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An Examination of the Locus of Illness Control Scale Using Data Collected in Brazil and Appalachia

Robert Lawrence Patrick Jr.
University of Tennessee, Knoxville

To the Graduate Council:

I am submitting herewith a thesis written by Robert Lawrence Patrick Jr. entitled "An Examination of the Locus of Illness Control Scale Using Data Collected in Brazil and Appalachia." I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Arts, with a major in Anthropology.

Michael H. Logan, Major Professor

We have read this thesis and recommend its acceptance:

Benita J. Howell, Lyle W. Konigsberg

Accepted for the Council:
Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

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Accepted for the council:

Lou Swinkel

Associate Vice Chancellor
and Dean of the Graduate School

AN EXAMINATION OF THE LOCUS OF ILLNESS CONTROL SCALE USING DATA COLLECTED IN BRAZIL AND APPALACHIA

A Thesis

Presented for the

Master of Arts

Degree

The University of Tennessee, Knoxville

Robert Lawrence Patrick, Jr.

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TABLE OF CONTENTS

LIST OF TABLES

CHAPTER I

INTRODUCTION

In recent years it has become increasingly apparent that the prevention and cure of disease can no longer be viewed as the province of the physician alone. The patient plays as much or more of a role in his or her health status as the medical professional, and the behavior of the patient is a vital force in health care. All the efforts of the medical profession can go to waste if the patient does not play a recovering role. Yet some individuals are far more willing than others to cooperate in the maintenance of their health. It becomes necessary under these conditions to determine what forces are at work to create and maintain differences in health-seeking behavior.

Researchers from a number of fields have participated in the exploration of this problem. The present study is predicated on work done by social scientists and health care workers on a construct known as Locus of Control. It is hypothesized that an individual's behavior is in part a function of a perception of the causal relationship between his or her behaviors and subsequent reinforcements, and there has long been convincing experimental support that this is the case. As an individual disowns responsibility for reinforcement possibilities, and perceives control of events as passing into the hands of exterior forces, the individual's behavior can be affected in various ways.

Locus of Control is operationalized on a dimension ranging from "internal" to "external." Generally speaking, an internal Locus of Control

implies a perception of being in control of events and potential reinforcemets, while an external Locus of Control implies a feeling of helplessness, powerlessness, and a lack of control over events.

A number of instruments have been devised with the intention of measuring Locus of Control along this dimension of internality versus externality. The purpose of the present study is to employ one of these instruments to examine differences in Locus of Control between people of different cultures and different socioeconomic standing. Earlier studies have discussed the importance of local disease etiology on the development of Locus of Control beliefs, and this must be addressed as well. In particular, I will use data collected using the Locus of Illness Control Scale developed by Coreil and Marshall (1982) to examine Locus of Control beliefs among four groups of people: students attending an introductory class at the University of Tennessee in Knoxville, Tennessee; students attending a political science class at the State University of Ceará in Fortaleza, Brazil; vendors of medicinal plants in a street market in Fortaleza, Brazil; and finally, individuals in Fortaleza who purchase medicinal plants from these same vendors. These data comprise a larger set of responses than previous studies using this instrument. It is hoped that this study will provide us with a better look at this instrument's viability as a means of examining variables related to Locus of Control.

It has been suggested (James 1957:81) that a "promising area for future research is that of the conditions affecting the development of individual tendencies to categorize situations on the external-internal control dimension." Recent studies have attempted to answer this question from a cross-cultural perspective. Of particular interest is the problem of how

popular theories of disease onset and cure might be related to such factors as health care role, socioeconomic status, and ethnicity. Using the Locus of Illness Control Scale, a picture of the tendencies toward internality or externality of people from radically different backgrounds might be obtained. It is to be hoped that a clearer understanding of the factors associated with the formation of Locus of Control beliefs can be gleaned from such studies. If we can more clearly understand what factors are related to the appearance of externality, we should be better able to influence health-related behavior.

CHAPTER II

BACKGROUND OF THE PROBLEM

Extensive reviews of the definitive and experimental literature concerning Locus of Control have been published elsewhere (Lefcourt 1966; Rotter 1966; Minton 1967; Joe 1971; Lefcourt 1972; Phares 1976; Wallston and Wallston 1978). Although it is not my intention to duplicate these reviews here, I do wish to briefly discuss some of the theoretical background of the Locus of Control construct. Essentially the focus of this construct is the prediction and modification of behavioral *choices*. Human behavior, it is assumed, is a product of choices (Phares 1957:339), and it is therefore important to come to an understanding of what factors lead to different choices in order to better understand human behavior. Although it would seem reasonable that a *desired goal* would be a prime motivator behind behavioral choices, "...it is now widely recognized that the apparent desirability of some social outcome is a poor predictor of the degree to which an individual will commit himself toward action to obtain the desired goal." (Gore and Rotter 1963:58). Many researchers have explored the possibility that an individual's manner of categorizing situations can be viewed as an important behavioral antecedent.

