeks to repay benefits received, and whether an individual expects benefits given to be repaid. The Exchange Orientation Scale also has demonstrated reliability and validity (Mills & Clark, 1994). For analysis both scales yielded an individual total score, which higher scores indicating a higher communal or exchange orientation.

Blood pressure. Many consider ABP to be more accurate than routine clinical measures ("National High Blood Pressure," 1990). While clinical measures are valuable and can provide baseline information, clinical measures have shown to overestimate hypertension diagnoses (Banegas et al., 2009) while ambulatory measures are stronger predictors of cardiovascular

mortality as well as all-cause mortality (Hansen, Jeppesen, Rasmussen, Ibsen & Torp-Pedersen, 2005).

To measure ambulatory systolic and diastolic blood pressure, this study used the Accutracker II (Suntech Medical Instruments, Raleigh, NC) monitor. The Accutracker II is a noninvasive devise that reads blood pressure through the auscultatory technique. The auscultatory technique processes and records Korotkoff sounds, from the brachial artery, through a microphone and correctly identifies the Korotkoff sounds through the use of ECG R-wave gating. Prior research has demonstrated that the Accutracker II accurately corresponds with intra-arterial blood pressure measures during rest, isometric exercise, and bicycle exercise (White, Lund-Johansen & Omvik, 1990). For the purposes of this study, the monitor was set to randomly measure blood pressure three times an hour during the day and once every hour during the night.

As our primary dependent variable average systolic and diastolic ABP values, daytime and nighttime systolic and diastolic values, as well as blood pressure dipping values were used for analysis. Blood pressure dipping describes the diurnal decrease in blood pressure during the nighttime. It is considered healthy for blood pressure to drop about ten percent from day to nighttime. Average ABP values were calculated by taking the average of the daytime and nighttime systolic values (same for diastolic values). Blood pressure dipping was also calculated separately for systolic and diastolic values by subtracting the nighttime from the daytime value and dividing by the daytime value, this total was then multiplied by 100.

Results

Data Screening and Treatment

Only participants who were married, European American, or foreign-born Mexican American were included for analysis; this resulted in a sample of 386 participants, see Table 1 for participants characteristics. From this sample roughly five percent of the data was missing. The majority of missing values were blood pressure values most likely due to machine error, thus missing data was left untreated and listwise deletion was performed in analysis. All tests of significance were two-tailed and had alpha set at .05.

Tests for the assumptions of homoscedasticity, linearity, and normality were performed. The Breusch-Pagan/Cook-Weisberg test for homoscedasticity was violated in many of the regression models performed. Visual inspection of scatterplots revealed no apparent violations of linearity. Based on this, robust standard errors (SE) were calculated to account for this violation. Additionally, when examining variable distributions most looked fairly normal, with only education having one obvious outlier (median + or - two interquartile ranges). Measures of central tendency and correlations between other variables were not significantly impacted when it was removed, thus it was retained for analysis. In the end, the robust SE's are conservative enough to account for any violation of these assumptions.

Since communal and exchange orientation were correlated, $r = -.23$ $p < .001$, they were tested separately to avoid multicolinearity. Based on previous evidence (Colhoun, Hemingway, & Poulter, 1998; Kagan, Faibel, Ben-Arie, Granevitze, & Rapoport, 2007; Lewington, Clarke, Qizilbash, Petro, & Collins, 2002) associations between age, gender and SES (education, income, and employment status) with ABP were examined to test if they should be included in models as covariates. Age, income and employment status were significantly correlated ($p < .05$) with at

least one of the ABP values and were included as covariates in subsequent models. There were

no significant correlations found between gender and education with ABP.

Communal/Exchange Orientation and RDAS/ISEL

Correlation analysis revealed a positive relationship between RDAS score and communal

orientation, $r = .27$, $p < .001$, and a negative relationship between RDAS score and exchange

orientation, $r = -.16$, $p = .003$. This relationship partially confirms our first hypothesis, that

people reporting a communal orientation were more likely to have better relationship satisfaction

with the opposite being the case for exchange orientation. To further examine this relationship

regression analysis was performed with the following equations:

$RDAS_{ij} = b_{0i} + b_{1i} (communal)$

$RDAS_{ij} = b_{0i} + b_{1i} (exchange)$

The bivariate regression predicting RDAS score from communal orientation was

significant, $\beta = .32$, SE $= .07$, $p < .001$, 95% CI [.18, .45], and accounted for 7 % of the variance

in RDAS score. Exchange orientation also significantly predict RDAS score, $\beta = -.25$, SE $= .08$,

$p = .003$, 95% CI [-.42, -.09], and accounted for 3 % of the variance in RDAS score. When

covariates were added into the models, the overall model for predicting RDAS score from age,

income, employment status, ethnicity and communal orientation was significant, $F(5, 332) =$

