Original Report:
Research Design

A Differential Item Functional Analysis by Age of Perceived Interpersonal Discrimination in a Multi-racial/ethnic Sample of Adults

Sherry Owens, MA[1]; Alfgeir L. Kristjansson, PhD[1]; Haslyn E. R. Hunte, PhD[1]

We investigated whether individual items on the nine item William's Perceived Everyday Discrimination Scale (EDS) functioned differently by age (<45 vs ≥45) within five racial groups in the United States: Asians (*n*=2,017); Hispanics (n=2,688); Black Caribbeans (*n*=1,377); African Americans (*n*=3,434); and Whites (*n*=854). We used data from the 2001-2003 National Survey of American Lives and the 2001-2003 National Latino and Asian Studies. Multiple-indicator, multiple-cause models (MIMIC) were used to examine differential item functioning (DIF) on the EDS by age within each racial/ethnic group. Overall, Asian and Hispanic respondents reported less discrimination than Whites; on the other hand, African Americans and Black Caribbeans reported more discrimination than Whites. Regardless of race/ethnicity, the younger respondents (aged <45 years) reported less discrimination than the older respondents (aged ≥45 years). In terms of age by race/ethnicity, the results were mixed for 19 out of 45 tests of DIF (40%). No differences in item function were observed among Black Caribbeans. "Being called names or insulted" and others acting as "if they are afraid" of the respondents were the only two items that did not exhibit differential item functioning by age across all racial/ethnic groups. Overall, our findings suggest that the EDS scale should be used with caution in multi-age multi-racial/ethnic samples. *Ethn Dis*.2015;25(4):479-486; doi:10.18865/ed.25.4.479

Keywords: Prejudice, Ethnic Groups Bias, Psychometrics, Age Distribution

Introduction

The association between perceived interpersonal discrimination and adverse health behaviors and health outcomes are diverse and well-documented.[1,2] In particular, the relationship between perceived interpersonal discrimination (hereafter referred to as discrimination) and health behaviors and outcomes have been examined in various racial/ethnic groups in the United States and other countries. For example, discrimination has been shown to be associated with a variety of poor mental and physical health outcomes among Hispanic, African American, Native American, and some White adults in the United States and among some racial/ethnic groups in other countries such as Chinese in Hong Kong and Maori in New Zealand.[2-8] Despite some limitations (eg, limited longitudinal evidence), collectively these studies suggest an inverse relationship between discrimination and various adverse health and behavioral outcomes.[2,9]

However, as interest in discrimination as a risk factor continues to expand, we must develop a better understanding of its potential limitations to appropriately advance this particular area of research. One important limitation in the literature is a lack of clarity about the generalizability of the available, and most widely used, measures of discrimination. Despite the widespread use of some longstanding measures, like the William's Everyday Discrimination Scale,[2,9-11] it is unclear if the currently available measures of discrimination are appropriate to use in all race/ethnicity groups, especially non-African Americans.[12-14] For example the Williams' Perceived Everyday Discrimination Scale (EDS) scale, among the most widely used measurement tools on interpersonal discrimination, has been used across a large number of racial/ethnic groups, although it was originally designed from a qualitative inquiry of African American women in the United States and

[1]Department of Social and Behavioral Sciences, School of Public Health, West Virginia University

Address correspondence to Haslyn E.R. Hunte, Robert C. Byrd Health Sciences Center, School of Public Health, West Virginia University, One Medical Center Drive, P.O. Box 9190, Morgantown, WV 26506-9190. 304.293.0756; hehunte@hsc.wvu.edu

Black women in the Netherlands.[15]

In general, non-Whites in the United States experience a lower social status than Whites; yet, each non-White racial/ethnic group as a whole has a very distinct cultural, economic and political history in the United States that may or may not impact their current experiences (or perceptions) of discrimination. As Bastos noted, researchers' ubiquitous use of the Williams' EDS ignores the possibility that subtleties in item content may differentially affect groups of people.[14] As such, it is a worthwhile endeavor to determine whether a single scale can be used to assess experiences of discrimination across various racial/ethnic groups. Recognizing this potential limitation, a handful of studies have begun to address the feasibility of using the EDS in multi-racial/ethnic populations. For example, a recent study has shown that three of the nine EDS items ("receiving poorer service at restaurants," "being treated as if you are dishonest," and "being treated with less courtesy than other people") functioned differently in a sample of middle-aged African American, Caucasian, Chinese, Hispanic, and Japanese women.[12] Similarly, Shariff-Marco et al (2009) found that Asian Americans, Native Americans and Pacific Islanders were more likely to endorse the EDS items; "people act as if they are better than you" "you have been threatened/harassed" and "treated with less respect" than African Americans with discrimination at similar levels.[13]

