DOCUMENT RESUME

ED 324 587 CG 022 843

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TITLE	Health Conception and Health-Promoting Lifestyle among Older Adults: The Validation of a Structural Equation Model.
SPONS AGENCY	National Center for Nursing Research (NIH), Bethesda, MD.
PUB DATE	8 Apr 90
CONTRACT	5-P01-NR-01121-02
NOTE	26p.; Paper presented at the Meeting of the American Society on Aging (36th, San Francisco, CA, April 5-8, 1990).
PUB TYPE	Speeches/Conference Papers (150)
EDRS PRICE	MF01/PC02 Plus Postage.
DESCRIPTORS	Adult Learning; Aging (Individuals); Client Characteristics (Human Services); Educational Gerontology; *Health Education; *Health Promotion; Hygiene; Models; *Older Adults; *Self Care Skills
IDENTIFIERS	Older Adult Project

ABSTRACT

Using data from the Older Adult Project within the Health Promotion Research Program at Northern Illinois University, this study examined four dimensions of health conception and their relationship to six dimensions of health-promoting lifestyle in a population of older adults (n=364). A battery of instruments was administred to all subjects to measure health conception, health-promoting lifestyle, importance of health, perceived control of health, perceived health status, perceived benefits of exercise, perceived barriers to exercise; demographic information was also obtained. Using these data, an analysis of covariance was conducted to compare the goodness of fit of two alternate models of the relationship between health conception and health-promoting lifestyle derived from the literature. Model A hypothesized strength of health conception as the single underlying dimension progressively related to the four health conception scales (eudaimonistic, adaptive, role performance, and clinical); Model B suggested that the adaptive and eudamonistic health conception variables were strongly related to one another. Results of the analysis suggest that Model B was best fitted to the data. A discussion of these findings and their implications ensues, and recommendations for further research for are made. References are included and structural equation charts of the two models under investigation are appended. (TE)

Health Conception and Health-Promoting Lifestyle Among Older Adults: The Validation of a Structural Equation Model

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Originally presented as a paper at the 36th Annual Meeting of the American Society on Aging, April 8, 1990

(The author wishes to thank Dr. Susan N. Walker and Dr. Nola J. Pender, Health Promotion Research Program, Northern Illinois University; Dr. Marvin Powell and Dr. Robert Karabinus, Department of Educational Psychology, Northern Illinois University; and Dr. Shirley C. Laffrey, Dept. of Community and Mental Health Nursing, University of California at San Francisco, for their invaluable assistance, support and patience.)

This study was supported by the National Center for Nursing Research, National Institutes of Health, grant number 5 P01 NR 01121-02

Health Conception and Health-Promoting Lifestyle Among Older Adults: The Validation of a Structural Equation Model

Recently, there has been a great deal of interest generated in healthy lifestyle due to the publication of *Healthy People: The Surgeon General's Report on Health Promotion and Disease Prevention* and a follow-up document, *Promoting Health/Preventing Disease: Objectives for the Nation*, as well as the more recently released *The 1990 Health Objectives for the Nation: A Midcourse Review* (U.S. Public Health Service, 1979, 1980, 1986). These documents have not only increased awareness about healthy lifestyle practices, but have inspired researchers and clinicians to form theoretical models of its structure. One such model has been conceptualized by Pender (1987). This model of healthy lifestyle practices consists of two components related to illness prevention and health promotion. The health-promoting lifestyle component may have special significance for older adults. Health-promoting (as opposed to illness preventing) lifestyle and its determinants, however, have not been extensively studied in the elderly. Of the possible determinants of health-promoting lifestyle in older adults, health conception may play an important role. Little specific information is known about the nature of health conception and its relationship to health-promoting lifestyle in older adults. Using data from the Older Adult Project within the Health Promotion Research Program at Northern Illinois University, this study examined four dimensions of health conception and their relationship to six dimensions of health-promoting lifestyle in a population of older adults.

Background

Health-promoting lifestyle practices can be thought of as behaviors which enhance health and well-being. They are related to growth and actualization rather than to the prevention of illness (Ardell, 1979, 1986; Pender, 1987). Ardell (1979) suggested that the dimensions of self-responsibility, nutritional awareness, physical fitness, stress management, and environmental sensitivity represent a wellness-oriented lifestyle. Pender (1987) suggested 10 dimensions as representing the health-promoting component of a healthy lifestyle. The dimensions of self-care competence, nutrition, physical/recreational activity, sleep, stress management, self-actualization, sense of purpose, interpersonal relationships, environmental control, and use of the health care system were included in the Lifestyle and Health Habits Assessment (LHHA), an instrument for the clinical measurement of healthy lifestyle.

In order to encourage health-promoting lifestyle habits it is important to understand the cognitive/perceptual variables which function to motivate this type of behavior. Bandura (1977, 1978, 1982) established the importance of cognitive/perceptual processes in the regulation and control of behavior. He postulated the interdependence of cognitive/perceptual processes, behavior, and external events. Bandura hypothesized that the cumulative effects of prior behavior alter the cognitive/perceptual processes, which consequently influence subsequent behavior. Therefore, cognitive/perceptual processes play an important role in motivating behavior change.

A recent study (Walker, Volkan, Sechrist, & Pender, 1988; Walker, Pender, & Volkan, 1987) examined the determinants of health-promoting lifestyle among older adults. Multiple regression analysis revealed that a number of demographic and cognitive/perceptual variables, including three dimensions of health conception, were related to health-promoting lifestyle. Health conception has therefore emerged as an important determinant of health-promoting lifestyle.

