The Structure and Reliability of Health Belief Indices

Alan M. Jette, K. Michael Cummings, Bruce M. Brock, Mary Crispin Phelps, and James Naessens

A wealth of research using the Health Belief Model provides empirical evidence of the model's utility in predicting health, illness, and sick role behaviors. Until recently, however, little attention has been paid to the important issues of the validity and reliability of measures used to assess various health belief dimensions. Using factor analysis, our study demonstrates that moderately reliable indices covering a wide spectrum of distinct health beliefs can be constructed and then replicated across independent samples. The factor analysis approach revealed that condition-specific measures of perception of susceptibility and severity and situation-specific measures of perceived barriers are empirically distinct from general measures of these beliefs. We therefore recommend caution in mixing general and specific questionnaire items within the same index when measuring these beliefs. A factor representing perceptions of health threat emerged, but its composition requires further clarification. The degree of similarity between the factor structures in the two independent samples provides support for the existence of independent health belief dimensions.

During the past two decades, social scientists have investigated the social and psychological forces that influence health behavior [1–4]. One

Address communications and requests for reprints to Alan M. Jette, Instructor, Department of Social Medicine and Health Policy/Division on Aging, Harvard Medical School, 643 Huntington Avenue, Boston, MA 02115. Dr. Jette is also Assistant Professor, Institute of Health Professions, Massachusetts General Hospital, Boston, MA. K. Michael Cummings is Assistant Professor, Department of Community Medicine, School of Medicine, Wayne State University, Detroit, MI. Bruce M. Brock is Research Investigator, Department of Health Behavior and Health Education, School of Public Health, University of Michigan, Ann Arbor, MI. Mary Crispin Phelps is Associate Statistician, Warner-Lambert Pharmaceutical Research Division, Ann Arbor, MI. James Naessens is Manager of Research and Information Systems, Central Michigan Medical Care Review, Inc., Lansing, MI.
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particular psychosocial model, the Health Belief Model (HBM), has received considerable attention from researchers and health practitioners alike [5]. The original HBM was formulated in the early 1950s by social psychologists in the Public Health Service who were seeking to develop a theory to better understand the lack of use of disease preventives and screening tests for the early detection of asymptomatic diseases [6]. The model postulated that the likelihood of undertaking a health action is a function of the individual's beliefs along three subjective dimensions: (1) the threat of illness, consisting of both the level of personal susceptibility to a particular condition and the degree of severity of the consequences that might result from the condition; (2) the efficacy of the recommended health action in preventing or reducing susceptibility and/or severity; and (3) the physical, psychological, financial, and other barriers related to initiating or continuing the proposed action.

The concept of susceptibility refers to the perceived risk of contracting an illness. Severity refers to the degree of emotional arousal created by the thought of an illness as well as the difficulties the individual believes the illness would create. Perceived susceptibility and severity have a strong cognitive component wherein knowledge, in part, leads to action. The direction the action takes is thought to be influenced by beliefs about the relative effectiveness of available alternatives in reducing the threat of the illness, relative to beliefs about the negative aspects of health actions (inconvenience, expense, pain) that serve as barriers to action. The earliest descriptions of the HBM propose that a stimulus, or "cue to action," must occur to trigger the appropriate health action.

Becker and his colleagues have expanded the original HBM [7] to better explain adherence to medical regimens after diagnosis of an illness. The expanded version includes the following: an individual's motivation toward health, which is operationalized as concern about health practices and beliefs about prevention that are primarily nonspecific and stable across situations; faith in physicians and medical care; re-susceptibility to previously contracted conditions or perceived susceptibility to sequelae of illness; and characteristics of the therapeutic regimen itself that might impair adherence [8]. Two other psychosocial factors frequently used in studies guided by the HBM but not included in any of the formal models are an individual's perceived health locus of control and perceived health status. Both have demonstrated positive correlation with various health behaviors [9].

