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Do socioeconomic gradients in subclinical atherosclerosis vary according to acculturation level? Analyses of Mexican-Americans in the Multi-Ethnic Study of Atherosclerosis

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Abstract

Objective—Although socioeconomic position (SEP) shows a consistent, inverse relationship with cardiovascular disease (CVD) risk in westernized non-Hispanic white populations, the relationship in ethnic minorities, including Hispanics, is often weak or even reversed (i.e., worse health with higher SEP). In the current study, we examined whether the association between SEP and subclinical atherosclerosis in Mexican Americans would be moderated by acculturation.

Methods—Participants were 801 Hispanics of Mexican origin (49.6% female; average age 60.47 years) from the Multi-Ethnic Study of Atherosclerosis cohort who underwent computed tomography of the chest for coronary artery calcium (CAC) and thoracic aortic calcium (TAC). SEP was represented by a composite of self-reported education and income. Acculturation was a composite score including language spoken at home, generation, and years of "exposure" to U.S. culture.

Results—Small, but statistically significant SEP by acculturation interaction effects were identified in relation to prevalent CAC, prevalent TAC, and extent of TAC (all $p < .05$). Follow-up analyses revealed that the direction of the SEP gradient on detectable CAC changed as individuals progressed from low to high acculturation. Specifically, the association between SEP and calcification was positive at low levels of acculturation (i.e., a "reversed" gradient), and negative in circumstances of high acculturation (i.e., the expected, protective effect of higher SEP).

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Conclusions—The findings support the utility of examining SEP and acculturation simultaneously, and of disaggregating large ethnic groupings (e.g., “Hispanic”) into meaningful subgroups to better understand health risks.

Keywords

Acculturation; calcification; coronary artery disease; Hispanics; socioeconomic status

Socioeconomic position (SEP) is inversely associated with cardiovascular disease (CVD) in westernized populations (1,2) with several studies indicating earlier, more extensive, and more rapidly progressing coronary artery disease in persons with low SEP relative to those with higher SEP (3–11). Hispanic Americans endure substantial socioeconomic hardships (12), suggesting that SEP may contribute to negative health outcomes in this population (13,14). Yet studies have produced inconsistent evidence for a socioeconomic health gradient in Hispanics, with some research showing weak or paradoxical associations between SEP and various health endpoints (15–20) and two prior studies indicating no association between SEP and subclinical atherosclerosis (21,22).

Given the diversity of the US Hispanic population (23), within group differences may contribute to mixed findings. For example, Hispanic immigrants often display better health than US born-Hispanics—although this health advantage deteriorates with increasing time spent in the US and across successive generations (24). Consistently, research has shown that foreign-born Hispanics had less prevalent and extensive coronary artery calcium (CAC; (22), and less carotid plaque (21) relative to those with US nativity. More years in the US also predicted more extensive CAC (22) and carotid plaque (21) and higher generation predicted more extensive carotid plaque (21).

Additional research suggests heterogeneity in SEP-health gradients in the Hispanic population, with especially weak associations in foreign-born Hispanics and those of Mexican or Central and South-American descent (17,25). In immigrants, SEP-health associations may mirror the reversed gradients (i.e., better health with lower SEP) often observed in less-developed sending countries (17,18). Moreover, selective migration may contribute to weakened gradients, since immigrants could be a particularly healthy or resilient group that is less vulnerable to the deleterious impact of low SEP (17,18). Disparate social patterning in native countries, variable reasons for immigration, and differential social circumstances within the U.S. may also contribute to inconsistent associations between SEP and health among national origins subgroups (23).

The current study examined the unique and combined effects of SEP (education and income) and acculturation (exposure to U.S. culture, generation, language) in relation to subclinical atherosclerosis (CAC and thoracic aortic calcium; TAC) in Hispanics of Mexican origin[1] from the Multi-Ethnic Study of Atherosclerosis (MESA). We focused explicitly on Hispanics of Mexican descent, and examined variability in the nature of SEP effects within this defined Hispanic sub-group, given prior research suggesting divergent SEP (and acculturation (26) health gradients according to national origins and nativity. We hypothesized that SEP would relate inversely to indicators of subclinical disease only in circumstances of higher acculturation.

