Health Practices and Health Outcomes in Rural Elderly

Heiner Maier, Lisa C. McGuire, and Sherry L. Willis

The Pennsylvania State University

Running Head: HEALTH PRACTICES AND HEALTH

Expanded text of paper presented at the 48th Annual Scientific Meeting of the Gerontological Society of America, November 18, 1995, in Los Angeles, CA.

The research reported in this paper was supported by Grant AG08082 from the National Institute on Aging to Sherry L. Willis. Partial preparation of this manuscript was supported by Training Grant MH 18904-06 to Lisa C. McGuire

Correspondence concerning this article should be addressed to Heiner Maier, who is now at the Max Planck Institute for Human Development and Education, Lentzeallee 94, 14195 Berlin, Germany; or to Sherry L. Willis, Department of Human Development and Family Studies, Pennsylvania State University, University Park, PA 16802, USA.

Abstract

The relationship between older adults' health practices and perceived health status is inconclusive. Some studies have suggested that good health practices are associated with better health status, but other studies did not confirm this relationship. The present study examined whether health practices mediated health status over a seven-year interval. In 1986, General Health, Vision, Hearing, and Cardiovascular Health Status were assessed based on self-reports of 258 older adults (M=72.3 years). In 1993, participants completed the Penn State Health Behavior Questionnaire (HBQ), an instrument that assessed self-reported health practices and self-reported health status. Confirmatory factor analyses indicated that four health practice factors (Abstention from Substances, Nutrition Habits, Health Maintenance Activities, and Medical Checkups) and three health status factors (Positive Health Status, Positive Health Perceptions, High Blood Pressure) sufficiently accounted for the variability in 43 HBQ items. Path analyses indicated that poor health status in 1986 was associated with favorable health practices in 1993. Health practices were related to health outcomes in 1993, but did not mediate the long-term associations among health status measures. Health Maintenance Activities, such as exercise, were the strongest predictor of positive 1993 health status.

Health Practices and Health Outcomes in Rural Elderly

Health practices or health behaviors are activities that people engage in with the intention of preventing disease or detecting it in an asymptomatic stage (Kasl & Cobb, 1968; Kirscht, 1983). Many studies have indicated that health practices (e.g., regular physical activities, maintaining proper weight, not smoking) may have beneficial effects on individuals' health status (Adler & Matthews, 1994; Schoenborn, 1993; Wiley & Camacho, 1982). The United States Department of Health and Human Services (1980) estimated that about 50% of present mortality can be attributed to unhealthy behaviors or lifestyles, and the promotion of beneficial health practices is a focus of the national health objectives (United States Department of Health and Human Services, 1991).

Effects of health behaviors on health outcomes are less well established for the elderly. Some prospective studies with older adults indicate that health behaviors are related to health outcomes (Palmore, 1970; Strawbridge, Camacho, Cohen, & Kaplan, 1993), but other studies did not confirm this relationship (Branch & Jette, 1984; Brown & McCreedy, 1986). It may be that the effects of health behaviors on health outcomes are less pronounced in the elderly, because their lifestyle in young adulthood and midlife is more critical for the health status of elders than their practices in late life.

The present study addressed associations among health practices and health status in rural elderly. We considered three pathways that may account for a link between health practices and health status. The first pathway, termed "selection hypothesis", argues that less healthy individuals are less likely to engage in preventive health behaviors because of psychological and physical incapacity (Mechanic & Cleary, 1980). The second pathway, termed "compliance hypothesis", suggest that the reverse is true: Less healthy individuals may in fact be more likely to follow recommended health practices, because they wish to improve their health. Selection and compliance hypotheses lead to different predictions. The selection hypothesis argues for positive associations among good health status and preventive health practices. In contrast, the compliance hypothesis postulates negative associations among good health status and preventive health

behaviors. Within the framework of the compliance hypothesis, good health status is a risk factor for poor health behaviors.

Both selection and compliance hypotheses are plausible explanations for the effects of health status on subsequent health practices. The third pathway, termed "mediation hypothesis", additionally addresses the effects of health practices on health outcomes. Can health practices be conceptualized as mediators of health outcomes over time, regardless of whether selection or compliance hypothesis are true?

Age and educational level are demographic characteristics that were shown to be associated with both health practices (Amir, 1987) and health status (Rodin and Salovey, 1989). Examining selection, compliance, and mediation hypothesis, we were interested whether age and educational level would moderate the associations among health behaviors and health status. We expected that age and educational level, although dispositional variables for both health practices and health outcomes, would not affect the interrelationships among behavior and health.

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 258 community-dwelling older adults, 219 women and 39 men, from the Central Pennsylvania region. Their age range in 1993 was 66 to 94 years (M=79.3, SD= 6.0), and their years of education ranged from 0 to 22 years (M=11.7, SD=2.8). Using a six-point Likert scale (1="very good" to 6="very poor"), participants rated their health as good in 1986 (M=2.0, SD= 0.8) and in 1993 (M=2.2, SD=0.8).

