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Race/Ethnicity and Measurement Equivalence of the Everyday Discrimination Scale

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Abstract

The present study examines the effect of race/ethnicity on measurement equivalence of the Everyday Discrimination Scale (EDS). Drawn from the Collaborative Psychiatric Epidemiology Surveys (CPES), adults aged 18 and older from four racial/ethnic groups were selected for analyses: 884 non-Hispanic Whites, 4,950 Blacks, 2,733 Hispanics/Latinos, and 2,089 Asians. Multiple-group confirmatory factor analyses were conducted. After adjusting for age and gender, the underlying construct of the EDS was invariant across four racial/ethnic groups, with Item 7 ("People act as if they're better than you are") associated with lower intercepts for the Hispanic/Latino and Asian groups relative to the non-Hispanic White and Black groups. In terms of latent factor differences, Blacks tended to score higher on the latent construct compared to other racial/ethnic groups, whereas Asians tended to score lower on the latent construct compared to Whites and Hispanics/Latinos. Findings suggest that although the EDS in general assesses the underlying construct of perceived discrimination equivalently across diverse racial/ethnic groups, caution is needed when Item 7 is used among Hispanics/Latinos or Asians. Implications are discussed in cultural and methodological contexts.

Keywords

Perceived Discrimination; Measurement Equivalence; Race/Ethnicity; Everyday Discrimination Scale (EDS); Health Disparities; Culture

Introduction

Perceived discrimination—defined as "a behavioral manifestation of a negative attitude, judgment, or unfair treatment toward members of a group" (Pascoe & Smart Richman, 2009, p. 533)—is a widely used concept in psychological research and has been studied in many different types of consequences. A general consensus on perceived discrimination in previous research is that it can be a chronic stressor regardless of the sources of discrimination (e.g., race/ethnicity, age, and gender), suggesting potential pathways linking

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to negative physical and mental health outcomes. There is ample evidence of research indicating that those experiencing greater discrimination in day-to-day life tend to have poorer physical and mental health outcomes than their counterparts (e.g., Gee, Spencer, Chen, Yip & Takeuchi, 2007; Kessler, Michelson, & Williams, 1999; Pascoe & Smart Richman, 2009; Pieterse, Todd, Neville, & Carter, 2012; Ryff, Keyes, & Huges, 2003; Williams & Mohammed, 2009).

One of the most widely used measures for perceived discrimination is the Everyday Discrimination Scale (EDS; Williams, Yu, Jackson, & Anderson, 1997). The EDS has been developed to capture aspects of interpersonal discrimination that are chronic or episodic but generally minor (Williams & Mohammed, 2009). An original version of the EDS consists of nine items on a 6-point Likert-type response format, with modified versions of the EDS having different numbers of items (e.g., Chan et al., 2012; Lewis et al., 2012) or different response formats (e.g., Jang et al., 2010; Lewis et al., 2012). A total possible range of the original EDS is 1 to 54, with higher scores indicating higher levels of perceived discrimination. Items included in the EDS are daily experiences with unfair treatment such as being treated with less respect, being treated with less courtesy, being called names or insulted, and being threatened or harassed.

With the reported advantages of its brevity and good utility (e.g., Krieger, Smith, Naishadham, Hartman, & Barbeau, 2005; Ryff et al., 2003; Williams & Mohammed, 2009; Yoo, Gee, & Takeuchi, 2009), the EDS has been applied to diverse racial/ethnic and cultural groups in the U.S., including African Americans/Blacks (e.g., Barnes et al., 2004; Clark, Coleman, & Novak, 2004; Lewis, Yang, Jacobs, & Fitchett, 2012; Stucky et al., 2011; Taylor, Kamarck, & Shiffman, 2004; Williams et al., 1997), Hispanics/Latinos (e.g., Lewis et al., 2012; Reeve et al., 2011), and Asians (e.g., Bernstein, Park, Shin, Cho, & Park, 2011; Chan, Tran, & Nguyen, 2012; Gee et al., 2007; Lewis et al., 2012; Jang, Chiriboga, Kim, & Rhew, 2010). The EDS has also been used with international populations such as South Africans (Williams et al., 2008). With regard to its psychometric properties, previous studies reported good reliability and validity of the EDS (Bernstein et al., 2009; Clark et al., 2004; Jang et al., 2010; Krieger et al., 2005). For example, in a study of Black adolescents, Clark and colleagues (2004) reported that the EDS items measured a similar construct, with an alpha reliability coefficient of 0.87 and item-total correlations ranging from 0.50 to 0.70. These researchers comprised a single component showing one factor yielded from a principal component analysis with 49.34% of the standardized variance accounted. Studies on Korean immigrants (Bernstein et al., 2009; Jang et al., 2010) reported .90 or higher alpha reliability coefficients of the EDS.

