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Volunteering, Educational Attainment, and Literacy Skills among Middle-Aged and Older Adults by Racial and Ethnic Groups in the U.S.

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Abstract

Volunteer participation benefits societies and individuals. The objective of this study was to examine the roles of education and adult literacy in formal volunteering among a nationally

representative sample of the U.S. middle-aged and older adults (45-74 years) by race and ethnicity (Whites, Blacks, Hispanics). Using cross-sectional data ($n = 3,770$) from the 2012/2014/2017 Program for the International Assessment of Adult Competencies (PIAAC), structural equation models were used to determine mediation relationships among educational attainment, literacy, and volunteering. The effect of educational attainment on formal volunteering was significantly greater among middle-aged and older Black adults compared to their Hispanic counterparts, as well as among middle-aged and older White adults compared to their Hispanic counterparts. However, literacy was the education-volunteering mediator among White adults only. Suggested policy implications include support for volunteer participation through culturally and socioeconomically sensitive approaches along with human capital development in adult life stages.

Keywords: Education and Training, Lifelong Learning, Mediation, Race, Volunteerism & Civic Engagement

Introduction

Productive aging encompasses the idea that meaningful societal contributions continue into older adulthood. An avenue for productive aging is civic and social engagement activities,

such as volunteering (Burr et al., 2002) which can be advantageous for both the society and the individual. Volunteering has an economic value of \$167 billion per year in the U.S. (AmeriCorps, 2018), and benefits civil society by providing adults the opportunity to achieve common goals and strengthen community ties (Putnam, 2000). Additionally, volunteering has been found to benefit the physical and mental well-being of aging adults (Kail & Carr, 2016; Li & Ferraro, 2006), including delaying physical disability (Carr, Kail, & Rowe, 2018) and mitigating loneliness (Carr, Kail, Matz-Costa, et al., 2018). However, varying factors related to one's level of human, social, and cultural capital influence who volunteers, thereby creating disparities (e.g., by racial and ethnic groups) in who potentially reaps these benefits. A noteworthy contributing factor to volunteering is educational attainment (N. G. Choi & Chou, 2010; Vera-Toscano et al., 2017). Literacy, which is one of the basic skills, is another factor positively associated with volunteering (Grotlüschen, 2017), and educational attainment has also been positively associated with literacy (OECD, 2016b). Yet, the complex interrelationships among educational attainment, literacy, and volunteering, and racial and ethnic identities are yet to be explored.

Theoretical Framework

This study was guided by the integrated theory of volunteer work (Wilson & Musick, 1997) and the notion of productive aging (Burr et al., 2002). In view of human, social and cultural capitals, the integrated theory of volunteer work is nuanced, with factors such as educational attainment, skill sets, values and beliefs towards oneself and others, and social connections, influencing whether an individual participates in volunteer opportunities (Wilson & Musick, 1997). Human capital refers to the knowledge and skills that individuals possess, and generally, individuals with greater knowledge and skills, such as educational attainment and

literacy skills, are more likely to seek opportunities like volunteering to further strengthen their existing knowledge and skills (Becker, 2009). Social capital refers to the resources (e.g., valuable information, mutual trust, emotional support) gained from relationships with others (Musick & Wilson, 2008). On a relevant note, social capital in the integrated theory of volunteer work seems to correspond with Putnam's concept, which suggests that social capital represents social values, norms and trust, and drives successful sociopolitical cooperation and contribution (e.g., volunteering), rather than with Bourdieu's concept, which treats social capital as a determinant of social class and in turn, power distribution in the society (Siisiainen, 2003). Cultural capital refers to the values (e.g., high expectation/standard) and attitudes (e.g., contributing to a community), developed from engagement in particular group memberships and broader societies (Wilson & Musick, 1997). Although social and cultural capital are not directly measured in this study, they contribute to deepening our understanding of the influence of human capital on volunteering, because social connections (as a measure of social capital) and civic engagement values (as a measure of cultural capital) are cultivated via educational socialization (Son & Wilson, 2012). Additionally, with a focus on middle-aged and older adults, since volunteering is a form of civic engagement and productive activity in later life (Burr et al., 2002; Morrow-Howell et al., 2014), the notion of productive aging lends itself to understanding the implications of the associations among education, literacy, and volunteering. This means that explaining the direct and indirect (via literacy) pathways between education and volunteering should extend beyond one's human capital to consider additional forms of capital accrued within the educational system, as well as the influences stemming from ideas around aging productively.