Materials and Procedure

Four categories of measures were administered in the present study. Personal background information and self-reported health status were assessed in 1986. Self-reported health behavior and self reports on health status were obtained in 1993.

Personal Background Measure. A Personal Data Questionnaire was used in 1986 to assess gender, age and education.

Health Status 1986 measure. The personal data questionnaire also included self-evaluation of health, hearing, and vision. Participants also reported the number of physician and hospital visits in the past year, and their current prescription medicines. These drugs were coded according to the American Hospital Formulary Service (1985) codes, and categorized according to therapeutic class.

Prior factor analyses of these health data, and similar data from another sample (Marsike, Willis, Goodwin, & Maier, 1992; Willis, Diehl, Gruber-Baldini, Marsiske, & Haessler, 1990; Willis; Marsiske & Diehl, 1991) had suggested that health variables could be factored into four dimensions: Positive General Health Status, Good Vision, Good Hearing, and Good Cardiovascular Health Status. A substantive interpretation of the four health factors is given in Table 1. Factor scores for the four health factors are used in subsequent analyses, with higher scores indicating better health.

Insert Table 1 about here

Health Behavior 1993 and Health Status 1993 measures. The Penn State Health Behavior Questionnaire (HBQ) is an 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). Confirmatory factor analyses with 44 HBQ items (Maier, McGuire, & Willis, 1994) had indicated that HBQ items tap four health behavior and three health status domains. The four health behavior domains are Abstention from Substances, Positive Nutrition Behaviors, Health Maintenance Activities, and Medical Checkups. The three health status domains are Positive General Health Status, Positive Health Perceptions, and High Blood Pressure. A brief description of the 44 HBQ items used in the present

study is provided in Table 2. A substantive interpretation of the four 1993 health behavior factors and the three 1993 health status factors is given in Table 1. Using the measurement model shown in Table 2, factor scores were calculated for four health behavior and three health status factors. Factor scores were used in subsequent analyses. For four health behavior factors, higher scores meant more desirable health practices. For Positive General Health Status and Positive Health Perceptions, higher scores meant better health status. For High Blood Pressure, however, higher scores indicated poorer health status (see Table 1).

Insert Table 2 about here

Results

The results are organized into two sections. Long-term effects of health status in 1986 on health behaviors in 1993 will first be described. Analyses addressing the mediating effects of health behaviors will then follow. Table 3 shows correlation coefficients describing the bivariate associations among health status measures 1986, health behavior measures 1993, health status measures 1993, age, and education.

Insert Table 3 about here

Long-term Effects of Health Status on Health Practices: Selection or Compliance?

Two regression models were employed to examine the effects of health status (assessed in 1986) on health practices (assessed in 1993). In a first model, each of the four health practices factors was regressed on four health status factors. In a second model, the effects of health status on subsequent health practices was examined controlling for participants' age and education. Standardized regression coefficients are reported below.

Model 1: Health Status in 1986 as a Predictor of Heath Behaviors in 1993. Positive General Health Status in 1986 was associated with less Medical Checkups in 1993 (b=-.26, p<.001). Good Cardiovascular Health Status in 1986 was associated with less Abstention from Substances in 1993 (b=-.19, p<.05) and with less Positive Nutrition Behaviors in 1993 (b=-.17, p<.05). Those three findings indicated that poor health status was associated with desirable subsequent health practices, and they were consistent with the compliance but not the selection hypothesis. Finally, Good Hearing in 1986 was weakly associated with more Health Maintenance Activities in 1993 (b=.13, p<.05). Figure 1 summarizes the effects of 1986 health status on 1993 health practices.

Insert Figure 1 about here

Model 2: Health Status in 1986 as a Predictor of Heath Behaviors in 1993, Controlling for Age and Education. Positive General Health Status in 1986 was again associated with less Medical Checkups in 1993 (b=-.27, p<.001). Good Cardiovascular Health Status in 1986 was again associated with less Abstention from Substances in 1993 (b=-.17, p<.05) and with less Positive Nutrition Behaviors in 1993 (b=-.17, p<.05). However, the effect of Good Hearing in 1986 on Health Maintenance Activities in 1993 was not significantly different from zero (b=.09, p>.05).

Mediating Effects of Health Behaviors

The next set of analyses addressed the question of whether long-term associations among health status measured were mediated through health behaviors. For each of the four 1993 health practices factors, a three-stage path model was calculated. The three stages were health status measures in 1986 as exogenous or independent variables, health practice factors in 1993 as mediating variables, and health status measures in 1993 as endogenous or dependent variables. Fully recursive models were calculated, involving the estimation of direct effects of exogenous variables on mediating and endogenous

variables, and the estimation of direct effects of mediating on endogenous variables. Standardized regression coefficients are reported below.

