Racial/ethnic differences in cognitive difficulty in the U.S.: does nativity matter?

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Introduction

Extant research on the immigrant health paradox has focused primarily on Latinos [1-4], however nativity-related heterogeneity in health outcomes may also be important among other racial/ethnic groups. For example, with respect to Blacks in the US, nativity has been found to be associated with a variety of health outcomes, with US born Blacks often fairing worse than foreign born Blacks. US born Blacks have a higher prevalence of personal care and physical activity limitations, are more likely to report poorer self-rated health, and are more likely to screen positive for depressive symptoms than foreign born Blacks [5-7]. Elo and Culhane [8] have observed higher rates of obesity and poorer self-rated physical and mental health among US born Black pregnant women compared to their foreign born counterparts, while others have reported more low birth weight and preterm babies born to US born Black mothers compared to foreign born Black mothers [9]. Overall, Singh & Siahpush [10] estimate that the largest ethnicity–nativity differential is found among Black immigrant men and women, whose mortality risks are respectively 47% and 45% lower than those of their US-born Black counterparts.

Given the limited evidence base with respect to specific mechanisms, some researchers suggest that nativity differences are merely a statistical artifact, the result of selection bias. The "healthy migrant" theory suggests that given such stringent immigration policies, those immigrants who actually obtain visas to leave their homeland are an extremely selective group and thus have superior health outcomes compared to people born in their host country [11]. Weitoft and colleagues [12], however, claim that the immigrant health advantage, specifically with respect to mortality, is solely a result of the inability of epidemiologic studies to capture the health status of potentially less healthy immigrants who eventually migrate back to their country of birth, also known as the "salmon" theory. Abraído-Lanza and colleagues [1] in their research of Latinos in the US argue that both the "healthy migrant" theory and the latter "salmon" theory fail to explain the immigrant health advantage. Instead, they argue that immigrants often engage in better health practices, which result in better health outcomes at least shortly after they arrive to their host country.

Abraído-Lanza and colleagues' theory is consistent with findings from other studies examining the immigrant health advantage among Latinos and Hispanics. Among Mexicans, in particular, their health advantage has been attributed to specific cultural and/or social protective factors [13-15], such as social support, familism, religion, and norms related to diet and substance use. This theory is bolstered by findings of an association between acculturation and health—that there is a deterioration of a protective effect with time spent in the United States and with subsequent generations born in the U.S. This suggests that as immigrants "acculturate," or become more similar to US born individuals, that these protective social institutions diminish. However, although most research on the immigrant health advantage has failed to directly test specific mechanisms that are postulated to lead to an immigrant health advantage, there is relative agreement that studying within-group nativity-related heterogeneity can help lead to important theories about resilience and vulnerability among racial/ethnic minorities currently living in the United States, in addition to more effective interventions and policies [2, 6].

One health outcome that can have a profoundly negative impact on individuals' livelihood and for which racial/ethnic differences need further exploration is cognitive difficulty. When racial/ethnic differences have been reported for cognitive difficulty, they tend to focus mostly on Black-White differences. For example, especially among older adults, Blacks often experience more cognitive difficulty than their White counterparts [16, 17]. Some researchers have partially attributed this racial difference to sociocultural biases in cognitive testing [18], whereas others have pointed to lower educational attainment and less literacy among Blacks in the US, especially since education and literacy have both been found to be protective against cognitive decline due to their ability to increase individuals' ability to cope with cognitive decline [17, 19]. Additionally, worse physical functioning, due to a variety of health conditions, has been posited as important mediators of racial differences in cognitive difficulty, however there is some recent evidence suggesting that racial differences in vascular-related cognitive difficulty may be substantially explained by racial differences in

educational attainment [20, 21]. Despite extensive examinations of the racial difference in cognitive difficulty between Blacks and Whites, it is unknown whether the magnitude of this difference is similar for other racial/ethnic minorities. Moreover, the complex interplay between race/ethnicity and nativity has yet to be explored as it relates to cognitive difficulty in the US.

Our study objectives were two-fold. In the present study, using a cross-sectional representative sample of US residents, we first examined racial/ethnic differences in cognitive difficulty among adults in the US, after accounting for demographics, social support, region of residence in the US, and social class. Second, we investigated whether nativity modifies the association between race/ethnicity and cognitive difficulty and whether the direction and magnitude of that impact is consistent across different racial/ethnic groups.