Research with the HBM provides empirical evidence of the model's utility in predicting the following behaviors: use of screening tests for tuberculosis and cervical cancer; preventive actions against dental disease, polio, and influenza; use of health services in the presence of symptoms;

and adherence to therapeutic regimens while under treatment [5,10–12]. Some studies have shown that health beliefs are modifiable and are related to various situational and social factors that influence an individual's health-related behaviors [13,14]. Health practitioners have long argued for tailored approaches to meet the educational needs of their clientele, in preference to unfocused campaigns with messages that may be irrelevant to many in the target audience. The HBM provides an approach to assessing educational needs that would permit the development of messages for different individuals or subgroups of the population.

Until recently, little attention was given to important methodological issues such as the reliability and validity of measures of the various belief dimensions in the HBM. One result of this lack of methodological attention is a plethora of radically different questionnaire items, each purportedly measuring the same health belief. Although one could say that demonstrated ability to predict behaviors using different questions to measure the same beliefs argues for their validity, this practice exacerbates the danger that as the measures change from study to study, the concepts being measured will also change. The absence of reliable and valid measures not only limits the practical utility of the theoretical formulation, but also reduces the potential for developing a reliable body of knowledge on which to design intervention strategies to change personal health behavior.

Researchers who have used the HBM formulation have increasingly recognized the desirability of using multiple questionnaire items to improve the reliability of the belief measures. The first known direct test of the reliability of indices of the HBM components was performed by Maiman et al. as part of a study of mothers' adherence to a diet regimen prescribed for their obese children [15]. The investigators constructed twelve indices and two single items to measure each major component of the HBM. The indices demonstrated substantial reliability. The reported intercorrelation among the constructed indices, however, demonstrates that five of them—general health concern for the child, child's general susceptibility to illness, worry about the child's illness in general, seriousness of obesity, and likelihood of cure—have substantial positive relationships with each other. This finding raises questions concerning the independence of the various belief measures included in the study.

The present study addresses the following methodological questions raised in part by the Maiman paper:

1. Are the HBM dimensions sufficiently distinct to be considered different beliefs? Specifically, (a) are condition-specific measures of perceived susceptibility and severity and situation-specific measures of barriers (e.g.,

"how serious would it be if you got a cold?") the same as general, nonspecific measures of these same concepts (e.g., "whenever you get sick it seems to be very serious")? (b) are perceptions of susceptiblity to and severity of a condition separate beliefs or are they components of a larger perceived health threat belief?

2. Can reliable indices of these health beliefs be constructed?

3. Are these constructed indices stable enough to be replicated across different samples, thus increasing their utility for research?

To explore these questions we identified the underlying structure of questions frequently used to measure these health beliefs, computed reliability coefficients for each constructed index, and assessed the similarity of the identified structures in two independent samples of adults living in Michigan.

Method

Respondents were drawn from two independent probability samples of households served by currently working telephone numbers in Michigan, using the Waksberg random digit dialing procedures [16,17]. In both samples, interviews were taken with any available adult (18 years of age or older) in each selected household, rather than with a randomly selected adult. While both samples represent the same population of Michigan households, this sampling method does not ensure a probability sample of individuals.

The questionnaire we developed consists of items chosen to measure perception of seven belief dimensions: *susceptibility to and severity of specific illnesses, general threat to health, concern about health matters, barriers to taking prescribed medications, health locus of control, trust in physicians,* and *health status.* (We did not assess perceived benefits of a health action.) We selected the questions from questionnaires used in previous studies guided by the HBM [5,15, 18–22], retaining the original wording whenever possible.

Table 1 displays the range, mean, and standard deviation of each questionnaire item examined in the following analyses. The reader should note that five of the variables (*likelihood of a heart attack, severity of a cold, get ill more easily, get illnesses that worry you,* and *get serious illnesses*) have skewed distributions. The appendix contains actual questionnaire items with the corresponding belief components they are intended to measure.