Mediating Effects of Abstention from Substances. The first path model examined health status measures in 1986 and Abstention from Substances in 1993 as predictors of health status measures in 1993. Good Cardiovascular Health Status in 1986 was associated with less Abstention from Substances in 1993 (see above). Additionally, Abstention from Substances in 1993 was related to High Blood Pressure in 1993 (b=.14, p<.05; controlled for age and education: b=.14, p<.05). However, the indirect path from Good Cardiovascular Health Status in 1986 on High Blood Pressure in 1993, meditated through Abstention from Substances in 1993, was not significantly different from zero (b=-.03, p>.05; controlled for age and education: b=-.02, p>.05). These results indicated that Abstention from Substances did not mediate the long-term associations among health status measures. The concurrent association between High Blood Pressure and Abstention from Substances was consistent with the compliance hypothesis. A graphical depiction of the path model including long-term associations among health status measures is shown in Figure 2.

Insert Figure 2 about here

Mediating Effects of Positive Nutrition Behaviors. The second path model examined health status measures in 1986 and Positive Nutrition Behaviors in 1993 as predictors of health status measures in 1993. Good Cardiovascular Health Status in 1986 was associated with less Positive Nutrition Behaviors in 1993 (see above). Additionally, Positive Nutrition Behaviors in 1993 were related to High Blood Pressure in 1993 (b=.15, p<.05; controlled for age and education: b=.16, p<.01). However, the indirect path from Good Cardiovascular Health Status in 1986 on High Blood Pressure in 1993, meditated through Positive Nutrition Behaviors in 1993, was not significantly different from zero (b=-.03, p>.05; controlled for age and education: b=-.03, p>.05). Similar to

the path model for Abstention from Substances, these results indicated that Positive Nutrition Behaviors did not mediate the long-term associations among health status measures. The concurrent association between High Blood Pressure and Positive Nutrition Behaviors was again consistent with the compliance hypothesis. A graphical depiction of the path model for Positive Nutrition Behaviors, including long-term associations among health status measures, is shown in Figure 3.

Insert Figure 3 about here

Mediating Effects of Health Maintenance Activities. The third path model examined health status measures in 1986 and Health Maintenance Activities in 1993 as predictors of health status measures in 1993. Good Hearing in 1986 was weakly related to more Health Maintenance Activities in 1993 (see above). Additionally, Health Maintenance Activities in 1993 were associated with Positive General Health Status in 1993 (b=.19, p<.001; controlled for age and education: b=.19, p<.001) and with Positive Health Perceptions in 1993 (b=.17, p<.01; controlled for age and education: b=.16, p<.01). No indirect path was significantly different from zero, suggesting that Health Maintenance Activities did not mediate the long-term associations among health status measures. However, the concurrent association between Health Maintenance Activities and both Positive General Health Status and Positive Health Perceptions suggested that Health Maintenance Activities may have beneficial effects for health outcomes. A graphical depiction of the path model for Health Maintenance Activities, including long-term associations among health status measures, is shown in Figure 4.

Insert Figure 4 about here

Mediating Effects of Medical Checkups. The fourth path model examined health status measures in 1986 and Medical Checkups in 1993 as predictors of health status

measures in 1993. Positive General Health status in 1986 was associated with Medical Checkups in 1993 (see above). Additionally, Medical Checkups in 1993 were associated with less Positive General Health Status in 1993 (b=-.15, p<.01; controlled for age and education: b=-.16, p<.01) and with High Blood Pressure in 1993 (b=.22, p<.001; controlled for age and education: b=.23, p<.001). No indirect path was significantly different from zero, suggesting that Medical Checkups did not mediate the long-term associations among health status measures. The concurrent associations between Medical Checkups and both Positive General Health Status (negative) and High Blood Pressure (positive) are consistent with the compliance hypothesis: Individuals in poor health may seek and receive more preventative medical examinations to improve the status of their health. The path model for Medical Checkups, including long-term associations among health status measures, is shown in Figure 5.

Insert Figure 5 about here

Discussion

This study examined interrelationships among health practices and health status in rural elderly. A focus was on two plausible pathways, termed selection and compliance hypothesis, that may account for effects of health status on health behaviors. The data were clearly consistent with the compliance, but not with the selection hypothesis: Individuals with poorer cardiovascular and general health status in 1986 were more likely to practice recommended health behaviors in 1993. Further support for the compliance hypothesis was obtained from an examination of concurrent relationships between health practices and health behaviors. "Good" practices in three domains of health behavior (abstention from substances, dietary habits, preventative medical examinations) were associated with some impairment in the health domain.

Recent research on health behaviors has focused on antecedents of preventive health practices (e.g., Ory, Abeles, & Lipman, 1992; Schwarzer, 1992). The compliance

hypothesis suggest that individuals health status may be a major factor of their compliance with recommended health practices. Some theoretical models designed to explain health behaviors incorporate health status as an antecedent of health behavior. For example, "perceived health threat" is a cognitive component of the health belief model (Kirscht, 1983) and "health status" is a need condition in Andersen's (1968) model of predisposing, enabling, and need characteristics. Findings from the present study suggest that cardiovascular health status ("Good Cardiovascular Health Status", "High Blood Pressure") may be a particularly predominant antecedent of good health practices.