Methods
Study Sample

We used the 2009 American Community Survey Public Use Microdata Sample (PUMS), which included a large nationally representative sample of households and persons living within those households. Detailed information about the design and methodology of the American Community Survey (ACS) can be found online [22]. Briefly, using the Master Address File from the U. S. Census Bureau, a large, nationally representative sample of housing units, along with group quarters, are selected through both multiphase and multistage sampling techniques. Information about persons living within the household units or group quarters is collected via mail, computer assisted telephone interviews, or computer assisted personal interviews. We restricted our sample to 2009 ACS respondents ≥25 years of age.

Outcome

Individuals were categorized as having cognitive difficulty if they responded affirmatively to the following statement: "…due to physical, mental, or emotional condition, you had 'serious difficulty concentrating, remembering, or making decisions'." Only individuals who responded with a yes or no to the above statement were included in this study. We excluded individuals who had a missing or unknown response.

Main Predictors

Race/ethnicity consisted of the following categories: non-Hispanic White (NHW), non-Hispanic Black (NHB), Hispanic, non-Hispanic Asian (NHA), non-Hispanic Native American/Pacific Islander (NHNAPI), non-Hispanic Other (NHO). Nativity was defined dichotomously as US born if individuals were born in the United States or foreign born, which in addition to those who were born in countries outside of the United States also included individuals born in Puerto Rico, Guam, the U.S. Virgin Islands, or the Northern Marianas.

Important Covariates

Demographics included age group in years at time of interview (25-44, 45-64, or 65+), sex (male or female), and educational attainment (≤ high school, some college/associate degree, or ≥ bachelors degree). Social support was assessed using information about respondents' marital status (married or single/divorced/widowed). Region of residence in the US, which can be defined as the region of the US in which respondents were residing at the time of survey assessment, consisted of the following categories: the Northeast, Midwest, South, or West. Social class or one's structural location within his/her society was assessed using information about individuals' occupations [23, 24]. We categorized individuals' occupations into three groups using a condensed version of a six category higher level aggregation of the Standard Occupational Classification [25] as follows: 1) management, business, science, and arts occupations (occupational category 1), or 2) all other occupations (occupational category 2), or 3) not currently working or never worked (occupational category 3).

Statistical Analysis

Categorical variables are summarized using unweighted frequencies and weighted proportions. The Rao-Scott Chi-Square test [26] was used to test for associations between categorical variables in bivariate

analyses. All analyses were performed using the SURVEYFREQ and SURVEYLOGISTIC procedures in SAS 9.2 (Cary, NC), thus taking into account the complex survey design and methodology [22, 27]. In addition to sampling weights, the analyses also accounted for the correlation between individuals living within the same household. Using multivariate logistic regression, we assessed racial/ethnic differences in the odds of cognitive difficulty after adjustment for demographics, social support, region of residence in the US, and occupation. Next, to assess the impact of the intersection between race/ethnicity and nativity on cognitive difficulty, we introduced *nativity* and *nativity***x***race/ethnicity* terms into the multivariate model, and compared the odds of cognitive difficulty for foreign born NHWs and both foreign born and US born NHBs, Hispanics, NHAs, NHNAPIs, and NHOs to that of US born NHWs. All analyses were assessed at the 0.05 level of significance.

Results

Sample Characteristics

The study sample included 2,080,894 adults from 1,212,365 households assessed in the 2009 American Community Survey. The racial/ethnic composition of the sample consisted of 70.0% (n=1,554,268) NHWs, 11.5% (n=197,173) NHBs, 12.9% (n=218,676) Hispanics, 4.6% (n=90,177) NHAs, 0.7% (n=16,316) NHNAPIs, and 0.2% (n=4,284) NHOs. The majority of the sample was US born (82.4%, n=1,769,419) and among the foreign born group, 3.9% (n=12,010) were from Puerto Rico and US Island Areas, 48.5% (n=137,516) from Latin America, 26.9% (n=90,092) from Asia, 14.3% (n=50,941) from Europe, 3.4% (n=9,776) from Africa, and 2.9% (n=11,140) from elsewhere. Additionally, almost half of foreign born respondents migrated to the US between 1980 and 1999, whereas 27.8% (n=99,132) migrated to the US prior to 1980 and the remaining 23.5% (n=64,462) between 2000 and 2009.

The sample was 51.7% (n=1,095,548) female and most respondents were either between 25 and 44 years of age (41.1%, n=738,010) or between 45 and 64 years of age (39.3%, n=862,914). About 43% (n=882,559) of respondents had a high school education at most, whereas there was a relatively balanced split between those who were in the some college/associate degree (28.9%, n=600,386) and ≥bachelors degree (27.9%, n=597,949) groups. The majority of respondents were married (58.3%, n=1,299,952). More than one-third (36.7%, n=773,174) of respondents were living in the South in 2009 with similar proportions living in the Midwest (21.8%, n=464,295) and West (22.9%, n=464,556) and the remaining 18.6% (n=378,869) living in the Northeast. Slightly more than one half of the sample reported being in either occupational category 1 (25.5%, n=544,176) or occupational category 3 (28.2%, n=544,176).