Measurement equivalence (or measurement invariance) of the EDS, however, has not been extensively researched. Given that items included in the EDS are based on qualitative data from interviews with African Americans/Blacks (Essed, 1990 & 1991), it is essential to establish measurement equivalence of the EDS further across diverse racial/ethnic groups for more accurate and meaningful cross-cultural comparisons of perceived discrimination. A number of researchers (Kim, 2010; Markides, Liang, & Jackson, 1990; van de Vijver, 2001) have suggested that measurement equivalence requires at least three interrelated conditions (i.e., conceptual, metric and structural equivalence), which constitutes a hierarchy in that

conceptual equivalence is required for metric equivalence and both conceptual and metric equivalence are required for structural equivalence. Given that the full version of metric equivalence means all corresponding factor loadings are invariant across groups and that the full metric equivalence is difficult to achieve, some researchers (e.g., Byrne, Shavelson, & Muthen, 1989; Gregorich, 2006; Knight, Roosa, & Umaña-Taylor, 2009) proposed to rely upon partial factorial invariance rather than full factorial invariance, especially for cross-cultural comparisons. An example of partial metric invariance would be that in a one-factor model with 5 items, 4 of 5 factor loadings may be invariant, whereas the fifth differs across groups (Gregorich, 2006).

Two recent studies have specifically examined the effect of race/ethnicity on the measurement equivalence of the EDS (Lewis et al., 2012; Chan et al., 2012). In a study of middle-aged women from five racial/ethnic groups including Caucasians, African Americans, Chinese, Hispanics, and Japanese, Lewis and colleagues (2012) found from their differential item functioning (DIF) analyses that three items included in the modified ten-item version of the EDS were biased by race/ethnicity. The three race/ethnicity-biased items were: “You receive poorer service in restaurants or stores (Item 3),” which functioned differently for African American women than for most other racial/ethnic groups; “People act as if they think you are dishonest (Item 6),” which functioned similarly for African American women and other racial/ethnic minority (Chinese, Japanese, and Hispanic) women but functioned differently for Caucasian women; and “You are treated with less courtesy (Item 1),” which functioned differently for Hispanic women compared with African American women. In another measurement equivalence study of the, Chan and colleagues (2012) reported that the original nine-item version of the EDS did not function similarly between Chinese and Vietnamese American groups, although information on item-level analysis was not available. The authors noted that after deleting four items (“People act as if they are afraid of you [Item 5],” “People act as if they think you are dishonest [Item 6],” “You are called names or insulted [Item 8],” and “You are threatened or harassed [Item 9]” which captures a perceived sense of unfair treatment) based on results from exploratory factor analysis, the modified five-item version of the EDS was comparable between Chinese and Vietnamese Americans (Chan et al., 2012). Chan and colleagues (2012) also reported that the reliability coefficients of the modified five-item version of the EDS remained to be good for both Vietnamese (α = .90) and Chinese (α = .87), with some minor changes in the reliability coefficients from the original nine-item version for both groups (α = .92 for Vietnamese; α = .88 for Chinese). Regarding the factor structure, the authors noted that the modified five-item model of the EDS was better than the full nine-item model for both the Vietnamese and Chinese groups, with a much better model fit for the Chinese group compared to the Vietnamese group (Chan et al., 2012). These two studies may indicate potential qualitative differences in the meaning of perceived discrimination across racially/ethnically and cultural diverse groups.