Background

Volunteering can be broadly classified into formal (e.g., providing unpaid services through an established organization) or informal (e.g., providing unpaid services to family, friends, or neighbors) (Wilson & Musick, 1997). This study focused on formal volunteering due to difficulties defining and measuring informal volunteering. As a means of productive aging, volunteering offers a trifecta of social engagement, a sense of purpose, and continued personal development (Morrow-Howell et al., 2014; Musick & Wilson, 2008). Older adults enjoy the health-related benefits of volunteering (Li & Ferraro, 2006; Morrow-Howell, 2010; Morrow-Howell et al., 2003) including decelerated aging-related functional decline and protective effects against mental health problems (N. G. Choi & Chou, 2010). Volunteering has also been reported to increase social connections, bolster confidence to engage in continued volunteering or other activities including employment, community activity and education/training (Morrow-Howell et al., 2014), and support the adaptation of new roles and provide a new sense of purpose in retirement that can expand one's identity (Cousineau & Misener, 2019). Notably, recent studies showed that volunteering, which involves cognitive stimulation and social engagement, is linked with improving cognitive functioning, and plasticity (Brydges et al., 2021; Carlson et al., 2015). Additionally, even after exiting the workforce, with the increased healthy life expectancy among older adults (Martinson & Minkler, 2006; Morrow-Howell, 2007), the wider society can expect to benefit from the continued productivity of this population via volunteering (Morrow-Howell, 2010). However, since aging in and of itself does not necessarily predict volunteering (Komp et al., 2012), other key contributing factors to volunteering should be explored.

Generally, human capital indicators, such as educational attainment and literacy proficiency are the known predictors of volunteering. In line with the absolute education model (Campbell, 2006), scholars noted that higher levels of educational attainment were predictive of

higher levels of volunteering (N. G. Choi & Chou, 2010; Vera-Toscano et al., 2017). Among highly educated persons, highly skilled (i.e., high adult literacy skills) persons were found to be more likely to volunteer compared to persons with lower skill levels (Vera-Toscano et al., 2017), suggesting that skill proficiency might play a significant role in volunteering. Additionally, educational attainment is known to be one of the primary determinants of adult literacy levels. In fact, adults with post-secondary education had higher literacy proficiency than those without (OECD, 2016b). Since adults typically complete formal education by their late twenties (National Center for Education Statistics, 2020a), educational attainment can logically be considered a determinant of adult literacy in the general population.

The integrated theory of volunteer work (Wilson & Musick, 1997) can aid understanding of how education and literacy are associated with volunteering. This theoretical framework posits an interplay among three kinds of capital—human capital, social capital, and cultural capital—that promote volunteering. For this study, the knowledge and skills that constitute human capital are operationally measured as educational attainment and literacy skills. The expectation is that highly educated and high-skilled people are likely to engage in the continuous improvement of their knowledge and skills. Volunteering, which often provides educational opportunities, is one way to accomplish personal and professional development (Wilson, 2000). However, human capital does not function in isolation to influence volunteering. Rather, education and literacy are aspects of human capital that are linked to social resources and cultural values that encourage volunteering. (Son & Wilson, 2011). Thus, one's human capital is inextricably tied to social and cultural capital, which jointly promote volunteering.

Other key contributing factors of volunteering include employment, parents' education, social networks, family composition, immigration status, gender, and health (Wilson, 2012).