In is an open question how the effects described by the compliance hypothesis may have affected the outcomes of studies that failed to observe benefits of health practices in older adults (e.g., Branch & Jette, 1984; Brown & McCreedy, 1986). Benefits of favorable health practices and compliance effects are processes that work in opposite directions. Benefits of favorable health practices will lead to a *positive* association between good health practices and good health status. In contrast, compliance processes will lead to a *negative* association between good health practices and good health status. If both processes are at work, the health behavior - health status association may approach zero. In face of the multiple chronic conditions characteristic for the elderly (Kovar, 1987), it is likely that compliance processes gain force as people grow older. As a consequence, panel studies with older participants may be less likely to observe the health benefits of good health practices that are well demonstrated in younger samples.

The second focus of the current study was on meditating effects of health behaviors. Our data did not indicate that health practices meditated health status over time. This finding, however, should be interpreted with caution. The long-term effects of health status measured in 1986 on health behaviors measured in 1993 were quite small, and they were the first component used in the calculation of the size of mediating effects. The small long-term effects suggest that the seven-year lag between measurement occasions that was chosen in this study may be to large, and different

conclusions may be drawn from studies with smaller lags between measurement occasions. However, we did find concurrent effects of health behaviors on health status. Health Maintenance Activities were predominantly associated with better general health status and with the absence of high blood pressure. This finding suggests that proactive, self-initiated activities such as exercise may lead to beneficial health outcomes even in advanced age.

Age and education did not moderate the relationships between health practices and health behaviors that were considered in this study. When age and education were controlled for, the same pattern of findings emerged. This suggests that our results are robust with regard to age and educational level. However, our sample had a restricted age range (66 years and older), and age may be a more important moderator when associations between behavior and health are examined in a more age-heterogeneous sample.

It should be noted that all health and health behavior measures obtained in this study were based on self-reports of participants. Future research should include objective measures of health status, and attention should focus on different pathways that individuals may pursue with regard to health and health behavior. Our study suggests that the major pathway chosen depends on the particular health behavior domain. Poor health status appears to trigger subsequent "good practices" in the domains of substance use, nutrition habits and preventative medical examinations. In contrast, good health maintenance activities appear to be less affected by prior health status but most closely associated with concurrent good health status.

References

Adler, N., & Matthews, K. (1994). Health Psychology: Why do some people get sick and some stay well? Annual Review of Psychology, 45, 229-259.

American Hospital Formulary Service (1991). AHFS drug information. Bethesda, MD: American Society of Hospital Pharmacists.

Amir, D. (1987). Preventive behaviour and health status among the elderly. Psychology and Health, 1, 353-377.

Andersen, R.M. (1968). A behavioral model of families' use of health services. Chicago: Center for Health Administration Studies.

Branch, L.G., & Jette, A.M. (1984). Personal health practices and mortality among the elderly. American Journal of Public Health, 74, 1126-1129.

Brown, J.S., & McCreedy, M. (1986). The hale elderly: Health behavior and its correlates. Research in Nursing and Health, 2, 317-329.

Kasl, S., & Cobb, S. (1968). Health behavior, illness behavior, and sick role behavior. Archives of Environmental Health, 12, 246-266.

Kirscht, J.P. (1983). Preventive health behavior: A review of research and issues. Health Psychology, 2, 277-301.

Kovar, M.C. (1987). Health assessment. In G.L. Maddox et al. (Eds.), The encyclopedia of aging (pp. 302-305). New York: Springer.

Maier, H., McGuire, L.C., & Willis, S.L. (1994). Structure of health behaviors in older adults. Paper presented at the 47th Annual Meeting of the Gerontological Society of America, Atlanta, GA.

Marsiske, M., Willis, S.L., Goodwin, P.E., & Maier, H. (1992). Relationships among cognitive processes, intellectual abilities, and everyday task performance. Poster presented at the Fourth Cognitive Aging Conference, Atlanta, GA.

Mechanic, D., & Cleary, P.D. (1980). Factors associated with the maintenance of positive health behaviors. Preventive Medicine, 9, 805-814.

Ory, M.C., Abeles, R.P., & Lipman, P.D. (Eds.) (1992). Aging, health, and behavior. Newbury Park, CA: Sage.

Palmore, E. (1970). Health practices and illness among the aged. Gerontologist, 10, 313-316.

Rodin, J., & Salovoy, P. (1989). Health psychology. Annual Review of Psychology, 40, 533-579.

Schoenborn, C. (1993). The Alameda Study - 25 years later. In S. Maes, H. Leventhal, and M. Johnson (Eds.), International Review of Health Psychology, Volume 2 (pp. 81-113). New York: Wiley.

Schwarzer, R. (1992). Self-efficacy in the adoption and maintenance of health behaviors: Theoretical approaches and a new model. In R. Schwarzer (Ed.), Self-efficacy: Thought control of action (pp. 217-243). Washington, DC: Hemisphere Publishing Corporation.

Strawbridge, W.J., Camacho, T.C., Cohen, R.D., & Kaplan, G.A. (1993). Gender differences in factor associated with physical functioning in old age: A 6-year longitudinal study. Gerontologist, 33, 603-609.

United States Department of Health and Human Services (1980). Promoting health/preventing disease: Objectives for the Nation. Washington, DC: Public Health Service.

