Relationships Between Health Factors and Everyday Problem Solving in African Americans

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The purpose of this paper was to examine if measures of health status enhance the prediction of performance on everyday problem solving in adult African Americans. The sample consisted of 209 community dwelling African American adults with a mean age 66.82 years (SD=7.95). The following variables were included in the analysis: Everyday Problems Test (EPT), summary index of chronic illnesses (cardiovascular disease, hypertension, arthritis, stroke, and diabetes), self-rated health (current health, health in the past month, health compared to others, health compared to 5 years ago), and demographic information. Using hierarchical regression and follow up communality analysis, we found that the number of chronic illnesses and self-rated health as compared to 5 years prior were significant and unique predictors of performance on the EPT, but did not account for all of the demographic-related variance. The results indicate that health indices contribute to the variability in everyday cognition in this understudied population.

Key Words: Everyday Problem Solving, Cognition, African Americans, Self-Rated Health
A number of studies have examined the relationship between self-rated health and cognition in older adults (Anstey & Christensen, 2000; Anstey, Luszcz, Giles, & Andrews; 2001; Christensen et. al, 1994; Earls, Conner, Smith, & Park, 1997; Salthouse, 1992; Zelinski, Crimmins, Reynolds, & Seeman, 1998). Research in this area suggests that poor self-rated health is associated with lower cognitive functioning. However, many studies have reported that although a bivariate association between self-rated health and cognition does exists, this relationship can be completely accounted for by demographic characteristics such as age and education (Anstey, Stankov, & Lord, 1993; Christensen & Mackinnon, 1993; Luszcz, Bryan, & Kent, 1997; Reynolds, Gatz, & Pedersen, 2002; Salthouse, Kausler, & Saults, 1990).

Aged African Americans have not been included in much of the research on cognition even though they represent one of the fastest growing segments of the population with estimated increases of 300% between 1995 and 2050 (Williams & Wilson, 2001). The lack of cognitive aging studies that involve this population represent an important "missed opportunity" to test the universality of conceptual notions about changes in cognition and the mediating factors accompany aging such as health status (Whitfield, 1996; Whitfield & Willis, 1998). In fact, examining links between cognition and health in African Americans may be particularly important due to evidence of low availability and utilization of health care (Miles, 1999) and previous findings of high rates of chronic illnesses (e.g., hypertension diabetes mellitus, and coronary heart disease) among older African Americans (Miles & Bernard, 1992). In addition, African Americans are more likely to experience chronic illness at earlier ages than Caucasians (Anderson, McNeilly, & Myers, 1991; Ferraro, & Farmer, 1996; Marquis, & Long,
These conditions may be important factors in increased susceptibility to the development of vascular dementia (Folstein, Anthony, & Parhad, 1985) and possibly accelerated age related cognitive declines for African Americans.

Given the paucity of research on cognition in African American elders, it is not surprising that there is little literature available discussing the link between self-reported health and cognitive functioning in African Americans. Using data from the MacArthur Studies of Successful Aging, Whitfield et al. (1997) found that self-ratings of health in a cohort of African Americans were important predictors of cognitive performance as well as decline over a three year period, but the number of chronic illness reported by the participant was not a significant predictor of cognitive functioning. Furthermore, Whitfield et al. (2001) found that including the interaction between race and health accounted for racial differences in memory measures among the same sample. However, the participants in these analyses were in the top third of a larger sample and considered “successful agers.” Subsequently as a group, they did not experience many chronic illnesses. It may be that in a non-selected sample, the presence of chronic illness may be more prevalent and a significant predictor of cognitive performance.