Employment status has also been found to be connected to volunteering (L. H. Choi, 2003). A study using data from two waves of the Americans' Changing Lives survey found that working part-time or not at all was positively correlated with volunteering compared to working full-time (Mutchler et al., 2003). Additionally, adults with previous positive volunteer experience are likely to volunteer again (N. G. Choi & Chou, 2010). Also, formal volunteering is dominated by persons with higher education and, as such, persons with low literacy might be effectively marginalized from volunteering as a form of civic engagement and its associated benefits (Grotlüschen, 2017). Similarly, volunteering can be an indication of social connection (e.g., non-profit organization membership) and integration (N. G. Choi & Chou, 2010). In fact, one's educational attainment along with immigration status can impact their level of social integration (Grotlüschen, 2017), and therefore, the pathway by which education/literacy is associated with volunteering. For immigrants, cultural barriers might restrict their volunteer activity to within their own cultural groups, but can mean more informal volunteer activity within their localized geographic spaces; however, with increased years of schooling in the U.S., immigrants were more likely to volunteer outside of their cultural group (Wilson, 2012) which suggests that education specifically within the U.S. system contributes to acculturation and the acquisition of social and cultural capital that foster volunteering. Given volunteering is associated with increased social connections (Son & Wilson, 2011), the larger one's family size is, the more social connections and volunteer opportunities one is expected to have (Morrow-Howell, 2007). However, one must have the time to volunteer, which might be a hindering factor in this case. Being female has been reported as a predictor of volunteering (Carr, Kail, & Rowe, 2018), although gender may be an unreliable indicator of volunteering. Better health status is also positively associated with volunteering (Onyx & Warburton, 2003; Wilson, 2012).

The volunteer experiences of older adults, particularly as they relate to differences in educational attainment, literacy proficiency, and other sociodemographic characteristics, are nuanced. Race and ethnicity are known to be linked with socioeconomic status as well as volunteering (Wilson, 2012). However, these factors have often been examined in silos. Given the estimated connection between education and literacy over the life course, and considering both are associated with volunteering, it is logical to examine whether literacy mediates the relationship between educational attainment and volunteering. In other words, adult literacy is likely determined by educational attainment from earlier life, and literacy might explain the pathway between educational attainment and volunteering in later life (a.k.a., partial mediation or attenuation or indirect effect). Further, formal volunteering also varies (i.e., is moderated) by racial and ethnic identity. According to the U.S. Bureau of Labor Statistics (2015), 26.4% of White Americans formally volunteered compared to 19.3% of Black Americans and 15.9% of Hispanic Americans. Additionally, due to the common timing of role transitions (i.e., education, work, retirement) over the life course in the U.S. and data availability (see the Methods section), middle-aged and older adults were classified within the 45-74 years age range. Thus, this study aims to systematically examine the moderated mediation (attenuation or indirect) relationships among educational attainment, adult literacy, and volunteering among middle-aged and older adults (45-74 years) by racial and ethnic groups.

Research Questions

The relationships among educational attainment, literacy and volunteering have been tested separately in the general population. However, little is known about the inter-relationships and differences by race and ethnicity in the second half of adult life (age 45 and older). Therefore, this study aims to fill these gaps in the literature by examining the moderated

mediation (attenuation or indirect) relationship among educational attainment, literacy, and volunteering, by race/ethnicity among middle-aged and older adults.

Specifically, the following research questions were answered:

RQ1: Are there differences in the direct effect of education on volunteering across middle-aged and older White, Black, and Hispanic adults?

RQ2: Are there mediation (attenuation or indirect) relationships between education, literacy, and volunteering in middle-aged and older White, Black, and Hispanic adults?

RQ3: Are there differences in the indirect effect of education on volunteering through literacy, across the middle-aged and older White, Black, and Hispanic adults?

It is hypothesized that education and literacy have direct associations with formal volunteering, literacy is a mediator of volunteering, and these relationships vary by racial and ethnic groups.

Methods

Data

Pooled data were obtained from the 2012/2014/2017 Program for the International Assessment of Adult Competencies (PIAAC) U.S. Restricted Use File (RUF) (Data License #17080026) (National Center for Education Statistics, 2017). PIAAC is an ongoing international study of basic skills in adult populations aged 16 to 74 years that is coordinated by the OECD, and the U.S. data are managed by the NCES (National Center for Education Statistics, 2017; OECD, 2016a). Basic skills, including literacy, numeracy, and digital problem-solving skills, are evaluated using the systematic assessment and statistical inference (i.e., item response theory) in PIAAC. The basic skill proficiency measure is provided as a set of 10 plausible values (see OECD, 2016a for the technical details). The plausible values were statistically derived based on

the respondent's performance on the systematic skill assessment items. Along with the sampling and replicate weights, these plausible values allow the estimation of nationally representative figures with consistent standard errors. Multi-stage stratified sampling was employed. To examine the second half of adult life stages, the study focused on participants aged 45 to 74 years. While PIAAC generally target working age adult population aged between 16 and 65, the U.S. PIAAC data include the supplemental data for older adults aged 66 to 74 years old (National Center for Education Statistics, 2020b). Since PIAAC yielded small sample sizes for several racial and ethnic groups (e.g., Asian Americans, Pacific Islanders, Native Americans, etc.), only White, Black, and Hispanic participants were included in the analysis. Given the essential measures and inclusion criteria, there were 4,010 eligible participants. After excluding missing values from other measures, the final sample size was 3,770. Considering a relatively small percentage of missing values (6%), only complete cases were included in the analysis.