United States Department of Health and Human Services (1991). Healthy people 2000: National health promotion and disease prevention objectives. Washington, DC: Public Health Service.

Wiley, J.A., & Camacho, T.C. (1980). Lifestyle and future health: Evidence from the Alameda County study. American Journal of Epidemiology, 116, 765-775.

Willis, S.L., Diehl, M., Gruber-Baldini, A.L., Marsiske, M., & Haessler, S.D. (1990). Description and prediction of intellectual change in older adults. Paper presented at the Third Cognitive Aging Conference, Atlanta, GA.

Willis, S.L., Marsiske, M., & Diehl, M. (1991). Older adults' performance on Instrumental Activities of Daily Living and mental abilities. Paper presented at the 44th Annual Scientific Meeting of the Gerontological Society of America, San Francisco, CA.

Table 1
Interpretation of Eleven Health Constructs.

Construct	Interpretation
Positive General Health Status (1986)	High values indicate good general health status, as measured by few doctor visits due to medical problems, no hospitalization, and positive self-evaluations of health.
Good Vision (1986)	High values indicate good eyesight, as measured by positive self-evaluations of eyesight and low intake of ophthalmic medication.
Good Hearing (1986)	High values indicate good hearing, as measured by positive self-evaluations of hearing and self-reported absence of the need to use a hearing aid.
Good Cardiovascular Health Status (1986)	High values indicate good cardiovascular health status, as measured by low intake of cardiovascular medication.
Abstention from Substances (1993)	High values indicate current and past abstention from smoking (i.e., cigarette, pipe, cigar) and abstention from alcoholic beverages.
Positive Nutrition Behaviors (1993)	High values indicate adherence to a low fat and low sodium diet, and low consumption of caffeinated beverages.
Health Maintenance Activities (1993)	High values indicate engagement in behaviors that promote health (e.g., exercise) and avoid risks (e.g., use of seat belts).
Medical Checkups (1993)	High values indicate frequent preventative medical examinations and treatments (e.g., cholesterol checks, mammograms or prostate exams, flu shots).
Positive General Health Status (1993)	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.
Positive Health Perception (1993)	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.
High Blood Pressure (1993)	High values indicate a diagnosed cardiovascular condition and the intake of cardiovascular medication.

Table 2
Measurement Model for Seven 1993 Health Constructs.

	Absten-tion from Substances	Positive Nutrition Behaviors	Health Maint. Activities	Medical Checkups	Positive Gen. Health Status	Positive Health Perception	High Blood Pressure
Current smoker	-.91						
Years smoked	-.91						
Amount smoked present	-.35						
Amount smoked past	-.88						
Alcohol consumption	-.41						
Read sodium labels		.72					
Buy low sodium		.77					
Cook low sodium		.44					
Read fat labels		.84					
Buy low fat		.85					
Eat butter (-)		.33					
Cook without butter		.35					
Drink caffeinated beverages (-)		.24					
Vision checked				.29			
Flu shots				.32			
Cholesterol checked				.62			
Medical check-up				.60			
Colon/rectal check-up				.44			
Mammogram or prostate exam				.53			
Regular exercise			.30				
Teeth brushing			.28				
Teeth flossing			.36				
Use of seat belts			.48				
Good vision (self-rating)						.73	
Good hearing (self-rating)						.42	
Decline in vision (self-rating) (-)						.71	
Decline in hearing (self-rating) (-)						.49	
Health (self-rating)					.47	.25	
Decline in health (self-rating)(-)						.62	
Read without glasses					.24		
Blood pressure taken by medical person (-)					.50		
Number of doctor visits (-)					.59		
Days in hospital (-)					.44		
Diabetes diagnosed (-)					.23		
Bowel stimulant					.26		
Sleep 7 or 8 hours					.15		
Need assistance for stairs (-)					.54		
Use walker (-)					.43		
Number falls last year (-)					.31		
Blood pressure taken - self							.15
High blood pressure diagnosed							.85
Blood pressure medication							.96
Body Mass Index			-.26				.15