In addition to race/ethnicity, it is also important to ask whether measures like the EDS also function in the same manner across older and younger adults, in light of the current civil rights enjoyed by racial/ethnic minorities today when compared to the oppressive pre-civil rights era. Some existing studies have suggested that older racial/ethnic minorities in general tend to report less discrimination using measures like the EDS.[16,17] However, what remains unclear is whether this variation is due to the fact that younger individuals tend to perceive (experience and/or report) more discrimination or whether the difference is merely due to the differential functioning of the questions in the EDS. In line with previous studies that attempted to better elucidate the applicability of the EDS, the goal of our study was to examine the applicability of the EDS in younger (aged < 45 years) and older (aged ≥45 years) adults in a national sample of African Americans (*n*=3,434), Asians (*n*=2,017), Black Caribbeans (*n*=1,377), Hispanics (*n*=2,688), and Whites (*n*=854), using differential item function analyses.

… the goal of our study was to examine the applicability of the EDS in younger (aged < 45 years) and older (aged ≥45 years) adults …

Methods

Data

For this study we used the National Survey of American Life (NSAL) and the National Latino and Asian Study (NLAAS), two of the 2001-2003 National Institute of Mental Health Collaborative Psychiatric Epidemiology Surveys (CPES). The CPES provides data on the distributions, correlates, and risk factors of mental disorders among the general population, with special emphasis on racial/ethnic minority groups in the United States. NLAAS consists of a stratified random sample of 2,554 Hispanics and 2,095 Asians, and was administered in Spanish and several Asian languages. Although the majority of the interviews for NLAAS were conducted in English, interviews were also conducted in Spanish, Mandarin, Cantonese, Tagalog, or Vietnamese by trained interviewers upon the request of the respondent. NSAL consisted of a nationally representative sample of 3,570 non-Hispanic African Americans, 1,438 non-Hispanic Black Caribbeans, 183 Hispanics, and a disproportionate sample of 891 White adults who resided in geographic areas that had a 10% or greater African American population.[16] All NSAL interviews were conducted in English. Additional information about the NSAL and NLASS studies can be obtained elsewhere.[16] After merging the NSAL and NLASS samples, the final analytic sample for this study (*N*=10,370) included responses from 3,434 African Americans, 2,017 Asians, 1,377 Black Caribbeans, 2,688 Hispanics and 854 Whites.

Measures

Perceived Everyday Discrimination

We used the nine EDS items included in the CPES (Table 3). The EDS, developed in 1997, assesses the occurrence and frequency with which individuals encounter routine day-to-day interpersonal experiences of discrimination.[17] The response scale for each of the items ranged from 1 to 6, with 1 indicating the highest frequency of "almost everyday" to 6 indicating "never". We scored the everyday discrimination scale, with a range of 0 to 5, by reverse-coding (response option 6 = 0; 5 = 1; 4 = 2; 3 = 3; 2 = 4; 1 = 5) and averaging across the nine items. Higher scores on the scale indicated higher frequencies of everyday discrimination. Both the full sample and the analytic sample have a Cronbach's α of 0.89 for all nine items.

Age

We divided the participants into two age groups (aged <45 years vs aged ≥ 45 years) based on the assumption that older racial/ethnic minority Americans, especially African Americans, were typically exposed to harsher, more overt forms of discrimination prior to the 1965 civil rights era, and consequentially may be less likely to endorse items describing subtle forms of discrimination like those presented in the EDS when compared to younger individuals.[18]

Race/ethnicity

Race/ethnicity was self-reported and categorized as African Americans, Asians, Black Caribbeans, Hispanics and Whites. With the exception of Hispanics, all of the other where coded to only include non-Hispanics.