Table 1: The Range, Mean, Standard Deviation, and Sample Size for Health Belief Questionnaire Items in Samples A and B

		Sample A			*Sample B*		
Variable	*Range*	*N*	*Mean*	*Standard Deviation*	*N*	*Mean*	*Standard Deviation*
Health Status	1.0–4.0	281	1.9	0.82	306	2.0	0.83
Activity Interference	1.0–4.0	267	2.4	0.89	294	2.4	0.94
Concern about Health	1.0–4.0	279	1.7	0.90	304	1.7	0.91
Current Care of Health	1.0–4.0	280	2.0	0.75	305	2.0	0.78
Likelihood Improve Care	1.0–4.0	273	1.7	0.78	295	1.7	0.79
Health Status: Compared to Others	1.0–3.0	273	1.8	0.77	301	1.8	0.77
Likelihood of a Cold	1.0–4.0	277	2.1	0.98	306	2.0	0.98
Likelihood of a Heart Attack	1.0–4.0	254	3.4	0.72	285	3.4	0.82
Likelihood of a Cavity	1.0–4.0	244	2.7	0.95	252	2.6	0.90
Likelihood of the Flu	1.0–4.0	262	2.6	0.89	293	2.5	0.91
Likelihood of 3 Days in Bed	1.0–4.0	269	3.2	0.91	299	3.1	0.96
Medication Cost	1.0–4.0	273	3.1	0.99	296	3.2	0.96
Felt Worse	1.0–4.0	227	1.9	1.04	247	1.9	1.01
Hard to Fit in Routine	1.0–4.0	269	3.0	0.94	297	3.1	0.87
Heard Dangerous Information	1.0–4.0	237	2.3	1.10	258	2.5	1.10
Severity of a Cold	1.0–4.0	280	3.5	0.79	299	3.4	0.84
Severity of a Heart Attack	1.0–4.0	275	1.2	0.56	295	1.2	0.56
Severity of the Flu	1.0–4.0	278	2.7	1.04	294	2.6	0.97
Severity of a Cavity	1.0–4.0	246	3.1	1.00	250	3.0	1.00
Severity of 3 Days in Bed	1.0–4.0	279	2.3	1.10	297	2.4	1.10
Avoid Illness	1.0–3.0	278	1.5	0.80	308	1.6	0.80
Get Ill More Easily	1.0–3.0	278	2.7	0.63	303	2.6	0.72

Table 1, continued

Variable	Range	Sample A N	Sample A Mean	Sample A Standard Deviation	Sample B N	Sample B Mean	Sample B Standard Deviation
Illness a Lack of Personal Care	1.0–3.0	279	2.0	0.94	303	2.1	0.93
Prevention More Trouble than Worth	1.0–3.0	276	1.7	0.85	298	1.7	0.86
Doctors Help Most	1.0–3.0	281	1.6	0.80	300	1.5	0.75
Home Remedies	1.0–3.0	277	1.5	0.70	297	1.6	0.74
Get Illness that Worries You	1.0–3.0	274	2.5	0.76	294	2.5	0.78
Get Serious Illness	1.0–3.0	278	2.6	0.71	301	2.6	0.75
Get Illness Doctors Can't Do Much For	1.0–3.0	277	1.5	0.82	303	1.5	0.78
Doctor's Advice Prevents Illness	1.0–3.0	279	1.5	0.72	303	1.4	0.67
Other Things More Important than Health	1.0–3.0	279	1.9	0.93	302	1.9	0.91

RESULTS

DEMOGRAPHIC COMPOSITION

Sample A consists of 282 respondents (an 83 percent response rate); sample B consists of 307 respondents (an 85 percent response rate). The two samples were quite similar with respect to education, race, employment status, and income. Only two demographic characteristics displayed statistically significant differences across samples: age ($X^2 = 21.7$; $p \leqslant 0.05$) and marital status ($X^2 = 7.07$; $p \leqslant 0.05$). Respondents in sample A are younger (the median age is 35 years in sample A, 41 years in sample B), and a smaller percentage are married (58 percent in sample A compared with 64.5 percent in sample B).

HEALTH BELIEF STRUCTURE

We used exploratory factor analysis to identify the structure underlying the 31 health belief questionnaire items. Product-moment correlations between pairs of questionnaire items were computed separately for each sample, and the resulting correlation matrices were used in the factor analysis. Variables with loadings of 0.35 or above within factors were grouped together in an index.[1]

Table 2 displays the factor analysis solution for the health belief items. The following interpretable factors emerged in both samples: general health threat, perceived barriers to taking medication, perceived severity, perceived susceptibility, health locus of control, trust in physicians, concern about health, and perceived health status. These eight factors account for approximately 37 percent of the total variance of the 31 variables in each sample. The appendix lists each questionnaire item along with the health belief it hypothetically measures and contrasts it with the underlying belief it is associated with based on these empirical analyses.