[1]The MESA cohort also includes Hispanics of Dominican (N=175), Puerto Rican (N=202), Cuban (N=57), and “Other” (N=213) national origins. However, the sample sizes in these ethnic subgroups are not sufficient to examine the hypotheses of interest. Although prior papers (including studies in MESA) have aggregated findings across various Hispanic groups, we chose not to do so in the current study given our hypothesis that the nature of associations between SES and acculturation with health would vary according to national origins, given marked sociodemographic heterogeneity (e.g., differences in proportions of immigrants, prior exposure to US culture, socio-political climates experienced in countries of origin and in the United States, reasons for immigration, etc.)

Methods

Overview and Participants

MESA is a multicenter cohort study that aims to identify the prevalence, course, and correlates of subclinical CVD in a diverse population. Details regarding sampling and methodology are published elsewhere (27). In brief, the MESA cohort includes 6814 men and women who self-identified as White, Black, Hispanic, or Chinese, and who were aged 45 to 84 years and free of clinical CVD at enrollment. Participants were recruited beginning in July 2000, from Baltimore City and Baltimore County, Maryland, Chicago, Illinois, Forsyth County, North Carolina, Los Angeles County, California, Northern Manhattan and the Bronx, New York, and St. Paul, Minnesota. The study was approved by Institutional Review Boards at all centers; all participants gave written informed consent. The current study examined baseline data and only Hispanic participants of Mexican origins (N=801). Hispanics were actively recruited from 3 centers (St. Paul, New York, and Los Angeles).

Socioeconomic Position

Participants rated their educational attainment on eight categories: no schooling; 1–8th grade; 9th–11th grade; high school or GED; some college; technical school; associates degree; bachelors degree; graduate or professional degree. They specified their total family income from all sources in the last 12-months, on 13 categories ranging from <$5,000 to $100,000 and above. The correlation between education and income was 0.47 and a principal components analysis (with direct oblimin rotation) showed that a single factor described the items (eigenvalue = 1.51, 75.58 % of item variance explained; both factor loadings > .86). Thus, to minimize the number of analyses, a combined SEP index was created by standardizing (i.e., resulting in equivalent scales with Mean=0; SD=1) and summing participants' education and income scores. Income was imputed using the expectation-maximization algorithm method (28) for 36 participants with missing data using the covariates age and education.

Acculturation

Language use at home was indicated on a 3 point scale of 2 (English only), 1 (English and Spanish), and 0 (Spanish) (26),. Generation was coded as 0 (foreign-born), 1st (one or both parents foreign-born), 2nd (parents US-born; at least two grandparents foreign-born), and 3rd or higher (parents and grandparents US-born) (22). Exposure to US culture was indicated by percent of life spent in the US, with US-born participants assigned a score of 1 (100%). Correlations between acculturation indices ranged from 0.63 to 0.70 and a principal components analysis (with direct oblimin rotation) showed that a single factor described the items (eigenvalue = 2.41, 80.21% of item variance explained; all factor loadings > .87). Thus, as with SEP, to maximize the information while minimizing Type I error risk, each acculturation variable was standardized (Mean = 0; SD = 1) and summed to form a composite index.

Calcified Atherosclerosis Protocol

Computed tomography of the chest for CAC and TAC was performed with cardiac-gated electron-beam scanners at three field centers (Imatron C-150; Imatron, Inc., San Francisco, California; (29) or with a prospectively electrocardiogram triggered scan acquisition at 50 percent of the R-R interval with multi-detector scanners at the remaining three centers (30). A previous study showed that these scanners in MESA were comparable in their ability to measure calcium (31). Calcium scores (with 0 indicating no detectable calcification, greater than 0 indicating prevalent calcification, and higher scores indicating more extensive disease) were quantified centrally at Harbor - University of California Los Angeles (Torrance, California) using the Agatston method (32).