Measures

Outcome Variable. Volunteer participation is recorded on a 5-point scale: 1 = never; 2 = less than once a month; 3 = less than once a week but at least once a month; 4 = at least once a week but not every day; 5 = every day.

Predictor Variable. Total years of education is the cumulative years of formal education at the time of the PIAAC survey.

Mediator Variable. Literacy proficiency is measured with a PIAAC assessment score ranging from 0 to 500 points. Literacy is defined as “understanding, evaluating, using and engaging with written text to participate in the society, to achieve one's goals and to develop one's knowledge and potential” (OECD, 2013, p. 59). The validity of literacy measures is adequate across sub-groups (e.g., gender, age) and details of the assessment methodology have been published

elsewhere (OECD, 2016a). All 10 plausible values were used in the statistical analysis of this study.

Covariates. Age at the time of the PIAAC survey was recorded in years. Gender (women vs. men [reference group]), U.S. Born (vs. immigrants [reference group]), race and ethnicity (Black and Hispanic vs. Whites [reference group]), employment (employed vs. not employed [reference group]), parent's/guardian's educational attainment (college or higher vs. less than college [reference group]) and self-rated health [Good (excellent, very good, good) vs. fair/poor [reference group]] were dichotomous measures. Number of household members is a count measure and is top-coded to 7. Income is recorded in 1-6, based on the quintile plus no income.

Analytic Approach

Weighted descriptive statistics were computed for all samples and by each racial and ethnic group. To address the research questions, multi-group structural equation model (SEM) with a mediation analysis was used (Hayes, 2013; Wang & Wang, 2020). SEM allows modeling direct and indirect (i.e., mediation or attenuation) relationships among education, literacy skills, and volunteer participation. Although the distribution of the volunteering measure was somewhat positively skewed, volunteering was treated as a continuous measure. We referred to the existing guideline (i.e., ordinal scale with 5 or more levels) and used robust maximum likelihood to accommodate a skewed distribution (DeMaris, 2005).

The model specification is depicted in Figure 1. All analyses were conducted in Mplus version 8 (Muthén & Muthén, 1998-2017). A simpler model with education, literacy, and volunteer participation were first examined, and the covariates were subsequently added. Based on the few iterations referring to the model fit indices, modification indices and theoretical framework, the analytic model was adjusted. The modification indices are possible changes in

the model chi-square statistics, due to a specific model specification (e.g., inclusion or exclusion of a variable; model structure) (Kline, 2015). The final model was chosen in view of the theoretical propositions, model fit and interpretability. Model fit was evaluated based on four recommended fit indices, including the chi-square statistic ($p > 0.05$), comparative fit index (CFI $> 0.90-0.95$), root mean square error of approximation (RMSEA < 0.10) and Standardized Root mean square residual (SRMR < 0.10) (Kline, 2016; Wang & Wang, 2020). None of the model fit indices can independently evaluate the model. Thus, all model fit indices were considered for their consistency, although the statistical significance of chi-square statistics is known to be somewhat overly strict (Mueller & Hancock, 2010).

The estimation of the indirect effect requires an empirical sampling distribution (e.g., bootstrapping) to correctly estimate the standard error and to meet the assumption (i.e., normally distributed coefficient) (Hayes, 2013). In this study, use of replicate weights allowed for the estimation of the standard error of each coefficient for the direct and indirect effects. The empirical identification is a necessary condition to estimate a SEM. Given 60 freely estimated parameters, 11 variables in the final model, and the degrees of freedom [$11*(11+1) - 60 = 6 > 0$], the model was over-identified and adequate for the model estimation (Wang & Wang, 2020). Estimated coefficients of interest were treated as latent variables and statistically compared across White, Black, and Hispanic adults, using the Mplus MODEL CONSTRAINTS command. The statistical significance was determined according to the alpha level of 0.05.