48.96, $p < .001$, and now accounted for 42 % of the variance in RDAS score. However the

covariates reduced the communal orientation variable in the model to non-significant, $\beta = .08$,

SE $= .05$, $p = .14$, 95% CI [-.02, .18] with the covariates accounting for the significant overall

model. Of the covariates ethnicity was the strongest predictor of RDAS score, $\beta = -10.01$, SE

$= .83$, $p < .001$, 95% CI [-11.64, -8.37] such that Mexican Americans had lower RDAS scores

holding constant the other variables in the model. The overall model for predicting RDAS score

from exchange orientation, with added covariates, was also significant, $F(5, 332) = 49.15$ p < .001, and also accounted for 42 % of the variance in RDAS score, with exchange orientation being reduced to non-significant, $\beta = -.10$, SE = .06, $p = .11$, 95% CI [-.23, .02] and ethnicity again being the strongest predictor of RDAS score, $\beta = -10.09$, SE = .83 $p < .001$, 95% CI [-11.72, -8.46] holding constant the other variables in the model. These results indicate that compared to European Americans, the foreign-born Mexican Americans in our sample displayed lower marital adjustment.

Examining whether global social network support was related to communal and exchange orientation correlation analysis found a negative relationships between communal orientation and ISEL score, $r = -.14$, $p = .008$, with no relationship found between exchange orientation and ISEL score. To further examine this relationship regression analysis was performed with the following equations:

$$ISEL_{ij} = b_{0i} + b_{1i} \ (communal)$$

$$ISEL_{ij} = b_{0i} + b_{1i} \ (exchange)$$

The bivariate regression predicting ISEL score from communal orientation was significant, $\beta = -.07$, SE = .03, $p < .01$, 95% CI [-.12, -.02], and accounted for 2 % of the variance in ISEL score while exchange orientation did not significantly predict ISEL score, β = .01, SE = .04, $p = .82$, 95% CI [-.08, .10]. When covariates were added into the models, the overall model for predicting ISEL score from communal orientation was significant, $F(5, 330) =$ 4.23, $p = .001$, and accounted for 6 % of the variance in ISEL score, however communal orientation was no longer a significant predictor, $\beta = -.04$, SE = .03, $p = .158$, 95% CI [-.09, .02] and ethnicity was the strongest predictor of ISEL score, $\beta = 1.25$, SE =.41, $p = .003$, 95% CI [.43, 2.06] holding constant the other variables in the model. The overall model for predicting ISEL

score from exchange orientation, with added covariates, was also significant, $F(5, 330) = 3.85$, p = .002, and also accounted for 6 % of the variance in ISEL score, with ethnicity again being the strongest predictor of ISEL score, $\beta = 1.42$, SE = .40 $p < .001$, 95% CI [.64, 2.20] holding constant the other variables in the model. These results indicate that compared to European Americans, the foreign-born Mexican Americans in our sample were more likely to have higher levels of perceived availability of social support from their social network.

Communal/Exchange Orientation and Ethnicity

Contrary to our second hypothesis point biserial correlation (r_{pb}) analysis revealed that the foreign-born Mexican Americans in our sample were more likely to have lower communal orientation scores, $r_{pb} = -.35$, $p < .001$, and higher exchange orientation scores, $r_{pb} = .18$, $p < .001$, compared to European Americans. When looking at mean differences between ethnicities, European Americans' had a higher average communal orientation score, $M = 51.67$, compared to the Mexican Americans' in our sample, $M = 46.46$ (see Figure 1). Mexican Americans also reported higher average scores on the exchange orientation scale, $M = 23.67$, compared to European Americans, $M = 20.80$ (see Figure 2).

To further explore these differences we tested if ones ethnicity could predict ones communal and exchange orientation score in the following equations:

$Communal_{ij} = b_{0i} + b_{1i}$ (age) + b_{2i} (income)+ b_{3i} (employment status) + b_{4i} (*ethnicity*)

$Exchange_{ij} = b_{0i} + b_{1i}$ (age)+ b_{2i} (income)+ b_{3i} (employment status) + b_{4i} (*ethnicity*)

Tests revealed that ethnicity was the strongest predictor of both communal, $\eta^2 = .11$, $\beta = -5.07$, SE = .77, $p < .001$, 95% CI [-6.57, -3.56], and exchange orientation, $\eta^2 = .06$, $\beta = 2.78$, SE = .62, $p < .001$, 95% CI [1.57, 3.98], such that Mexican Americans were lower in communal and

higher in exchange orientation relative to European Americans holding the effects of age, sex, and SES constant.