Covariates

Age (in years) at baseline and sex were included as covariates in all analyses. A second set of models included biomedical CVD risk factors: body mass index (kg/m^2), hypertension [(1), present if measured DBP>=90 or SBP>=140 or self reported hypertension and on anti-hypertensives (33)]; diabetes [(1), present if fasting glucose >=126 mg/dL or treatment for diabetes (34)]; and cholesterol [(1) if <200; (2) if borderline, 200–239; (3) if >=240]. A third set of models controlled for prior covariates and behavioral risk factors: total dietary calories (kcal), total fat (grams), and fiber (grams), estimated from a food frequency questionnaire adapted from the Insulin Resistance Atherosclerosis study (27); physical activity (total intentional exercise in MET-min/wk) and smoking [0, never; 1, former; 2, current]. Clinical and health behavior data were collected in a standardized manner by trained personnel, and blood assays were processed at central laboratories that met all applicable quality-control standards (for additional information about MESA methodology, see (27,35).

Statistical Analyses

Descriptive statistics were calculated and all variables were examined for deviations from normality. Logarithmic transformations were utilized for TAC, CAC, and BMI to minimize skew. Multiple linear (extent of TAC and CAC) and binary logistic (prevalent CAC and TAC) regression analyses with appropriate interaction terms were performed in SPSS 15.0, to examine if acculturation moderated relationships between SEP and calcification, and to determine the degree to which CVD risk factors accounted for such relationships. Significant interaction effects were probed as outlined in (36) and (37). Covariates, SEP, and acculturation were standardized (mean=0; SD=1) to reduce multicollinearity between main and interaction effects and increase interpretability of regression coefficients. Predictors were entered in blocks as follows: 1) covariates (age and sex in model 1; age, sex and biomedical risk factors in model 2; age, sex, biomedical and behavioral risk factors in model 3); 2) SEP and acculturation main effects; 3) SEP by acculturation interaction effect. Each model for CAC and TAC involved two analyses, examining 1) the odds of exhibiting any detectable calcification and 2) extent of calcification in those participants with detectable calcification. Aside from previously mentioned imputations, missing data were excluded on a pair-wise basis. Thus, sample sizes varie slightly between models due to missing data on the covariates cholesterol and diabetes (1 participant with missing data) and dietary variables (45 participants with missing data).

Results

Participant Characteristics

Table 1 shows the sociodemographic characteristics and prevalence and extent of calcification for the sample. Forty-nine percent and 29% of Mexican Americans in MESA displayed any detectable CAC and TAC, respectively. By way of comparison, CAC prevalence in MESA participants varied from 34.9% (Chinese women) to 70.4% (White men) (35), and TAC prevalence across all participants was 28% (38).

Acculturation, SEP, and CAC—Table 2 shows the results of analyses regressing prevalent CAC and extent of CAC on SEP, acculturation, and the interaction between SEP and acculturation. Higher acculturation was associated with increased odds of displaying detectable CAC ($p<0.01$), whereas there was no significant main effect of SEP. As predicted, a significant acculturation by SEP interaction effect was also observed in relation to prevalent CAC ($\Delta R^2=0.005$, $p<0.05$). To further examine this interaction effect, post hoc simple slopes analyses were performed estimating the association between SEP and CAC across different levels of acculturation. (See Table 4). These analyses revealed that among the less acculturated SEP was positively associated with detectable CAC; however the strength of the gradient diminished as acculturation increased and SEP became inversely associated with detectable

CAC at high levels of acculturation. The interaction effect was attenuated to non-significance with control for biomedical and behavioral risk factors. Higher acculturation was also associated with more extensive CAC among participants with any detectable CAC ($p< 0.01$), whereas higher SEP tended to be associated with more extensive CAC, an association that was statistically significant with control for biomedical and behavioral risk factors ($p < .05$). The interaction between acculturation and SEP did not reach statistical significance for this outcome, although point estimates suggested stronger inverse SEP gradients with increasing acculturation.