From an extensive review of literature, Smith (1981, 1983) suggested four categories of health conception or health definition in order to expand the concept of health beyond the standard medical viewpoint. The first conception of health was labeled clinical and represented an illness prevention approach to health derived from the medical model. In this conception, health is seen as a state free from disease or debilitating conditions. The second conception of health was labeled role-performance and viewed health as the ability to perform normally in society. The third conception of health was labeled adaptive and viewed health as the ability to adapt to environmental change. The fourth conception of health was labeled eudaimonistic and viewed health as the experience of exuberant well-being. Smith postulated these health conceptions as being hierarchically oriented along an increasingly complex continuum ranging from absence of illness to exuberant well-being. Within this continuum, the more complex conceptions of health subsume the less complex conceptions. Laffrey (1985) investigated the association of health behavior choice with self-actualization and Smith's four categories of health conception. Along the lines of Maslow (1962, 1968, 1970), she hypothesized that a person who chooses to engage in health-promoting behaviors is more self-actualized and has a more complex conception of health than a person who engages in health maintenance or illness prevention behaviors. She found a lack of relationship of both health conception and health-promoting behavior choice to self-actualization. She believed, however, that this lack of relationship may have been due to the fact that the *Personal Orientation Inventory* self-actualization instrument she used had not been health-specific. Laffrey did find a moderate correlation of health conception with healt'ı-promoting behavior choice, suggesting that a person's performance of health-promoting behavior choice may be related to the way in which he or she defines health. She concluded that those who had complex health conceptions were more likely to make health-promoting behavior choices than those with less complex health conceptions. Therefore, those who conceive of health in an eudaimonistic sense would be expected to engage in more health-promoting behavior than those who have a clinical definition of health. A study by Walker, Volkan, Sechrist and Pender (1988) indicated that Laffrey's health conception dimensions were related to health-promoting lifestyle. In a regression analysis using a number of cognitive/perceptual variables to explain health-promoting lifestyle, three health conception variables, eudaimonistic, adaptive and clinical, were found to contribute 12.42%, 3.15%, and 1.01% respectively to the 35.10% overall explained variance. In addition, these health conception variables were found to be simply correlated with health-promoting lifestyle in descending order of hypothesized complexity. The largest correlation of health promoting lifestyle was with the eudaimonistic variable ($r = .353$) and the lowest with the clinical variable ($r = .059$).

No other studies could be found which examined the dimensions of health conception and their relationship with the dimensions of health-promoting lifestyle in older adults. The purpose of this study was to further explicate the relationships between health conception and health-promoting lifestyle with regard to older adults. These relationships were evaluated through the comparison of two models of the underlying structural parameters of the relationships between health conception and health-promoting lifestyle in a population of older adults.

Population and Sample Methodology

This study involved secondary analysis of data from a sample of 364 older adult volunteers drawn from northern Illinois between May, 1985 and June, 1986. The ages of the sample ranged from 55 to 91 with a mean age of 69.5. The demographic characteristics for the sample are summarized in Table 1.

Subjects were assured of confidentiality if they participated in the study. They were also asked to sign a consent to participate form. A battery containing instruments to measure health conception, health-promoting lifestyle, importance of health, perceived control of health, perceived health status, perceived benefits of exercise, perceived barriers to exercise, and demographic information was administered to all older adults in the study.

The administration of the instrument battery was supervised by trained research assistants and was self-paced.

Measurement of Health-Promoting Lifestyle

Health-promoting lifestyle was measured in the study by the Health-Promoting Lifestyle Profile (HPLP). This instrument has been reported to be valid and reliable (Walker, Sechrist, & Pender, 1987). The HPLP instrument consists of a total scale and six subscales which measure self-actualization, health responsibility, exercise, nutrition, stress management, and interpersonal support. The HPLP contains 48 items which are scored in a 1 to 4 format, with 1 = never, 2 = sometimes, 3 = often, and 4 = routinely. The structures of the six HPLP subscales were supported through principal axis factor analysis which explained 47.1% of the variance in the instrument. A second order factor analysis supported a one factor solution underlying the instrument. This was interpreted as an overall construct of health-promoting lifestyle. Cronbach's alpha coefficients for the HPLP subscales ranged from 0.702 to 0.904. The total scale alpha was 0.922. Pearson's r was used to evaluate the test/retest stability of the instrument. The total scale r was 0.926. Tne r coefficients for the subscales ranged from 0.808 to 0.905.

Measurement of Health Conception

Laffrey (1986) subjected the Laffrey Health Conception Scale (LHCS) to psychometric evaluation using data gathered from a sample of western adult women aged 24 to 61. The 28 item LHCS used a 6-point Likert-type format with responses ranging from strongly agree (1) to strongly disagree (6). Principle component factor analysis confirmed the four scales of the instrument as representing Smith's (1981) four conceptions of health. The four scales accounted for 61.7% of the explained variance. The health conception scales were found to be reliable with alpha coefficients ranging from 0.867 to 0.884 in the final 28 item instrument.

Structural Models

Two alternate structures of the underlying dimensions of health conception and their relationship to the dimensions of health-promoting lifestyle were derived from the theoretical literature and are presented in Figures 1 and 2. Model A (M_a) described in Figure 1 was tested for goodness of fit in relation to Model B (M_b) presented in Figure 2. A number of indices were used to assess both the overall goodness of fit and the goodness of fit of the individual components of the models. The models also were tested for identification. All significance testing done in this study was conducted at the 0.05 level.