Ethnicity and Blood Pressure

To test if Mexican Americans had lower blood pressure than Caucasians seemingly unrelated regression (SUR) was used. In this analysis blood pressure values (average and dipping of systolic and diastolic ABP) were used as the dependent variables in separate equations all entered into one model; allowing us to account for any correlations between error terms. Multivariate regression was not used since the blood pressure values are highly correlated. Additionally, to account for the heteroskedastic distributions we bootstrapped the standard errors. The following equations were used in the SUR models, with different equations for each dependent blood pressure value:

SUR 1: *Blood pressure$_{ij}$* = b_{0i} + b_{1i} (*ethnicity*)

SUR 2: *Blood pressure$_{ij}$* = b_{0i} + b_{1i} (age) + b_{2i} (income) + b_{3i} (employment status) + b_{4i} (*ethnicity*)

SUR 3: *Blood pressure$_{ij}$* = b_{0i} + b_{1i} (age) + b_{2i} (income) + b_{3i} (employment status) + b_{4i} (*ethnicity*) + b_{5i} (RDAS) + b_{6i} (RDAS * ethnicity)

The first SUR found that ethnicity significantly predicted systolic ABP, R^2 = .04, β = 4.86, SE = 1.28, p < .001, 95% CI [2.35, 7.36], and systolic dipping, R^2 = .02, β = -2.70, SE = .98, p = .006, 95% CI [-4.63, -.78], and moderately predicted diastolic dipping, R^2 = .01, β = -2.09, SE = 1.12, p = .063, 95% CI [-4.29, .11]. Figure 3 displays the mean differences between ethnic groups on systolic ABP. Once covariates were added into the second SUR the only relationship that was still significant was ethnicity predicting systolic ABP, β = 3.47, SE = 1.57, p < .05, 95% CI [.39, 6.55], while controlling for age, sex and SES. This, contrary to our hypothesis, indicates

that the foreign-born Mexican Americans in our sample had higher systolic blood pressure than our Caucasian sample.

To examine this further we tested if relationship satisfaction moderated the association between ethnicity and ABP. Despite graphical displays (see Figures 4 and 5) that suggest large differences in RDAS scores and an interaction between ethnicity and RDAS scores, none of the SUR's revealed a significant interaction between ethnicity and marital quality to moderate ethnicities relationship with ABP.

Communal/Exchange Orientation and Blood Pressure

To test the direct effect of RDAS score on blood pressure and the potential moderating effect of communal and exchange orientation SUR was again employed, with bootstrapped standard errors. When testing for moderation all variables included in the interaction term were centered on their mean to allow for meaningful interpretation. The following equations were used in the SUR models, with different equations for each dependent blood pressure value, these were repeated a second time with ISEL score replacing RDAS and SUR's 3-6 also include demographic covariates:

SUR 1: *Blood pressure*$_{ij}$ = b_{0i} + b_{1i} (*RDAS*)

SUR 2: *Blood pressure*$_{ij}$ = b_{0i} + b_{1i} (*RDAS*) + b_{2i} (age) + b_{3i} (income) + b_{4i} (employment

status) +

SUR 3: *Blood pressure*$_{ij}$ = b_{0i} + b_{1i} (*RDAS*) + b_{2i} (*communal*)

SUR 4: *Blood pressure*$_{ij}$ = b_{0i} + b_{1i} (*RDAS*) + b_{2i} (*exchange*)

SUR 5: *Blood pressure*$_{ij}$ = b_{0i} + b_{1i} (*RDAS*) + b_{2i} (*communal*) + b_{3i} (*RDAS*communal*)

SUR 6: *Blood pressure*$_{ij}$ = b_{0i} + b_{1i} (*RDAS*) + b_{2i} (*exchange*) + $b3_i$ (*RDAS*exchange*)

The first SUR model examining the direct effect of RDAS score revealed that having a higher RDAS score was a significant predictor of lower systolic ABP, $R^2 = .02$, $\beta = -.16$, SE $= .07$, $p < .05$, 95% CI [-.31, -.01]. No significant relationships were found for diastolic ABP or any of the dipping values. Similarly ISEL scores did not significantly predict any of the blood pressure values.

When covariates were added into the RDAS model (SUR 2), RDAS score was no longer significant. Contrary to our final hypothesis, there were no direct effects found for communal or exchange orientation in the RDAS or the ISEL models (SUR 3 & 4) and when testing for the moderating effect of communal and exchange orientation (SUR 5 & 6) one of the models revealed significant effects. Exchange orientation moderated the effects of RDAS score on diastolic dipping, $\beta = -.03$, SE $= .01$, $p = .016$, 95% CI [-.06, .01], when holding the other variables in the model constant. This could suggest that within our sample those who were in satisfying relationships and had a stronger exchange orientation experienced blunted diastolic blood pressure dipping.