Acculturation, SEP, and TAC—Table 3 shows the results from analyses regressing prevalence and extent of TAC on SEP, acculturation, and the interaction between SEP and acculturation. Main effects of SEP and acculturation were not observed in relation to TAC prevalence. However, as predicted, acculturation moderated the association of SEP with prevalent TAC ($\Delta R^2=0.01$, $p< 0.01$). Consistent with the findings for CAC, post hoc analyses revealed that SEP was positively associated with odds of prevalent TAC at low levels of acculturation and inversely associated with TAC at high levels of acculturation. (See Table 4). The interaction effect was not clearly explained by traditional CVD risk factors. Similar results were identified in analyses of extent of TAC. Specifically, no main effects of SEP and acculturation were identified, whereas the SEP by acculturation interaction effect was statistically significant ($\Delta R^2=0.02$, $p< 0.05$), and followed the same pattern described above, as shown in Table 4.

Discussion

The current study expanded on prior research in MESA that has explored SEP gradients in atherosclerosis within Hispanics by focusing on a more refined group defined by national origins, and examining within-group variability in SEP gradients according to acculturation. In so doing, we sought to contribute to the understanding of previously reported conflicting and paradoxical evidence concerning associations between SEP and CVD in Hispanics. This study is also the first within MESA to examine associations of acculturation and SEP with TAC. Like CAC (39–41), TAC has been associated with future risk of cardiovascular events and mortality (42–44) and has also been shown to have incremental value in estimated 10-year risk of CHD beyond the predictive value of CAC (45).

Prior analyses in MESA have shown a positive association between indicators of acculturation and the presence and extent of CAC across all Hispanics (22). The current study showed similar associations in Hispanics of Mexican origins using a composite reflecting generation, exposure to US culture, and language spoken at home. In addition, we found that more US-acculturated Mexican Americans were more likely to have prevalent TAC. In general, variability in traditional cardiovascular risk factors contributed to, but did not completely explain associations between acculturation and calcification. In previously published papers, income was not consistently associated with prevalence or amount of calcification in MESA Hispanics, but lower education was associated with lower CAC prevalence (22,35). We found no significant association between our composite SEP indicator and prevalent CAC in Hispanics of Mexican origin; however, we did find that SEP related significantly, and positively, to the extent of CAC. SEP did not relate to the prevalence or extent of TAC.

Consistent with predictions, acculturation was found to moderate the association between SEP and measures of calcification, suggesting that main effects of acculturation and SEP identified here and in prior analyses of the Hispanic MESA cohort (21,22) may mask important heterogeneity. Statistically significant SEP by acculturation interaction effects were observed in relation to prevalent CAC, prevalent TAC, and extent of TAC. In addition, a marginally significant interaction effect was observed in relation to extent of CAC. Only in some cases

were observed interaction effects attenuated with control for biomedical and behavioral risk factors. However, residual confounding may be an issue since traditional risk factors were measured only at a single point in time.

As predicted, SEP was only inversely related to calcification measures in circumstances of higher acculturation. Among less acculturated Mexican-Americans, the opposite was observed with SEP relating *positively* to prevalence and extent calcification. Importantly, effect sizes for interaction terms were quite small. However, the fact that multiple interaction effects were observed across analyses supports the contention that the nature of SEP effects does differ according to US-acculturation. Inconsistencies in SEP-health associations observed across studies of Hispanics may stem from sample differences in nativity or acculturation, among other influences.

As discussed previously (17,18), several factors may help explain why SEP gradients in Hispanics vary according to acculturation or national origins. First, given the resources and opportunities necessary for successful migration, immigrants may be uniquely physically and/or psychologically healthy (46). As a result, they could be less vulnerable to the deleterious impact of low SEP (17,20). In addition, foreign-born participants may bring with them the social gradients of their sending countries, which in less developed contexts has historically meant an association of higher SEP with worse health (20). For example, a recent study identified a reversed gradient between SEP and blood pressure in women residing in rural areas of Mexico (47). Educational quality may also differ vastly depending on location of schooling, thus leading to discrepancies in corollary achievements in SEP (48). In addition, regardless of educational quality, ethnic minorities may encounter discrimination and other obstacles that impede opportunities for occupational and financial advancement (49). Other possible explanations center on Hispanics' social and cultural characteristics (e.g., strong social networks and familial relationships; healthy behaviors), which might protect against disadvantaged environments in segments of the population that retain strong ties with their culture of origin (e.g., recent immigrants or persons low in US-oriented acculturation) (46, 50). Additional research is needed to understand the degree to which these factors contribute to divergent SEP gradients among Hispanic subgroups.

