

Development of the Multidimensional Health Locus of Control (MHLC) Scales*

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The development of the Multidimensional Health Locus of Control scales is described. Scales have been developed to tap beliefs that the source of reinforcements for health-related behaviors is primarily internal, a matter of chance, or under the control of powerful others. These scales are based on earlier work with a general Health Locus of Control scale, which, in turn, was developed from Rotter's social learning theory. Equivalent forms of the scales are presented along with initial internal consistency and validity data. Possible means of utilizing these scales are provided.

The original Health Locus of Control (HLC) scale was developed by Wallston, Wallston, Kaplan and Maides¹¹ as a unidimensional measure of people's beliefs that their health is or is not determined by their behavior. Individuals with high scores on the 11-item HLC scale are "health-externals;" they are presumed to have generalized expectancies that the factors which determine their health are such things as luck, fate, chance, or powerful others, factors over which they have little control. On the other end of the dimension are the "health-internals," who believe that the locus of control for health is internal and that one stays or becomes healthy or sick as a result of his or her behavior.

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The HLC scale was designed to yield a single score (the higher the score the more external the belief in locus of control) similar to Rotter's I-E scale, the more generalized, non-health-specific measure upon which most locus of control research has been based; the HLC scale, however, used a Likert-type scale response format while the I-E scale used a forced-choice format. A deliberate attempt was made to balance the original HLC scale between items worded in the internal and external direction. Since the HLC scale appeared to be internally consistent (although the original alpha reliability of .72 dropped considerably when the scale was used with later samples, ranging from .40 to .54), little consideration was given at the time to the possibility that more than one dimension of locus of control was represented in this scale. However, evidence supporting the multidimensionality of the generalized locus of control scale,¹² and further HLC data analyses suggested the need to explore the dimensionality issue.

Based upon an earlier finding, cited by MacDonald,⁷ that a factor analysis of a Likert-type locus of control scale produced a first factor consisting almost entirely of externally worded items, a number of HLC scale protocols were rescored to form two subscales: HLC-I consisted of the five items worded in the internal direction and HLC-E consisted of the six items worded in the external direction. The correlation between these two subscales was essentially zero. Item analyses of the subscales revealed that the alpha reliability of HLC-E was approximately the same as for the total 11-item scale and the alpha for HLC-I was even higher, though only based on five items. Thus, it seemed that at least two health locus of control dimensions existed.

Questioning the conceptualization of locus of control as a unidimensional construct, Levenson⁹ argued that not only are internal beliefs orthogonal to external beliefs, but understanding and prediction could be further improved by studying fate and chance expectations separately from external control by powerful others. She developed three 8-item Likert-type scales (Internal, Powerful Others, and Chance—I, P, & C) to measure generalized locus of control beliefs and demonstrated initial evidence of their discriminant validity.⁴⁻⁶ Levenson's P and C scales were moderately intercorrelated ($r = .9$, a finding which Rotter⁹ interpreted to support his contention that externality is a single factor), but were essentially independent of scores on the I scale. Like Rotter's I-E scale, Levenson's new scales did not include items specific to expectations about health; yet, given that she demonstrated the utility of measuring three distinct dimensions of locus of control, there was reason to explore this approach in predicting health behaviors utilizing health-specific locus of control scales.

Of the six externally worded items on the original HLC scale, only one, "I can only do what my doctor tells me to do," was conceptually related to the dimension of powerful others externality. Thus, new items tapping this dimension were necessary. Furthermore, the HLC scale included a mixture of items tapping personal and general control ideology, but a strong case was made by Levenson that beliefs about people in general should have less

predictive power than beliefs about one's own control. Therefore, a decision was made to reconceptualize health locus of control along multidimensional lines paralleling Levenson's work and to develop new scales consisting only of personally worded items.

