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Socioeconomic and psychosocial mechanisms underlying racial/ethnic disparities in cognition among older adults

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Abstract

Objective: Racial/ethnic disparities in cognitive aging are only partly attributable to socioeconomic indicators. Psychosocial factors, such as discrimination and perceived control, also differ across racial/ethnic groups, and emerging literature highlights their potential role in contributing to cognitive disparities in addition to socioeconomic status.

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Method: 1,463 older adults (51% Hispanic, 27% non-Hispanic Black, 22% non-Hispanic White) in the Washington Heights-Inwood Columbia Aging Project completed cognitive and psychosocial measures, including a comprehensive neuropsychological battery, Everyday and Major Experiences of Lifetime Discrimination scales, and the Perceived Control scale. Mediation models quantified separate indirect effects of Black race and Hispanic ethnicity on global cognitive composite scores through education, income, discrimination, and external perceived control.

Results: Educational attainment, income, and perceived control each mediated racial/ethnic disparities in global cognition. Socioeconomic indicators (i.e., lower education, lower income) explained approximately 50% of the Black-White and Hispanic-White disparities in global cognition, and more external perceived control explained an additional 5–8%. Hispanics reported the lowest levels of discrimination, while non-Hispanic Blacks reported the highest levels. However, neither everyday nor major lifetime discrimination was associated with global cognition. Significant racial/ethnic disparities in global cognition remained after accounting for the included socioeconomic and psychosocial factors.

Conclusions: This study suggests that psychosocial factors may explain racial/ethnic disparities in cognitive aging above and beyond socioeconomic indicators. More external perceived control, which could reflect chronic exposure to interpersonal and institutional marginalization, may be a particularly salient psychosocial risk factor for poorer cognitive aging among non-Hispanic Black and Hispanic older adults.

Keywords

Locus of Control; Discrimination; Cognitive Aging; African American; Hispanic

Introduction

Racial/ethnic disparities in cognitive aging are well-documented (Manly & Mungas, 2015). Upon formal neuropsychological testing, both non-Hispanic Black and Hispanic older adults exhibit lower scores than non-Hispanic Whites across cognitive domains, including episodic memory, language, executive functioning, working memory, processing speed, vocabulary, and visuospatial functioning (Boone et al., 2007; Brewster et al., 2014; Díaz-Venegas et al., 2016; Liu et al., 2015; Sisco et al., 2015; Sol et al., 2020; Wilson et al., 2015; Zahodne et al., 2016). Racial/ethnic disparities in cognitive performance are multiply determined (Glymour & Manly, 2008), and additional research is needed to better understand the variety of causes across different racial/ethnic groups.

Much of the literature on racial/ethnic disparities in cognitive aging has focused on socioeconomic mediators, including educational attainment (e.g., Weuve et al., 2018) and income (e.g., Haq & Penning, 2019). On average, both Hispanic (Duncan et al., 2006) and non-Hispanic Black (Bloome, 2014; Donovan, 1984; Keith & Benson, 1992; Reynolds, 1989) older adults report lower educational attainment and income than non-Hispanic Whites. In turn, both lower educational attainment and lower income each predict lower cognitive performance in late life when considered together (Koster et al., 2005; Zahodne et

al., 2015). However, these objective indicators of socioeconomic status do not fully explain racial/ethnic disparities in cognitive aging.

Emerging research highlights the role of psychosocial factors, such as racially-patterned social stress, in explaining cognitive inequalities. For example, everyday discrimination mediated Black-White disparities in episodic memory level and change in the Health and Retirement Study (Zahodne, Kraal, Sharifian, et al., 2019; Zahodne, Sol, et al., 2019). However, findings regarding associations between everyday discrimination and cognitive outcomes have been mixed. While some studies found negative associations (Barnes et al., 2012; Zahodne et al., 2020), some found positive associations (Pugh et al., 2020), and some found no associations (Zahodne et al., 2017). Because these studies focused on everyday forms of discrimination experienced through interpersonal interactions (e.g., microaggressions), even less is known about potential links between major experiences of lifetime discrimination and cognitive aging. Thus, additional research is needed to clarify the relationship between different types of discrimination and cognitive aging and to identify other measures of psychosocial stress that may be relevant to racial/ethnic disparities in cognition.

Above and beyond discrimination, lower perceived control mediated Black-White disparities in episodic memory and executive functioning in the National Survey of Midlife Development in the United States (Zahodne et al., 2017). Lower perceived control also contributed to Black-White and Hispanic-White disparities in episodic memory in the Health and Retirement Study (Zahodne, Sol, et al., 2019). The construct of perceived control originated in social learning theory (Rotter, 1966), and it refers to the extent to which individuals feel like they have control over important life outcomes (Lefcourt, 2014). Perceived control reflects a learned view of the self and the environment, and it can change over time and in response to experience (Eizenman et al., 1997). While early work on the control construct considered internal and external control beliefs as two ends of a single continuum, more recent work emphasizes internal and external perceived control as separate dimensions, with more external perceived control characterized by beliefs about environmental or interpersonal constraints that limit instrumentality (Lefcourt, 2014; Lachman, Neupert & Agrigoroaei, 2011). Compared with non-Hispanic Whites, both Hispanics and non-Hispanic Blacks report more external perceived control (Mirowsky & Ross, 1983, 1990). In turn, more external perceived control is linked to worse subsequent cognitive aging (Caplan & Schooler, 2003; Seeman et al., 1996). Drawing on cognitive behavioral theory (Bandura, 1997), the relationship between perceived control and cognitive outcomes has been theorized to be reciprocal, and external perceived control may lead to lower cognitive performance via behavioral, motivational, and affective mechanisms (Lachman, 2006).