Covariates

We included years in the United States and educational status as covariates in all of the multivariable analyses to control for potential confounding by these structural variables. Years in the United States was coded as US-born, <5 years, 5-10 years, 11-20 years, and ≥ 20 years. Education was coded as 0-11 years, 12 years, 13-15 years and ≥ 16 years.

Data Analyses

We first examined the distribution of EDS, age, education and years in the United States within each of the racial/ethnic groups. We then used Student's t-test to test for statistical differences in the mean EDS scores by the two age groups (aged <45 vs ≥ 45 years). Confirmatory factor analysis (CFA) was used to test the fit of the hypothesized factor structure to the covariance matrix of the observed variables within each racial/ethnic group. All models were assessed using the comparative fit index (CFI).[19] With a range between 0 and 1, Hu and Bentler's cutoff criteria for adequate-fit indices were adopted, with a CFI of .95 indicating a good fit to the data and the standardized root mean squared residual (SRMR) of .080 and below as good fit to the data.[19] It should be noted that the SRMR has been shown to be less sensitive to simple structural equation models (SEM) such as single factor CFA than the more commonly applied root mean square error of approximation (RMSEA).[20] When forming the measurement model, we identified a substantial correlation between the residuals (error terms) for a number of the discrimination indicator variables within all racial groups. This was especially common in the non-Black groups. Using modification indices, those correlated error terms are accounted for in the structural models. Using SEM, we then constructed multiple-indicator, multiple-cause models (MIMIC) to examine differential item functioning (DIF) across the two age groups within each racial/ethnic sample. DIF can be conceptualized as a form of measurement bias, where individuals respond to items on a scale as a function of an attribute (eg, age) other than what the scale is designed to measure.[12] DIF occurs when any indicator variable is significantly different by the attribute, thus causing a change in the latent measure EDS. Each of the nine items on the EDS serves as an independent variable that may be subject to DIF in the association with the EDS measure when assessed by age group within race.

After combing the NLASS and NSAL datasets and accounting for missing data across all of the variables of interest, the sample size for each of the racial/ethnic group were moderately reduced (from 3,570 to 3,434 among African Americans; from 2,095 to 2,017 among Asians; from 1,438 to 1,377 among Black Caribbeans; from 2,737 to 2,688 among Hispanics; and from 891 to 854 among Whites. All of the analyses in the study were weighted using the prescribed population-centered analytic weights noted in the pub-

Table 1. Mean EDS score by race/ethnicity and age and descriptive analyses by characteristics of interest in the NLASS and NLAS Samples

	Asians (*n*=2,017)	Hispanics (*n*=2,688)	Black Caribbeans (*n*=1,377)	African Americans (*n*=3,434)	Whites (*n*=854)	Total (*N*=10,731)
EDS (Age ≥ 45), mean[a]	.64 (.03)[b]	.53 (.02)[b]	1.11 (.04)[b]	1.05 (.02)[b]	.74 (.03)[b]	.75 (.01)[b]
EDS (Age < 45), mean	.90 (.02)	.92 (.02)	1.38 (.03)	1.40 (.02)	1.12 (.04)	1.11 (.01)
Age						
≥ 45, %	35.7	26.4	34.8	37.5	45.7	42.0
< 45, %	64.3	73.6	65.2	62.5	54.3	58.0
Education, %						
0-11 years	14.7	45.0	2.5	24.3	14.9	19.5
12 years	17.3	25.0	3.8	37.9	31.2	3.5
13-15 years	25.3	2.0	27.3	24.0	24.5	24.0
≥ 16 years	42.6	9.9	21.5	13.8	29.4	26.0
Years in US, %						
US-born	23.6	42.2	33.8	98.7	97.8	87.6
< 5 years	14.2	9.7	9.2	.8	1.1	2.7
5-10 years	11.8	8.8	9.3	.5	1.1	2.5
11-20 years	26.5	18.4	21.6	.0	.0	3.5
> 20 years	24.0	21.1	26.1	.0	.0	3.7

EDS, Everyday Discrimination Scale; NLASS, National Latino, Asian American Study; NSAL, National Survey of American Lives.
P based on bivariate regression analyses with African Americans as the reference group.
a. *P* based on bivariate regression analyses with aged< 45 years as the reference group.
b. *P*<.001.

licly available documentation files. All of the analyses for the study were performed in STATA version 12 (StataCorp LP, College Station, TX).