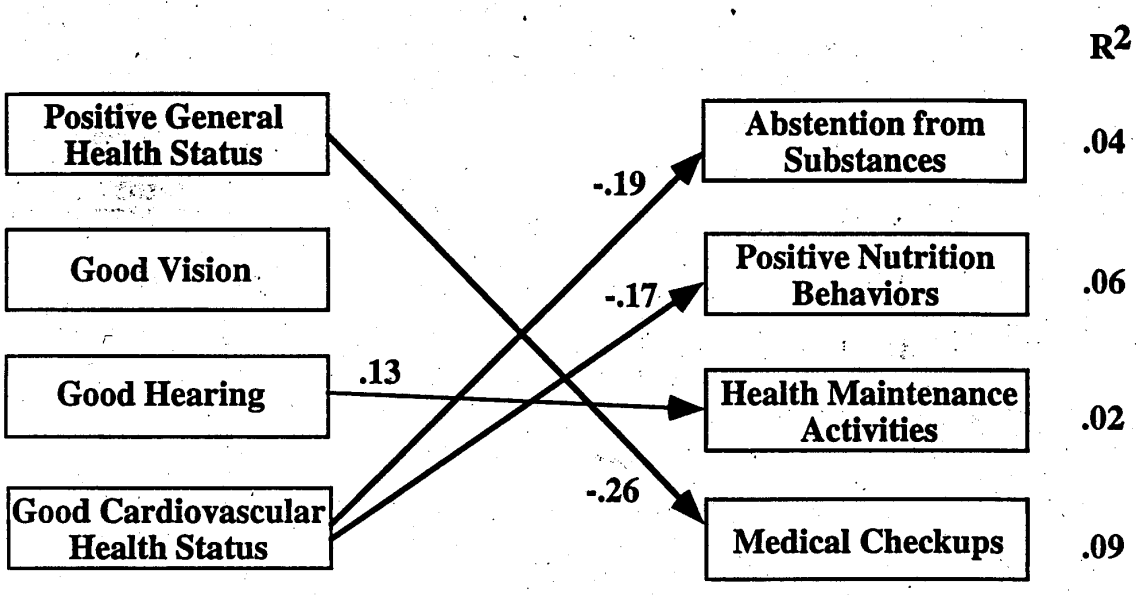
Note. (-) indicates reverse scoring.
All factor loadings were significantly ($p < .01$) different from zero.

Table 3
Correlations among Health Status, Health Behaviors and Demographic Variables (N=258).

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. Positive General Health Status (1986)	--											
2. Good Vision (1986)	.11	--										
3. Good Hearing (1986)	.20*	-.05	--									
4. Good Cardiovascular Health Status (1986)	.52*	.01	.18*	--								
5. Abstention from Substances (1993)	.02	.08	.07	-.12	--							
6. Positive Nutrition Behaviors (1993)	-.17*	-.05	.07	-.20*	.10	--						
7. Health Maintenance Activities (1993)	.04	-.02	.13*	.04	.14*	.20*	--					
8. Medical Checkups (1993)	-.28*	.00	.03	-.20*	.04	.33*	.17*	--				
9. Positive General Health Status (1993)	.41*	.06	.19*	.36*	-.05	-.12	.22*	-.25*	--			
10. Positive Health Perceptions (1993)	.28*	.07	.39*	.26*	.01	.06	.22*	-.02	.43*	--		
11. High Blood Pressure (1993)	-.26*	-.07	-.06	-.22*	.14*	.20*	-.02	.28*	-.27*	-.12	--	
12. Age	.03	-.02	-.25*	-.10	.14*	.00	-.15*	-.02	-.20*	-.16*	-.05	--
13. Education	.09	.03	.02	.03	-.12	.08	.12	.06	.04	.02	-.14*	.08

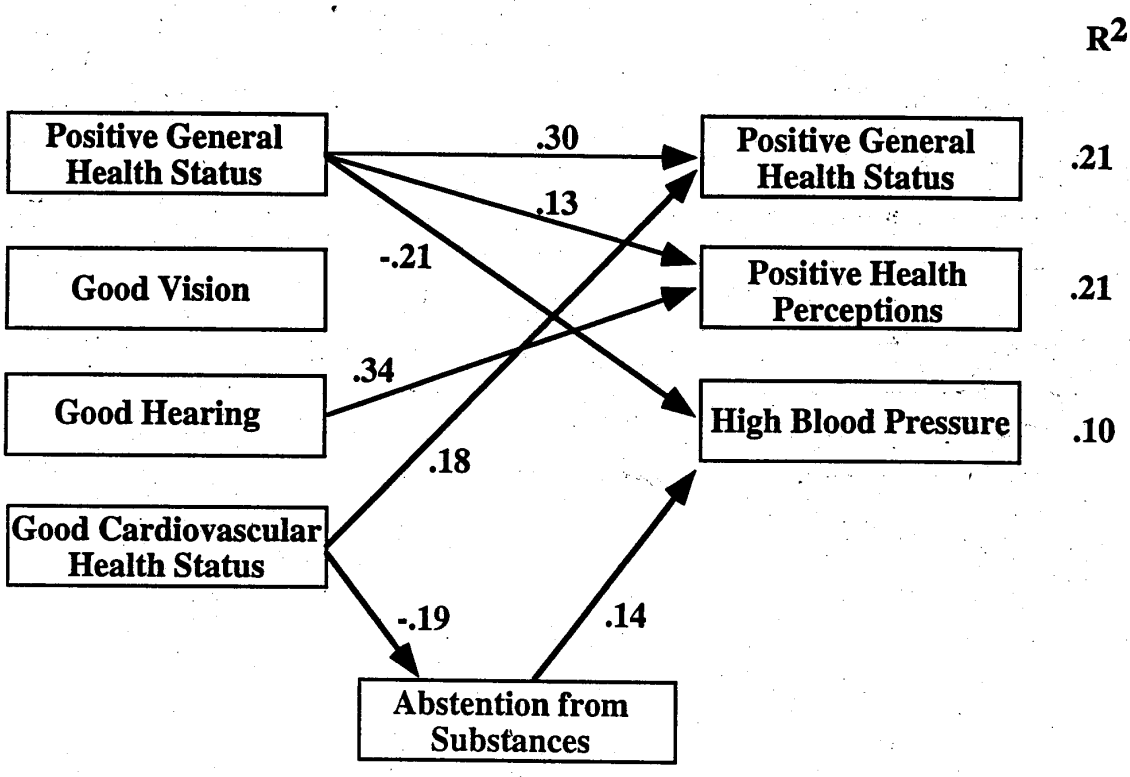
Note. * = $p < .05$.