Together, these studies suggest that the subjective psychosocial experiences of non-Hispanic Black and Hispanic adults may contribute to racial/ethnic disparities in cognitive aging in addition to objective socioeconomic resources. The biopsychosocial model proposed by Clark and colleagues (1999) provides a theoretical foundation for how racially-patterned social stress may affect health. These authors not only consider the structural and institutional forces that shape racial inequalities in health, but also outline how subjective

social experiences can contribute to health disparities via psychological and physiological stress responses. However, this seminal paper focused exclusively on African Americans. Indeed, the vast majority of the extant literature on psychosocial contributors to racial/ethnic disparities in cognitive aging focuses on Black-White differences, with very few studies including Hispanic older adults (c.f., Zahodne, Sol, et al., 2019).

In the United States (U.S.), the broad health impacts of racially-patterned social stress can be seen not only for non-Hispanic Blacks (Beatty Moody et al., 2018; Chae et al., 2010; Guyll et al., 2001; Lewis et al., 2010; Zahodne, Kraal, Zaheed, et al., 2019), but also for Hispanics (Beatty Moody et al., 2018; Cuevas et al., 2016; Molina et al., 2019), who represent the largest and fastest-growing minority group in the U.S. (Colby & Ortman, 2015). For example, greater racial/ethnic discrimination was associated with psychological distress, unhealthy body mass index, and sleep disturbances in a sample of 1,332 Hispanic adults in the Texas City Stress and Health Study (Garcini et al., 2018). Similarly, additional studies have linked greater discrimination to worse overall health (Brondolo et al., 2011), mental health (Howarter & Bennett, 2013), and physical health-related quality of life (Molina et al., 2019) in Hispanic samples. Hispanic immigrants may also face psychosocial stressors related to acculturation, anti-immigrant policies and attitudes, and disruption of social networks (Cervantes, Padilla, & Salgado de Snyder, 1990). Additional research is needed to understand how socioeconomic and psychosocial disadvantages contribute to *cognitive* disparities across Hispanics, non-Hispanic Blacks, and non-Hispanic Whites.

The current study sought to extend the literature on racial/ethnic inequalities in cognitive aging by examining the separate contributions of multiple socioeconomic and psychosocial factors in a sample of 1,463 Hispanic, non-Hispanic Black, and non-Hispanic White older adults living in northern Manhattan. Specifically, we quantified the proportions of Black-White and Hispanic-White disparities in performance on a comprehensive neuropsychological battery that were explained by educational attainment, income, discrimination, and perceived control. Based on prior research, we predicted that non-Hispanic Black and Hispanic older adults would demonstrate lower cognitive scores compared to non-Hispanic White older adults, and these racial and ethnic differences would be partly attributable to lower socioeconomic status, greater discrimination, and more external perceived control.

Method

Participants and Procedures

The 1,463 individuals in this sample participated in the Washington Heights-Inwood Columbia Aging Project (WHICAP; Manly et al., 2005; Tang et al., 2001), a longitudinal, community-based study of aging and dementia in northern Manhattan. In brief, adults aged 65 and older living in the study catchment area were identified from Medicare records or a commercial marketing company in two initial waves (1992, 1999), and ongoing since 2009. WHICAP visits take place approximately every 18–24 months in participants' homes or at the Columbia University Medical Center. At each visit, bilingual research staff administer a battery of cognitive, functional, and health measures in the participant's preferred language (English or Spanish).

The current sample included only participants who received a set of psychosocial measures that was added to the core WHICAP battery in 2017. Thus, while WHICAP is a longitudinal study, only cross-sectional data were available for the current analyses. Additional inclusion criteria for the current study were: (1) availability of at least one cognitive outcome; (2) availability of data on basic sociodemographics (i.e., age, sex/gender, and race/ethnicity). Characteristics of the analytic sample (N = 1,463) are shown in Table 1. This study complied with the ethical rules for human experimentation stated in the Declaration of Helsinki and was approved by the local institutional review board. Informed consent was obtained from all participants.

Cognitive Outcomes

Cognition in WHICAP is assessed with a comprehensive neuropsychological battery (Stern et al., 1992). English measures were translated into Spanish, and back translation and reconciliation ensured comparability of English and Spanish versions. In the current study, 93% of Hispanics were tested in Spanish. Factor analysis previously revealed that the WHICAP neuropsychological battery assesses the following four cognitive domains: episodic memory, language, speed, and visuospatial functioning, and this factor structure is invariant across English and Spanish speakers (Siedlecki et al., 2010).