One additional purpose of this new scale development effort was to attempt to create equivalent forms of the health locus of control scales. Many research designs call for repeated measurements of locus of control beliefs and equivalent forms of an instrument would decrease the possibility of individuals remembering their previous responses and would thus increase the instrument's sensitivity to changes in beliefs over time.

METHOD

New Item Pool

Starting with the 11 items which constituted the original HLC scale, new items were written which, on an *a priori* basis, reflected three dimensions of health locus of control beliefs: internality (IHLC); powerful others (PHLC); and chance (CHLC) externality. The new items were all written in the personal mode and were generally developed for an eighth grade reading level. The actual item pool reading level, calculated using the Dale-Chall formula,² was 5th-6th grade. The total item pool consisted of 25 IHLC items, 30 PHLC items, and 26 CHLC items.

Scale Development Study

In a booklet format the 81 health locus of control items were mixed with Levenson's I, P, and C scale items, a shortened 10-item version of the Marlowe-Crowne Social Desirability scale,¹⁰ and two items tapping health status, ("At the moment I am in excellent health" and "In general, I am an extremely healthy person"). All items utilized a 6-point, Likert-type format, ranging from "Strongly Disagree" (scored as one) to "Strongly Agree" (scored as six). The booklet also contained a statement of the purpose of the scale development study, an assurance of confidentiality, detailed instructions, and four demographic questions: sex, age, educational level, and place of residence. In order to control for item placement, two versions were printed so that the items appearing first in one version came last in the other and vice versa.

Persons over 16 years of age who were waiting at gates in a metropolitan airport were approached by a research assistant who briefly described the study and asked if they would be willing to fill out the booklet. The research assistant was instructed to approach a widely divergent group of persons. If a person agreed to participate, he or she was handed a booklet, offered a pencil, and given a stamped, self-addressed envelope. Of the 354 persons approached, 282 (80%) took a booklet. This potential sample was 48% males, 90% whites, had a median estimated age of 35-44 years, and did not differ significantly from those approached who chose not to take a booklet.

Of the 282 booklets handed out, 125 (44%) were completed and returned by

mail or handed to the research assistant at the airport. Of the group returning the booklets, 49% were males, 74% had at least some college education, and mean age was 42 years. While a sizable number were returned from other areas, 55% listed their residence as the state of Tennessee, 22% in the immediate Nashville area.

Of the 125 returned booklets, 115 were utilized for scale development. Two were returned after data analysis had begun, and eight had to be discarded because more than 10% of the items were incomplete. For the cases of missing data in the usable booklets, a coin toss determined whether an item was scored three (Slightly Disagree) or four (Slightly Agree).

Item Selection

Separate item analyses were run on the pools of IHLC, PHLC and CHLC items. The following criteria were used to select the items which constituted the new scales: (a) item mean close to 3.5, the midpoint; (b) wide distribution of response alternatives on the item; (c) significant item-to-*a priori* scale (minus the item) correlation; (d) low correlation with the measure of social desirability; and (e) item wording. This latter criterion was used for the purpose of constructing equivalent forms of the new scales.

Using the above criteria, six pairs of items (with items paired on the basis of meaning) were chosen for each of the three new scales. To construct two equivalent forms of each scale, items within each pair were assigned to Form A or Form B in such a manner that the total scores of Form A and Form B (six items each) were as identical as possible. Table 1 presents the items chosen for each of the three scales and form pairs.

RESULTS

Descriptive information (means, standard deviations, and alpha reliabilities, a measure of a scale's internal consistency) for the Multidimensional Health Locus of Control (MHLC) scales is included in Table 2. Also presented in Table 2 is descriptive information about Levenson's I, P, & C scales and the Social Desirability scale.

As can be seen in Table 2, alpha reliabilities for the MHLC scales (six-item forms) ranged from .673 to .767 and, when Forms A & B were combined into 12-item scales, the alpha reliabilities increased (.830 to .859). These figures compared quite favorably to Levenson's 8-item I, P, & C scales (alpha reliabilities = .508 to .733). Also, because they were constructed that way, the mean scores of Form A and Form B of each MHLC scale were nearly identical.