In general, the items designed to measure the concepts of perceived severity of disease, perceived barriers to taking medication, concern for health, trust in physicians, and health locus of control factor together in one or both of the samples. The hypothesized measure of general barriers and one of the general severity measures (activity interference) did not achieve a high factor loading on any factor and remain as single-item measures. Only two of the five questions believed to measure the concept of perceived susceptibility factor together in both samples (susceptibility to flu and to a cold). Questions about the likelihood of having a heart attack and the likelihood of spending three days in bed both factor with the general health belief variables.

Table 2: Summary of the Results of Factor Analysis of 37 Health Belief Items in Two Independent Probability Samples of Michigan Households

Health Belief Item	*Sample*	
	A	*B*
General Health Threat		
Get illness that worries you	-0.62	-0.72
Get seriously ill	-0.44	-0.53
Get ill more easily	-0.48	-0.43
Likelihood of heart attack	-0.54	-0.56
Likelihood of 3 days in bed	-0.49	-0.56
Perceived health status	0.60	0.65
Common variance:	22.2%	22.9%
Perceived Severity		
Seriousness of a cold	0.46	0.55
Seriousness of a heart attack	0.39	0.20
Seriousness of a cavity	0.51	0.56
Seriousness of the flu	0.58	0.64
Seriousness of 3 days in bed	0.66	0.47
Common variance:	14.3%	13.3%
Perceived Barriers to Taking Medications		
Medication cost	0.63	0.54
Felt worse	0.47	0.57
Hard to fit	0.59	0.41
Read dangerous	0.43	0.49
Common variance:	13.7%	10.7%
Concern about Health		
Concern about health	-0.55	-0.54
Likelihood of improved care	-0.63	-0.53
Current care of health	-0.12	-0.44
Other things more important than health	-0.31	-0.43
Common variance:	9.1%	10.5%
Trust in Physicians		
Home remedies	0.44	0.53
Doctors help most	0.67	0.67
Doctor's advice prevents illness	0.30	0.57
Common variance:	7.7%	10.2%
Perceived Susceptibility		
Likelihood of a cold	0.62	0.60
Likelihood of a cavity	0.41	0.05
Likelihood of the flu	0.68	0.70
Common variance:	12.3%	12.1%
Perceived Health Status		
Perceived health status	0.41	0.02
Compared to others	0.63	0.42
Get illnesses doctors can't do much for	0.60	0.66
Common variance:	10.7%	9.2%
Health Locus of Control		
Avoid illness	0.71	0.57
Illness lack of personal care	0.48	0.71
Common variance:	9.6%	10.3%

The general health threat factor accounts for the largest proportion of common variance in both samples: 22.2 percent in sample A and 22.9 percent in sample B. This factor includes questions about personal susceptibility to and severity of illness, and about susceptibility to a heart attack and likelihood of spending three days in bed. Perceived health status also factors with general health threat but in the opposite direction.

INDEX RELIABILITIES

We estimated the index reliabilities using the Spearman-Brown formula, which is based on the average intercorrelation among items in an index [25]. Table 3 presents reliabilities for the eight indices. The magnitude of the coefficients varies substantially between factors within each sample (0.72–0.431 in sample A and 0.77–0.389 in sample B), and within factors between each sample. In sample A, for instance, measures of general health threat, perceived barriers, and perceived severity attain reliability coefficients of over 0.60. Reliability coefficients for measures of health concern and trust in doctors are under 0.50.