Of considerable importance to this view is the concept of *generalized expectancies*. In his book, *Social Learning and Clinical Psychology*, Julian Rotter defined an *expectancy* as "the probability held by an individual that a particular reinforcement will occur as a function of a specific behavior on his

part in a specific situation or situations" (Rotter 1954:107). From the standpoint of social learning theory, a reinforcement "acts to strengthen an *expectancy* that a particular behavior or event will be followed by that reinforcement in the future" (Rotter 1966:2; emphasis in original). Rotter argued that these expectancies are not necessarily limited to a particular set of situations, but that they can generalize "from a specific situation to a series of situations which are perceived as related or similar" (Rotter 1966:2). It is this generalization of expectancies which allows the individual to form expectancies in novel situations (Rotter 1954:166). Although the value of a reinforcement plays a role, it is the expectation by the individual that reinforcement will occur if a particular action is taken that should be closely examined. Rotter argues that "a generalized attitude, belief, or expectancy regarding the nature of the causal relationship between one's own behavior and its consequences might affect a variety of behavioral choices in a broad band of life situations" (Rotter 1966:2).

Thus it can be stated that, although the value of reinforcement can be an important consideration, the perceived relationship between action and reinforcement is a vital determinant of what sort of action occurs. Individuals categorize situations in ways which affect their responses. Early researchers into the application of learning theory to human behavior were interested in the "use of symbolic behavior as a means by which situations are categorized" (James and Rotter 1958:397). James argued that "the same objective situation can be categorized in varying ways depending on the acquired significance of meaning of the situation to the individual" (James 1957:4), and that "changes in the categorization of the situation can lead to marked changes in expectancy as well as reinforcement value" (James 1957:5).

In a study of changes in expectancy under differing conditions, Phares (1957) explored two categories into which situations might be placed. Following an earlier work by Lasko (1952), he distinguished between "learning in situations where the effects following a behavior are a function of the behavior itself, and learning in situations where the subsequent effect or reinforcement is controlled by someone else..." (Phares 1957:339). Phares referred to these two potential situations as *chance* and *skill* situations. James (1957:25) referred to a skill situation as one in which a person views the situation as being *internally controlled*, with a chance situation being controlled *externally*. In an unpublished dissertation, he argued (James 1957:7) that this categorization "is an important personality characteristic which may have predictive value in relation to other behaviors of an individual."

While exploring the influence of an individual's *Weltanschauung* (loosely: "world-view" or "perspective") on his or her decision-making in risk situations, Liverant and Scodel were interested in the influence of a generalized expectancy which they referred to as a dimension of "internal versus external control" (Liverant and Scodel 1960:59). Individuals were seen as categorizing the potential outcome of behavior as a function of this generalized expectancy (Liverant and Scodel 1960:60). In a 1966 paper, Julian Rotter defined external and internal Locus of Control in the following way:

> When a reinforcement is perceived by the subject as following some action of his own but not being entirely contingent upon his action, then, in our culture, it is typically perceived as the result of luck, chance, fate, as under the control of powerful others, or as unpredictable because of the great complexity of the forces surrounding him. When the event is interpreted in this way by an individual, we have labeled this a belief in *external control.* If the person perceives that the event is contingent upon his own behavior or his own relatively permanent characteristics, we have termed this a belief in *internal*

control [Rotter 1966:1].

It has been further argued that people with a belief in internal control (henceforth: *internals*), when given positive or negative reinforcement for a particular behavior, will be more likely to repeat that behavior under similar circumstances (Rotter 1966:5). This raises the possibility that internals "would show more overt striving for achievement than those who felt that they had little control over their environment" (Rotter 1966:21).

Of particular relevance to the present study is the support given by Rotter's work for the hypothesis that internals will be more likely, not only to take active steps to improve their situation, but also to keep themselves informed about how to do so. In a review of the literature, Lefcourt (1966) reported similar findings from other studies. In one such study, Seeman and Evans (1962) found that "hospitalized tuberculosis patients characterized as external controls had less objective knowledge about their own conditions" (cited in Lefcourt 1966:213). Joe (1971:626) has also summarized several studies in which internals "exhibited more initiative in their efforts to attain goals and to control their environments than did externals."

Rotter noted that, although these differences can be expected when different groups are delineated for experimental purposes, they must be further explained when they occur *within* groups in a study (Rotter 1954:167), and he maintained that an objective measure was necessary to explore these within-group differences. James (1957) developed a 60-item questionnaire, of which 30 questions were actually scored. Gore and Rotter (1963) and others (see Phares 1965:642) used a scale consisting of 23 scored items and six filler items. These and other measures (see Lefcourt 1966:217) facilitated the operationalization of subjects' expectations concerning the control of

reinforcement, and have greatly increased our knowledge of the relationship of Locus of Control to expected behavior patterns.

