Everyday Competence as a Correlate of Health Behaviors in Late Life

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Abstract

Previous studies reported that individual differences in demographic, cognitive, and personality variables were associated with preventive health behaviors in older adults. This study examined the relationship between health behaviors and a measure of cognitive everyday problem solving. Participants were 430 older adults (n=366 females and n=64 males) who participated in a larger on-going longitudinal study. Participants had a mean age of 77.8 years (SD=6.5) and a mean of 11.6 years of education (SD=2.6). In 1991, participants had received the Everyday Problem Solving Test (EPT) as a measure of everyday cognitive competence. In 1993, participants received the Penn State Health Behavior Questionnaire (HBQ), a 44 item questionnaire that assesses self-perceptions of health status and self-reported health practices. Exploratory and confirmatory factor analyses indicated that four health practices factors (i.e., Substance Use, Positive Nutrition Behaviors, Medical Check-ups, Health Maintenance Activities) and three health status factors (i.e., Positive Health Perception, Positive Health Status, High Blood pressure) sufficiently accounted for the observed variability in HBQ items. The EPT was associated with more Positive Nutritional Behaviors and more positive Health Maintenance Activities. The EPT was also associated with higher Positive Health Status and lower Positive Health Perceptions. Findings remained valid even after age and educational level were taken into account. Results indicated that everyday cognitive competence is related to both health status and preventive health practices in older adults.

Everyday Competence as a Correlate of Health Behaviors in Late Life

Everyday cognitive competence refers to cognitive processes and strategies that individuals successfully use to perform everyday tasks. Research in everyday competence may be divided into three broad domains. A first strand of research addresses defining characteristics and components involved in everyday reasoning (e.g., Berg, 1990; Marsiske & Willis, 1992). Another group of studies has examined the relationship among everyday cognitive competence and more traditional psychometric abilities (e.g., Ceci & Liker, 1986; Marsiske, Willis, Goodwin, & Maier, 1992; Willis & Schaie, 1986). Third, everyday cognitive competence has been examined in relation to various tasks of everyday life (e.g., Salthouse, 1984; Sternberg, Wagner, & Okagaki, 1993). Stemming from this latter perspective, the present study investigated the association between everyday cognitive competence and health behaviors. We were interested in whether individuals with a high level of everyday cognitive competence were more likely to engage in preventive health behaviors.

Prior research has established that various health practices and routines may affect subsequent health and physical well-being (Breslow & Enstrom, 1980; Kaplan, 1992). Behaviors implicated as beneficial are very diverse (e.g., "being a nonsmoker", "7-8 hours sleep per day", "maintain proper weight", or "routine seat belt use"). A first goal of the present study was to reduce those molecular behaviors into a smaller, meaningful set of composite variables.

Beliefs were studied as cognitive variables that may affect personal health practices. Beliefs about the effectiveness of health practices and an internal locus of control may incline individuals to engage in those practices (Prohaska, Leventhal, Leventhal, & Keller, 1985; Rakowski, Julius, Hickey, & Halter, 1987; Royak-Schaler & Maloney Alt, 1994).

Another cognitive variable, everyday cognitive competence, has not been thoroughly studied with regard to health behaviors. However, we believe that a moderate level of everyday cognitive competence is a prerequisite for at least some health routines (e.g., understanding a nutritional food label). Knowledge about potential health hazards and beneficial health routines must be acquired, processed, and translated into appropriate preventive health behaviors. Thus, we expect that carrying out preventive health behaviors will be facilitated by everyday cognitive competence.

Many studies have indicated a significant relationship between health status and cognitive competence (Goodwin & Willis, 1992; Lawton, 1987; Perlmutter & Nyquist, 1990). This association usually has been conceptualized with health status as the independent variable and cognitive ability as the dependent variable. In the present study, a different perspective was chosen: Everyday cognitive competence was regarded as a possible predictor of subsequent health status and health perceptions.

Our study had three goals. First, we reduced health behaviors into a meaningful set of composite variables to study them at the factor level. Second, everyday cognitive competence was examined as a correlate of these health behavior and health status factors. We hypothesized that everyday cognitive competence would be associated with more preventive health behaviors and better health status. Third, both age and education were thought to be related to everyday competence (Marsiske et al., 1992), health behaviors (Prohaska et al., 1985), and health status (Kaplan, 1992). We hypothesized that an association between everyday cognitive competence and health factors would still exist after partialling out the effects of age and education.