Table 3: Reliability Coefficients for Eight Health Belief Factors

	Reliability		
Factor	*Sample A*	*Sample B*	*Number of Items*
General Health Threat	0.721	0.771	6
Barriers	0.600	0.582	4
Severity	0.669	0.587	5
Trust in Doctors	0.468	0.600	3
Susceptibility	0.599	0.389	3
Health Status	0.527	0.463	3
Locus of Control	0.534	0.589	2
Health Concern	0.431	0.524	4

Some indices are stable from sample to sample while others are not, as indicated by the extent of differences in magnitude of the reliability coefficients. Comparing the reliability of indices across the samples, we see that there are small differences for measures of general health concern, perceived severity, and health locus of control. In contrast, there are large differences for measures of trust in doctors, perceived susceptibility, health status, and health concern.

SIMILARITY OF STRUCTURE

We matched the factor configurations derived from the two samples using the Schonemann and Carroll approach [26]. We assessed the degree of

configurational congruence that represents the similarity of the identified factor structure in the two samples by means of the Lingoes-Schonemann "S" statistic.[2] Fitting one sample to the other yields an "S" coefficient of 0.54. The communality between the two configurations is 0.72, which is considered fair [27].

Discussion and Conclusions

The overall structural similarity of these health belief measures across two independent samples suggests that discrete health beliefs do exist. Except for 6 out of 30 items, questions traditionally used in HBM studies to measure the same beliefs do factor on the same underlying belief.

These findings shed new light on the first methodological question to which this study is addressed: the findings support the theoretical assumption that the HBM dimensions are sufficiently distinct to be considered different beliefs. Although discrete belief factors emerged, general measures of perceived susceptibility to illness, perceived severity of illness, and perceptions of barriers to health actions were conceptually distinct from condition- or situation-specific measures of these beliefs. A perceived health threat factor appeared, but its composition requires further clarification in future research. In particular, efforts should be made to determine whether, in other samples and under other circumstances, measures of beliefs about specific health conditions also factor with measures of beliefs about general susceptibility and severity.

The fact that the index reliabilities vary considerably across these two samples suggests that the between-sample differences we observed either reflect measurement error in the variables or are due to the lack of normality in some of the variable distributions. That moderate reliabilities were achieved at all, given the lack of methodological research in this field, suggests that existing measures of various health beliefs have some merit. Nevertheless, since only certain measures can be replicated with moderate reliability, there is a need for further methodological work to develop better measures of these health beliefs. The degree of replication achieved in this study provides further support for the continued exploration of conceptually distinct health beliefs such as those included in the HBM.

A number of unexpected findings of our study are relevant to future HBM research. We had hypothesized that discrete factors of perceived susceptibility and severity would emerge, containing both condition-specific and general items. Although the findings suggest that condition-specific perceptions of susceptibility are distinct from condition-specific perceptions of severity, the general measures of these two beliefs did not factor with the condition-specific items. Likewise, we had expected that

all questions concerning perceived barriers, whether situation-specific or not, would form a single factor. Whereas a factor containing situation-specific perceptions of barriers did emerge, the hypothesized general barrier measure remained as a separate single item. As a result of these findings, we recommend caution in mixing general and specific questionnaire items in the same index when measuring perceptions of susceptibility, severity, and barriers. Such mixing may account for some of the diversity in findings reported in previous HBM research.

Although all of the hypothesized condition-specific perceived severity measures factored together, the factor analysis solution for two of the hypothesized condition-specific perceived susceptibility questions was unexpected. Beliefs about the likelihood of having a heart attack and of spending three days in bed, which were hypothesized to represent condition-specific measures of perceived susceptibility, did not achieve a high factor loading on the perceived susceptibility factor; they contributed, rather, to the general health threat factor. One explanation for this finding is that, although the two items may appear to be specific in content, respondents may perceive them as general because of their relatively low probability of occurrence. That is, since the majority of the respondents considered themselves to be in excellent or good health (80 percent in sample A and 77 percent in sample B), it is possible that responses to susceptibility items measuring specific but rare conditions reflected not perceptions of the specific health problem, but a more general view of vulnerability to illness.