Discussion

With lingering questions in the literature as to how specific aspects of a marriage relationship influence ABP and what this relationship might look like comparing different ethnic groups, we looked to the potential role of communal and exchange relationship orientations. The current study presents findings that show differences between foreign-born Mexican Americans and Caucasians in how communal and exchange orientations are experienced and that there are ethnic differences in relationship satisfaction and ABP. However, despite previous research suggesting a potential link between communal and exchange orientations and health little evidence was found indicating that communal or exchange orientations have direct or indirect

influences on ABP. Thus, the current findings add to the current literature about ethnic disparities in health, ethnic differences in marital quality and help to rule out one possible explanation of the Hispanic Paradox.

Contrary to our hypotheses, the Caucasians in our sample reported a tendency to engage in more communal relationships and foreign-born Mexican Americans reported a tendency to engage in more exchange relationships. Despite Mexican values that seem to be more communal in nature, one probable explanation for this finding is acculturation. The foreign-born Mexican Americans in our sample were very highly educated; 60 % having two years or more of college. The National Health and Nutrition Examination Survey (NHANES) 2001-2006 indicates that only 22.1 % of Mexican Americans had some college (Hamner, Cogswell, & Johnson, 2011). This number would be expected to be even lower for foreign-born Mexican Americans. Education has been an important variable of SES linked with risk of mortality (Turra & Goldman, 2007). In addition to our sample being highly educated, a majority (72 %) of the foreign-born Mexican Americans in our sample had lived in the United States for five years or more, many of them for more than 20 years. While years spent living outside your country of origin is a rudimentary measure of acculturation, it is still used in the literature (Thomson & Hoffman-Goetz, 2009). So taken together, our foreign-born Mexican Americans were highly educated to national estimates and had been living in the United States for many years; providing evidence for an influence of acculturation.

As immigrants spend more time in the United States it is likely that they will adopt certain values that are adaptive and diminish some of their once held cultural values. Flores, Tschann, VanOss Marin, and Pantoja (2004) provide evidence to suggest that once Mexican immigrants acculturate to Western society they let go of previous cultural scripts of how to

communicate in marriage. Foreign-born Mexican American couples who were more acculturated used more open and direct communication of personal feelings; something that is not supported by traditional Mexican values (Flores et al., 2004). It is possible that this "release of cultural scripts" due to acculturation could also account for the foreign-born Mexican Americans in our sample being more exchange oriented than the Caucasians.

Another potential explanation for foreign-born Mexican Americans reporting more exchange relationships and the Caucasians reporting more communal relationships lies in the statistical comparison with our reference group. The European Americans in our study were sampled from a highly conservative and religious community; over 97% reported being affiliated with the Church of Jesus Christ of Latter-Day Saints (LDS), while only 66% of the Mexican Americans reported being LDS. The LDS faith teaches values of charity, love and giving that would promote individuals helping when they see a need. These values seem to mirror the type of giving found in communal relationships. While there are likely similar values taught in other Christian faiths, LDS members who believe highly in their faith are more likely to practice their religion than other Christians who believe highly in their faith (PEW Research Center, 2009), thus potentially leading the LDS members to engage in more communal behaviors. However, when controlling for religious affiliation in our analyses, Caucasians were still more likely than Mexican Americans to have a communal orientation. Even though we did not find any influence of religious orientation on these ethnic differences in communal/exchange orientation, religious values could still help explain the differences seen in our sample; we only measured religious affiliation. It could be that measures of spirituality or religious values (not available in our data) could be better measures to capture whether or not an individual follows the values their religion upholds—influencing communal behavior.

Confirming one of our hypotheses, higher relationship satisfaction was related with having a communal orientation and lower relationship satisfaction was related with more of an exchange orientation. This is consistent with the theories of reciprocity stress and reciprocal conflict (Fincham, 2003; Gottman, 1998) suggesting that the reciprocal norms of exchange relationships are damaging to marital quality. It seems reasonable that exchange relationships, typified by equal giving in relationships could be associated with marital conflict—conflict being a key factor in poor martial functioning (Pasch & Bradbury, 1998). While there are likely types of conflict that can enhance a marriage and eventually lead to higher satisfaction, conflict within an exchange relationship context would likely lead to reciprocal conflict where partners continue in a negative conflict patterns (Fincham, 2003). This type of conflict and method of engaging a spouse would do nothing to build a strong and satisfying relationship. While not only confirming this prior research it also builds upon it by providing some evidence that this type of reciprocal conflict and reciprocity stress has negative consequences for both Caucasians as well as Mexican Americans.