Results

As shown in Table 1, younger respondents (aged <45 years), regardless of race/ethnicity, consistently reported higher levels of discrimination than their older counterparts (aged ≥45 years). In addition, results suggested that younger African Americans and Black Caribbeans experienced more discrimination than the other racial/ethnic counterparts of the same age.

As shown in Table 2, all of the models were statistically significant based on the chi-square value. The typical approach in constructing SEM is to employ a chi-square test of the null hypothesis that the observed and the expected matrices are identical. The model is accepted if the test fails to reject the null hypothesis. However, in large samples, such tests usually lead to the rejection of good models on the basis of trivial misspecifications.[21] Hence, we used a combination of other goodness-of-fit indices to assess fit of the model to the data, including the CFI and SRMR. In particular, the CFI for each of the race/ethnicity models ranged from a low of .973 among African Americans to high of .998 among Whites. Similarly, the SRMR statistic also revealed a good fit for each group (<.08), with a range of .019 to .030. The CFA yielded good fits to the data for each of the racial/ethnic groups. The CFA within race confirmed the single factor structure of the EDS within each of the five racial/ethnic groups.

Table 3 shows the results of the DIF analyses within each racial/ethnic group by age. Differential item functioning by age occurred within race in seven of nine items. Age was determined to be a factor in 19 of the total of 45 statistical tests (42.2%). Among Black Caribbeans, DIF did not occur by age for any of the EDS questions. On the other hand, Hispanics' responses varied the most by age group, with 6 of 9 items functioning differentially by age. Five items functioned differentially in the White sample. Four items yielded DIF in the African American and Asian samples.

The question with the highest frequency of DIF by age within race/ethnicity was "People act as if you are not smart." Older individuals (aged ≥45 years) in four of five racial/ethnic groups endorsed this item most

Table 2. Model fits are shown for each racial/ethnic group after accounting for modification indices

	Asians (*n*=2,017)	Hispanics (*n*=2,688)	Black Caribbeans (*n*=1,377)	African Americans (*n*=3,434)	Whites (*n*=854)
χ2	119.6	131.5	41.5	326.0	3.06
df	16	17	25	24	12
P	<.001	<.001	.020	<.001	.003
CFI	.99	.992	.98	.973	.998
SRMR	.021	.019	.030	.029	.009

Model fits are shown for each racial/ethnic group after accounting for modification indices.

frequently. Three of the five groups varied by age in response to "You are treated with less respect than other people are" and "People act as if they think you are dishonest," although no pattern by age emerged across groups. The items "You are treated with less courtesy than other people are," "You receive poorer service than other people at restaurants or stores," "People act as if they're better than you are," and "You are threatened or harassed" exhibited DIF in two racial/ethnic groups. Younger Hispanics and Whites consistently reported less courtesy more than older individuals, while younger Asians and Hispanics reported receiving poorer service than others at restaurants/stores and being threatened/harassed. Younger African Americans and Whites reported people "act as if they are better than you are" more frequently.

Discussion

To expand the recent investigations about the generalizability of the EDS, the goal of our study was to examine whether the EDS functioned differently by age within various racial/ethnic groups. Differential item functioning by age did indeed vary between the five racial/ethnic groups we examined in this study. Generally, the same age group endorsed an item more frequently across racial/ethnic groups. However, questions 2 and 6 (Table 3) showed between-group age variation. Younger Asians felt they were treated with less respect than older Asians, on the other hand older Hispanics, Whites, and African Americans felt they were treated

Table 3. Path coefficients for differential item functioning tests between age (aged <45 vs ≥45 years) within racial/ethnic groups[a]