Given the observed racial/ethnic-bias in the EDS items in these recent studies (Lewis et al., 2012; Chan et al., 2012), more comprehensive racial/ethnic comparisons of the measurement equivalence of the EDS should be conducted, especially using a nationally representative sample in order to establish measurement equivalence of perceived discrimination. Considering strong needs for more research on measurement equivalence issues of

discrimination scales, the present study focused on testing measurement bias in the EDS across four major racial/ethnic groups in the U.S. (i.e., non-Hispanic whites, Blacks, Hispanics/Latinos, and Asians) drawn from nationally representative data. This investigation will further advance science and increase our knowledge in psychological and health disparities research.

Methods

Sample

Data were drawn from the Collaborative Psychiatric Epidemiology Surveys (CPES, 2001–2003). The CPES is a combined data set of three nationally representative data sets including the National Comorbidity Study-Replication (NCS-R), the National Survey of American Life (NSAL), and the National Latino and Asian American Study (NLAAS). Funded by the National Institute of Mental Health (NIMH), the CPES data collections used a multi-stage area probability sampling method. Face-to-face interviews were conducted unless a telephone interview was specifically requested or a face-to-face interview was not feasible. The CPES was selected for the present study because of its inclusion of (a) an original version of the EDS measure and (b) diverse racial/ethnic groups, despite the fact that the data were collected about a decade ago. The current analyses utilized 10,656 adults aged 18 or older who responded to items in the EDS from four racial and ethnic groups: 884 non-Hispanic whites, 4,950 Blacks, 2,733 Hispanics/Latinos, and 2,089 Asians. Seven individuals who had missing values on all of the EDS items were excluded.

As described in Table 1, background characteristics of the four racial/ethnic groups varied significantly (all *p*s < .001). With the mean age of 42.1 years (SD=15.88, range: 18–97), the Hispanic/Latino group was the youngest (M=40.6, SD=15.66) and the non-Hispanic white group (M=47.4, SD=16.89) was the oldest. More than half were female for all four racial/ethnic groups showing significant racial/ethnic differences: Blacks included more females (63.4%), while Asians included relatively fewer females (52.4%). Asians were more likely than other racial/ethnic groups to have higher levels of education and income (% of some college or higher education=67.3%; mean & SD of annual household income=73K±58.7K). Hispanics/Latinos had lower levels of educational attainment (% of some college or higher education=37.1%) and Blacks had lower levels of annual household income (mean=34K, SD=31K) compared with other groups.

Measures

Race/Ethnicity—Respondents were categorized into four racial and ethnic groups (non-Hispanic white, Black, Hispanic/Latino, and Asian) in accordance with the U.S. Census definition.

Everyday Discrimination Scale—The EDS (Williams et al., 1997) measures chronic and routine unfair treatment in everyday life. Adopted from the Detroit Area Study, respondents were asked to report how often they experience unfair treatment in their day-to-day life on a 6-point Likert-type response format. Response categories ranged from 1 (never) to 6 (experience discrimination almost every day), with higher scores indicating

greater perceived discrimination. Nine items included in the EDS are: "You are treated with less courtesy than other people are (Item 1)," "You are treated with less respect than other people are (Item 2)," "You receive poorer service than other people at restaurants or stores (Item 3)," "People act as if they think you are not smart (Item 4)," "People act as if they are afraid of you (Item 5)," "People act as if they think you are dishonest (Item 6)," "People act as if they're better than you are (Item 7)," "You are called names or insulted (Item 8)," and "You are threatened or harassed (Item 9)." The internal consistency for the EDS was acceptable; Cronbach's α was .88 and McDonald's ω was .85. Distribution statistics (i.e., skewness and kurtosis) indicated univariate normality (skewness < 2; kurtosis < 7; see Curran, West, & Finch, 1996) for Items 1–7, but minor violations for Items 8 (skewness = 2.05) and 9 (skewness = 2.49, kurtosis = 8.67).

Data Analysis

Although the EDS has been considered unidimensional, we first conducted an exploratory factor analysis (EFA) to determine whether multiple latent constructs explain variance in these indicators. For the primary analyses, confirmatory factor analysis (CFA) was used to estimate a measurement model using Mplus 7.0 (Muthen & Muthen, 2012). Because some individual EDS items did not meet criteria for univariate normality, we used a robust maximum likelihood estimator (MLR) to account for violations to multivariate normality.[1] Model fit was evaluated using the Satorra-Bentler-scaled Chi Square statistic (S-B χ^2), Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR). Since chi square statistics are heavily influenced by sample size, CFI, TLI, RMSEA, and SRMR are better estimates of violations to model fit in a large sample (Little, 2013). CFI and TLI values greater than 0.90 and RMSEA values up to 0.08 indicate acceptable fit (Kline, 2011; Little, 2013).