Method

Sample

Participants in this study were part of a larger on-going study of adult cognitive development, the Adult Development and Enrichment Project. Participants were 430 community-dwelling older adults, 366 females and 64 males. Their age range in 1993 was

59 to 100 years (M=77.9, SD=6.5), and their years of education ranged from 0 to 22 years (M=11.6, SD=2.6). Participants rated their health as good (M=2.24, SD=.89) on a six-point Likert scale (1="very good" to 6="very poor").

Measures

Three categories of measures were relevant to this study: Personal measures and a measure of everyday cognitive competence were assessed in 1991. A health behavior measure was administered in 1993.

Personal measures. A Personal data questionnaire was used to assess gender, age, and years of education.

Everyday cognitive competence measure. The Everyday Problems Test (EPT; Willis & Marsiske, 1993) was used to assess adults' cognitive competence to reason and to solve problems associated with daily living. The EPT provides participants with everyday printed stimuli representing seven instrumental activities of daily living (IADL; Lawton & Brody, 1969): Health and Medication Use, Meal Preparation, Phone Usage, Shopping and Consumerism, Financial Management, Household Management, and Transportation. Each printed stimulus (e.g., prescription drug label, bus schedule) is associated with two questions about that stimulus. The version of the measure used in this study contained 84 items. The total score for the EPT was calculated as the sum of the items answered correctly.

Health behavior measure. The Penn State Health Behavior Questionnaire (HBQ) is a new instrument developed to assess health behaviors and health-related issues in adults. The HBQ was mailed to participants and completed in their homes. The response rate for this survey was 75.5%. The HBQ is comprised of 86 items with different response formats (multiple-choice, open-ended, and rating scale formats). HBQ items tap seven health-related domains: Substance use, nutrition behaviors, medical check-ups, health maintenance activities, health perceptions, general health status, and cardiovascular health status. 44 HBQ items were used for this study. A brief description of the items may be found in the first column of Table 1.

Insert Table 1 about here

Results

The results are organized in two sections. The factor structure of the health items will first be described. Analyses addressing the relationship among health factors and EPT, age, and education will then follow.

Measurement model of seven health factors. The 44 HBQ items used in this study represent quite different and heterogeneous domains. We hypothesized that the 44 items could be reduced to seven health factors: Substance Use, Positive Nutrition Behaviors, Medical Check-ups, Health Maintenance Activities, Positive Health Perception, Positive Health Status, and High Blood Pressure. A confirmatory factor analysis approach (Joereskog & Soerbom, 1989) was chosen to achieve simple structure in the factor pattern matrix (most items loading on only one factor) and to account for factor intercorrelations. A substantive interpretation of the hypothesized seven health factors is given in Table 2.

Insert Table 2 about here

A preliminary factor model was fitted assuming uncorrelated unique variances. An inspection of this solution suggested several correlated residuals due to two sources: (1) additional shared variance among variables loading on the same factor that was not accounted for by the factor (e.g., "brushing teeth" and "flossing teeth"); and (2) shared variance among variables loading on different factors that was not accounted for by factor intercorrelations (e.g., "perceived eyesight" and "reading without glasses"). Subsequently, 18 correlated residuals were specified. Residuals were only allowed to correlate if their

correlation was both substantively meaningful and highly significant ($p<.0001$). This second model fit the data quite well (Chi-square[860]=1362.60, $p<.001$; GFI=.876, AGFI=.858, RMSR=0.052), considering the heterogeneity of the behaviors investigated and the parsimony of the model imposed. The factor loadings estimated by this model are shown in Table 1. Although some loadings are of low magnitude, all factor loadings were significantly ($p<.01$) different from zero.

Health factor intercorrelations are displayed in Table 3. Inspection of Table 3 shows that the seven health factors were related (Chi-square[21]=234.01, $p<.0001$). Only four of 21 correlations are not significantly ($p<.05$) different from zero. Although health factors were related, the correlations were on average moderate in magnitude (ranging from r=.007 to r=.505). This indicated that health factors were sufficiently distinct and that they should be treated as separate constructs.

Insert Table 3 about here

Relationship between health factors and EPT, age, and education. Two regression models were employed. In a first model (Model 1), EPT (measured in 1991) was treated as a predictor of seven health factors (measured in 1993). In a second model (Model 2), the relationship between health factors and EPT was examined controlling for participants' age and education. Standardized regression coefficients are reported below.

Model 1: EPT as a predictor of Health factors. A multivariate test of the seven regression weights indicated that the EPT was associated with seven health factors (Chi-square[7]=58.22, $p<.0001$). Univariate regression analyses revealed that the EPT was related to Positive Nutrition Behaviors (b=.129, $p<.05$), Health Maintenance Activities (b=.253, $p<.01$), and Positive Health Status (b=.300, $p<.01$). Surprisingly, the EPT was negatively related to Positive Health Perceptions (b=-.127, $p<.05$). The amount of variance accounted for in health factors was modest, ranging from 0% (High Blood

Pressure) to 9% (Positive Health Status). Model 1 regression analyses are summarized in Table 4.