Overall, the current findings suggest that to fully understand the nature of either socioeconomic or acculturation gradients in Hispanics, researchers should simultaneously consider both factors. Moreover, greater clarity regarding SEP health gradients may derive from studies that disaggregate the Hispanic population into meaningful subgroups according to national origins and other characteristics (25,51). For example, a prior study showed that statistical control for SEP caused the mortality advantage of persons of Mexican origin relative to non-Hispanic Whites to widen, and the mortality disadvantage of Puerto Ricans relative to non-Hispanic Whites to dissipate (52). Another recent study showed education mortality gradients in Puerto-Ricans that were similar to those of non-Hispanic Whites, whereas gradients in Mexican Americans were much weaker (20). Thus, paradoxical and conflicting findings observed in prior studies of SEP and health in Hispanics may, in part, reflect the aggregation across widely varied subgroups.

Future research should also consider the specific social-cultural characteristics in both sending and receiving communities that may alter SEP and acculturation- health gradients. Indeed, contrary to the findings identified here, a prior study by the current researchers showed a significant, inverse association between SEP and multiple CVD risk factors in a small sample of primarily immigrant (i.e., >90%) Mexican American women (53). However, the immigrant status of this sample obscures the fact that participants were drawn from a community adjacent to the San Diego/Mexico border. Because Mexican immigrants in San Diego often preserve associations with family, friends, and cultural conventions across the border and vice versa,

the population and sociocultural influences on their health are likely to be unique. Similarly, a second study based on this sample showed that greater US-based acculturation related to more positive health behaviors (e.g., diet, exercise) as well as a lower incidence of the metabolic syndrome (54). These results run contrary to a sizeable body of literature suggesting deleterious health implications of acculturation, yet they agree with those of prior studies performed in the same region (55,56). Findings such as these illustrate the complexity involved in understanding how broad sociocultural factors such as SEP and acculturation affect the health of heterogeneous ethnic minority and immigrant populations (57).

The current study has a number of strengths, such as including a large, representative sample of Mexican-Americans, and use of state-of-the art assessments of subclinical atherosclerosis. There are also limitations. Although the Hispanic MESA sample is diverse, all data were collected in urban areas and findings may not generalize to Mexican-Americans residing in more rural or isolated US settings, given potential contextual influences. In addition, the number of participants from any country of origin besides Mexico was relatively small, so that statistical power was not sufficient to examine the hypotheses of interest in other ethnic subgroups, such as Cubans or Puerto-Ricans. Although we examined multiple indicators of acculturation, all were proxy variables, rather than measures of cultural values, beliefs, or behaviors (58–60). Thus, the current findings offer little insight into why acculturation relates to atherosclerotic burden, or exactly why it moderates SEP effects. The assessment of SEP was also limited, since a one-time measure cannot fully capture the impact of SEP experienced across the lifespan (61). Finally, the cross-sectional framework of the study is a limitation, since direction of causality cannot be determined (although it is unlikely that the presence of subclinical disease would have a causal influence on SEP or acculturation). Future research should incorporate more comprehensive measures of both SEP and acculturation, to better understand the complex interrelated pathways through which these variables relate to CVD and other health outcomes in Hispanics.

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Abbreviations

SEP, socioeconomic position; CAC, coronary artery calcium; TAC, thoracic aortic calcium; MESA, Multi-ethnic Study of Atherosclerosis..