Table 3 presents the intercorrelation matrix for the MHLC scales (Forms A & B and combined versions), and Table 4 presents the intercorrelation matrix of the MHLC scales (combined version only) with Levenson's I, P, & C scales and Social Desirability. From these two tables it can be seen that the IHLC and PHLC scales are statistically independent, the IHLC and CHLC are negatively correlated (especially Form A), and PHLC and CHLC are

TABLE 1

MULTIDIMENSIONAL HEALTH LOCUS OF CONTROL (MHLC) SCALES

Internal Health Locus of Control (IHLC)	
Form A	Form B
1. If I get sick, it is my own behavior which determines how soon I get well again.	1. If I become sick, I have the power to make myself well again.
6. I am in control of my health.	6. I am directly responsible for my health.
8. When I get sick I am to blame.	8. Whatever goes wrong with my health is my own fault.
12. The main thing which affects my health is what I myself do.	12. My physical well-being depends on how well I take care of myself.
13. If I take care of myself, I can avoid illness.	13. When I feel ill, I know it is because I have not been taking care of myself properly.
17. If I take the right actions, I can stay healthy.	17. I can pretty much stay healthy by taking good care of myself.
Powerful Others Health Locus of Control (PHLC)	
Form A	Form B
3. Having regular contact with my physician is the best way for me to avoid illness.	3. If I see an excellent doctor regularly, I am less likely to have health problems.
5. Whenever I don't feel well, I should consult a medically trained professional.	5. I can only maintain my health by consulting health professionals.
7. My family has a lot to do with my becoming sick or staying healthy.	7. Other people play a big part in whether I stay healthy or become sick.
10. Health professionals control my health.	10. Health professionals keep me healthy.
14. When I recover from an illness, it's usually because other people (for example, doctors, nurses, family, friends) have been taking good care of me.	14. The type of care I receive from other people is what is responsible for how well I recover from an illness.
18. Regarding my health, I can only do what my doctor tells me to do.	18. Following doctor's orders to the letter is the best way for me to stay healthy.
Chance Health Locus of Control (CHLC)	
Form A	Form B
2. No matter what I do, if I am going to get sick, I will get sick.	2. Often I feel that no matter what I do, if I am going to get sick, I will get sick.
4. Most things that affect my health happen to me by accident.	4. It seems that my health is greatly influenced by accidental happenings.
9. Luck plays a big part in determining how soon I will recover from an illness.	9. When I am sick, I just have to let nature run its course.

TABLE 1 (continued)

11. My good health is largely a matter of good fortune.	11. When I stay healthy, I'm just plain lucky.
15. No matter what I do, I'm likely to get sick.	15. Even when I take care of myself, it's easy to get sick.
16. If it's meant to be, I will stay healthy.	16. When I become ill, it's a matter of fate.

positively correlated (mainly Form B). The intercorrelations of Levenson's three scales (as shown in Table 4) present a slightly different picture: the I scale is negatively correlated with both the P & C scales, which, in turn, are highly positively correlated with one another. The only scale which correlates with Social Desirability is the CHLC-Total, but that negative correlation accounts for less than 6% shared variance between the two instruments.

The intercorrelations of the MHLC scales and the I, P, & C scales are such that each MHLC scale correlates most highly with its theoretical counterpart among Levenson's scales. This is most clearly the case with the IHLC which correlates significantly only with the I scale. The PHLC correlates highest with the P scale, but also correlates significantly with the C scale. Likewise, the CHLC correlates highest with the C scale but, again, correlates significantly with the P scale and negatively with the I scale.