The power analysis was conducted using the Monte Carlo simulation approach (Muthén & Muthén, 2002). Specifically, the Mplus MONTECARLO command with the estimated parameters in the final model, several different sample sizes (i.e., 320; 490; 2,960) and 1,000 replications were used. The simulation results showed that the final model, even with the

smallest subsample size ($n = 320$), had the conventionally accepted statistical power of 0.80, for all main measures of interest, including education, literacy, and mediation (attenuation or indirect) effect on volunteering. Finally, given the different sample sizes across White, Black, and Hispanic adults in this study, a sensitivity analysis with the randomly selected White samples for different sample sizes (e.g., 2000; 1500; 1000; 500) was conducted. The statistical significance of these analyses was compared to the results with the full sample.

Results

Table 1 presents the weighted descriptive summary by race and ethnicity. Although volunteering seems to be comparable across the racial/ethnic groups, White adults tend to have greater years of formal education (14 years) and higher literacy proficiency (274 points), than Black (13 years and 229 points) and Hispanic (12 years and 219 points) adults. Table 2 presents the estimated coefficients and model fit indices from the multigroup SEM. Except for the chi-square statistic ($1281.18, p < 0.05$), CFI (0.93), RMSEA (0.06) and SRMR (0.02), consistently met the suggested criteria. Given the overly sensitive chi-square and consistency across the model fit indices, the final model fit was considered adequate. All predictors and covariates were associated with volunteering among White adults. However, only education and U.S. born (vs. immigrants) were associated with volunteering among Black adults. None of the variables was associated with volunteering among Hispanic adults. On the contrary, age, education and self-rated health were associated with literacy proficiency in all racial/ethnic groups, except for age in Black adults. Table 3 presents differences in all estimated coefficients across racial and ethnic groups. There were statistically significant differences in the effect of years of education on formal volunteering between Black adults and Hispanic adults [$b(\text{Black}) = 0.112$ versus $b(\text{Hispanic}) = 0.080, p < 0.05$], and White adults and Hispanic adults [$b(\text{White}) = 0.078$ versus

$b(\text{Hispanic}) = 0.034, p < 0.05]$ (RQ1). Only the mediation (attenuation or indirect) effect among White adults was statistically significant (RQ2). There was no significant difference in the mediation (attenuation or indirect) effect coefficients across racial/ethnic groups (RQ3). At the same time, a sensitivity analysis with the reduced White sample sizes showed inconsistent findings with the statistical significance of the mediation (attenuation or indirect) effect and effect of literacy in the full samples of White adults.

Discussion

This study examined whether the association between educational attainment and volunteering was mediated by literacy, and whether the interrelationships were moderated by race and ethnicity. There was limited statistical evidence of literacy being a mediator of educational attainment and volunteering, and there was no evidence of differences in the mediation (attenuation or indirect) effect across racial groups. These results of the mediation analysis indicated that adult literacy is unlikely to explain the pathway between education and volunteering, or racial/ethnic differences. However, given the significant associations between literacy and education, as well as that of literacy and volunteering (see Table 2), literacy is still an important factor to be considered in this present study. While the direct and indirect effects of literacy on volunteering was statistically significant among White adults, it should be interpreted with caution as the sensitivity analysis indicated. Our findings show that the direct effect of educational attainment on volunteering was significantly moderated among particular racial and ethnic groups. Specifically, the positive effect of education on formal volunteering was significantly greater among middle-aged and older Black adults than among their Hispanic counterparts. Similarly, results suggested that White adults benefited more from the effect of years of education on formal volunteering than the Hispanic adults. However, again, the

sensitivity analysis suggested that the finding of the differences between White and Hispanic adults might have been partially driven by the unbalanced sample sizes. Taken together, despite the findings that partially supported the hypotheses, the finding regarding the difference in the effect of educational attainment on volunteering between Black and Hispanic adults was considered robust, and other findings should be treated with caution.