Based on this factor analysis, cognitive composites in WHICAP are derived by converting all cognitive test scores to z-scores using means and standard deviations from the overall sample at baseline and averaging them within each domain. Episodic memory composite scores include immediate, delayed, and recognition trials from the Selective Reminding Test (Buschke & Fuld, 1974). Language scores include a modified 15-item Boston Naming Test (Kaplan, Goodglass, & Weintraub, 1983), letter fluency (i.e., C, F, L), category fluency (i.e., animals), the Similarities subtest of the Wechsler Adult Intelligence Scale – Revised (Wechsler, 1981), and the Repetition and Comprehension subtests of the Boston Diagnostic Aphasia Examination (Goodglass, 1983). Speed scores include Color Trails I and II (D'Elia et al., 1994). Visuospatial scores include recognition and matching trials from the Benton Visual Retention Test (Benton, 1955), the Rosen Drawing Test (Rosen, 1981), and the Identities and Oddities subtest of the Dementia Rating Scale (Mattis, 1976). In the current study, episodic memory, language, speed, and visuospatial composites were averaged to obtain a comprehensive indicator of global cognitive functioning, which was used as the outcome variable in all models.

Socioeconomic and Psychosocial Mediators

Based on previous literature (Zahodne et al., 2017; Zahodne, Sol, et al., 2019), the current study considered multiple potential mediators of associations between race/ethnicity and cognitive performance, including socioeconomic status, discrimination, and perceived control. Correlations among these predictors of interest are shown in Table 2.

Socioeconomic status was operationalized with two variables: educational attainment and monthly household income. Educational attainment was self-reported and ranged from 0 to 20. Monthly self-reported household income was operationalized as a 12-category variable ranging from $450 or less to more than $4,000 and was treated as a continuous variable.

Discrimination was operationalized with the Everyday Discrimination (Williams et al., 1997) and Major Experiences of Lifetime Discrimination (Williams et al., 1997) scales, modified to be administered orally due to the wide range of literacy levels in WHICAP. Everyday discrimination comprised 10 items assessing how often participants experience unfair treatment in their day-to-day life (e.g., "*You are treated with less respect than other people*"). Responses are on a 6-point Likert-type scale ranging from Never (6) to Almost Every Day (1). Items were reverse-scored and averaged so that higher scores correspond to greater everyday discrimination. Major Experiences of Lifetime Discrimination comprised 9 dichotomous items assessing the occurrence of unfair treatment in relation to a variety of major life events (e.g., "*At any time in your life, have you ever been unfairly fired from a job?*"). Items were summed so that higher scores correspond to greater lifetime discrimination.

Perceived control was operationalized using the Constraints subscale of the Perceived Control scale (Lachman & Weaver, 1998), which was modified to be administered orally. This subscale corresponds to external perceived control and comprises 8 items querying whether participants agree with statements such as "*What happens in my life is often beyond my control*" and "*I sometimes feel I am being pushed around in my life.*" Items were summed so that higher scores correspond to more perceived constraints (i.e., more external perceived control). Of note, the Mastery subscale of the Perceived Control scale, which corresponds to internal perceived control, was not used in the current study given prior empirical evidence that it does not predict cognitive performance in older adults (Sharpe et al., 2014). Furthermore, previous studies indicate that internal perceived control does not vary by race and does not mediate Black-White disparities in cognitive outcomes in older adults (Zahodne et al., 2015).

Race/Ethnicity

Race and ethnicity were determined using the format of the 2000 U.S. Census. Blacks and Whites were all non-Hispanic, and Hispanics could have identified as any race. To estimate Black-White and Hispanic-White differences, race/ethnicity was operationalized as dummy-coded variables with non-Hispanic Whites as the reference group.

Covariates

All models controlled for age and sex/gender. A sensitivity analysis additionally controlled for depressive symptoms, vascular/cardiometabolic disease burden, and stroke, each of which show reliable associations with cognitive aging outcomes (Diniz, Butters, Albert, Dew, & Reynolds, 2013; Marden, Mayeda, Tchetgen Tchetgen, Kawachi & Glymour, 2017; Savva et al., 2010; Verhaeghen, Borchelt & Smith, 2003). We conceptualize these mental and physical health constructs as potential mediators of the effects of socioeconomic and psychosocial disadvantage on cognition, in line with previous theoretical work (Clark et al., 1999; Zahodne et al., 2019). Therefore, including them as covariates in the primary model could lead to an underestimate of the cognitive effects of the socioeconomic and psychosocial predictors of interest. However, we acknowledge that depressive symptoms, vascular/cardiometabolic diseases, and stroke could also potentially influence socioeconomic conditions and/or psychosocial functioning. Therefore, they could

represent confounders of certain associations, which is why we included them as covariates in a sensitivity analysis. Depressive symptoms were quantified with a 10-item version of the Center for Epidemiological Studies Depression Scale (CES-D; Irwin, Artin, & Oxman, 1999). Vascular/cardiometabolic disease burden was quantified as the sum of the self-reported presence/absence of hypertension, diabetes, and heart disease. Stroke was operationalized as the self-reported presence/absence of a history of stroke.