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Table 1

Sociodemographic Characteristics and Subclinical Disease for for Hispanics of Mexican Origin: MESA 2000–2002 (N=801)

Variable		
Mean age in years (SD)		61.47 (10.30)
Female, %		49.6
Region of Residence, %		
	South	---
	Northeast	0.5
	Midwest	47.6
	West	51.9
Percent of Life in the US[a], %		
	100%	54.2
	75–99.9%	4.0
	50–74.9%	19.0
	25–49.9%	11.2
	Less than 25%	11.7
Generation, %		
	Foreign born	50.3
	1	31.9
	2	12.7
	3	5.2
Language spoken at home, %		
	English	41.3
	Spanish	42.0
	English and Spanish	16.7
Household Income[a], %		
	Less than $12,000	18.7
	$12,000–24,999	30.2
	$25,000–34,999	24.5
	$35,000–49,999	15
	$50,000–74,999	9.8
	$75,000–99,999	5.3
	Greater than $100,000	3.0
Education [a], %		
	Grade 8 or less	31.7
	Grade 9–11	9.7
	High School Diploma/GED	19.6
	Technical school, AA, or some college	25.9
	Bachelors Degree	4.4
	Graduate or Professional Degree	2.9
Coronary Calcium: % with any detectable (Median Score for those with detectable calcium)		48.8 (73.14)
Thoracic Aortic Calcium: % with any detectable (Median Score for those with detectable calcium)		27.2 (318.45)

[a] Categories created for table (full distribution used in analysis)

Table 2

Results of analyses regressing prevalence of CAC and extent of CAC (in participants with detectable CAC) on SEP, Acculturation, and their interaction in Mexican-Americans from MESA 2000–2002

	Prevalence of Coronary Artery Calcium		
	Model[a](N = 801)	**Model 2[b](N = 800)**	**Model 3[c](N = 755)**
Step 1 (Covariates)	ΔR^2=0.287, p<0.01	ΔR^2=0.346, p<0.01	ΔR^2=0.369, p<0.001
Step 2 [d]	ΔR^2=0.014, p< 0.01	ΔR^2=0.010, p<0.05	ΔR^2=0.007, p<0.10
SEP (OR, 95% CI)	1.00 (0.89, 1.13)	1.04 (0.92, 1.18)	1.05 (0.92, 1.19)
ACC(OR, 95% CI)	1.10 (1.02, 1.17)**	1.07 (1.00, 1.14)#	1.07 (0.99, 1.15)
	Model 1	Model 2	Model 3
Step 3	ΔR^2=0.005, p<0.05	ΔR^2=0.002, p>0.10	ΔR^2=0.001, p>0.10
*SEP*ACC(OR, 95% CI)*	0.96 (0.93, 1.00)*	0.97 (0.94, 1.01)	0.98 (0.94, 1.02)
	Extent of Coronary Artery Calcium		
	Model 1[a](N = 391)	Model 2[b](N = 390)	Model 3[c](N = 368)
Step 1(Covariates)	ΔR^2=0.095, p<0.001	ΔR^2=0.122, p<0.001	ΔR^2=0.142,p<0.001
Step 2[d]	ΔR^2=0.044, p<0.001	ΔR^2=0.045, p<0.001	ΔR^2=0.035,p<0.001
SEP(OR, 95% CI)	1.04 (0.99, 1.09)	1.05 (0.99, 1.10)#	1.06 (1.00, 1.11)*
ACC(OR, 95% CI)	1.05 (1.02, 1.08)**	1.05 (1.02, 1.08)**	1.04 (1.01, 1.08)*
Step 3	ΔR^2=0.007, p<0.10	ΔR^2=0.004, p>.0.10	ΔR^2=0.005, p>0.10
SEP ACC (OR, 95% CI)*	0.98 (0.97,1.00)#	0.99 (0.97, 1.01)	0.99 (0.97, 1.01)

Notes: SEP = Socioeconomic position composite score. ACC = Acculturation composite score.

[a] Controlled for age and gender

[b] Controlled for age, gender, and CVD biomedical risk factors.

[c] Controlled for age, gender, biomedical, and behavioral risk factors.

[d] Main effects of SEP and ACC, i.e., prior to inclusion of interaction term.

* p<.05.