The two models were different in that they did not share the same latent variable structure underlying the four health conception variables. The first model, M_a (Figure 1), was suggested by Laffrey's (1986) work in instrument development and her theoretical formulations (Laffrey, Loveland-Cherry, & Winkler, 1986). In her development of the LHCS instrument, Laffrey sought to emulate Smith's (1981) four health conception dimensions. Within this framework, the four health conception dimensions would be progressively inclusive of one another, with the most complex dimensions subsuming, in order of complexity, the other health conception dimensions. This would indicate a high degree of relationship among the four health conception dimensions.

Laffrey (1986) supported the validity of the four health conception dimensions in the LHCS through a principal components factor analysis with an orthogonal rotation. This type of rotation defines the factor structures as being independent of one another. Laffrey used this type of factor analysis, along with low inter-scale correlations, to support the interpretation of the four health conception scales as independent. She concluded that the four health conception scales were not progressively inclusive and therefore not highly related to each other. Laffrey, however, did imply that some type of relationship existed among the four health conception scales. In her description of the LHCS instrument, Laffrey stated that a total score could be obtained by summing the four health conception scales of the LHCS instrument to yield a strength of total health conception score. This would seem to imply a unitary dimension underlying the four health conception scales. Laffrey did not test this assumption through a secondary factor analysis of the LHCS instrument.

M_a hypothesized a single underlying dimension related to the four health conception scales. This single underlying dimension or latent variable was hypothesized to be a strength of health conception dimension that was progressively related to the four health conception dimensions. The progressive relationship of the underlying dimension to the four health conception dimensions was determined by examining the factor loadings of the four health conception scales on the single strength of health conception latent variable. If the four health conception scales were progressively inclusive, then the factor loadings would be the largest between the eudaimonistic scale and the latent variable and decrease in order of complexity with the loadings on the other health conception scales.

The second model, M_b (Figure 2), had a different theoretical basis than M_a. In addition to the progressive relationship of the health conception dimensions (tested in M_a), Smith (1981, 1983) also suggested that the adaptive and eudaimonistic health conception variables were strongly related to one another. Smith (1981, 1983) saw the adaptive and eudaimonistic components as both being "...oriented towards change and growth" (p. 49). The progressively inclusive nature of the health conception variables and the strong relationship between the eudaimonistic and adaptive dimensions were tested in M_b. This was done by hypothesizing that the first latent health conception variable ξ_1(KSI) would not only be progressively related to all of the health conception variables, but would also be most highly related to the eudaimonistic and adaptive variables. The four health conception dimensions would load on the first latent health conception dimension in decreasing order of strength from the eudaimonistic to the clinical variables. Nevertheless, this first latent variable would also load most highly on the eudaimonistic and adaptive variables. In addition to the relationship between the eudaimonistic and adaptive variables, Smith also saw the clinical and role performance scales as being related. She stated that the relationship of the clinical and role performance components seemed "... to focus on the maintenance of stability: They may be said to aim at physiological and social monostasis" (Smith, 1981, p. 49). It was therefore possible to hypothesize another dimension underlying health conception related to the maintenance of stability. This second underlying dimension was tested in M_b by the inclusion of another latent health conception variable ξ_2. This second latent variable was hypothesized to be related to social and clinical conceptions of health. This latent variable would only be related to the clinical and role performance dimensions and would not be related to the eudaimonistic and adaptive dimensions. These two hypothesized latent variables were also supported by Schlenger's (1976) definition of health as two systems, the first being a positive feedback and growth definition of health, and the second a negative feedback, homeostatic definition of health.

Statistical Analysis

The theoretical models M_a and M_b, outlined in Figures 1 and 2, were programmed as covariance structure models using the LISREL VI program (Joreskog & Sorbom, 1985). Since LISREL assumes multivariate normality only for the structural equation component of a model, the data were not reverse scored or log transformed for the LISREL analyses. The two covariance structure models were constructed using methodology shown to be effective for testing models related to health phenomena (Bentler & Speckart, 1979; Rothman, 1983). The models each consisted of four observed X variables, six observed Y variables, either one or two latent ξ(KSI) variables and one latent dependent η (ETA) variable. The measurement component of the LISREL program was used to derive the independent and dependent latent variables from the observed variables for each model. The structural equation component was used to relate the independent latent variables to the latent dependent variable in each model. The LISREL VI program (Joreskog & Sorbom, 1985) compared the fit of each model to the data by the use of maximum likelihood analysis of structural equations among the latent variables (Long, 1983). This method of analysis uses only the factorally validated portion of the observed variables to estimate the structural components of a model and is therefore more precise than standard regression analysis. This method also allows for comparisons between a number of models which all may appear theoretically valid (Bentler, 1980). Therefore, even though a general model under analysis is assumed to be confirmatory, the configuration of components within the general framework may be tested against each other in an exploratory fashion. Lomax (1982) stated that ". . . the major goal of LISREL-type structural equation modeling is confirmatory, in the sense of substantiating some theory, and exploratory, in the sense of making finer theoretical distinctions than were initially hypothesized" (p. 4). This use of the LISREL program corresponds to Joreskog's view that LISREL is both exploratory and confirmatory (Joreskog, 1978). In the models of the relationship between health conception and health-promoting lifestyle, the parameters to be compared were among the measurement components of the X variables and the structural equation parameters. The Y variable measurement components were identical for both models. The error variances for both the X and Y measurement components of the models were derived from preliminary analyses using starting values calculated by from known reliabilities. Some error variances were then fixed in the final models in order to meet the order condition of identification. This procedure is similar to that suggested by Lomax (1982) for the construction of structural equation models. The addition of correlated measurement errors in the models correspond to the derivative analysis suggested by Lomax (1982). This was done during the preliminary testing of each of the measurement components of the model. The derivative analysis allows for measurement errors to be correlated as long as the correlated error terms make theoretical sense and their addition gives a significant increase in the X^2 difference between models.