Furthermore, for measurement invariance testing across groups, chi square difference tests have been found too stringent, particularly when using very large sample sizes. We therefore used ΔCFI < .01 (Cheung & Rensvold, 2002; Meade, Johnson, & Braddy, 2008) and overlapping 90% RMSEA confidence intervals to indicate invariance at the measurement (i.e., indicator) level (Little, 2013). For latent parameters, however, robust chi square difference testing was used (Little, 2013), as most simulation studies to date have focused on measurement invariance rather than structural invariance.

Age and gender were used as covariates in all CFA analyses (i.e., representing a Multiple Indicators Multiple Indicator Causes [MIMIC] model). The MIMIC model was used to statistically control for potential demographic confounders such as age and gender as they are known to be correlated with perceived discrimination (Lewis et al., 2012).

[1]Some readers may question why we did not consider EDS items ordered categorical data and thus used a robust weighted least squares estimator. We prefer the robust ML estimator here due to its flexibility and simulation studies showing that items with five or greater categories can be estimated via maximum likelihood with minimal bias (Johnson & Creech, 1983).

Results

Exploratory Factor Analysis: A Test of Unidimensionality

An EFA was conducted first to determine if the EDS items were indicated by more than one latent factor. We used maximum likelihood estimation with robust scaling to extract the optimal number of factors in conjunction with Horn's (1965) parallel analysis. Results from the parallel analysis indicated that the first three eigenvalues from the actual data were 4.96, 0.97, and 0.73; the first three corresponding 95^{th} percentile random data eigenvalues were 1.05, 1.03, and 1.02. In addition to the traditional Kaiser (1960) criterion of an eigenvalue of 1.00 or greater for a viable factor, these parallel analysis results clearly support a one-factor solution, and thus, unidimensionality.

Confirmatory Factor Analysis: One Factor Model

Next, we estimated a one-factor CFA model with age and gender as covariates separately in all four racial/ethnic groups, as it is appropriate to determine a well-fitting model in all individual groups prior to testing for measurement invariance (Byrne, 2011). Table 2 shows model fit statistics for each racial/ethnic group for the initial model. The results showed poor model fit in all four racial/ethnic groups for the initial model. We therefore examined whether re-specification would improve model fit by consulting modification indices. More specifically, since we were working with a one-factor model, we examined estimating correlated residuals (or more appropriately, item uniquenesses) that could be justified for conceptual reasons. In all four racial/ethnic groups, estimating correlated uniquenesses for Items 1 and 2 would be associated with the greatest decrement in the chi square statistic. We believed that this modification could be applied based on conceptual grounds (both items clearly reflect underlying lack of respect). Model fit statistics improved substantially, but the incremental fit indices (CFI and TLI) fell within the borderline range (.897–.928 for CFI; .867–.907 for TLI) across the four groups. We therefore consulted modification indices again, and determined that correlated item uniquenesses for items 8 and 9 were associated with the greatest improvement in model fit in all for groups. This modification would also be applied based on conceptual grounds in that both items concern overt maltreatment (i.e., insults, threats, harassment) not captured in other items. This modification improved model fit to an acceptable level in all four groups (see Table 2). Figure 1 shows the overall covariance parameter estimates for the final model.