	Asians (*n*=2,017)		Hispanics (n=2,688)		Black Caribbeans (*n*=1,377)		African Americans (*n*=3,434)		Whites (*n*=854)	
	b	(SE)	b	(SE)	b	(SE)	b	(SE)	b	(SE)
1. Treated with less courtesy	-.012	(.013)	-.033[c]	(.012)	.002	(.043)	-.007	(.013)	-.061[d]	(.014)
2. Treated with less respect	-.032[b]	(.013)	-.022	(.011)	-.001	(.042)	-.033[c]	(.013)	-.037[c]	(.013)
3. Receive poorer service	-.056[c]	(.017)	-.047[c]	(.014)	-.040	(.060)	-.029[b]	(.015)	-.019	(.017)
4. People act as if you are not smart	-.031[b]	(.015)	-.060[d]	(.013)	-.046	(.051)	-.035[b]	(.015)	-.13[d]	(.014)
5. People act as if they are afraid of you.	-.032	(.018)	-.007	(.015)	-.027	(.057)	-.027	(.015)	-.010	(.017)
6. People act as if they think you are dishonest	-.000	(.016)	-.043[c]	(.013)	-.030	(.059)	-.035[b]	(.014)	-.078[d]	(.016)
7. People act as if they're better than you	-.012	(.015)	-.015	(.012)	-.027	(.052)	-.039[c]	(.015)	-.084[d]	(.015)
8. You are insulted	-.008	(.016)	-.021	(.014)	-.034	(.057)	-.015	(.015)	-.014	(.014)
9. You are threatened/harassed	-.036[b]	(.017)	-.036[b]	(.014)	-.060	(.062)	-.021	(.016)	-.010	(.015)

SE, standard errors for path coefficient.

a. Positive coefficients (b) represent more frequent endorsement for the ≥45 groups, while negative coefficients (b) represent more frequent endorsement among the aged <45 years groups.

b. *P*<.05.

c. *P*<.01.

d. *P*<.0001.

with less respect than their younger counterparts. Traditions and beliefs in Asian culture may lead to preferential treatment of older individuals over younger. Secondly, older African Americans endorsed "People act as if they think you are dishonest," as did younger Hispanics and Whites. Older African Americans' experiences vary greatly from those of other racial/ethnic groups. Lewis et al's differential item functioning study using a sample of women aged 42-52 also showed that African Americans endorsed "You are treated as dishonest" more frequently than other groups.[12] While this is not a direct comparison of groups, Lewis's SWAN sample was older.[12] A 2004 study by Barnes et al, analyzed EDS scores in older Black and White respondents.[22] Items that could be considered personal rejection items included items 6-9 (Table 3). Additional analyses of older individuals by age revealed an incremental increase in personal rejection item scores with age (data not shown). The same appears to have emerged with African American respondents in this study.

Generally, the same age group endorsed an item more frequently across racial/ethnic groups. However, questions 2 and 6 (Table 3) showed between-group age variation.

Although the average EDS score was equally as high among Black Caribbeans as it was among African Americans, surprisingly no differential item functioning by age was detected among this group. This is particularly intriguing given that most Black Caribbeans can easily be misidentified as African Americans and as such are equally as likely to experience racial discrimination as African Americans. Although the Black Caribbeans in this sample are not homogenous with respect to country of origin and time spent in the US, the lack of differential item function among Black Caribbeans may in part be due to the socialization about discrimination in the US from family members in the US regardless of age.[23] Future research should further explore this particular issue, especially among US and foreign-born Black Caribbeans.

Another interesting result was that among four of the five racial/ethnic groups, older individuals endorsed "People act as if you are not smart" more frequently than younger groups. This particular question may be in part a reflection of the stereotype held by some that older individuals lose cognition or awareness with age.[24] Conversely, younger Asians and Hispanics reported receiving poorer service at restaurants or stores. Such differences may be attributed to the idea potentially held by the staff and/or younger customers, especially Asians and Hispanics that younger patrons do not tip for services as well as older due to being poor and or cheap.[25]

Not surprisingly "People act as if they are afraid of you" and "You are called names or insulted" functioned without DIF in all groups. These questions address proactive, aggressive acts of discrimination, which in theory are subject to very little interpretation by race and age. Individuals are unlikely to misconstrue the intent of fear and name-calling if experienced. Moreover, these experiences are strongly linked to discrimination in the US. On the other hand, the other items used to measure discrimination may be considered more ambiguous and as such may allow for latent factors to affect perceptions.

Age appears to be a latent construct in experiences of everyday discrimination in our analyses. The interaction of age and race generate new questions that can be addressed through further differential item functioning iterations as well as qualitative analyses. Essed's original work consisted of qualitative interviews of African American and Dutch women.[15] This original work of qualitative interviews may be expanded to include both sexes, differences in ages and ethnicities.