Results

The results of the model comparisons are summarized in Table 2. In both the M_a and M_b models, parameter estimates were consistent in the unweighted least squares (UL) and maximum likelihood (ML) analyses, indicating that the ML estimates were not affected by the distribution of the data. The comparison parameters which follow were derived from ML analyses. The smallest X^2/df ratio was found in M_b and was 68.12/31 (2.20). The X^2/df ratio for M_a was 1184/34 (34.8). The X^2/df ratio for M_b was in the less than 5 range suggested by Wheaton, Muthen, Alwin and Summers (1977) and also within the 2 - 3 range suggested by Carmines and McIver (1981). The change in X^2/df between models was significant between M_a and M_b (X^2/df=1116.24/3, $p < 0.001$). This X^2 value suggests that the addition of the parameters in M_b allows for a much better fit of the model to the data. As shown in Table 2, the goodness of fit (GFI) and the adjusted goodness of fit (AGFI) indices were largest for M_b at 0.966 and 0.939, respectively. The GFI and AGFI indices were 0.445 and 0.102 for M_a. The goodness of fit indices indicated that M_a was not adequately fitted to the data. M_a also did not achieve the > 200 critical n (CN) criterion suggested by Hoelter (1983) with CN indices of 15.73, while M_b achieved a CN of 253.6. The largest standard errors were the same for both models at 0.105. M_a had a largest normalized residual of 31.059 related to the clinical variable (X_4), while the largest normalized residual for M_b was 2.45, related to the eudaimonistic variable (X_1). None of the models had largest normalized residuals of < 2 suggested by Joreskog and Sorbom (1985), although the largest normalized residual in M_b came close to this value. These normalized residual values could be indicative of specification errors, especially in M_a. The normalized residual values were reflected in the root mean square residual index (RMSR) which is the average amount of residual error in each model. As shown in Table 2, the RMSR values were 0.11 for M_a and 0.046 for M_b. The Q-plots of the residuals of M_a showed deviation from a 45 degree angle and appeared to be underfitted. The Q-plot of the residuals in M_b fit very well along a 45 degree angle. This indicated that there was little specification error in M_b. The z values were significant for all components in each of the models, indicating that the parameters were most likely different than zero.

The comparison of the fitting parameters of the two models clearly showed that M_b was best fitted to the data and represented an adequate specification of the parameters of the model. Therefore, M_a was rejected as an adequate structure for the relationship between the dimensions of health conception and the dimensions of health-promoting lifestyle. A diagram of parameter components in M_b is shown in Figure 3. and are summarized in Table 3.

These parameter components include correlated error terms which were derived during a derivative analysis of the models (Lomax, 1982). The discussion of the parameters of M_b will be based on the ML estimates unless otherwise noted. The measurement parameters of the X variables in M_b were all of reasonable magnitude, using 0.3 as a minimum value (Kachigan, 1982; Kim & Mueller, 1985) with the exception of λ_{x32} (LAMBDA). This parameter was barely significant and quite small in magnitude (0.082). The measurement component of the X variables in M_b showed that ξ_2 was related to the clinical and role performance conception of health variables, although the role performance variable contributed little to the magnitude of this relationship. The measurement model of the X variables clearly showed that ξ_1 was derived from all four health conception variables, including the clinical conception of health.

The X variables all appeared to be related to ξ_1, although the adaptive, eudaimonistic and role performance variables were almost equally related. The factor loadings of the role performance and clinical variables on ξ_1 decreased in hypothesized order of complexity. The latent variables had large variances indicating that they were good measures of the observed X variables. The coefficient of determination for the X variables was quite high (0.994) indicating that there was little error in their measurement and that they were stable measures. The γ (GAMMA) coefficients indicated a small but significant contribution of the latent X (ξ) variables to the latent Y (η) variable. The γ coefficients further indicated that ξ_1 had a positive relationship to η_1, while ξ_2 was negatively related to η_1. The coefficient of determination for the structural equations showed that the latent X (ξ) variables were explaining 16.7% of the variance in the latent Y (η) variable. The matrix of the disturbance error term in the structural equation ψ (PSI) was a moderate 0.393 indicating that η was a fairly good measure of the latent Y (η) dependent variable. Likewise, the coefficient of determination of the observed Y variables was 0.774 indicating that these measures were fairly good. The ε_3 (EPSILON) error term was the largest in the model at 0.882. This may be an indication that Y_3 was not a good measure of η_1. A number of error term correlations were significant, especially among the Y variables. Although these error terms correlations were significant, none were large in magnitude.