Statistical Analysis

Descriptive statistics were computed using SPSS version 25 (IBM Corp., Armonk, NY). Groups were compared using chi square tests for categorical variables and analyses of variance (ANOVAs) with post-hoc Tukey's Honest Significant Difference tests for continuous variables. Mediation models were conducted in Mplus version 8 (Muthén, L. K., & Muthén, 2011) using maximum likelihood estimation. All mediators were modeled simultaneously and allowed to covary. Missing data were managed with full information maximum likelihood, which can handle non-random missingness due to variables included in the models (e.g., age, race/ethnicity). Direct effects were defined as the association between race/ethnicity and cognition, adjusted for all mediators and covariates. Indirect effects were defined as the product of the association between race/ethnicity and a mediator (e.g., education) and the association between that mediator and cognition, adjusted for covariates. Total effects were defined as the sum of direct and indirect effects and reflect the association between race/ethnicity and cognition adjusted only for covariates. Because covariates were included to control for both exposure-mediator and mediator-outcome confounding, mediation models were fully saturated, resulting in perfect model fit.

Results

Racial/Ethnic Differences

As shown in Table 1, there were significant racial/ethnic differences in all variables of interest. With regard to socioeconomic status, Hispanics reported the lowest levels of education and income, followed by non-Hispanic Blacks, then non-Hispanic Whites. Hispanics also reported the lowest levels of everyday and lifetime discrimination, followed by non-Hispanic Whites, then non-Hispanic Blacks. Hispanics reported the most external perceived control, followed by non-Hispanic Blacks, then non-Hispanic Whites. Hispanics obtained the lowest cognitive scores across all domains, followed by non-Hispanic Blacks, then non-Hispanic Whites. Hispanics reported more depressive symptoms than non-Hispanic Blacks and Whites, who did not differ from each other. Hispanics reported the most vascular/cardiometabolic diseases, followed by non-Hispanic Blacks, then non-Hispanic Whites. More Hispanics reported a history of stroke compared with both non-Hispanic Blacks and Whites, who did not differ from each other.

As shown in Table 2, patterns of inter-correlation among the predictors of interest were not identical across the three racial/ethnic groups. While eduation and income were positively correlated with one another and negatively correlated with external perceived control among all groups, these variables exhibited different patterns of association with the discrimination measures across groups. Specifically, more frequent everyday discrimination was associated

with more education among non-Hispanic Blacks, but not among Hispanics or non-Hispanic Whites. Similarly, more instances of lifetime discrimination were associated with more education among Hispanics and non-Hispanic Blacks, but not among non-Hispanic Whites. Finally, more discrimination (both everyday and lifetime) was associated with more external perceived control among Hispanics and non-Hispanic Whites, but not among non-Hispanic Blacks.

Mediation Model

Results of the mediation model are shown in Table 3 and Figure 1. As shown, there were total effects of race/ethnicity on global cognition. Controlling for age and sex/gender, both non-Hispanic Black and Hispanic participants obtained lower scores than non-Hispanic Whites. These associations were partially mediated by education, income, and perceived control, but not by everyday discrimination or lifetime discrimination. Compared with non-Hispanic Whites, non-Hispanic Blacks and Hispanics reported lower education and income, as well as more external perceived control. In turn, lower education, lower income, and more external perceived control were each associated with worse global cognition. Education explained 29% of the Black-White disparity and 39% of the Hispanic-White disparity. Income explained an additional 16% of the Black-White disparity and 16% of the Hispanic-White disparity. External perceived control explained an additional 5% of the Black-White disparity and 8% of the Hispanic-White disparity. Significant direct effects indicated that racial/ethnic differences in global cognition remained even after considering all of the included mediators and covariates.

Sensitivity Analyses

Results were unchanged when participants with a consensus diagnosis of dementia (n=172) were excluded from the analysis. In WHICAP, dementia diagnoses are made by a consensus group of neurologists and neuropsychologists based on *Diagnostic and Statistical Manual of Mental Disorders, Revised Third Edition* criteria (American Psychiatric Association, 1987) using all available neuropsychological, functional, and medical data. A separate sensitivity analysis considered depressive symptoms, vascular/cardiometabolic diseases, and stroke as additional covariates, and the pattern of results was unchanged.

Finally, a separate series of sensitivity analyses was conducted to determine whether effects of discrimination and perceived control had been underestimated due to the inclusion of the other mediators. In separate models that included only a discrimination measure, age, and sex/gender, neither everyday (β=0.029; 95% CI: −0.015 – 0.072) nor lifetime (β=0.031; 95% CI: −0.004 – 0.007) discrimination was associated with global cognition. Similarly, neither everyday (β=0.031; 95% CI: −0.007 – 0.070) nor lifetime (β=0.021; 95% CI: −0.010 – 0.053) discrimination was associated with global cognition in models that included only one discrimination measure, age, sex/gender, education, and income. In a separate model that included only the perceived control measure, age, and sex/gender, external perceived control showed a stronger association with global cognition (β=−0.245; 95% CI: −0.279 – −0.211) and explained a greater proportion of the Hispanic-White (12%) and Black-White (7%) disparities in global cognition compared with the primary model. Specifically, external perceived control explained an additional 4% of the Hispanic-White disparity, which is 50%

more than the 8% explained by this variable in the primary model. For the Black-White disparity, external perceived control explained an additional 2%, which is 40% more than the 5% explained by this variable in the primary model.