In contrast to the Hispanic Paradox, the foreign-born Mexican Americans in our sample displayed elevated levels of systolic ABP compared to Caucasians. While this relationship contradicts the Hispanic Paradox, we need to look more closely at the actual blood pressure values. Our sample of foreign-born Mexican Americans had a mean systolic ABP of 118.1 mmHg and diastolic ABP of 68.1 mmHg, which is still in a normal range for blood pressure (U.S. Department of Health and Human Services, 2003). These ABP values are substantially lower in our sample compared to other national samples of Mexican Americans, the Caucasians in our sample also had uncharacteristically low ABP, systolic ABP of 113.3 mmHg and diastolic ABP of 68.5 mmHg (Redmond, Baer, & Hicks, 2011). National averages suggest that roughly 30% of

Caucasian men and women have high blood pressure (American Heart Association, 2010; Redmond, Baer, & Hicks, 2011), in our sample only three percent were hypertensive. So we have a healthy sample of Mexican Americans and an even healthier sample of Caucasians, this is problematic when trying to compare the groups, especially in examining the Hispanic Paradox. In samples of higher SES (our sample being more highly educated than national averages) the mortality benefits of the Hispanic paradox do not typically hold (Turra & Goldman, 2007).

This study is also consistent with and builds upon previous research documenting that higher relationship satisfaction predicts lower systolic blood pressure when across ethnicities (Grewen, Girdler & Light, 2005). While Grewen, Girdler and Light's (2005) study found that higher relationship satisfaction was associated with lower blood pressure for Caucasians and African Americans, our results extend this to a sample of foreign-born Mexican Americans. Our regression models indicate that regardless of ethnic group (Caucasian or Mexican American) higher relationship satisfaction in marriage predicted lower systolic ABP. However, when examining the graphical displays of ethnicity moderating relationship satisfactions influence on ABP we found some evidence to suggest potential differences between ethnic groups; though these models were not significant.

One potential reason for why we saw higher relationship satisfaction predicting lower systolic blood pressure across both ethnicities could again lie in the fact that our sample of Mexican Americans were highly educated and the majority of our foreign-born Mexican Americans had lived in the United States for more than five years—thus having adopted more Western values. Previous research indicates that these cultural shifts can also influence blood pressure (Steffen, 2006). Another reason why we did not see differences between ethnicities could lie in the nature of marriage relationships. Despite differing cultural backgrounds, if you

are in a satisfying relationship, regardless of ethnicity or culture, it seems likely that this would bring an important source of happiness. This relationship would serve as an important buffer against outside stress. Conversely, previous research suggests that poor relationship quality adds stress and has a negative impact on cardiovascular functioning (Baker et al., 2000; Eaker et al., 2007; Holt-Lunstad e al., 2008).

While the Mexican Americans in our sample had more exchange relationships and higher ABP, exchange orientation did not seem to account for the Mexican Americans having heightened blood pressure. It is also possible that our society is so highly dependent on exchange relationships, especially in fields like business and politics, that the values of an exchange relationship could be less stressful than we hypothesized—thus not experiencing any influence on ABP.

Despite direct effects for ethnicity and relationship satisfaction predicating ABP we were only able to find partial evidence for relationship satisfaction moderating the association between ethnicity and ABP. When graphing the association between these variables (Figure 5) there looked to be evidence for an interaction between relationship satisfaction and ethnicity predicting ABP however the regression analysis revealed no significant effect. This is likely due to limited power. Even with a sample of over 300 participants, the standard errors for our ABP values were large (between 7-11) and large variability in a sample makes it difficult to meet the criteria necessary to reject our null and provide statistically significant evidence for our interaction. Even though we did not find statistical significance for an interaction, Figure 5 depicts a substantively interesting relationship between these variables that warrants future consideration.

Our results also provided some evidence to suggest that those who are in satisfying exchange relationships tend to experience blunted diastolic blood pressure dipping. An

important aspect of a satisfying marriage is feeling support from your spouse (Dehle, Larsen, & Landers, 2001) and having high social support has been previously associated with enhanced nocturnal dipping (Cooper, Ziegler, Nelesen, & Dimsdale, 2009). So despite having a satisfying relationship, there were rare instances when individuals in our sample who experienced exchange relationship in conjunction with a satisfying marriage and this was associated with blunted diastolic dipping. One potential explanation, consistent with our hypotheses, for this unexpected finding could be due to negative relational influences in marriage having a stronger influence on health than positive influence (Kiecolt-Glaser & Newton, 2001). So someone could report having a satisfying relationship, but the exchange nature of it could lead to elevated stress that has a stronger impact on their diurnal blood pressure rhythms. Outside of this somewhat peculiar and novel finding, communal and exchange orientation did not have any impact on ABP.