Discussion

The comparison of M_a and M_b (Figures 1 and 2) gave information about the nature of the dimensions underlying the four health conception variables and the way in which these variables were related to health-promoting lifestyle. The first latent health conception variable was positively related to the latent health-promoting lifestyle variable (η_1). The first latent health conception variable was more strongly related to the eudaimonistic and adaptive scales than the role performance and clinical scales. As was expected, this variable was positively related to the latent health-promoting lifestyle variable. The second latent health conception variable (ξ_2), associated with the clinical and role performance health conception variables, was found to have a negative relationship with the latent health conception variable. Both latent health conception variables together explained roughly 16% of the variance in the latent health-promoting lifestyle variable. This was a large enough amount of variance to support the assumption that health conception plays an important role in the decision of an individual to engage in health-promoting behavior. M_a had a single dimension underlying health conception and was rejected in favor of M_b which had two dimensions underlying health conception. The rejection of M_a called into question the adequacy of a single underlying health conception dimension. Two latent health conception variables were tested in M_b. The first latent variable was related to all of the health conception variables but was more highly related to the eudaimonistic and adaptive variables. This latent variable could be represented as a positive strength of health conception dimension. The first latent variable incorporated two of Smith's (1981, 1983) ideas about health conception. The first idea was that a complex eudaimonistic conception of health was progressively related to all the other dimensions of health conception. The second idea was that the eudaimonistic and adaptive health conception variables were highly related to one another. Both of these ideas were somewhat confirmed in M_b. The first latent variable was strongly related to the eudaimonistic, adaptive, and role performance health conception variables and was less related to the clinical variable. The relationship of the first latent variable to the dimensions of health conception has implications for the calculation of an overall LHCS score. Rather than a total strength of health conception score, this score might be better conceptualized as a positive strength of health conception score. This score could be created by using the factor scores corresponding to the first health conception variable. The factor scale score would weight the eudaimonistic and adaptive variables more highly than the role performance and clinical variables, yet would include the contributions of the role performance and clinical variables. The use of a factor score, however, might not be practical for all users of the LHCS. Another approach to creating a positive strength of health conception score would be to sum the eudaimonistic, adaptive, and role performance scales of the LHCS. This scoring scheme would give a close approximation to the factor score and would be easier to calculate. The second latent health conception variable was conceived as a clinical, illness-preventing health conception dimension. As with the first latent variable, a factor score could be created. The role performance health conception variable, however, was only slightly related to this underlying variable. Unless more work were to be done to strengthen the relationship between the second latent variable and role performance, the clinical score by itself would be a good measure of the illness-preventing dimension of health conception.

The dimensions underlying health conception would appear to support Schlenger's (1976) theoretical health conception constructs. It is possible to speculate that Smith's (1981, 1983) four definitions of health can be subsumed by Schlenger's (1976) positive and negative definitions of health. It would seem that the Laffrey Health Conception Scale can function as an adequate measure of the theoretical dimensions postulated by both Smith (1981, 1983) and Schlenger (1976).

The measurement component of the health-promoting lifestyle variables was found to correspond closely with the previous higher order factor analysis of the health-promoting lifestyle instrument. The health-promoting lifestyle scales were found to support one underlying factor in a population of older adults. The factor loadings between the underlying health-promoting lifestyle variable and the health-promoting variables were all fairly large. Interestingly, the stress management variable loaded highest on the latent health-promoting lifestyle variable. This might be indicative of the importance of stress management to overall health-promoting lifestyle among older adults. The exercise variable had a slightly larger error or unique factor variance associated with it, suggesting that it may be tapping into a construct separate from the other components. This finding supported the contention made by Blair, Jacobs and Powell (1985) that physical activity may not be related to other health behaviors. There were also a number of correlated error terms associated with the health-promoting lifestyle variables. As with the health conception variables, these error correlations could have been related to method variance from the pencil and paper nature of the instrument. A more reasonable explanation, however, was that these error terms were an indication of the presence of another weak factor underlying the health-promoting lifestyle subscales. Although this factor was not strong enough to affect the validation of the model, it necessitated the use of correlated error terms among the health-promoting lifestyle variables in order to obtain a good fit of the model to the data. The health conception variables appeared to be related either to the more abstracted, non-behavior specific health-promoting lifestyle variables such as self-actualization and interpersonal support, or to the action specific health-promoting lifestyle variables such as nutrition, exercise, and stress-management. (Health responsibility appeared to be related to both groups, but was more highly related to the behaviorally specific group.) These relationships suggested a possible division among the health-promoting lifestyle variables. Further work could possibly refine two latent structures of health-promoting lifestyle; one related to the abstract actualizing components of health-promoting lifestyle and another related to the action specific components of health-promoting lifestyle.

Implications

The population under study consisted of a relatively heterogeneous group of older adults. A recent study (Walker, Volkan, Sechrist, & Pender, 1988) has shown that as a group, older adults demonstrate higher frequencies of health-promoting lifestyle behaviors than younger adults. Nevertheless, little is known about the role of cognitive/perceptual influences in motivating health-promoting behavior in older adults. Not much is known about health conception in older adults and therefore it was not known if the health conception parameters might differ across age groups. For instance, the moderate relationship between role performance and the first underlying latent health conception variable (ξ_1), the weak relationship between role performance and the second underlying health conception variable (ξ_2), and the lack of relationship between role performance and the dimensions of health-promoting lifestyle might have been due to the way in which older persons view role expectations. It is possible that older people feel less of a need to define their health with regard to expectations of others. Younger persons with more emotional investment in their careers, have better reasons for defining their health according to what they can and cannot do with other people. In this context, old age may be a period of life in which people no longer view health as the ability to perform a role or function expected by society. Instead, older persons may feel that the performance of a role contributes to personal growth and awareness. In this sense, old age can be seen as 'roleiess', at least with respect to traditional societal roles.