Discussion

This study of a large, racially/ethnically diverse sample of older adults living in northern Manhattan provides evidence that both socioeconomic and psychosocial experiences contribute to late-life cognitive disparities. Lower educational attainment was the largest mediator of both Black-White and Hispanic-White disparities in global cognition, followed by lower income and more external perceived control (i.e., the perception of environmental or other constraints that limit control over important life outcomes).

Socioeconomic Mediators of Cognitive Disparities

The finding that racial/ethnic differences in educational attainment represented the strongest contributor to cognitive disparities is highly consistent with previous studies (Aiken Morgan et al., 2010; Sisco et al., 2015; Yaffe et al., 2013; Zahodne et al., 2017). Lower educational attainment among Hispanics and non-Hispanic Blacks is largely attributable to structural inequities, such as racial disparities in wealth and racially-patterned residential segregation, which result in differential educational opportunities for many minority children and young adults (Donovan, 1984; Keith & Benson, 1992; Reynolds, 1989). Because the majority of Hispanic participants in the current study were born and educated in the Carribbean, Hispanic-White disparities in educational attainment also reflect cross-national differences in compulsory school laws, educational quality, achievement, and educational attainment (Schleicher, 2018). Of note, the importance of educational experiences is likely to have been underestimated in the current study, as it did not include measures of educational quality. Single-word reading ability has been used as a proxy for educational quality and helps to explain Black-White cognitive disparities above and beyond years of education (Manly et al., 2002). However, measures of single-word reading ability were not included in the current multiethnic study because different reading tests were necessarily used in English versus Spanish speaking participants.

In addition to education, lower income among Hispanics and non-Hispanic Blacks compared with non-Hispanic Whites also explained a substantial proportion of cognitive disparities, which is in line with previous research (Mehta et al., 2004; Schwartz et al., 2004). In the U.S., the median income of Black families is approximately 60% that of White families, and this income disparity has remained consistent since the 1960s (Bloome, 2014). While income levels vary widely across Hispanic subgroups in the U.S., national data suggest that Hispanic families' incomes are approximately 73% that of non-Hispanic White families (Mora & Dávila, 2018). Of note, the current study may have underestimated the importance of economic resources due to the lack of measures of wealth (e.g., financial assets). Wealth may be a better indicator of economic resources among older adults in the U.S. due to leveling effects of retirement and social security (Holtz-Eakin & Smeeding, 1994).

Psychosocial Mediators of Cognitive Disparities

Above and beyond socioeconomic indicators, more external perceived control contributed to both Hispanic-White and Black-White disparities in cognition, which is in line with previous studies (Zahodne et al., 2017; Zahodne, Sol, et al., 2019). The current study extends these prior results from national data sets to a regionally-representative sample of diverse older adults living in the same neighborhood (roughly the same five square miles) who were tested in-person with a comprehensive neuropsychological battery.

Both Hispanic and non-Hispanic Black older adults in this study reported more external perceived control than non-Hispanic Whites. These racial/ethnic differences are in line with previous work suggesting that repeated experiences of inequity and racism can lead to social and economic constraints, as well as demoralization and fatalism among historically marginalized groups (Mirowsky & Ross, 1983, 1990). In turn, perceiving more external control has been theorized to directly interfere with cognitive performance by heightening anxiety, cognitive rumination, and/or self-doubt (Bandura, 1989; Bandura & Wood, 1989; Wood & Bandura, 1989).

Perceiving more external control may also lead to worse cognitive aging indirectly. For example, perceiving more external control has been associated with lower participation in healthy behaviors that have been linked to better cognitive aging (Mueller et al., 2013; Scarmeas et al., 2009), such as cognitively-stimulating activities, refraining from smoking, and eating a balanced diet (Bandura, 1981, 1986, 1988; Lachman et al., 2011). Individuals who feel less in control of their lives may not perceive the utility of personal health behaviors, particularly in the context of other, greater threats to health. They may also engage in behaviors that compromise physical health as a means of coping with psychological distress (Mezuk et al., 2013). Perceived control also appears to have implications for stress responding. Perceiving less external control predicts more adaptive coping (Gourounti et al., 2012) and buffers physiological stress responses related to both acute and lifetime stressors (Bollini et al., 2004; Elliot et al., 2017). In turn, a substantial literature implicates stress processes in poorer cognitive aging (Aggarwal et al., 2014; Machado et al., 2014; Peavy et al., 2009). The current study provides additional support for the relevance of perceived control to the study of cognitive aging and also highlights its particular role in cognitive disparities, which has received relatively less attention in the literature to date.