Despite its strengths, our treatment of the Asians and Hispanics subsamples in this study is somewhat limiting. Specifically, we ignored the ethnic heterogeneity among Asians and Hispanics in this study, due to sample size limitations, that may have biased our results. For example in some preliminary analyses not shown, Vietnamese and Cuban respondents reported slightly lower EDS scores than the Asian and Hispanic groups, respectively. On the

other hand, Filipino respondents reported slightly higher scores than the Asian groups. Lewis et al found differences in Chinese and Japanese women's EDS scores with Chinese women scoring similarly to African American women.[12] Future research may further divide age and racial/ethnic categories into higher resolution groups to further define differences in EDS perceptions.

In line with previous research, results from our analyses do suggest that race/ethnicity and age are important factors to be considered when studying discrimination. Traditional DIF analyses recommend removal of questions that show DIF. For example, "People act as if you are not smart" clearly functions with DIF when comparing age groups. This item may be omitted when addressing older groups or when comparing older and younger individuals for racial/ethnic discrimination. However, the EDS, and similar scales, plays a pivotal role in our understanding of how chronic discrimination affects health outcomes. Moreover, the breadth of ages, races, and ethnicities that the EDS cover complicates item removal. Removing items without a thorough, exhaustive deliberation may undermine future research with the EDS. Any alterations to the EDS scale with such little information could prove to be short sighted. Nonetheless, we do strongly suggest that future studies should judiciously examine the current EDS items on a case-by-case basis.

Acknowledgments

The National Survey of American Life and the National Latino and Asian Studies were supported by the National Institute of Mental Health (grant U01-MH57716), the National Institutes of Health, Office of Behavioral and Social Science Research, the National Institute on Aging (grant 5R01 AG02020282), the National Institute on Drug Abuse, and the University of Michigan. The contents of this article are solely the responsibility of the authors and do not necessarily represent the official views of the supporting institutions.

Author Contributions

Research concept and design: Owens, Kristjansson, Hunte. Data analysis and interpretation: Owens, Kristjansson, Hunte. Manuscript draft: Owens, Kristjansson, Hunte. Statistical expertise: Kristjansson, Hunte. Supervision: Kristjansson, Hunte.