Support for this explanation is found by dividing each sample at the median age and comparing the belief structures across age groups. Assuming that older persons perceive themselves to be susceptible to a wider range of illnesses than do younger persons, one would expect less discrimination between general and specific measures of perceived susceptibility for respondents above the median age. We find a clear separation of conditon-specific and general measures of perceived susceptibility for younger respondents; there is, however, little discrimination between general and specific indicators for respondents over the median age. Hence researchers should carefully consider the age of a study population as well as other potential confounding influences when selecting measures of perceived susceptibility and should use structural analyses (e.g., factor analysis) as a guide when combining multiple measures of condition-specific perceptions of susceptibility. (It is also possible that the measure of the likelihood of spending three days in bed did not factor with the other disease-specific items because it refers to the consequences of an illness and not to a specific condition.)

One general severity question (the degree to which illness interferes with one's activity) did not achieve any substantial factor loading. This is

surprising: perceived general severity is widely thought to include a component that deals with disruption in daily activities. All of the remaining measures of general susceptibility and severity factored together with the measures of the likelihood of having a heart attack and spending three days in bed, and with perceived health status. All of the items in this general health threat factor had a negative factor loading, with the exception of perceived health status. It seems that respondents who rate themselves high on general susceptibility and severity items also perceive themselves as having fair or poor health status.

That the measure of perceived health status produces a substantial factor loading on both the health status factors is not easily understood from these data. It is surprising that the health status measures did not achieve a higher factor loading on the general health status factor for sample B. Whether this is a statistical artifact or an indication that this measure assesses other belief dimensions can only be clarified through further research.

One item that purportedly measures an individual's trust in physicians, and that is often used as such in the literature, contributed to perceived health status but not to trust in physicians. This suggests that individuals who report excellent or good health may not contract the kind of illnesses that doctors cannot treat. The remaining questions measuring trust in physicians factored as anticipated.

Our findings demonstrate that moderately reliable indices of a wide spectrum of health beliefs can be constructed and replicated across samples. The composition and overall replicability of the indices support the theoretical assumption that the HBM dimensions are sufficiently distinct to be considered different beliefs. While the degree of replication supports the continued exploration of health beliefs, further methodological work is needed to develop better measures. The lack of replicability of some of the belief dimensions may account for some of the variability in past research on the relationship between health beliefs and health behavior. Improvement in measures of health beliefs will enhance our ability to develop a reliable body of knowledge on which to design intervention strategies to influence personal health behavior.

Appendix—Health Belief Questionnaire Items

Variable	*Questionnaire Item*	*Hypothesized Construct*	*Empirically Derived Construct*
Activity Interference	In general, when you get sick, how much does it interfere with your usual activities?	General Severity	Single Item: Activity Interference
	Would you say a great deal, a moderate amount, a little, or not at all?		
Get illnesses that worry you	You get the kinds of illnesses that worry you a great deal. (agree, neutral, disagree)	General Severity	General Health Threat
	If you were to do nothing in particular to protect yourself, how likely is it that you will		
Likelihood of a cold	—get a cold	Condition-specific Susceptibility	Condition-specific Susceptibility
Likelihood of a cavity	—get a new cavity	Condition-specific Susceptibility	Condition-specific Susceptibility
Likelihood of flu	—get the flu	Condition-specific Susceptibility	Condition-specific Susceptibility
Likelihood of heart attack	—have a heart attack	Condition-specific Susceptibility	General Health Threat
Likelihood of 3 days in bed	—be sick enough to spend 3 days in bed	Condition-specific Susceptibility	General Health Threat
	. . . . . during the next 12 months? Would you say very likely, likely, unlikely, or very unlikely?		

Appendix, continued

Variable	*Questionnaire Item*	*Hypothesized Construct*	*Empirically Derived Construct*
Get ill more easily	Compared to other people your age, you get sick more easily. (agree, neutral, disagree)	General Susceptibility	General Health Threat
Severity of cold	How serious would it be if you got a cold in the next 12 months?	Condition-specific Severity	Condition-specific Severity
Severity of heart attack	How serious would it be if you had a heart attack in the next 12 months?	Condition-specific Severity	Condition-specific Severity
Severity of cavity	How serious would getting a new cavity in your teeth during the next 12 months be?	Condition-specific Severity	Condition-specific Severity
Severity of 3 days in bed	How serious would it be to be sick enough to spend 3 days in a row in bed during the next 12 months? . . . Would you say very serious, somewhat serious, a little serious, or not serious at all?	Condition-specific Severity	Condition-specific Severity
Get serious illness	Whenever you get sick it seems to be very serious. (agree, neutral, disagree)	General Severity	General Health Threat
Compared to others	Compared to other people your age, would you say your health is better, about the same, or worse?	Health Status	Health Status
Health Status	In general, how would you describe your health. Would you say that it is excellent, good, fair, or poor?	Health Status	Health Status