The finding that non-Hispanic Black older adults reported more discrimination than non-Hispanic Whites is highly consistent with some previous studies (Barnes et al., 2004; Zahodne et al., 2017; Zahodne et al., 2019). However, the extant literature contains mixed findings regarding associations between discrimination and cognitive outcomes. In the current study, neither everyday nor lifetime discrimination was associated with global cognition. This finding is consistent with a previous study of non-Hispanic Black and White adults in the National Survey of Midlife in the United States, which found that everyday discrimination was not associated with measures of episodic memory or executive functioning (Zahodne et al., 2017). However, the lack of association between discrimination and cognition contrasts somewhat with a previous study of diverse older adults in the Health and Retirement Study (Zahodne, Sol, et al., 2019). While more

frequent everyday discrimination was *not* associated with worse episodic memory level independent of external perceived control in that study, it *was* associated with faster subsequent episodic memory decline (Zahodne, Sol, et al., 2019). Among Black older adults, early cross-sectional analyses in the Minority Aging Research Study indicated that more frequent discrimination was associated with worse episodic memory and perceptual speed (Barnes et al., 2012). However, more recent longitudinal analyses in that study indicate that more frequent discrimination is associated with better initial working memory, as well as slower subsequent semantic memory decline (Pugh et al., 2020). Given these mixed results, additional research is needed to clarify associations between discrimination and cognitive aging outcomes, particularly in different racial/ethnic groups.

In line with Clark and colleagues' (1999) biopsychosocial model, discrimination has the potential to reduce health through stress pathways involving physiological dysregulation. However, the experience of stress includes not only the occurrence of stressors, but also an individual's interpretations of and reactions to these stressors (Cohen et al., 1983). Importantly, Hispanic and non-Hispanic Black adults in the U.S. report being less upset by chronic stressors (e.g., health, social, or financial problems) than non-Hispanic Whites, despite having greater exposure (Brown et al., 2020). Indeed, the same stressor may exert differential impacts on individuals as a function of their personal characteristics (Kessler, 1979). It is also notable that older adults report less discrimination than middle-aged adults, which could reflect habituation, age differences in social roles, age differences in coping, and/or birth cohort differences in the interpretation of racist events (Clark, 2004). Thus, it is possible that commonly-used discrimination measures do not fully capture individuals' experiences or, perhaps even more importantly, the potential impact of these experiences.

In the current study, Hispanic participants did not report more frequent experiences of discrimination than non-Hispanic Whites, which is in line with previous findings (Lewis et al., 2012; Zahodne et al., 2017; Zahodne, Sol, et al., 2019). Acculturation (e.g., English proficiency), age of immigration, and ethnic identity are each inversely associated with reports of discrimination among Hispanics in the U.S. (Finch et al., 2000; Pérez et al., 2008). These findings may indicate that Hispanics are less likely to interpret interpersonal experiences of discrimination as such when they are less familiar with the racism that is embedded within U.S. culture and institutions. Additional work is needed to understand the extent to which these findings reflect differences in the occurrence and/or the perception of discrimination.

The current finding that Hispanics reported significantly lower rates of discrimination than non-Hispanic Whites and Blacks may also reflect the unique context of ethnic enclaves such as northern Manhattan, which is characterized by a high density of Spanish-speaking businesses and service providers, as well as co-ethnics from the Caribbean. While Hispanics living in such an ethnic enclave may not frequently experience day-to-day instances of interpersonal discrimination or perceive events as such, it is important to note that they still experience significant structural barriers to their well-being, as well as that of their friends and family, which are not likely to be fully captured by the commonly-used measures of discrimination that were developed based on qualitative work with Black adults. Indeed, these structural barriers (e.g., lack of neighborhood resources, anti-immigrant policies) may

partly explain why Hispanics in the current study reported the highest levels of external perceived control.

Together, the current pattern of results regarding psychosocial mediators of cognitive disparities may suggest that measures of external perceived control capture the psychosocial experiences of non-Hispanic Blacks and Hispanics that are most relevant to cognitive disparities better than commonly-used measures of discrimination. External perceived control may capture the impacts of not only interpersonal discrimination, but also vicarious discrimination, anticipatory discrimination, institutional racism, and other stressful life events that are more commonly experienced by Hispanic and Black individuals in the U.S. While the proportions of the racial/ethnic disparities explained by external perceived control were relatively low (i.e., 5–8%), it is notable that these proportions were 40–50% larger in sensitivity analyses that excluded SES measures. This pattern of results may suggest that in addition to contributing to cognitive disparities over and above SES (i.e., additive effects), external perceived control may also mediate some of the negative cognitive effects of low SES. Thus, external perceived control may also represent a more proximal intervention target to interrupt risk pathways involving SES.

The current study may have important implications for reducing racial/ethnic disparities in cognitive aging. Policies to dismantle structural racism (e.g., investing in minority communities, criminal justice reform) may reduce cognitive disparities, in part, by reducing environmental constraints that lead to more external perceived control among non-Hispanic Back and Hispanic adults. In addition, we recommend that individual-level interventions with non-Hispanic Black and Hispanic adults explicitly address external control beliefs, and the environmental constraints that promote them, to maximize cognitive and other health benefits (Zahodne et al., 2015). For example, health promotion interventions could help participants identify strategies to overcome specific structural barriers to behavior change, and cognitive training interventions could include psychoeducation about individuals' ability to improve their own cognitive performance.