One of the challenges facing gerontological researchers interested in studying ethnic diversity is selecting an appropriate measure of cognitive functioning (Willis, 1991). Results from past research on Caucasians suggest that assessing everyday problem solving may be a useful concept in studying cognitive aging in African Americans. The study of everyday problem solving represents the assessment of cognitive ability within contextually relevant, real-word domains such as medication use, food preparation, and transportation (Allaire & Marsiske, 1999; Willis, 1991) as well as
interpersonal and social domains (Berg & Klaczynski, 1996; Blanchard-Fields & Chen, 1996). More specifically, measures of everyday problem solving are designed, in part, to assess the processes and strategies individuals employ to answer the challenges of everyday life (Allaire & Marsiske, 1999). In fact, everyday cognition has been found to be strongly related to a number of underlying basic cognitive abilities (Allaire & Marsiske, 1999; Marsiske & Willis, 1995), accounting for all of the variance in elders’ instrumental functioning associated with traditional measures of cognitive functioning and provides unique predictive utility (Allaire & Marsiske, 2002). Health status and health behaviors have also been found to relate to everyday problem solving even after accounting for age and education (Maier, McGuire, & Willis, 1994). Although everyday problem solving may be a useful approach to assess cognitive functioning, because African Americans differ from Caucasians in their language, social experiences, health exposures, and economic experiences, it is important to understand the within group variability on this measure prior to cross-cultural analyses (Whitfield & Baker-Thomas, 1999).

It is within this context that the current paper examines the relationship between everyday problem solving and health indices in a sample of adult African Americans. Specifically, we examined: (1) The bivariate associations between self-rated health, everyday problem solving, and demographic variables and (2) the predictive utility of self-rated health variables in accounting for individual differences in everyday problem solving before and after controlling for demographic characteristics.

Method

Participants
The sample consisted of 209 African American adults living in the community ranging in age from 47 to 91 (mean = 66.82 years; SD = 7.95). The sample consisted of 64% females and the average education was 10 years (SD = 3.40; range = 1 – 20 years). The data was collected from small groups of 5-10 individuals and required approximately 2 hours for completion.

**Measures**

Three demographic variables were included in the analyses: age, education, and gender. Chronic conditions were measured as the total number of self-reported doctor’s diagnoses (e.g., present or absent) of five systemic chronic illnesses (i.e., cardiovascular disease, high blood pressure, diabetes, arthritis, and stroke). Self-rated health was measured using 4 different items (1) current health status (1=very poor to 4=very good); (2) current health compared to their status a month prior (1=very poor to 4=very good); (3) compared to others their age (1=very poor to 6=very good); and (4) compared to health 5 years prior (1=very poor to 7=very good). The 42 item version of the Everyday Problems Test (Willis & Marsiske, 1993) was used as a measure of the participants’ ability to reason and to solve problems associated with daily living. There are seven general domains of activities from which questions were created: telephone, finances, shopping, transportation, food, health, and house keeping.

**Results**

The intercorrelations among the self-rated health variables, everyday problem solving and demographics are provided in Table 1. All of the variables of interest were significantly correlated with everyday problem solving with the exception of gender, and self-rated health compared to 5 years prior. Additionally, all of the health indices were
significantly correlated with each other. The count of chronic illnesses was associated negatively with the self-rated health assessments and positively with physical limitations, indicating that the more chronic illness reported the more physical limitation was reported.

To examine the predictive utility of health in accounting for individual differences in elders’ everyday problem solving, we conducted a two-step hierarchical regression the results of which are presented in Table 2. The first step of the model included the four self-rated health variables and the variable representing the total number of chronic illnesses reported by the participant. Together this block of predictors explained 8% of the variance in EPT performance. Specifically, the number of chronic illnesses was a significant predictor of EPT performance with poorer performance associated with more reported chronic illnesses. Health compared to 5 years prior was just shy of statistical significance. Next in the second step, the demographic variables were entered into the model as a block of predictors, and the amount of variance explained in the EPT increased to 20%. Both age and education were significant predictors of EPT performance, with older participants performing more poorly on the EPT while better educated participants were performing better on the EPT. However it is important to note that with the addition of the demographic variables, the number of chronic illnesses remained significant and participants’ perception of their health compared to 5 years earlier increased in magnitude and was statistically significant.
In order to determine predictive variance in everyday problem solving that was unique to and shared among the health and demographic predictors, a communality analysis was performed (Hertzog, 1989; Pedhazur, 1982). Estimates of the unique and shared variance components were obtained by allowing all possible combinations of Health Variables and Demographics to predict EPT performance. Results indicated that the health variables uniquely explained 5% of the variance in EPT performance, while the demographic variables uniquely explained 12%. Interestingly, only 3% of the variance was shared among the two sets of predictors.