Based on the findings of this study, recommendations for further research concerning the relationship of health conception to health-promoting lifestyle can be made. These recommendations involve the comparison of the dimensions of health conception, health-promoting lifestyle, and models of the relationships among these dimensions across different populations and across cultural, ethnic, and age groups. A notable beginning in this area is a recent study by Liang, Asano, Bollen, Kapana, and Maeda (1987) which used LISREL techniques to compare the factor structure of the Philadelphia Geriatric Center Morale Scale (PGMS) in Japanese and American populations. The LISREL methodology employed in this study provided an example of an excellent tool for use in cross-cultural research. Further studies should be done addressing the contrast between older and younger populations in the areas of health conception and health promotion. In particular, much could be learned through a comparison of the model validated in this study across age groups. Differences found across age groups might lead to greater insight into how health conception and health-promoting lifestyle develop during the aging process. This type of study would also demonstrate how health conception influences health-promoting behaviors during the aging process. This information would be valuable in helping both younger and older persons establish more health-promoting behaviors. The recommendations presented here provide a glimpse into some possible directions for further research. Health promotion research is a rapidly growing field and it is anticipated that further refinement and understanding of the dimensions examined in this study will be forthcoming. This will hopefully lead to knowledge that will enable people with diverse attitudes and needs to be able to enjoy the benefits of a healthy lifestyle.

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Table 1. Sample Demographic Characteristics

	n	%
Gender		
Male	119	32.7
Female	244	67.0
Marital Status		
Married	218	59.9
Widowed	109	29.9
Divorced/Separated	29	8.0
Never Married	8	2.2
Employment Status		
Employed Full-Time	51	14.0
Employed Part-Time	24	6.6
Retired	218	59.9
Homemaker	68	18.7
Unemployed	3	0.8
Education Level		
Less than 8th Grade	5	1.4
8th Grade	25	6.9
Some High School	42	11.5
High School Graduate	112	30.8
Some College	97	26.6
Bachelors Degree	31	8.5
Graduate/Prof. Degree	52	14.3
Yearly Family Income		
Below $20,000	153	42.0
$20,000 - $40,000	165	45.3
$40,000 - 60,000	31	8.5
Above $60,000	15	4.1
Ethnicity		
White (Non Hispanic)	361	99.2
Hispanic	1	0.3
Asian	2	0.5
Black	0	0.0
Other	0	0.0
Residence		
Urban	38	10.4
Suburban	121	33.2
Rural	204	56.0

(Note: Missing values are not reflected, thus some % may not add to 100%)

Table 2. Comparison of the fitting parameters of Model A and Model B.

Fitting Parameters	Model A	Model B
Chi Square/df	1184/34	68.12/31
Goodness of Fit Index (GFI)	0.445	0.966
Adjusted Goodness of Fit Index (AGFI)	0.102	0.939
Root Mean Square Residual (RMSR)	0.111	0.046
Critical N (CN)	15.73	253.6

Table 3. Maximum Likelihood Parameter Estimates from M_b

LAMBDA (λ) Parameters

λ_{x11}.....1.000 *
λ_{x21}.....0.800
λ_{x31}.....0.922
λ_{x41}.....0.371
λ_{x32}.....0.082
λ_{x42}.....1.000 *
λ_{y11}.....1.000 *
λ_{y21}.....0.921
λ_{y31}.....0.503
λ_{y41}.....0.834
λ_{y51}.....0.890
λ_{y61}.....1.080

EPSILON (ε) Parameters

ε_1.....0.528
ε_2.....0.599
ε_3.....0.881
ε_4.....0.672
ε_5.....0.627
ε_6.....0.453

DELTA (δ) Parameters

δ_1.....0.241 **
δ_2.....0.103 **
δ_3.....0.372 **
δ_4.....0.150 **

PHI (ϕ) Parameters

ϕ_{11}.....0.765
ϕ_{22}.....0.744

GAMMA (γ) Parameters

γ_{11}.....0.292
γ_{21}...-0.135

PSI (ψ) Parameter

ψ_{11}.....0.393

THETA (θ) Parameters

$\theta_{\varepsilon 23}$.....0.130
$\theta_{\varepsilon 24}$.....0.124
$\theta_{\varepsilon 45}$...-0.081
$\theta_{\varepsilon 15}$.....0.170
$\theta_{\delta 12}$...-0.093 **

* Value set to establish metric.