Figure 1
Effects of Health Status on Health Behaviors.



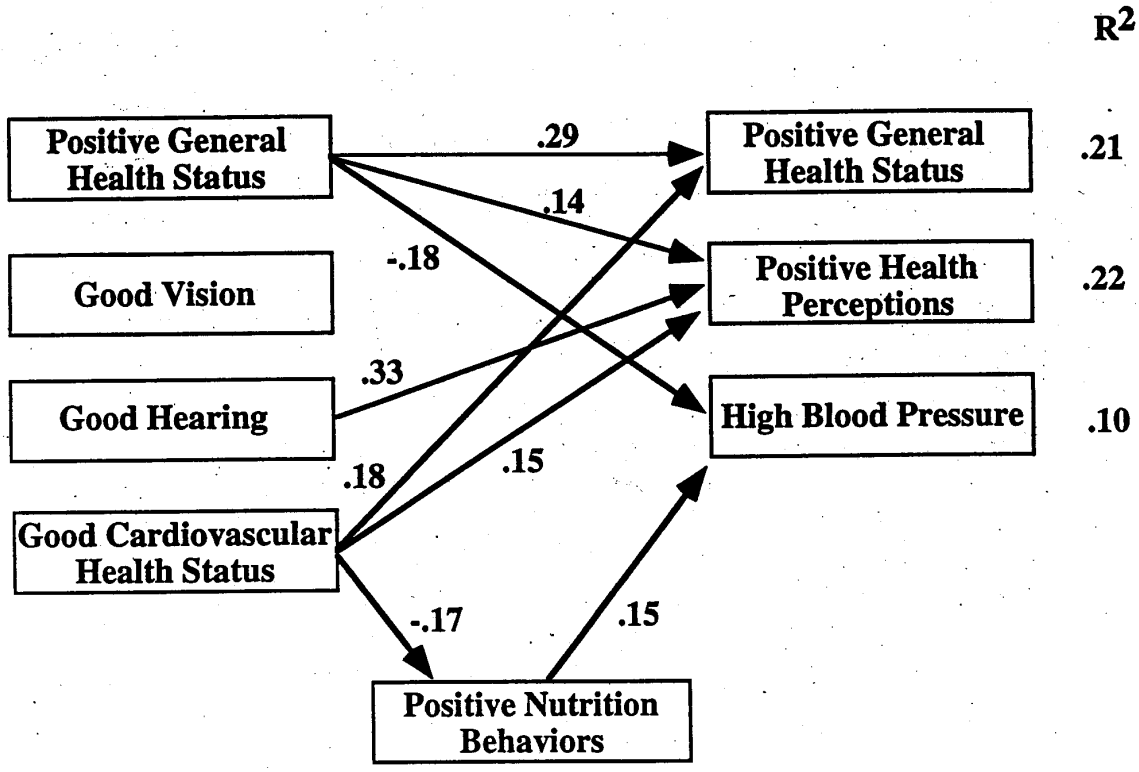
Note. Standardized regression coefficients are reported. Coefficients that were not significantly ($p < .05$) different from zero are omitted.

Figure 2
Correlates of "Abstention from Substances".