Measurement Invariance Tests

Our next step was to examine measurement invariance to determine whether the underlying latent constructs are equivalent across four racial/ethnic groups, following procedures and recommendations by Meredith (1993) and Little and Slegers (2005). Results are presented in Table 3. A model in which indicator loadings and thresholds were freely estimated served as the baseline (or configural) model. This model met criteria for acceptable model fit. Next, we estimated a model in which indicator loadings were constrained to be equal across the four groups (i.e., weak invariance), and used the ΔCFI and RMSEA confidence intervals to evaluate potential differences in model fit relative to the configural model. As evident from Table 3, there was evidence for weak invariance in multigroup comparisons for both the model with and the model without correlated residuals. Finally, we examined a model in

which both indicator loadings and thresholds were constrained to be equal across groups (i.e., strong invariance) and compared this model to the weak invariance model. As shown in Table 3, there was no evidence for strong measurement invariance. As such, we consulted the modification indices to determine whether freeing up the intercept for a particular group (or groups) would meet criteria for partial strong invariance. Indeed, allowing the intercept for Item 7 ("People act as if they're better than you are") to be freely estimated in the Hispanic/Latino and Asian groups, while constraining all other intercepts to be equivalent met criteria for partial strong invariance. For Item 7, the Hispanic/Latino and Asian groups had significantly lower intercepts relative to the White and Black groups, meaning that lower levels of the underlying latent construct are needed for higher scores on this item for Hispanic/Latino and Asian groups relative to the other racial/ethnic groups.

Latent Means, Variances, and Effect Sizes across Racial/Ethnic Groups

Finally, group differences on latent parameters were examined. Because this was a one-factor model, we only focused on latent variances and means across groups. Using the same multigroup comparisons described earlier, we first examined whether the variances in the latent factor were invariant across groups. We constrained these to be equal and then compared the model fit (using S-B χ^2 difference test) to that of the weak invariance (with equivalent correlated uniquenesses) model (see Table 3). The results indicated that latent variances were not equivalent across groups ($\Delta\chi^2 = 73.30$, df = 3, $p < .001$). We therefore consulted modification indices, which supported freeing the latent variances in the Black and Hispanic/Latino groups; this modification resulted in a model that was otherwise equivalent to the comparison model ($\Delta\chi^2 = 0.78$, df = 1, $p = .382$). Table 4 shows the latent variances of each group. Next, we examined latent means differences across groups. Using the partial strong invariance model as baseline (see Table 3), we constrained the latent means to be equal across the groups. This constraint was not tenable ($\Delta\chi^2 = 87.16$, df = 3, $p < .001$). We subsequently allowed the latent means for the Black and Asian groups to be freely estimated; this resulted in an otherwise equivalent model ($\Delta\chi^2 = 3.27$, df = 1, $p = .071$). Table 4 shows the latent means and variances, as well as estimated effect sizes for group differences (in *d* units).

Discussion

In our attempt to identify the effect of race/ethnicity on measurement equivalence of the EDS, we found evidence for the overall invariant underlying construct of the EDS across four racial/ethnic groups from non-Hispanic whites, Blacks, Hispanics/Latinos, and Asians, as well as the lack of invariance for one item (Item 7, "People act as if they're better than you are") showing lower intercepts for Hispanics/Latinos and Asians than for Blacks and non-Hispanic whites. This suggests that when the EDS is used to measure perceived discrimination, the concept of discrimination regardless of the sources of perceived discrimination (e.g., race/ethnicity, age, gender) is in general perceived equivalently across different racial/ethnic groups in the U.S. Previous studies using modified versions of the EDS (e.g., different numbers of items) also supported a one-factor model across different racial/ethnic groups (Chan et al., 2012; Lewis et al., 2012). However, findings on the non-equivalent item across racial/ethnic groups suggest that the perceived discrimination

construct over-predicted responses to the item “People act as if they’re better than you are” for Hispanics/Latinos and Asians compared with Blacks and non-Hispanic whites, which requires researchers’ careful attention. It was also evidenced that Blacks scored higher on the latent construct compared to other racial/ethnic groups, whereas Asians scored lower on the latent construct compared to Whites and Hispanics/Latinos.