** Values derived in preliminary analysis and set to comply with order condition of identification.

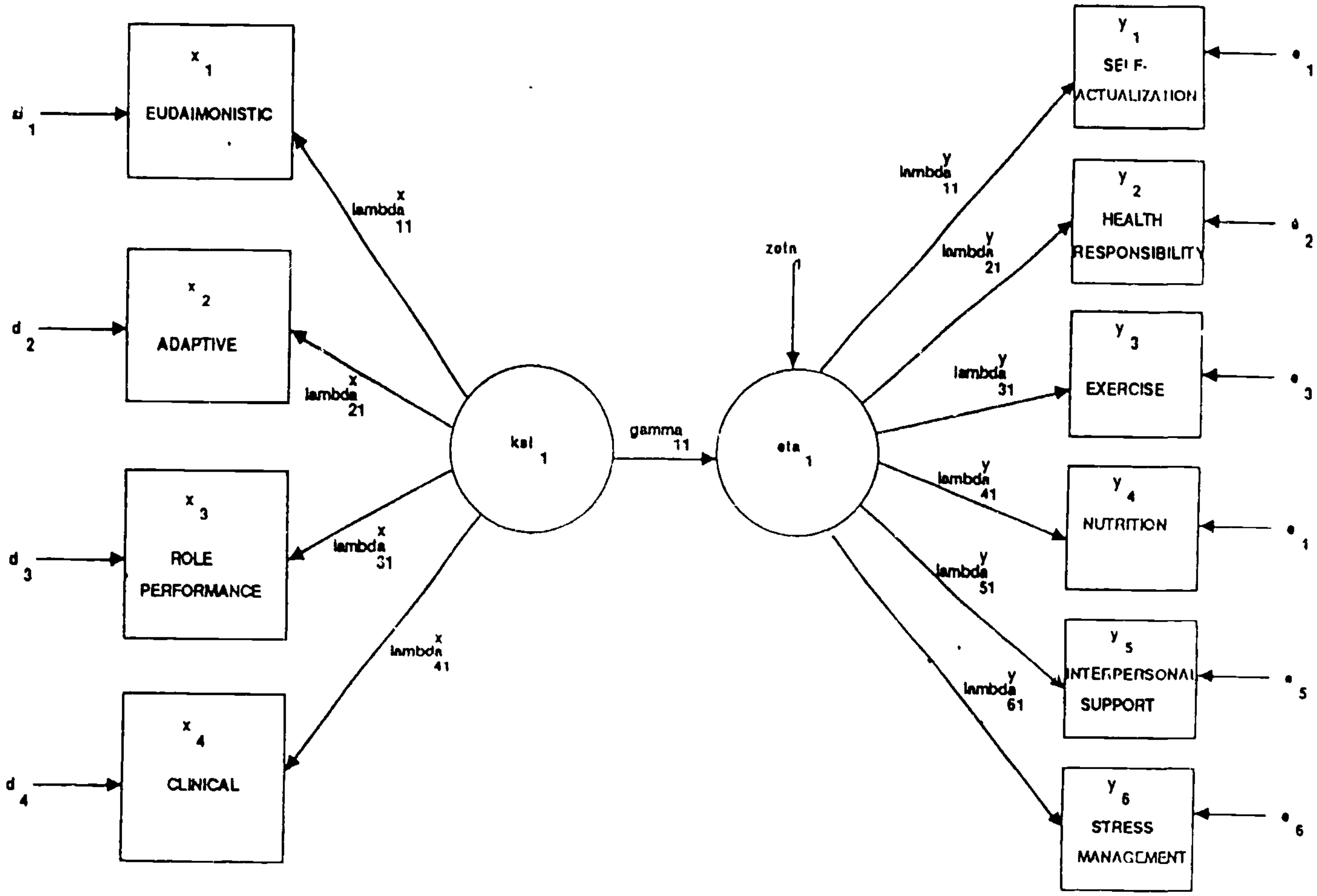

Figure 1. Structural equation model of the relationship of health conception to health-promoting lifestyle with one latent health conception variable (M_a).

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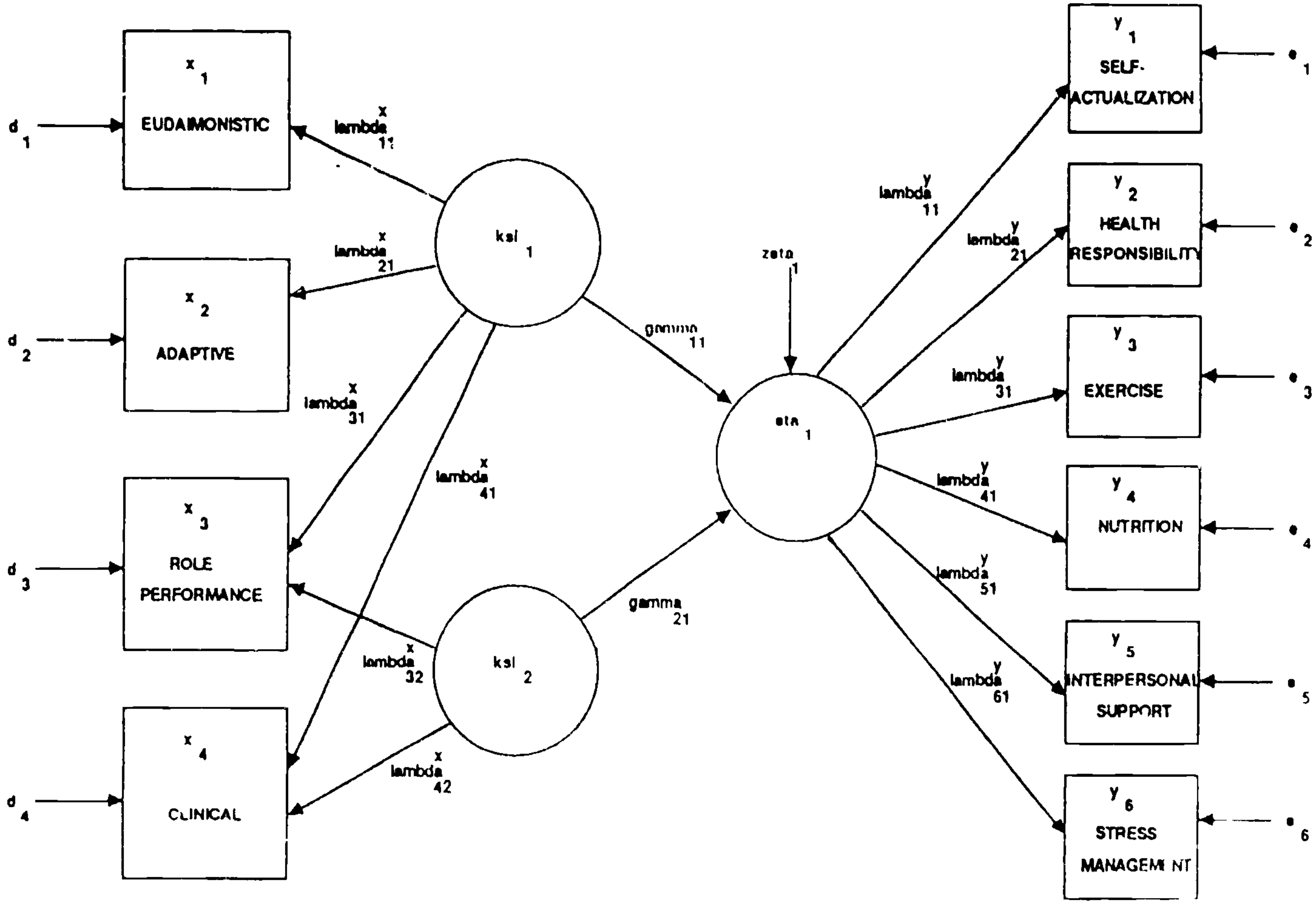