Sample Characteristics and Cognitive Difficulty: Bivariate Results

Almost 6% (n=120,805) of respondents reported having cognitive difficulty. With respect to race/ethnicity, the proportion with cognitive difficulty was highest among NHBs (7.9%) and NHNAPIs (8.4%), while the lowest proportion was observed among NHAs (3.3%, p<0.001; Table 1). Being foreign born was protective against cognitive difficulty (3.9% vs 6.3%, p<0.001). The proportion of respondents with cognitive difficulty was higher for females than for males (6.2% vs 5.5%, p<0.001). A positive association between age and cognitive difficulty was observed ranging from 3.6% with cognitive difficulty in the youngest age group to 11.7% in the oldest age group (p<0.001). Education was negatively associated with cognitive difficulty in that the proportion with cognitive difficulty was highest at 9.3% among those least educated and decreased with increasing education (p<0.001). Almost one-tenth of single, widowed, or divorced respondents had cognitive difficulty compared to 3.2% among married respondents (p<0.001). With respect to region of residence, the highest proportion with cognitive difficulty was observed among those living in the South (6.3%), whereas the distribution of cognitive difficulty was relatively similar in the other regions of residence ranging from 5.4% in the West to 5.8% in the Midwest (p<0.001). Lastly, the proportion with cognitive difficulty was highest at 14.3% among those in occupational category 3 compared to 1.3% and 3.3% among respondents in occupational categories 1 and 2, respectively (p<0.001).

Race/Ethnicity and Cognitive Difficulty

Compared to NHWs, the unadjusted odds of cognitive difficulty were 1.37 (95% CI=1.34 – 1.40) times higher for NHBs and 1.47 (95% CI=1.36 – 1.58) times higher for NHNAPIs, whereas the odds were lower for Hispanics (OR=0.79, 95% CI=0.77 – 0.81), NHAs (OR=0.55, 95% CI=0.52 – 0.58), and NHOs (OR=0.78, 95% CI=0.66 – 0.92, Table 2). After multivariate adjustment, we no longer observed a statistically significant difference in the odds of cognitive difficulty for NHBs (OR=0.996, 95% CI=0.97 – 1.02) and NHOs (OR=0.95, 95% CI=0.79 – 1.13) compared to NHWs. NHNAPIs, however, still experienced higher odds of cognitive difficulty than NHWs (OR=1.13, 95% CI=1.04 – 1.23) and the protective effects were still evident for Hispanics (OR=0.68, 95% CI=0.67 – 0.70) and NHAs (OR=0.72, 95% CI=0.68 – 0.76).

Race/ethnicity, Nativity, and Cognitive Difficulty

All foreign born groups, regardless of race/ethnicity, had significantly lower odds of cognitive difficulty after multivariate adjustment compared to US born NHWs. More specifically, the odds of cognitive difficulty were almost 50% lower for foreign born NHNAPIs (OR=0.51, 95% CI=0.36 – 0.73), Hispanics (OR=0.53, 95% CI=0.51 – 0.55), and NHBs (OR=0.56, 95% CI=0.51 – 0.62), about 30% lower for foreign born NHAs (OR=0.68, 95% CI=0.60 – 0.76) and NHOs (OR=0.68, 95% CI=0.52 – 0.89), and about 20% lower for foreign born NHWs (OR=0.80, 95% CI=0.77 – 0.84) compared to US born NHWs (Fig. 1). A significant protective effect was observed for US born Hispanics compared to US born NHWs (OR=0.95, 95% CI=0.91 – 0.98), but the protective effect was not nearly as substantial as that observed for foreign born Hispanics. We observed significantly higher odds of cognitive difficulty for US born NHBs (OR=1.03, 95% CI=1.002 – 1.05) and NHNAPIs (OR=1.19, 95% CI=1.10 – 1.30) than US born NHWs. We did not observe statistically significant differences in the odds of cognitive difficulty for US born NHAs (OR=0.91, 95% CI=0.81 – 1.01) and NHOs (OR=1.22, 95% CI=0.97 – 1.54) compared to US born NHWs.

INSERT TABLE 1, TABLE 2, AND FIGURE 1.

Discussion

DISCUSSION, STRENGTHS, AND LIMITATIONS TO FOLLOW.

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