The most intriguing finding was the lack of invariance for the item “people act as if they’re better than you are” across different racial/ethnic groups. It took a lower level of the perceived discrimination latent construct to score higher on this item in the Hispanic/Latino and Asian groups relative to the non-Hispanic white and Black groups. When interpreting this item bias, researchers should first understand that true mean differences in the perceived discrimination construct across different racial/ethnic groups can occur with or without item bias and that the true mean differences in the perceived discrimination construct do not yield item bias in the EDS by race/ethnicity. This item bias occurs when individuals in the same mean perceived discrimination construct, belonging to different racial/ethnic groups, have differential responses. McHorney & Fleishman (2006) noted in their epilogue of the special issue on measurement equivalence issues in diverse populations that explaining the occurrence of bias in terms of meaningful psychological constructs is one of the crucial goals of measurement equivalence research. Amongst many potential sources of bias, over-endorsement on this item by Hispanics/Latinos and Asians relative to non-Hispanic whites and Blacks may be related to Hispanics/Latinos and Asians’ susceptibility to cultural superiority that may be translated to discrimination experiences. It is also possible that the immigration-related factors such as nativity and acculturation might have predisposed Hispanic/Latino and Asian individuals’ greater responses to this item, especially compared to Blacks. In addition, given that the CPES data were collected when immigration had taken on very negative connotations in some parts of the United States, more recently immigrated participants could be more sensitive to this particular item, which may reflect real differences in the perceptions of discrimination of these immigrant groups rather than bias in item functioning. Although further specific reasons for the item bias are not clear, researchers applying the EDS to Hispanics/Latinos or Asians should be careful about the potential risk for over-endorsement of this item by these racial/ethnic groups. A previous study examining measurement equivalence of the EDS (Lewis et al., 2012) did not find any evidence of racial/ethnic-bias in this particular item. Differences in results may be due to the use of different samples and response formats between Lewis et al. (2012) and our study. Our analyses used both men and women from nationally representative data, whereas only women were included in Lewis et al.’s study (2012). In addition, our study used the original 6-point Likert-type response format, whereas Lewis et al. (2012) used a revised 4-point Likert-type response format. Researchers should further elucidate potential reasons for the different racial/ethnic responses to this item.

Additional racial/ethnic-specific findings warrant further discussion. In accordance with previous research (Lewis et al., 2012), evidence from the present study suggests Blacks’ greater experiences with unfair treatment in their day-to-day life than all other racial/ethnic groups. Previous studies investigating differential item functioning (DIF) in depressive symptom items also found that Blacks had different responses to items relating to perceived discrimination (e.g., “people were unfriendly” and “I felt people disliked me”) (Blazer et al.,

1998; Kim, Chiriboga, & Jang, 2009), which may be related to their history of lower social status (Kim et al., 2009). Blacks' higher score on the latent construct found in the present study may be due to items included in the EDS scale being adopted from qualitative work on Blacks (Essed, 1990, 1991), in that essential components of Blacks' experiences with day-to-day discrimination might have been well represented in the EDS scale, whereas some potentially important components of day-to-day discrimination experiences among other diverse racial/ethnic groups might have not been accounted for. In addition, in accordance with previous studies (Lewis et al., 2012), Asians were less likely than other racial/ethnic groups to report their experiences with unfair treatment in their day-to-day life, which may be related to the "model minority" image of Asian Americans in the United States. However, given that Asian Americans are heterogeneous in terms of their immigration history, language, culture, and socioeconomic status, their everyday discrimination experiences may vary dramatically by ethnicity, which requires further investigation.

Some study limitations should be noted. First, given that our main focus was cross-racial/ethnic comparisons of the EDS, the present study did not consider ethnic subgroup differences. Given the reported heterogeneous characteristics of ethnic subgroups within Blacks, Hispanics/Latinos and Asians (Hajat, Lucas, & Kington, 2010; Kim et al., 2010), future research should examine potential differences in responses to the EDS items across different subgroups within each racial/ethnic group (e.g., African Americans vs. Caribbean Blacks). Second, other important background characteristics of racial/ethnic groups such as educational attainment and immigration-related factors (e.g., nativity, generational status, and English-speaking ability) were not considered as covariates in the present analyses due to the lack of evidence of the effects of these variables on the construct underlying the EDS in previous research. Given that not many national surveys try to capture linguistic diversity among ethnic minority participants, it is possible that many monolingual Spanish- or Asian language-speaking individuals may not be included these survey data, suggesting that more limited English proficient Hispanics/Latinos and Asians might have been represented in these data. Thus, further analyses on the influence of educational attainment and immigration-related factors (particularly language use) on measurement equivalence of the perceived discrimination will add to the current literature. Third, it is possible that perceived discrimination measured about a decade ago may be different from the concept measured more recently. Given the fact that the CPES contains 10-year old data, results presented in this study should be interpreted with caution and thus should be replicated with more recent data. Fourth, although examining differential correlates of the EDS by race/ethnicity would add to the existing literature, concurrent measures of the EDS were not available in a combined CPES data set of three different national surveys. Future research should further examine racial/ethnic differences in correlates of the EDS. Lastly, qualitative analyses would be helpful to better understand how the individual items and the perceived discrimination construct are perceived.