Discussion

The purpose of the current study was to determine if measures of self-rated health status facilitated the prediction of performance on everyday problem solving in African American adults. Results revealed that, in general, indices of self-rated health were significantly related to performance on the everyday problem solving test such that higher ratings of health were related to better performance on the EPT at the bivariate level. The only exception was health as compared to 5 years prior. Results from hierarchical regression models indicated that self-rated health with the 5 year comparison and the number of chronic illness were both significant predictors of EPT performance even after age, gender, and education were included in the analysis. In fact, results from this study indicate that both of these health indices were unique predictors of everyday problem solving and also shared a proportion of additional variance with the demographic
variables. However, it is important to note that the largest proportion of unique variance was accounted for by the demographic variables; thus indicating that the health variables do not explain all of the variance in EPT performance associated with age, education, and gender. While these results are interesting, it should not be overlooked that the self-reported health items explained a relatively small proportion of the variance in everyday problem solving. However, given the multidimensionality of the everyday problem solving (Marsiske & Willis, 1995) the identification of any factors associated with elders’ performance is important.

It is interesting to note that the self-rated health item employing the 5 year temporal frame was not significantly related to EPT performance at the bivariate level. However, once entered into the regression model, with the other self-rated health indices, it was a unique and negative predictor, indicating that individuals who rated their health as better than 5 years prior were in fact performing more poorly on the EPT. This suppression effect (Pedhazur, 1982), was only evident once variance in EPT performance due to more ‘recent’ self-rated health (i.e., current, past month, peers) was controlled for in the regression model. One possible explanation maybe that those individuals who are more likely to inflate their self-ratings of current functioning when faced with a 5 year temporal frame are in fact the same individuals who experience more deleterious changes in health status. Thus, only after controlling for proximal self-rated health do the compensatory or self-serving features of temporal comparisons become apparent.

As for count of chronic illnesses, the results suggest that co-morbidity of systemic diseases influences performance on everyday problem solving. This is an important finding in light of the disproportionate number of chronic illnesses and comorbidity
experienced by African Americans (Miles & Bernard, 1992). Since the maintenance of
cognitive functioning is typically thought of as a critical factor in sustaining quality of
life, our findings contribute to the importance of disease prevention in this population.

Given that chronic conditions contribute to variability in everyday problem
solving and the high rates of each condition experienced by African Americans declines
in health may be occur earlier than observed in age matched Caucasians populations.
Thus, African Americans as a group may be more susceptible to accelerated declines in
cognitive functioning due to poor health than Caucasians who are equivalent in age. This
hypothesis is further supported by the fact that self-rated health relative to 5 years prior
was predictive of performance. This accelerated cognitive aging hypothesis needs to be
tested empirically, but may account for differences in mean levels of cognitive
functioning as more cross-cultural analyses are performed.

In conclusion, it appears that health is critical for understanding individual
differences in cognitive functioning in African Americans. Longitudinal within group
and cross-cultural analyses of these relationships need to be performed to provide a more
accurate depiction of cognitive aging for this underrepresented population and older
adults in general. Improvements in the health status among African Americans
population should help to increase competence in everyday activities and significantly
improve the quality of life. Interventions designed to improve health may have the added
benefit of improving cognitive functioning and assist in increasing independent living by
African Americans.
References


Table 1.

Intercorrelations among Variables of Interest

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* = p < .05
### Hierarchical Regression Results Predicting Everyday Problem Solving

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<td>β</td>
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| R²                                               | .08    |       |       |       | .20    |       |       |
| Δ R²                                            |        |       |       |       | .12    |       |       |