Figure 2. Structural equation model of the relationship of health conception to health-promoting lifestyle with two latent health conception variables (M_b).

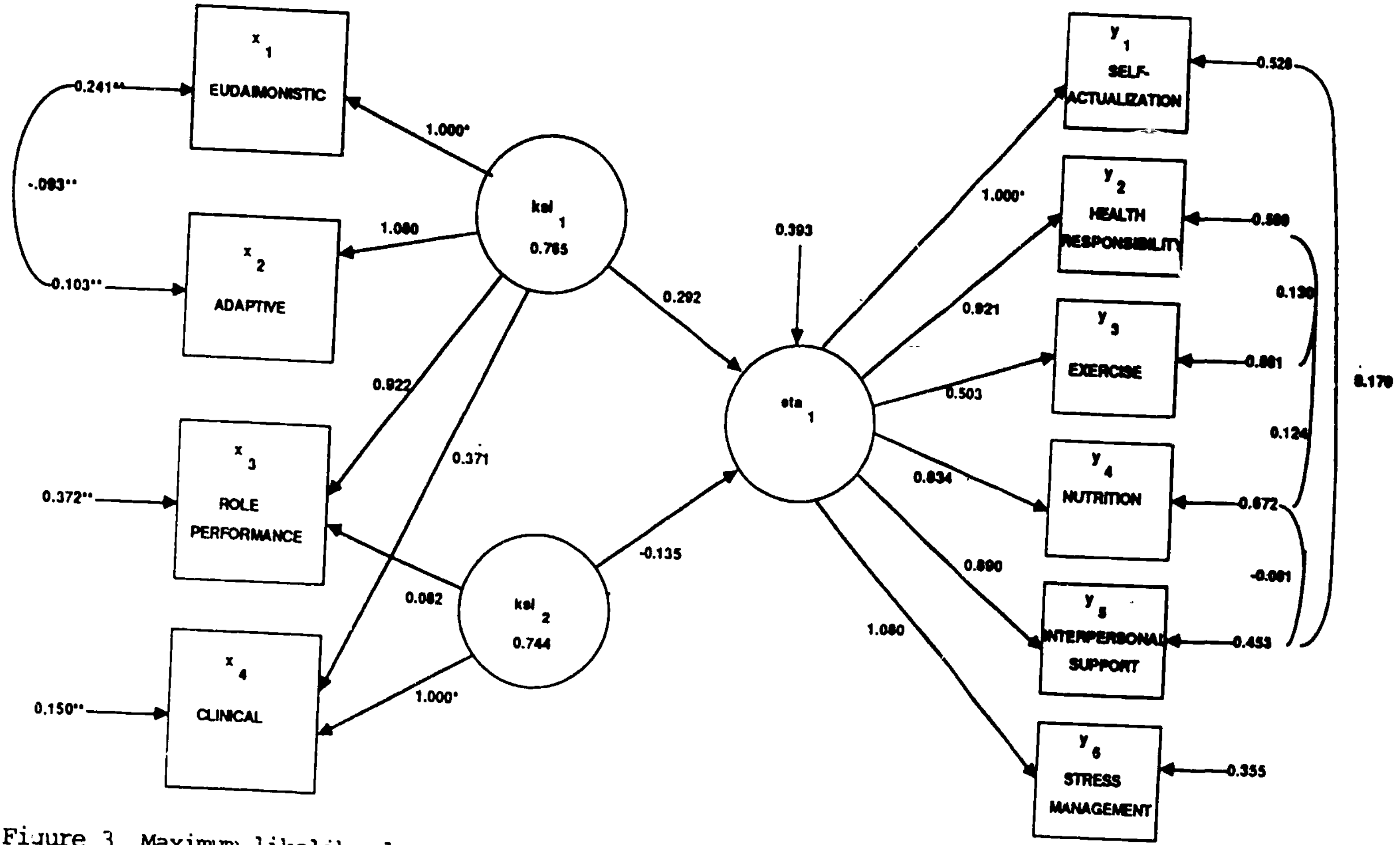

Figure 3. Maximum likelihood parameter estimates for M_b.

* value set to establish metric

** value derived in preliminary analysis and fixed