Limitations and Strengths

A primary limitation of this study is its cross-sectional design due to the recent addition of the psychosocial measures to the WHICAP battery. Follow-up of these participants is ongoing, so future work will examine socioeconomic and psychosocial mediators of racial/ethnic differences in cognitive trajectories. Of note, racial/ethnic disparities in cognitive aging are far more consistent and pronounced for cognitive level than for subsequent rates of cognitive change (Manly & Mungas, 2015). Therefore, eliminating racial/ethnic disparities in cognitive level is likely to have the greatest impact on dementia inequalities, underscoring the significance of the current study. While the simultaneous mediation framework used in the current study allowed for an evaluation of the relative contributions of socioeconomic and psychosocial variables to cognitive disparities, it did not model potential sequential mediation. Specifically, lower socioeconomic economic status can contribute to discrimination and/or perceived control. However, the direction of associations among the included mediators is not clear-cut. For example, the lifetime discrimination measure queries

whether participants were ever unfairly discouraged from pursuing higher education. Future research should endeavor to disentangle causal pathways, which may be bi-directional.

Strengths of this study include the racially and ethnically diverse sample, which allowed for an examination of mediators of both Black-White and Hispanic-White cognitive disparities within the same sample. The focus on individuals living in the same geographic region reduces the potential for confounding due to major geographic differences. Another strength is the inclusion of multiple potential psychosocial mediators of disparities, which allowed for preliminary recommendations about psychososcial constructs that should be prioritized in future studies of racial/ethnic disparities (i.e., external perceived control). Finally, the use of a comprehensive, in-person neuropsychological battery allowed for a better characterization of cognition than in previous national studies (e.g., Zahodne et al., 2017; Zahodne, Sol, et al., 2019)

Conclusions

This study of Hispanic, non-Hispanic Black, and non-Hispanic White older adults living in northern Manhattan confirms that commonly-measured socioeconomic indicators only partly explain racial/ethnic disparities in cognition. This study also highlights the additive contribution of external perceived control to both Hispanic-White and Black-White cognitive disparities. External perceived control likely reflects chronic exposure to interpersonal and institutional marginalization that culminates in differential patterns of cognitive health in late life. Future models of racial/ethnic disparities in cognitive aging should explicitly incorporate psychosocial factors such as perceived control.

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Key Points:

What is the key question this paper addresses?

What factors explain racial/ethnic inequalities in cognitive functioning among older adults?

What are the primary findings?

Lower socioeconomic status and lower perceived control each contribute independently to racial/ethnic inequalities in cognitive functioning.

What are the key scientific and practical implications of the findings?

Targeting both economic and psychosocial factors may help to reduce racial/ethnc inequalities in cognitive aging.

What directions should be explored in future research?

Future research should disentangle causal pathways to inequality involving socioeconomic and psychosocial factors, which may be interactive and/or bi-directional.

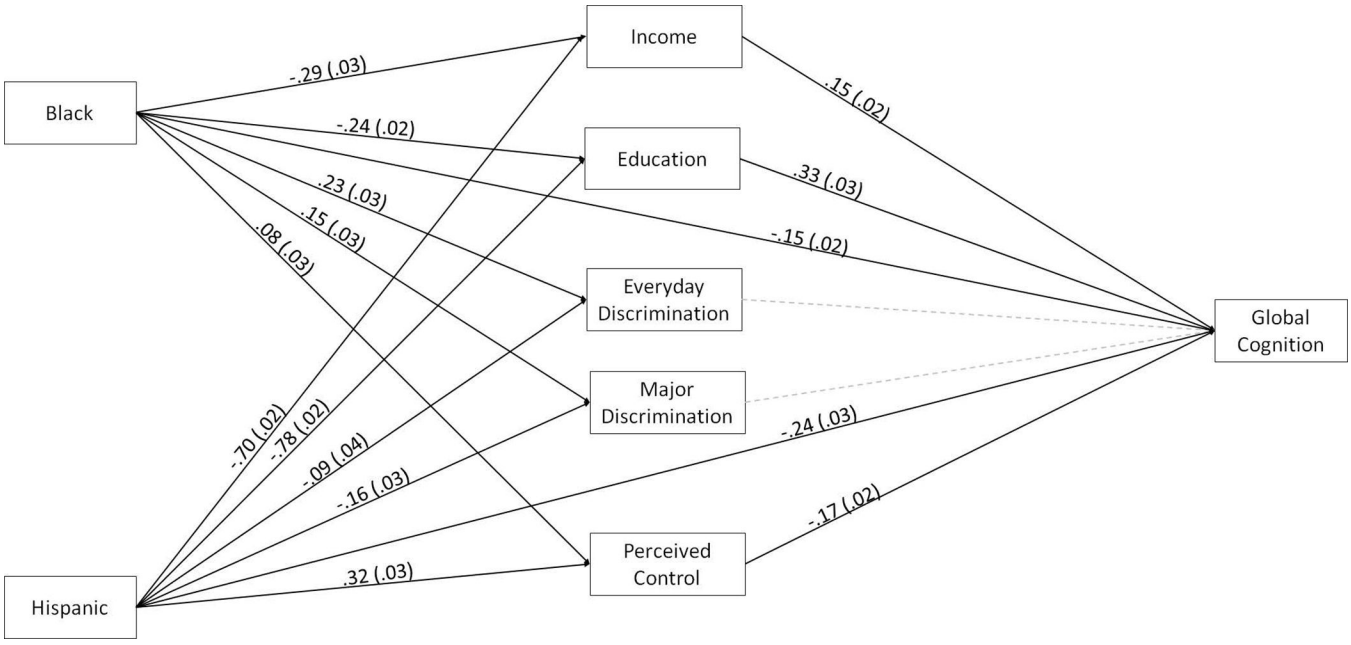

Figure 1.