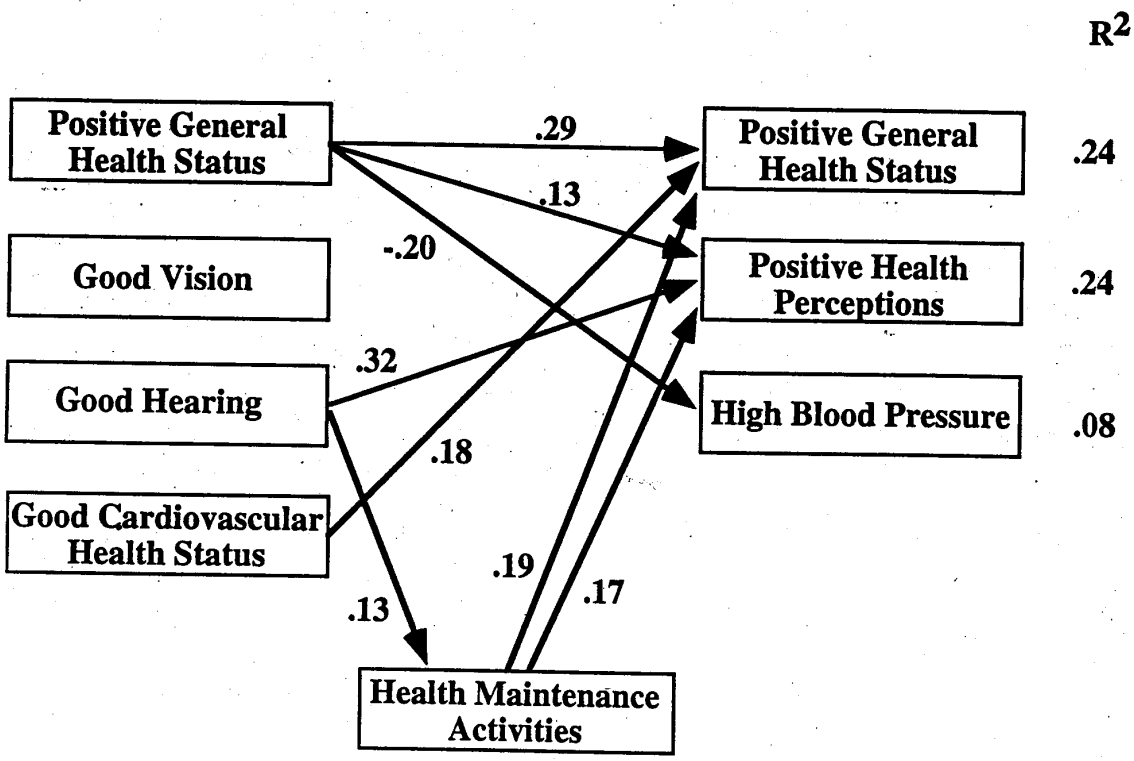
Note. Standardized regression coefficients are reported. Coefficients that were not significantly ($p < .05$) different from zero are omitted.

Figure 3
Correlates of "Positive Nutrition Behaviors".



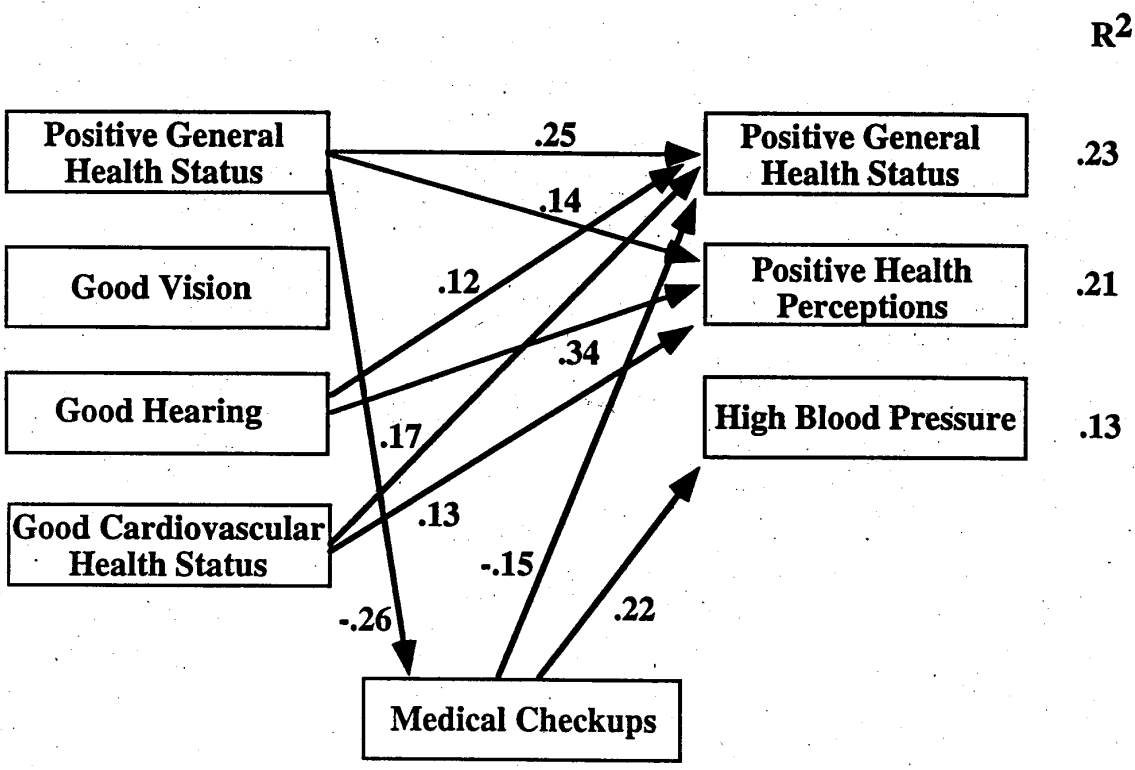
Note. Standardized regression coefficients are reported. Coefficients that were not significantly ($p < .05$) different from zero are omitted.

Figure 4
Correlates of "Health Maintenance Activities".



Note. Standardized regression coefficients are reported. Coefficients that were not significantly ($p < .05$) different from zero are omitted.

Figure 5
Correlates of "Medical Checkups".



Note. Standardized regression coefficients are reported. Coefficients that were not significantly ($p < .05$) different from zero are omitted.