Correlations of the MHLC scales with the demographic information obtained from the respondents produced no significant correlations with sex,

TABLE 2
DESCRIPTIVE DATA ON SCALES

Scale	# of Items	Mean	sd	Alpha
IHLC				
— Form A	6	25.104	4.891	.767
— Form B	6	25.304	4.646	.710
— Forms A&B	12	50.409	9.051	.859
PHLC				
— Form A	6	19.991	5.221	.673
— Form B	6	20.974	5.487	.715
— Forms A&B	12	40.965	10.048	.830
CHLC				
— Form A	6	15.574	5.751	.753
— Form B	6	15.461	5.204	.691
— Forms A&B	12	31.035	10.204	.841
Levenson's				
I — Scale	8	37.009	4.529	.508
P — Scale	8	20.783	6.818	.725
C — Scale	8	20.609	6.321	.733
Social Desirability	10	34.687	7.652	.730
Health Status	2	10.339	2.013	.796

TABLE 3
INTERCORRELATIONS OF MHLC SCALES

Form	IHLC			PHLC			CHLC		
	A	B	A&B	A	B	A&B	A	B	A&B
IHLC									
A	....							
B	.801	....						
A&B	.946	.952	....					
PHLC									
A	.154	.168	.172	....				
B	.055	.058	.060	.761	....			
A&B	.111	.120	.124	.935	.941	....		
CHLC									
A	-.343	-.215	-.303	.055	.275	.171	....	
B	-.276	-.189	-.252	.139	.259	.210	.734	....
A&B	-.327	-.213	-.293	.104	.284	.204	.938	.924	....

Note: For N=115, $r_{.05}=.183$, $r_{.01}=.241$, $r_{.001}=.300$.

TABLE 4
INTERCORRELATIONS OF MHLC SCALES, THE I, P, C SCALES,
AND SOCIAL DESIRABILITY

	IHLC	PHLC	CHLC	I	P	C
IHLC	....				
PHLC	.124	....			
CHLC	-.293	.204	....		
I Scale	.567	-.073	-.303	....	
P Scale	-.115	.275	.566	-.252	....
C Scale	-.140	.230	.799	-.222	.604	....
Social Desirability	.097	.091	-.236	.044	.107	.084

Note: Correlations for the MHLC scales are based upon Forms A&B combined. For N=115, $r_{.05}=.183$, $r_{.01}=.241$, $r_{.001}=.300$.

and only one scale, Form A of the PHLC, correlated significantly with age ($r = .198$, $p < .05$) or educational level ($r = -.222$; $p < .05$).

As an initial indication of predictive validity, correlations were computed between health status and the MHLC scores. As expected, health status correlated positively with IHLC ($r = .403$, $p < .001$), negatively with CHLC ($r = -.275$, $p < .01$) and did not correlate with PHLC ($r = -.055$).

DISCUSSION

With the development of these new scales, health researchers have at their disposal a set of instruments with far greater potential usefulness than the original HLC scale. Not only can scores be obtained on three separate theoretically and empirically differentiated dimensions, but equivalent forms of the scales are available for research designs which require repeated administrations. The problem of low alpha reliability encountered with the original HLC scale should not occur with the new scales, since the major factor contributing to low internal consistency, combining internal and external statements in the same measure, has been eliminated. These new scales have also been developed using a more representative sample of respondents than the relatively homogeneous group of college students on whom the psychometric properties of the original scale were established. As with the HLC scale, however, the MHLC scales are intended for use with adults; most persons with an eighth grade reading level and no functional impairments should be capable of understanding and responding to the items. Investigators who wish to assess the health locus of control beliefs of children are advised to use scales specifically constructed for younger populations.

How might the MHLC scales be utilized? By assessing more than one dimension of health locus of control, the probability of increasing understanding and prediction of health behaviors could be increased. As an example, consider an investigation where the dependent variable is delay in seeking care following observance of a possibly cancerous mass. With other

factors controlled for, persons scoring high on the CHLC scale should, theoretically, delay longer than those scoring high on the PHLC or IHLC scales.