Mediation model. Significant paths are shown as black lines, with corresponding standardized parameter estimates and standard errors. Non-significant paths are depicted with gray, dotted lines. For simplicity, covariates (i.e., age, sex/gender) and covariances between mediators are not shown.

Table 1.

Characteristics of the sample by race/ethnicity

	Hispanic (*N* = 740)	Non-Hispanic Black (*N* = 395)	Non-Hispanic White (*N* = 328)	Group Differences[a]
Age	80.26 (7.53)	77.06 (7.15)	77.50 (6.37)	B=W<H
Sex/gender (% female)	73.11	68.35	56.10	W<B<H
Education (0–20)	7.76 (4.37)	13.50 (3.02)	16.26 (2.92)	H<B<W
Income (1–12)	6.02 (2.44)	8.50 (2.61)	10.49 (2.27)	H<B<W
Depressive symptoms (0–10)	1.71 (1.91)	1.36 (1.73)	1.24 (1.55)	W=B<H
Vascular/cardiometabolic diseases (0–3)	1.37 (0.85)	1.24 (0.82)	0.89 (0.82)	W<B<H
History of stroke (% yes)	8.97	5.10	2.48	W=B<H
Everyday Discrimination (1–6)	1.10 (0.22)	1.46 (0.59)	1.22 (0.38)	H<W<B
Lifetime Discrimination (0–9)	0.36 (0.73)	1.28 (1.74)	0.87 (1.20)	H<W<B
Perceived Constraints (0–8)	2.34 (2.13)	1.34 (1.65)	1.01 (1.36)	W<B<H
Episodic Memory (z-score composite)	−0.14 (0.84)	0.35 (0.91)	0.82 (0.75)	H<B<W
Language (z-score composite)	−0.18 (0.68)	0.55 (0.56)	1.06 (0.45)	H<B<W
Speed (z-score composite)	−0.02 (1.02)	0.69 (0.76)	1.07 (0.62)	H<B<W
Visuospatial Functioning (z-score composite)	−0.03 (0.72)	0.52 (0.47)	0.84 (0.36)	H<B<W
Global Cognition (z-score composite)	−0.09 (0.66)	0.52 (0.57)	0.95 (0.43)	H<B<W

[a]Significant group differences were determined using chi-square tests for categorical variables and analyses of variance with post-hoc Tukey's Honest Significant Difference tests for continuous variables.

Table 2.

Correlations among the predictors of interest

	1	2	3	4
All participants				
1. Education	-			
2. Income	.584*	-		
3. Everyday Discrimination	.177*	.057	-	
4. Lifetime Discrimination	.250*	.111*	.471*	-
5. Perceived Constraints	−.374*	−.337*	−.002	−.047
Hispanic				
1. Education	-			
2. Income	.324*	-		
3. Everyday Discrimination	.076	.032	-	
4. Lifetime Discrimination	.079*	.020	.365*	-
5. Perceived Constraints	−.248*	−.214*	.181*	.094*
Non-Hispanic Black				
1. Education	-			
2. Income	.327*	-		
3. Everyday Discrimination	.162*	−.056	-	
4. Lifetime Discrimination	.243*	−.011	.430*	-
5. Perceived Constraints	−.280*	−.195*	−.033	−.065
Non-Hispanic White				
1. Education	-			
2. Income	.184*	-		
3. Everyday Discrimination	.027	−.035	-	
4. Lifetime Discrimination	.029	−.174*	.405*	-
5. Perceived Constraints	−.118*	−.233*	.220*	.194*

* $p < .05$

Table 3.

Standardized estimates (95% confidence intervals) from the mediation model

	Black-White Disparity	Hispanic-White Disparity
Total effect	−0.276 (−0.315 – −0.237) *	−0.664 (−0.700 – −0.628) *
Indirect effects through:		
Education	−0.079 (−0.096 – −0.063) *	−0.260 (−0.294 – −0.225) *
Income	−0.044 (−0.058 – −0.030) *	−0.107 (−0.136 – −0.076) *
Everyday Discrimination	0.008 (−0.001 – 0.018)	−0.003 (−0.008 – 0.001)
Lifetime Discrimination	0.003 (−0.002 – 0.008)	−0.003 (−0.009 – 0.002)
Perceived Constraints	−0.014 (−0.023 – −0.004) *	−0.054 (−0.068 – −0.041) *
Direct effect	−0.150 (−0.187 – −0.113) *	−0.236 (−0.286 – −0.186) *

* $p < .05$