Notwithstanding these limitations, the present study holds significant implications and strengths. It should be emphasized that this may be one of the few studies examining the measurement equivalence of the EDS across four major racial/ethnic groups in the U.S., especially using a very large, nationally representative data set. Unlike previous studies demonstrating the measurement equivalence of the EDS in samples of two ethnic groups or

racially/ethnically diverse women from limited geographic areas (Chan et al., 2012; Lewis et al., 2012), we made a broad comparison of racially/ethnically diverse adults across the entire U.S. Findings from the present study indicate that racially/ethnically diverse minority adults in the U.S. in general perceive, experience, and report their everyday discrimination similarly, which may also imply that researchers can compare the concept of perceived discrimination meaningfully across different racial/ethnic groups with relatively little risk of cultural bias. One biased item identified in the present study, however, should be carefully used in the Hispanic/Latino and Asian groups. Given that the term "perceived discrimination" is widely used in psychological and health disparities research, researchers should clearly understand consequences of using non-equivalent perceived discrimination items for comparison and establish measurement equivalence of the existing discrimination scales such as the Experiences of Discrimination scale (Krieger, 1990), the Schedule of Racist Events (Landrine & Klonoff, 1996), and the Racism and Life Experiences Scale (Harrell, 1997) before diverse racial/ethnic groups are compared. In addition, given the identified race/ethnicity-specific experiences of and responses to day-to-day discrimination, researchers might want to consider developing culture- or race/ethnicity-specific discrimination scales.

In conclusion, the EDS can be used to measure perceived discrimination across diverse racial/ethnic groups as originally intended with some caution on racial/ethnic-specific responses to everyday discrimination experiences. However, researchers should be aware of the potential risk that compared to other racial/ethnic groups, Blacks are more susceptible to the experience of perceived discrimination and Asians are less likely to report their experiences of discrimination. In addition, given the identified non-invariant "people act as if they're better than you are" item among Hispanics/Latinos and Asians, researchers should be careful when interpreting results from the EDS across diverse racial/ethnic groups, especially Hispanics/Latinos or Asians. Further investigation should focus on structural equivalence of the EDS. Researchers should pay more attention to measuring perceived discrimination accurately and comprehensively. Given that stressful experiences are influenced by many factors and thus should be understood in cultural, historical and social contexts (Williams & Mohammed, 2009), cross-national equivalence of the perceived discrimination items should be further investigated.

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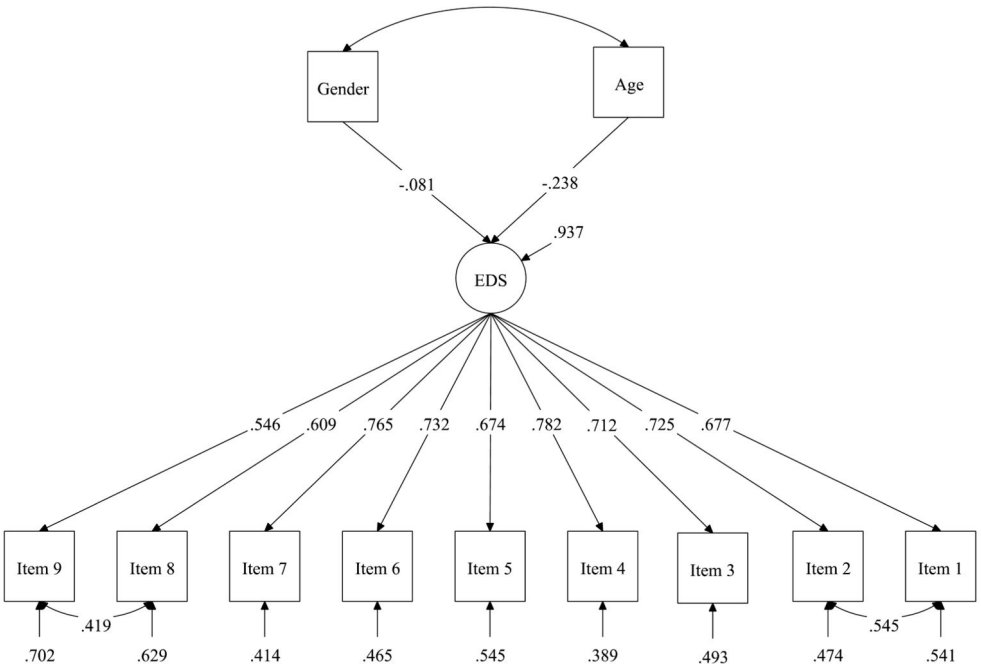