Insert Table 4 about here

Model 2: EPT, age, and education as predictors of health factors. A multivariate test of 14 regression weights indicated that the inclusion of age and education as predictors improved the prediction of seven health factors as compared to Model 1 (Chi-square[14]=45.42, $p<.0001$). After controlling for age and for education, the EPT was still associated with Positive Nutrition Behaviors ($b=.135$, $p<.05$), Health Maintenance Activities ($b=.176$, $p<.05$), and Positive Health Status ($b=.274$, $p<.01$). The EPT was still negatively related to Positive Health Perceptions ($b=-.188$, $p<.05$). Controlling for EPT and for education, age was negatively related to Substance Use ($b=-.132$, $p<.01$) and to Positive Health Perceptions ($b=-.248$, $p<.01$). Controlling for EPT and for age, education was associated with Health Maintenance Activities ($b=.238$, $p<.01$) and negatively related to High Blood Pressure ($b=-.166$, $p<.05$). Inclusion of age and education as predictors slightly increased the amount of variance accounted for in health factors, now ranging from 1% (Medical Check-ups) to 12% (Health Maintenance Activities). The multiple regression analyses of Model 2 are summarized in Table 4.

Discussion

This study examined the effects of everyday cognitive competence on seven health factors. Everyday cognitive competence was related to preventive nutrition behaviors, health maintenance activities, and better health. These findings remained valid even after age and educational level were statistically taken into account.

Surprisingly, everyday cognitive competence was negatively related to positive health perceptions, suggesting that individuals with a higher level of everyday cognitive competence were more likely to evaluate their health as poor. Note that everyday cognitive

competence correlates *positively* with good health status but *negatively* with perception of good health status. Perhaps those individuals with higher everyday cognitive competence are more knowledgeable about health-related issues, and this may lead to a more realistic appraisal of their health. Differently put, people with lower everyday cognitive competence may overestimate their actual health status. Research has shown that overly positive self-evaluations and unrealistic optimism may be adaptive for the individual's mental health, especially under threatening circumstances (Taylor & Brown, 1988).

Controlling for everyday cognitive competence, age was related to lower substance use and less favorable evaluations of health, while higher education was associated with more health maintenance activities and with the absence of a cardiovascular condition. Age and education performed less well than expected as predictors of health variables that were measured at the factor level. Selection effects in our sample may be one reason for the moderate contribution of age and education, as study participants were of advanced age, and mainly individuals with above average health may have chosen to participate. In a representative sample, we would have expected more pronounced effects for age and education.

The amount of variance accounted for in the health variables was generally low, ranging from 1% to 12%. This result is consistent with other research on health behaviors. Due to the heterogeneous nature of health behaviors and their multiple determinacy (Prohaska et al., 1985; Royak-Schaler & Maloney Alt, 1994), single individual difference variables such as everyday cognitive competence cannot be expected to capture a large proportion of variance. For example, older individuals with high everyday cognitive competence may be capable of performing a larger array of preventive health behaviors, but may choose not to do so for various motivational or emotional reasons. However, we would expect that true correlations are somewhat higher than correlations reported in this study. Variance accounted for in health factors is attenuated by measurement error in both health and everyday competence measures. Reliability of the EPT is fairly high ($r=.94$;

Willis & Marsiske, 1993), but less is currently known about the reliability of scores on health factors.

Some prior research on health and cognition has suffered from rather crude measurement. Health and/or cognition has often been assessed at the item level, sometimes health was measured by a single item. We believe that one contribution of the present study is that more sophisticated measures were employed. Everyday competence was assessed using the EPT, an 84 item instrument with known measurement properties. Health beliefs and practices were assessed on the factor level, aggregating molecular behaviors into molar measures of life style. The benefit of refined measurement techniques becomes apparent when the factor intercorrelations are considered. The moderate correlations among the factors suggest that both health status and health behaviors need to be conceptualized as multidimensional. Had health status or behaviors in the present study been measured by a single item, we would not have discovered the differential relationship between everyday competence and perceived health versus health status.

Aside from perceived health, relationships among everyday cognitive competence and health variables found in this study were congruent with our hypotheses. Different causal mechanisms may have led to the observed pattern of findings. We believe that there are good theoretical reasons to assume that everyday cognitive competence has an effect on health behaviors. The causal pattern is less clear with regard to health status. In affecting health behaviors, everyday cognitive competence may have an indirect effect on health status. Equally plausible, and often reported in the literature, is the assumption that health status affects everyday cognitive competence. There were two measurement occasions in this study, but no repeated assessment was obtained. True longitudinal studies are necessary to disentangle uni- and bidirectional effects among everyday cognitive competence, health, and health behaviors.