The results and conclusions of this study need to be considered in relation to its strength and limitations. One of the major strengths of this study is the large sample size. Even when omitting participants who weren't married and had missing data we had a sample size of over 300. Another important strength of this study is that all of our Mexican American's were foreign-born, so we more closely examine how communal and exchange relationships could stem from cultural values of being Mexican. We also acknowledge multiple limitations of our study. First, we only examined legally married couples. It is unclear the extent to which our findings may generalize to other groups such as homosexual or cohabiting couples. Second, our Caucasians were sampled from a highly educated and conservative population. Even though education was not a significant covariate in our study we did include income level and employment status which were statistically significant covariates. It is important to note that there are important differences socioeconomically between groups with high and low education

levels, and these differences have been associated with subsequent blood pressure trajectories (Loucks, Abrahamowicz, Xiao, & Lynch, 2011). Caution is warranted in extending the results of this study to other populations where there may be important baseline and demographic differences that would influence health characteristics as well as relationship behaviors in marriage. Additionally, our sample was overall very healthy. This makes it difficult to extend results to a nation that displays higher BP on average. Despite this limitation, we have gathered important information for a subgroup of the population that is of interest—healthy groups. Lastly, our cross-sectional design gathered data from participants over one day; excluding important variation that can take place in a relationship. Longitudinal designs would yield important information about how couples interact over time and would allow us to better understand potential causal pathways between marriage relationships and how they influence health.

Despite the limitations, the current study has important results to contribute to the literature. Though communal and exchange orientation did not have any direct influences on ABP, they did strongly influence relationship quality. We also found evidence suggesting differences in relationship quality and ABP between Mexican Americans and Caucasians. Future research could explore why certain samples of Mexican Americans do not follow the Hispanic Paradox trends and continue to explore if relationship quality might help account for this paradox. This could be due to characteristics of the Mexican American samples, the samples they are being compared to, or other individual or contextual factors. It will also be important for future research to confirm that the constructs of communal and exchange orientation have little influence on blood pressure. It could be that important relationships other than marriage (e.g. friendship) have a significant influence on health via communal and exchange orientations.

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Appendix

Table 1

Characteristics of Participants

Characteristic	Total (n = 386)	Foreign-born Mexican American (n = 201)	European American (n = 185)
Male, *n* (%)	122 (33)	32 (17)	90 (49)
Age, years, $M \pm SD$	35.3 ± 10.9	38.3 ± 10.0	32.0 ± 10.9
European American, *n* (%)	185 (48)		
Employed, *n* (%)	328 (86)	176 (90)	152 (82)
Education, *n* (%)			
Low	56 (15)	55 (28)	1 (1)
Medium	98 (25)	65 (32)	33 (18)
High	232 (60)	81 (40)	151 (81)
Income, *n* (%)			
Low	230 (64)	92 (51)	138 (76)
Medium	111 (31)	82 (45)	29 (16)
High	21 (5)	7 (4)	14 (8)

Note. These numbers reflect demographics once those who were unmarried (36%) were removed.

Education was broken down as follows: Low = less than a high school education, Medium = up

to 2 year of college, and High = more than 2 years of college.

Figure 1

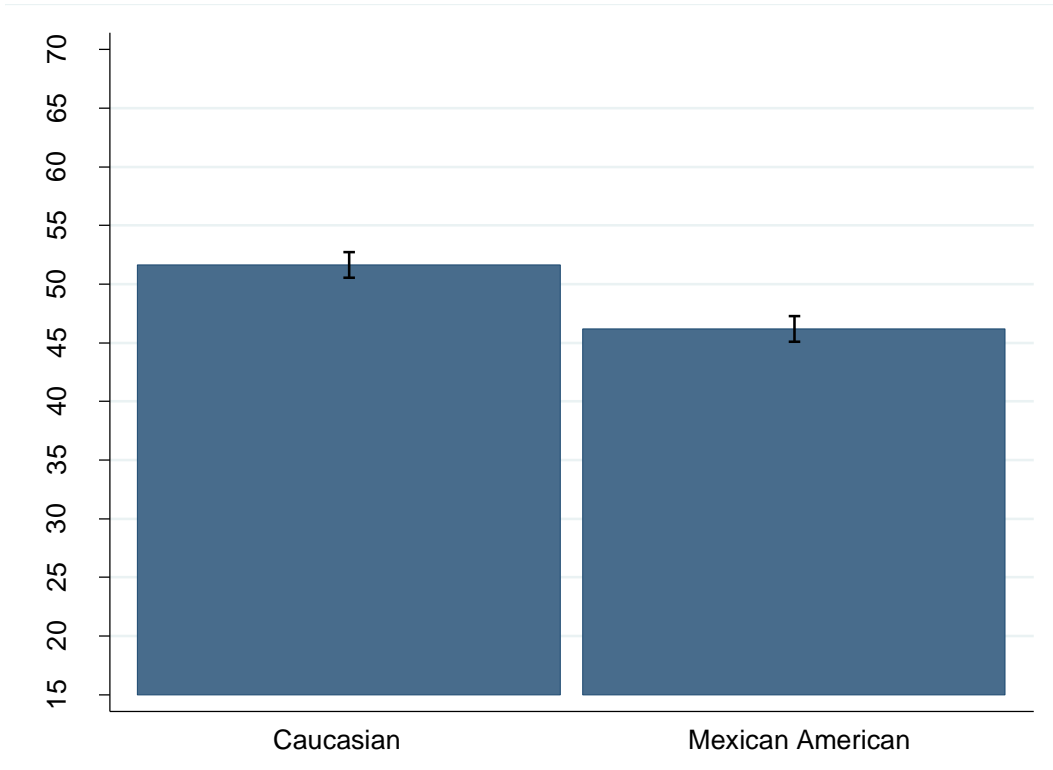*Mean of communal orientation scale by ethnicity*