Figure 1.
Overall Covariance Parameter Estimates

Table 1

Descriptive Characteristics of the Sample.

	M ± SD (Range) or %				
	White	**Black**	**Hispanic/Latino**	**Asian**	**F (chi-square)**
Age	47.43 ± 16.89 (18–91)	42.45 ± 16.06 (18–94)	40.61 ± 15.66 (18–97)	41.21 ± 14.76 (18–95)	44.723***
Female	58.1%	63.4%	55.8%	52.4%	(88.72***)
Married	48.1%	36.7%	61.3%	70.3%	(88.72***)
Educational Attainment					(998.513***)
Less than high school	16.7%	23.7%	37.6%	15.1%	
High school diploma	33.0%	35.7%	25.2%	17.6%	
Some college	50.2%	50.6%	37.1%	67.3%	
Household Income	43K ± 34.0K	34K ± 31.0K	45K ± 45.5K	73K ± 58.7K	411.865***
Perceived discrimination	17.12 ± 6.78 (6–53)	19.82 ± 8.12 (1–54)	15.81 ± 7.45 (4–54)	15.84 ± 6.55 (1–54)	230.191***

Note.

*** $p < .001$

Table 2

CFA Model Fit Statistics for Separate Racial/Ethnic Group One-Factor Models.

Model	χ^2	df	*p*	CFI	TLI	RMSEA (90% CI)	SRMR
Original Models							
White	345.82	43	<.001	.840	.799	.089 (.081, .098)	.053
Black	2003.55	43	<.001	.838	.797	.096 (.092, .100)	.056
Hispanic/Latino	908.89	43	<.001	.856	.820	.086 (.081, .091)	.050
Asian	904.22	43	<.001	.833	.791	.098 (.092, .104)	.053
Final Re-specified Models							
White	140.35	41	<.001	.947	.931	.052 (.043, .062)	.037
Black	798.68	41	<.001	.938	.918	.061 (.057, .065)	.036
Hispanic/Latino	308.91	41	<.001	.956	.941	.049 (.044, .054)	.030
Asian	317.77	41	<.001	.946	.929	.057 (.051, .063)	.035

Note. Final re-specified models include correlated uniquenesses for items 1 and 2 and items 8 and 9.

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Table 3

Measurement Invariance Tests.

Model	S-B χ^2	df	CFI	ΔCFI	RMSEA (90% CI)
1. Configural	1511.65	164	.945	--	.056 (.053, .058)
2a. Weak	1698.28	188	.938	.007	.055 (.053, .057)
2b. Weak with CU	1720.27	194	.938	.007	.054 (.052, .057)
3a. Strong	2290.75	212	.915	.023	.061 (.058, .063)
3b. Partial Strong	1950.46	210	.929	.009	.056 (.054, .058)

Note. CU = correlated uniqueness are estimated to be equivalent.

Table 4

Latent Means, Variances, and Effect Size Differences across Racial/Ethnic Groups.

			Latent *d*		
	M	**Variance**	**2**	**3**	**4**
1. Whites	0.00_{a}	1.00	0.35	0.22	0.44
2. Black	0.46_{b}	1.81	--	0.55	0.73
3. Hispanic/Latino	-0.26_{ac}	1.49	--	--	0.17
4. Asian	-0.46_{c}	1.11	--	--	--

Note. Means with different subscripts are not equivalent (per invariance analyses).