Black adults benefit more from the effect of educational attainment on volunteering, compared to Hispanic adults. This finding might be attributed to a selection effect since Black adults with higher levels of education will most likely have a higher socioeconomic status, which is associated with increased volunteering (Burr et al., 2002; Wilson & Musick, 1997). Additionally, Black adults benefitting more from the influence of educational attainment on volunteering might be indicative of the virtuous cycle (i.e., positive effects of socioeconomic position and resource availability on volunteer opportunities) (Niebuur et al., 2018). Further research is needed to clarify why highly educated middle-aged and older Black adults are more likely than their Hispanic counterparts to volunteer in later life. One study suggested that for socioeconomically disadvantaged college graduates considered less likely to complete higher education, their educational attainment might have had a greater influence on volunteering (Brand, 2010). Considering racial disparities in educational attainment, socioeconomic difference is one area of research for further exploring the education-volunteering pathway among Black adults. In addition, a few emerging evidence showed that specific individual characteristics such as religiosity and generativity (e.g., desire to contribute to next generations and communities) are associated with volunteer motivation (Okun et al., 2015; Yamashita et al., 2017). These motivational factors, which could be reflections of earlier life socialization, social norms, culturally accepted attitudes and perceived benefit of volunteering, are likely to vary across age

groups, and racial and ethnic groups, and thus, advancement in this line of research may clarify the explanations for the systematic differences in volunteer motivation and engagement (Grinshteyn & Sugar, 2021; Tang et al., 2012).

In view of the two theoretical perspectives that frame this present study, two important points should be noted. First, human, social, and cultural capital might have jointly amplified the effect of educational attainment on volunteering among Black adults (Becker, 2009; Burr et al., 2002; Wilson & Musick, 1997). In particular, the social and cultural views on volunteering held by highly educated Black adults might have been shaped by the generally observed social inequality by race and ethnicity. That is, perceived as well as experienced inequality might have led to volunteering being seen as one of the beneficial ways to promote career, social/civic participation, and contribution to communities. On the other hand, systematic differences in volunteer participation might have impacted productive aging and created inequality over the life course (Burr et al., 2002). Thus, the interrelationships between three capitals may be dynamic, and the three capitals and productive aging may simultaneously influence each other and change their roles across life stages. On a related note, given the higher percentages of immigrants among Hispanic adults (58.0%), compared to White (4.3%) and Black (13.7%) adults (refer to the US born variable in Table 1 which shows weighted descriptive summary by race and ethnic groups), the foreign credentials and education measure based on the countries of origin might have translated into different forms of human, social or cultural capitals after moving to the U.S.

Second, although relatively little is known about the reasons for volunteering in later life, higher educational attainment might be an indication of resource availability (e.g., time and money) and sufficient capacity (i.e., human capital). It should also be noted that the present study examined both the middle-aged and older adults. Given the systematic differences in their

employment status (about 70% and 30% employed for age 55-64 and 65-74, respectively in 2010 and 2020), older adults may have more time available for volunteering (U.S. Bureau of Labor Statistics, 2021). Given the Black adult population tends to generally experience greater socioeconomic disadvantages than other racial and ethnic groups, the stronger effect of educational attainment on volunteering could have been a sign of greater within-group variability (i.e., higher educational attainment vs. lower educational attainment) among Black adults, than among White or Hispanic adults. Despite the existing social disparities across racial and ethnic minorities, such disadvantages may carry over to later life both at the individual-level (e.g., poorer health) and the societal-level (e.g., negative attitudes toward aging and reduced socioeconomic contributions) in view of productive aging (Burr et al., 2002). On a related note, our analysis with the systematically assessed literacy skills adds under-explored areas of study and informs possible explanations through human capital by race and ethnicity in future research.

Limitations

Several limitations of this study are noted. First, the measurement of volunteering in the PIAAC dataset was limited to formal volunteering through non-profit organizations. Therefore, the findings and discussions should not be extended to informal volunteering. That said, limited empirical data on informal volunteering should not deter but rather be an impetus for future research that might further investigate the effect of educational attainment on informal volunteering. After all, informal volunteer opportunities might be more readily accessible by foreign-born racial and ethnic minorities (e.g., Hispanics) and thus help better explain the education-volunteering pathway. Similarly, the measurement of education in the dataset was limited to years of education and thus does not capture education quality and content (Son & Wilson, 2012). Second, while our conceptual and analytic model was developed based on the

theoretical propositions and the existing literature, the cross-sectional data from PIAAC did not allow for empirically examining the time order of events, including educational attainment, basic skill development and volunteer participation over time. Future longitudinal data will be more appropriate to explicitly test the empirical mediation (attenuation or indirect) relationships.