Figure 2

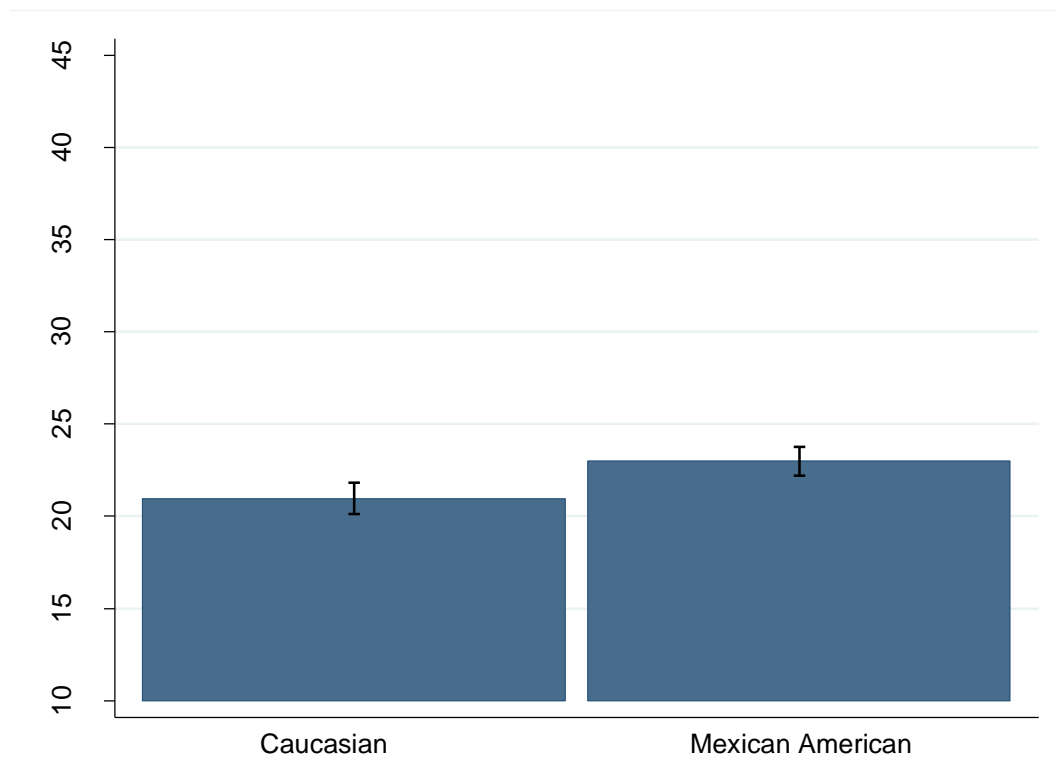*Mean of exchange orientation scale by ethnicity*