Consider, as another example, the situation of a person experiencing unpleasant side effects after taking medication prescribed by a physician. A person with strong beliefs in external control by powerful others (i.e., high scorer on the PHLC scale) might be expected to continue taking the medication, especially if he or she also had high trust in physicians. Given the same situation, a high scorer on the CHLC scale might abandon the medication entirely. A person with strong beliefs in internal health locus of control might carry out a self-study by going off the medication for a day or two, noting the difference, then resuming the medication to see if the side effects reappear.

As a final example, suppose that two different approaches, one emphasizing self-direction, the other stressing decision-making by an expert therapist, were available to persons desiring to lose weight or stop smoking. High IHLC scale scorers should prefer and be successful with the former approach. High PHLC scale scorers should respond favorably to the latter approach, and high CHLC scale scorers may shun or fail with either approach.

Potential users of the MHLC scales should make appropriate choices of scales (and forms) to suit their purpose. Appropriate choices will vary according to one or more of the following factors: (a) the population being studied; (b) the health behavior(s) being investigated; (c) the time available; and (d) the research design. For certain populations and/or health behaviors it might make sense to investigate only one or two of the dimensions. If time is limited and the size of the instrument is a factor, perhaps only one or two of the dimensions would be used. If a more reliable instrument is advantageous, the two forms of the scales can be combined. It would, however, be better to omit one of the scales entirely than to alter them significantly by choosing only some of the items from a given form.

In utilizing the MHLC scales it is important to keep in mind the theoretical and empirical underpinnings of health locus of control. As a health-specific indicator of generalized expectancy of locus of control of reinforcements, based on Rotter's social learning theory, there is no reason to expect that MHLC scale scores alone should explain much of the obtained variance in health behaviors. Only in interaction with one, or preferably more, of a multitude of contributing factors will beliefs in the locus of control of health play a significant role in the explanation of health behavior. Examples of other contributing factors are perceived severity and susceptibility; health motivation; social supports; previous behavior; attitudes toward health professionals; perceived costs and benefits of specific actions; demographic factors such as race and social class; and, most importantly, the value of health as a reinforcement.

One positive note for investigators who have collected data utilizing the

TABLE 5
INTERCORRELATIONS OF MHLC SCALES WITH
MULTIDIMENSIONAL SCORING OF HLC SCALE ITEMS

		HLC-I	HLC-C	HLC-P
IHLC	A	.695	-.301	.102
	B	.707	-.223	-.026
	A&B	.738	-.277	.042
PHLC	A	.219	.151	.424
	B	.157	.238	.359
	A&B	.200	.209	.416
CHLC	A	-.297	.785	.059
	B	-.189	.679	.229
	A&B	-.264	.689	.150

Note: HLC-I, HLC-C, and HLC-P consist of 5, 5, and 1 items respectively, from the 11-item HLC scale. *N* = 115.

original HLC scale: an approximation to the MHLC scales can be obtained by rescoring the data from the HLC scale along multidimensional lines. Table 5 presents the intercorrelations of the MHLC scales with the HLC-I (consisting of the five internally worded HLC scale items), the HLC-C (consisting of the five chance externally worded HLC scale items), and HLC-P (the single powerful others externally worded HLC scale item). These intercorrelations demonstrate that the HLC scale can be rescored in such a manner as to permit a multidimensional analysis of health locus of control. This may, in some cases, result in theoretically more consistent findings than were originally determined by treating the HLC scale as a unidimensional measure.

SUMMARY

Data related to the reliability/validity of the MHLC scales were presented. Low positive correlations with appropriate I, P, & C scales represented initial construct validity. Correlations in the predicted direction of the MHLC scales with health status provided some evidence of predictive validity. However, the extent of the validity and reliability of these instruments will not be fully known until they are appropriately used in a number of studies.

Whether the multidimensional approach to the measurement of health locus of control will provide more precise and conceptually relevant predictions than previously possible is an empirical question, which should be a challenge to anyone seeking a greater understanding of the variance in health behaviors.

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