Third, an examination of within-racial and ethnic group variabilities was beyond the scope of this study. Future research needs to further examine the sub-groups of each racial and ethnic group. Ideally, in future PIAAC studies, racial and ethnic minorities will have equivalent sample sizes to that of White adults. Finally, compared to White and Black adults, the analytic model for Hispanic adults shows no significant predictor of volunteering, and need further improvement in future research. Given the higher percentage of immigrant status among Hispanics, the education measure might need further refinement in future research (e.g., differentiating educational attainment from within and outside the U.S.). Additionally, although the background question was available in both English and Spanish, the literacy assessment was in English. Therefore, Spanish only speakers might have been underrepresented. Overall, these limitations do not compromise the findings but rather highlight opportunities for further studies that might utilize different methods and broaden the scope.

Policy Recommendations

This study examined volunteer participation among middle-aged and older adults across racial and ethnic groups. The findings can support preliminary policy recommendations to promote later life volunteer participation across racial and ethnic groups. While greater years of education was associated with formal volunteering among middle-aged and older White and Black adults, those with fewer years of education experience had lower participation in volunteering. Policies designed to promote volunteer motivation as well as engagement can

consider targeting adult education opportunities to communities with lower formal education. Such opportunities can provide access to human, social and cultural capitals (see, for example, Wilson & Musick, 1997) while simultaneously opening pathways to volunteer participation. Volunteer participation among middle-aged White and Black adults with lower formal education might also be tied to other SES outcomes. Therefore, opportunities to engage in both adult education and volunteer opportunities must afford equitable access.

One of the most important findings of this study was regarding heterogeneity among racial and ethnic minority adults. The empirical result supports consideration of cultural and socioeconomic differences across racial and ethnic minority groups when implementing policies to promote volunteering. Racial and ethnic groups might have unique determinants of volunteer participation because their human, social, and cultural capitals, as well as group-specific sociocultural norms (e.g., religiosity, generativity) are likely to vary. Therefore, a one-size-fits-all model to promote volunteer participation might not be as successful as more culturally sensitive, targeted approaches. For instance, given the higher percentage of immigrant status among Hispanic adults, aligning volunteer opportunities with cultural values and educational backgrounds may support their increased volunteer participation.

Conclusion

Adult literacy did not explicitly explain the pathways between education and volunteering among middle-aged and older adults. However, findings from this study indicate that the positive effect of educational attainment on volunteering significantly differed between Black adults and Hispanic adults. Thus, human capital, in part, shapes volunteering differently across racial and ethnic groups, which suggests that sociocultural differences might be additional factors driving volunteering. Contextualized within the integrated theory of volunteer work,

human capital is intertwined with social and cultural capital to influence volunteering. Therefore, efforts to promote widely beneficial volunteer participation should consider the interplay among human (e.g., education), social (e.g., social integration and social networks), and cultural factors, as well as racial/ethnic differences.

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Table 1: Weighted Descriptive Summary by Race and Ethnic Groups

Variables	All (N = 3770) ^a	White (n = 2960) ^a	Black (n = 490) ^a	Hispanic (n = 320) ^a
	Mean (SE) or percentage	Mean (SE) or percentage	Mean (SE) or percentage	Mean (SE) or percentage
Volunteer participation (1-5: Never – Everyday)	2.07 (0.02)	2.11 (0.02)	1.95 (0.06)	1.85 (0.07)
Years of formal education	13.61 (0.03)	14.01 (0.04)	12.76 (0.09)	11.66 (0.23)

Adult literacy proficiency (Score 0-500)	262.94 (0.94)	274.07 (1.02)	229.08 (2.56)	219.05 (4.03)
Age	57.76 (0.07)	58.26 (0.09)	56.64 (0.23)	55.32 (0.21)
Gender	52.1%	51.7%	54.8%	51.4%
U.S. born	89.0%	95.7%	86.3%	42.0%
Number of household members	2.57 (0.02)	2.49 (0.02)	2.52 (0.07)	3.30 (0.10)
Employment (employed)	64.1%	64.2%	60.7%	67.1%
Parent's/guardian's educational attainment (college or higher)	29.0%	31.9%	17.6%	18.7%
Self-rated health (excellent, very good & good)	77.2%	78.7%	73.5%	70.2%

Notes: The sampling and replicate weights were applied.