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Table 1
Measurement Model for Seven Health Factors (N=430).

	Substance Use	Positive Nutrition Behaviors	Medical Check-ups	Health Maint. Activities	Positive Health Perception	Positive Health Status	High Blood Pressure
Current smoker	.711						
Years smoked	.827						
Amount smoked present	.637						
Amount smoked past	.989						
Attempt to quit smoking (-)	.415						
Alcohol consumption	.195						
Read sodium labels		.802					
Buy low sodium		.798					
Cook low sodium		.459					
Read fat labels		.833					
Buy low fat		.805					
Eat butter (-)		.325					
Cook without butter		.352					
Drink caffeinated beverages (-)		.233					
Vision checked			.281				
Flu shots			.322				
Cholesterol checked			.633				
Medical check-up			.593				
Colon/rectal check-up			.449				
Mammogram or prostate exam			.543				
Regular exercise				.233			
Teeth brushing				.303			
Teeth flossing				.360			
Use of seat belts				.489			
Good vision (self-rating)					.578		
Good hearing (self-rating)					.405		
Decline in vision (self-rating) (-)					.638		
Decline in hearing (self-rating) (-)					.522		
Health (self-rating)					.207	.486	
Decline in health (self-rating) (-)					.717		
Read without glasses						.206	
Blood pressure taken by medical person (-)						.414	
Number of doctor visits (-)						.471	
Days in hospital (-)						.366	
Diabetes diagnosed (-)						.206	
Bowel stimulant (-)						.269	
Sleep 7 or 8 hours						.175	
Need assistance for stairs (-)						.607	
Use walker (-)						.475	
Number falls last year (-)						.392	
Blood pressure taken - self							.188
High blood pressure diagnosed							.864
Blood pressure medication							.946
Body Mass Index				-.255			.151

Note. (-) indicates reverse scoring.
All factor loadings are significantly ($p < .01$) different from zero.

Table 2
Interpretation of Seven Health Factors.

Factor	Interpretation
Substance Use	High values indicate current or past smoking (i.e., cigarette, pipe, cigar) and consumption of alcoholic beverages.
Positive Nutrition Behaviors	High values indicate adherence to a low fat and low sodium diet, and low consumption of caffeinated beverages.
Medical Check-ups	High values indicate frequent preventative medical examinations and treatments (e.g., cholesterol checks, mammograms or prostate exams, flu shots).
Health Maintenance Activities	High values indicate engagement in behaviors that promote health (e.g., exercise) and avoid risks (e.g., use of seat belts).
Positive Health Perception	High values indicate a positive evaluation of sensory functioning (i.e., vision and hearing) and general health, both with regard to prior level of function and in comparison to other people of the same age.
Positive Health Status	High values indicate a good general health status, as measured by few doctor visits due to medical problems, no hospitalization, and the absence of frailty.
High Blood Pressure	High values indicate a diagnosed cardiovascular condition and the intake of cardiovascular medication.

Table 3
Correlations among Seven Health Factors.

Factor	1	2	3	4	5	6	7
1. Substance Use	--						
2. Positive Nutrition Behaviors	-.170	--					
3. Medical Check-ups	-.150	.432	--				
4. Health Maintenance Activities	-.173	.412	.231	--			
5. Positive Health Perception	-.139	.180	*-.008*	.271	--		
6. Positive Health Status	*.007*	*-.053*	-.261	.505	.488	--	
7. High Blood Pressure	*-.088*	.170	.303	*-.125*	-.166	-.237	--

Note. Correlations in *italics* are not significantly ($p < .05$) different from zero.

Table 4
Predictors of Seven Health Factors.

	Model 1: EPT as predictor		Model 2: EPT, Age, and Education as predictors			
Dependent Variable	EPT[a]	R^2	EPT[a]	Age[a]	Education[a]	R^2
Substance Use	.026	.001	.014	-.132**	.057	.021
Positive Nutrition Behaviors	.129*	.017	.135*	.029	-.010	.018
Medical Check-ups	.037	.001	.019	-.026	.053	.005
Health Maintenance Activities	.253**	.065	.176*	.076	.238**	.121
Positive Health Perception	-.127*	.016	-.188**	-.248**	.095	.084
Positive Health Status	.300**	.090	.274**	-.101	.044	.100
High Blood Pressure	.022	.000	.065	.029	-.116*	.013

Note. * $p < .05$; ** $p < .01$.
[a] Standardized regression weights are reported.