References

1. Williams DR, Mohammed SA. Discrimination and racial disparities in health: evidence and needed research. *J Behav Med*. 2009;32(1):20-47. http://dx.doi.org/10.1007/s10865-008-9185-0. PMID:19030981.
2. Pascoe EA, Smart Richman L. Perceived discrimination and health: a meta-analytic review. *Psychol Bull*. 2009;135(4):531-554. http://dx.doi.org/10.1037/a0016059. PMID:19586161.
3. Parker G, Chan B, Tully L, Eisenbruch M. Depression in the Chinese: the impact of acculturation. *Psychol Med*. 2005;35(10):1475-1483. http://dx.doi.org/10.1017/S0033291705005623. PMID:16164771.
4. Les Whitbeck B, Chen X, Hoyt DR, Adams GW. Discrimination, historical loss and enculturation: culturally specific risk and resiliency factors for alcohol abuse among American Indians. *J Stud Alcohol*. 2004;65(4):409-418. http://dx.doi.org/10.15288/jsa.2004.65.409. PMID:15376814.
5. Hunte HE, Williams DR. The association between perceived discrimination and obesity in a population-based multiracial and multiethnic adult sample. *Am J Public Health*. 2009;99(7):1285-1292. http://dx.doi.org/10.2105/AJPH.2007.128090. PMID:18923119.
6. Williams DR, Neighbors H. Racism, discrimination and hypertension: evidence and needed research. *Ethn Dis*. 2001;11(4):800-816. PMID:11763305.
7. Edwards RR. The association of perceived discrimination with low back pain. *J Behav Med*. 2008;31(5):379-389. http://dx.doi.org/10.1007/s10865-008-9160-9. PMID:18581224.
8. Bhopal R. Racism, socioeconomic deprivation, and health in New Zealand. *Lancet*. 2006;367(9527):1958-1959. http://dx.doi.org/10.1016/S0140-6736(06)68859-4. PMID:16782467.
9. Williams DR, Neighbors HW, Jackson JS. Racial/ethnic discrimination and health: findings from community studies. *Am J Public Health*. 2003;93(2):200-208. http://dx.doi.org/10.2105/AJPH.93.2.200. PMID:12554570.
10. Krieger N, Smith K, Naishadham D, Hartman C, Barbeau EM. Experiences of discrimination: validity and reliability of a self-report measure for population health research on racism and health. *Soc Sci Med*. 2005;61(7):1576-1596. http://dx.doi.org/10.1016/j.socscimed.2005.03.006. PMID:16005789.
11. Paradies Y. A systematic review of empirical research on self-reported racism and health. *Int J Epidemiol*. 2006;35(4):888-901. http://dx.doi.org/10.1093/ije/dyl056. PMID:16585055.
12. Lewis TT, Yang FM, Jacobs EA, Fitchett G. Racial/ethnic differences in responses to the everyday discrimination scale: a differential item functioning analysis. *Am J Epidemiol*. 2012;175(5):391-401. http://dx.doi.org/10.1093/aje/kwr287. PMID:22306556.
13. Shariff-Marco S, Gee GC, Breen N, et al. A mixed-methods approach to developing a self-reported racial ethnic discrimination measure for use in multiethnic health surveys. *Ethn Dis*. 2009;19(4):447-453.
14. Bastos JL, Celeste RK, Faerstein E, Barros AJD. Racial discrimination and health: a systematic review of scales with a focus on their psychometric properties. *Soc Sci Med*. 2010;70(7):1091-1099. http://dx.doi.org/10.1016/j.socscimed.2009.12.020. PMID:20122772.
15. Essed P. *Everyday Racism: Reports from Women of Two Cultures*. Almeida, Calif: Hunter House. 1990.
16. Heeringa SG, Wagner J, Torres M, Duan N, Adams T, Berglund P. Sample designs and sampling methods for the Collaborative Psychiatric Epidemiology Studies (CPES). *Int J Methods Psychiatr Res*. 2004;13(4):221-240. http://dx.doi.org/10.1002/mpr.179. PMID:15719530.
17. Williams DR, Yu Y, Jackson JS, Anderson NB. Racial differences in physical and mental health: Socio-economic status, stress and discrimination. *J Health Psychol*. 1997;2(3):335-351.
18. Kessler RC, Mickelson KD, Williams DR. The prevalence, distribution, and mental health correlates of perceived discrimination in the United States. *J Health Soc Behav*. 1999;40(3):208-230. http://dx.doi.org/10.2307/2676349. PMID:10513145.
19. Hu L-T, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. *Structural Equation Modeling-a Multidisciplinary Journal*. 1999;6(1):1-55.
20. Browne MW, Cudeck R. Alternative ways

of assessing model fit. In: Bollen KA, Long JS, eds. *Testing Structural Equation Models.* Newsbury Park, CA: Sage; 1993:136-162.
21. Byrne B. *Structural Equation Modeling with AMOS.* 2nd ed. NY: Routledge; 2010.
22. Barnes LL, Mendes De Leon CF, Wilson RS, Bienias JL, Bennett DA, Evans DA. Racial differences in perceived discrimination in a community population of older blacks and whites. *J Aging Health*. 2004;16(3):315-337. http://dx.doi.org/10.1177/0898264304264202. PMID:15155065.
23. Jackson JS, Forsythe-Brown I, Govia IO. Age cohort, ancestry, and immigrant generation influences in family relations and psychological well-being among Black Caribbean family members. *J Soc Issues*. 2007;63(4):729-743. http://dx.doi.org/10.1111/j.1540-4560.2007.00533.x.
24. Garstka TA, Schmitt MT, Branscombe NR, Hummert ML. How young and older adults differ in their responses to perceived age discrimination. *Psychol Aging*. 2004;19(2):326-335. http://dx.doi.org/10.1037/0882-7974.19.2.326. PMID:15222826.
25. Lynn M, Kwortnik RJ Jr, Sturman MC. Voluntary tipping and the selective attraction and retention of service workers in the USA: an application of the ASA model. *Int J Hum Resour Manage*. 2011;22(9):1887-1901. http://dx.doi.org/10.1080/09585192.2011.573968.