SE = standard error

a. unweighted sample size

Data Source: 2012/2014/2017 PIAAC Restricted Use File Data (National Center for Education Statistics, 2017)

Table 2: Estimated Coefficients from the Multigroup Structural Equation Model

Variables	White (n = 2960) ^a b(SE)	Black (n = 490) ^a b(SE)	Hispanic (n = 320) ^a b(SE)
Dependent variable 1 (Volunteering)			
Literacy proficiency (0-500)	0.003 (0.001)*	0.003 (0.001)	0.003 (0.002)
Years of education	0.078 (0.009)*	0.112 (0.026)*	0.032 (0.022)
Age	0.011 (0.003)*	-0.002 (0.008)	0.001 (0.012)
Gender (women vs. men)	0.167 (0.042)*	-0.130 (0.140)	0.052 (0.126)
U.S. born (vs. immigrants)	0.238 (0.117)*	0.436 (0.185)*	0.076 (0.166)
Income level (0-5)	-0.063 (0.016)*	-0.019 (0.045)	-0.117 (0.065)

Number of household members	0.047 (0.021)*	0.015 (0.043)	0.036 (0.046)
Parent's/guardian's educational attainment (college or higher vs. less than college)	0.252 (0.060)*	-0.121 (0.183)	0.018 (0.201)
Employment (employed)	0.231 (0.043)*	0.221 (0.206)	0.407 (0.258)
Self-rated health (excellent, very good & good vs. fair & poor)	0.202 (0.061)*	0.202 (0.161)	0.047 (0.134)
Dependent Variable 2 (Literacy)			
Age	-0.810 (0.134)*	-0.558 (0.338)	-0.986 (0.495)*
Years of education	7.780 (0.370)*	7.364 (1.009)*	6.855 (1.186)*
Self-rated health (excellent, very good & good vs. fair & poor)	17.081 (2.096)*	17.997 (6.540)*	27.811 (8.901)*
Indirect/mediation effect			
Years of education → literacy → volunteering	0.021 (0.005)*	0.018 (0.015)	0.021 (0.0013)
Model fit indices			
Chi-square (DF)		1281.18 (57)*	
CFI		0.93	
RMSEA		0.06	
SRMR		0.02	

* $p < 0.05$; See the results and discussion sections for the sensitivity analysis

The sampling and replicate weights were applied.

SE = standard error; DF = degrees of freedom; CFI = comparative fit index; RMSEA = root mean square error of approximation; SRMR = standardized root mean square residual

a. unweighted sample size

Volunteering: 1-5 = never, less than once a month, less than once a week but at least once a month, at least once a week but not every day and every day.

Literacy: Score between 0 and 500.

Data Source: 2012/2014/2017 PIAAC Restricted Use File Data (National Center for Education Statistics, 2017).

Table 3: Differences in the Estimated Coefficients across Racial and Ethnic Groups

Reference groups	White – education	White – literacy	White – mediation	Hispanic – Education	Hispanic – Literacy	Hispanic – mediation
Groups	Δb (SE)	Δb (SE)	Δb (SE)	Δb (SE)	Δb (SE)	Δb (SE)
Black – education	0.034 (0.030)	-	-	0.080 (0.034)*	-	-
Black – literacy	-	>0.001 (0.002)	-	-	-0.001 (0.003)	-
Black mediation	-	-	-0.003 (0.015)	-	-	-0.003 (0.021)
Hispanic – Education	-0.046 (0.023)*	-	-	-	-	-
Hispanic – Literacy	-	>0.001 (0.002)	-	-	-	-
Hispanic – mediation	-	-	>0.001 (0.014)	-	-	-

* $p < 0.05$; SE = standard error

See the results and discussion sections for the sensitivity analysis

The numbers represent the differences in the estimated coefficients (Δb : Group – Reference group)

Mediation = the mediation or indirect effect of education, literacy (mediator) and volunteering (outcome)

Figure 1: Path Diagram of the Final Model