	Suppose your doctor were to tell you to take a certain medicine to protect your health. How likely is it that you would stop taking the medicine in each of the following situations?		
Medication cost	—the medicine was costing a lot of money	Situation-specific Barriers	Situation-specific Barriers
Felt worse	—you felt worse when you took the medicine	Situation-specific Barriers	Situation-specific Barriers
Hard to fit	—taking the medicine was hard to fit into your daily routine	Situation-specific Barriers	Situation-specific Barriers
Heard dangerous information	—you heard that taking the medicine might be dangerous to your health, even though your doctor prescribed it for you	Situation-specific Barriers	Situation-specific Barriers
	. . . Would you say very likely, likely, unlikely, or very unlikely?		
Prevention more trouble than worth	Sometimes it seems that when you try to prevent illness, it is more trouble than it is worth. (agree, neutral, disagree)	General Barriers	Single Item: prevention more trouble than it is worth
Avoid illness	If you take care of yourself, you can avoid getting sick. (agree, neutral, disagree)	Health Locus of Control	Health Locus of Control
Illness lack of personal care	Chances are when you get sick it is because you did not take care of yourself. (agree, neutral, disagree)	Health Locus of Control	Health Locus of Control
Doctors help most	For most kinds of illnesses, it is the doctor who can help you the most. (agree, neutral, disagree)	Trust in Physicians	Trust in Physicians
Home remedies	Home remedies are often better than the drugs that the doctor prescribed. (agree, neutral, disagree)	Trust in Physicians	Trust in Physicians

Appendix, continued

Variable	*Questionnaire Item*	*Hypothesized Construct*	*Empirically Derived Construct*
Get illnesses doctors can't do much for	You seem to get the kinds of illnesses that doctors can't do much for. (agree, neutral, disagree)	Trust in Physicians	Perceived Health Status
Doctors advice prevents	If you follow a doctor's advice you will have less illness in your lifetime. (agree, neutral, disagree)	Trust in Physicians	Trust in Physicians
Concern about health	How concerned are you about your health? Would you say you are very concerned, somewhat concerned, a little concerned, or not concerned at all?	General Health Concern	General Health Concern
Current care of health	How good a job are you doing in taking care of your health right now? Would you say you're doing an excellent job, a good job, a fair job, or a poor job?	General Health Concern	General Health Concern
Likelihood improve care	How likely is it that you will try to do a better job of taking care of your health in the future? Would you say it is very likely, likely, unlikely, or very unlikely?	General Health Concern	General Health Concern
Other things more important than health	Although you are concerned about your health there are other things that are more important to you. (agree, neutral, disagree)	General Health Concern	General Health Concern

NOTES

1. Squared multiple correlations were used as initial communality estimates, and the scree test [23] was employed to determine the optimal number of factors. Orthogonal and oblique rotations of the factors were performed. The oblique rotation of the factors did not produce a very different solution than the orthogonal rotation; interfactor correlations in the oblique rotation were minimal. The factors presented here are based on the orthogonally rotated solution (i.e., a zero interfactor correlation), which maximizes the total variance across the squared loadings for each factor [24].
2. The technique of matching involves taking one configuration (sample A) as the target and then rotating, dilating, and translating another (sample B) so as to get the corresponding points in the configuration to match one another as closely as possible. The "S" statistic has two characteristics which make it suitable for this analysis: it has the same values regardless of which configuration is used as the target, and the value of the statistic does not depend on the size of the configuration. The "S" statistic is analogous to a coefficient of alienation [(1–r)/2]. Thus low values of "S" indicate low similarity. For instance, an "S" = 1.00 indicates a zero product-moment correlation between the dimensional location of points in the two configurations; an "S" = 0.00 implies a perfect match (product-moment r = 1.00).

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