** p<.01.

# p<.10.

Table 3

Results of analyses regressing prevalence of TAC and extent of TAC (in participants with detectable TAC) on SEP, Acculturation, and their interaction in Mexican-Americans from MESA 2000–2002

	Prevalence of Thoracic Aortic Calcium		
	Model 1[a] (N = 801)	**Model 2[b] (N = 800)**	**Model 3[c] (N = 755)**
Step 1 (Covariates)	ΔR^2=0.408, p<0.01	ΔR^2=0.443, p<0.001	ΔR^2=0.449, p<0.001
Step 2[d]	ΔR^2=0.003, p>0.10	ΔR^2=0.002, p>0.10	ΔR^2=0.004, p>0.10
SEP (OR, 95% CI)	1.00 (0.86, 1.15)	1.02 (0.89, 1.19)	1.02 (0.88, 1.19)
ACC(OR, 95% CI)	1.10 (0.97, 1.14)	1.04 (0.96, 1.13)	1.07 (0.98, 1.16)
Step 3	ΔR^2=0.010, p<0.01	ΔR^2=0.008, p<0.05	ΔR^2=0.005, p<0.05
*SEP*ACC(OR, 95% CI)*	0.93 (0.89, 0.98)**	0.94 (0.89, 0.99)*	0.94 (0.89, 0.99)*
	Extent of Thoracic Aortic Calcium		
	Model 1[a] (N = 218)	Model 2[b] (N = 218)	Model 3[c] (N = 210)
Step 1(Covariates)	ΔR^2=0.161, p<0.001	ΔR^2=0.229, p<0.001	ΔR^2=0.240, p<0.001
Step 2[d]	ΔR^2=0.003, p> 0.10	ΔR^2=0.007, p>.0.10	ΔR^2=0.003, p>.0.10
SEP(OR, 95% CI)	1.02 (0.95, 1.10)	1.04 (0.97, 1.12)	1.03 (0.96, 1.11)
ACC(OR, 95% CI)	0.98 (0.94, 1.02)	0.97 (0.94, 1.02)	0.98 (0.94, 1.03)
Step 3	ΔR^2=0.019, p<0.05	ΔR^2 =0.021, p<0.10	ΔR^2=0.020, p<0.05
*SEP*ACC (OR, 95% CI)*	0.97 (0.94, 0.99)*	0.97 (0.94, 0.99)*	0.97 (0.94, 0.99)*

Notes: SEP = Socioeconomic position composite score. ACC = Acculturation composite score.

[a] Controlled for age and gender

[b] Controlled for age, gender, and biomedical CVD risk factors.

[c] Controlled for age, gender, biomedical, and behavioral risk factors.

[d] Main effects of SEP and ACC, i.e., prior to inclusion of interaction term.

* p<.05.

** p<.01.

# p<.10

Table 4

Results of simple slopes analyses examining the SEP gradient in prevalent CAC, TAC, and extent of TAC at different levels of acculturation in Mexican-Americans from MESA 2000–2002

	Post Hoc Simple Slopes Analyses (OR, 95% CI)		
Effect of SEP on Outcomes at:	**Prevalent CAC**	**Prevalent TAC**	**Extent TAC**
1.5 SD below mean ACC	1.21 (0.97, 1.52)	1.41 (1.07, 1.87)	1.18 (1.02, 1.37)
1.0 SD below mean ACC	1.14 (0.96, 1.37)	1.27 (1.02, 1.59)	1.13 (1.01, 1.27)
0.5 SD below mean ACC	1.09 (0.94, 1.25)	1.15 (0.97, 1.36)	1.08 (0.99,1.18)
mean ACC	1.03 (0.91, 1.16)	1.04 (0.90, 1.20)	1.03 (0.96, 1.11)
0.5 SD above mean ACC	0.97 (0.86, 1.10)	0.93 (0.80, 1.09)	0.99 (0.91, 1.07)
1.0 SD above mean ACC	0.92 (0.79, 1.07)	0.84 (0.70, 1.02)	0.94 (0.85, 1.04)
1.5 SD above mean ACC	0.87(0.72, 1.05)	0.76 (0.60, 0.97)	0.90 (0.79, 1.03)

Notes: ACC = acculturation composite score, SEP = socioeconomic position composite score. Simple slopes analyses are shown only for significant SEP by ACC interaction effects.