Figure 3

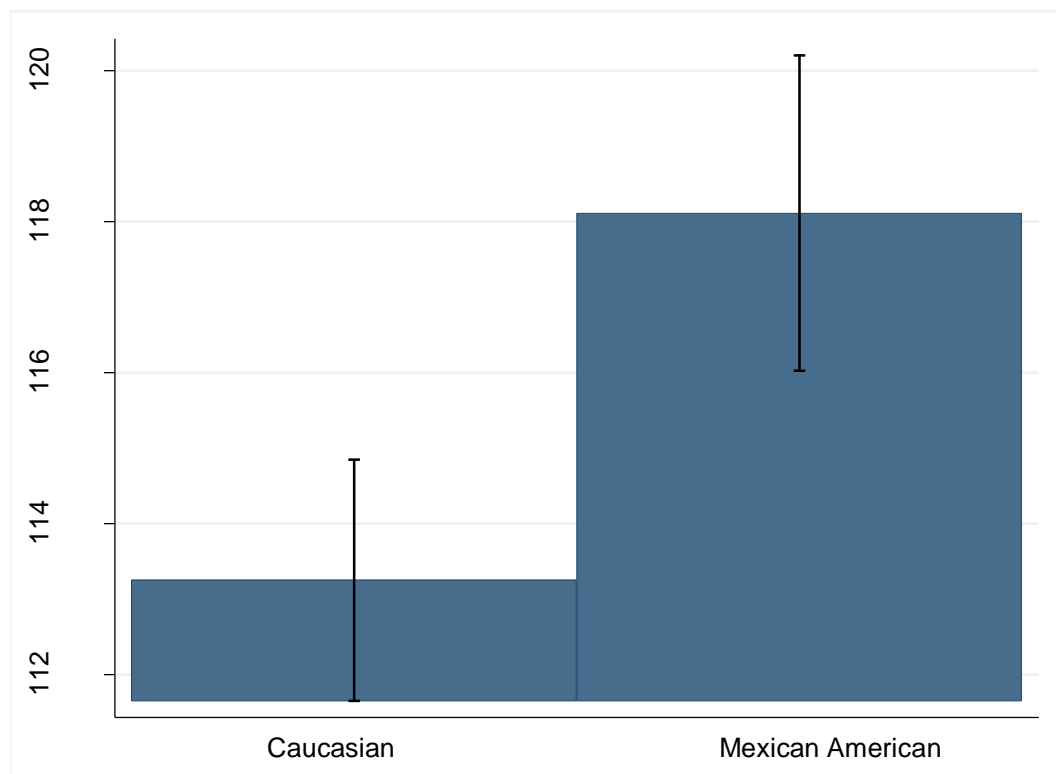*Mean systolic ABP by ethnicity*

Figure 4
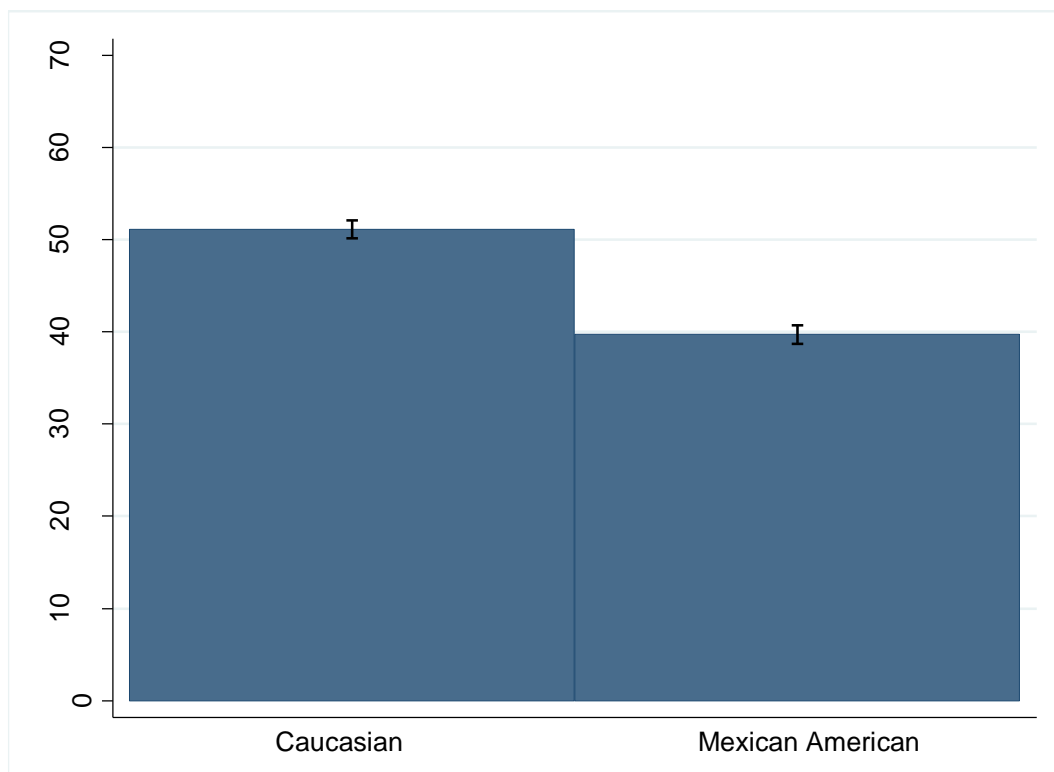
Mean RDAS score by ethnicity

Figure 5

Interaction between ethnicity and RDAS score predicting systolic and diastolic ABP