It would seem from the literature that this instrument could be an effective means of operationalizing an important variable related to achievement. If the Locus of Control construct can be utilized in this manner, it becomes necessary to discover other variables which might be correlated with internality or externality. Lefcourt has reported (1966:212) that, in several early studies, groups "whose societal position is one of minimal power either by class or race tend to score higher in the external-control direction." Similarly, Joe has argued (1971:624) that "individuals who are restricted by environmental barriers and feel subjected to limited material opportunities would develop an externally oriented outlook on life."

In an unpublished manuscript, Rotter, Simmons, and Holden (1961; cited in Rotter 1966:24) examined the relationship between religious orthodoxy and Locus of Control. In a study involving college students, they found no significant differences between people of different faiths. However, in an attempt to investigate the role of religion in the development of internal or external values, a number of students were interviewed individually. Based on these interviews, Rotter suggested that "it is the specific emphasis that is placed upon the role of external fatalistic determination by parents which is more likely to determine the attitude than the abstract doctrines of the sect" (Rotter 1966:24).

In a study of college students, Feather (1967, 1968; cited in Joe 1971:620) found that females scored significantly more external. It has been suggested that this finding may "be related to the cultural roles assigned to each sex, to social class, and to regional effects" (Joe 1971:634). In other studies, however

(Battle and Rotter 1963; Butterfield 1964), no significant difference was found between subjects of different gender.

Butterfield has examined the relationship of frustration to the concept of Locus of Control. He defines a frustration as "an obstacle in the path of some goal-directed behavior." An individual "may view an obstacle as either surmountable or insurmountable" (Butterfield 1964:355). He argues that people who view events as being largely under their own control [internals] would be more likely to view an obstacle as surmountable, while people who perceive external forces controlling their fate [externals] would be more likely to view an obstacle as insurmountable (Butterfield 1964:355). He suggests that an important distinction between internals and externals would be the types of things that they would do in order to cross obstacles on the way towards their personal goals (Butterfield 1964:366).

It should be emphasized that, in using terms such as "internals" and "externals," we are not, in the words of Rotter, "hypothesizing a typology or bimodal distribution" (Rotter 1975:57). Rather, we speak of an "internal orientation." Those individuals named "internals" are those whose scores lie within the internal range of an internal-external continuum. It should also be noted that, although the construct itself is a product of social learning theory, an attempt is made to gain the subject's own categorization of events as internal or external, and not that of the researcher. Results would seem to suggest that the instruments which have been utilized for this task have been at least partially successful.

Seeman and Evans (1962) pursued the relationship between Locus of Control and the sociological concept of powerlessness. They found that patients who scored more internally would "know more about their

condition, would be better informed about the disease of tuberculosis in general, and would be regarded by the ward personnel as being better patients and better informed about their own condition. These predictions held in spite of the fact that none of the items in the questionnaire dealt with tuberculosis specifically or any disease or attitude toward disease..." (Gore and Rotter 1963:60). A person manifesting externality with respect to health and illness control, it could be predicted, is less likely to attempt to control his or her health status because of a feeling of powerlessness. Gore and Rotter (1963:60) suggest that "if patients' efforts to find out about their own serious physical condition can be affected by such a generalized attitude, it seems likely that where people are highly involved in desire for certain social change...social action-taking behavior could be likewise predicted" from such a generalized attitude.

James and Rotter note (1958:402) that some people will "tend to view their experiences both positive and negative as being externally controlled and due to the whims of fate or the manipulation of other people," and they suggest that in order to "raise or lower expectancies in order to produce behavioral changes, it may be necessary to get the patient to perceive that to some extent the potential reinforcements (positive or negative) in situations are consequences of his own actions and can be controlled."

One interesting early application of this construct was an exploration by Battle and Rotter (1963) to class and ethnicity. Their subjects were divided into four groups: middle-class and lower-class blacks and whites. The most striking distinction was found between white subjects classified by the experimenters as "middle class" and black subjects classified as "lower class," with middle-class whites scoring the most "internal" and lower-class blacks

scoring as the most "external" (Battle and Rotter 1963:487).

In 1975, Rotter estimated that, at that time, well over 600 studies had been published touching on internal versus external control of reinforcement (Rotter 1975:56). At about that time, researchers were beginning to use the construct more and more within the field of health care. The implications for the use of this model within the context of behavior modification in a health care setting are promising. Saltzer suggests (1978:119) that there are "differences in the techniques which succeed in changing the behavior of internals and externals," and Wallston, et al. (1976:583) discuss evidence that "treatments which have been tailored to match a subject's locus of control orientation may be more successful than nonmatching treatments."

A study by James, Woodruff and Werner (1965:184) seemed to indicate that smokers are more external than nonsmokers. In a study of internal variation among smokers trying to quit, Kaplan and Cowles (1978:133) found that among both male and female smokers, those "most likely to be successful in changing their smoking behavior and maintaining behavior changes were those who both valued health highly and who held internally-oriented beliefs with respect to their state of health."

These and other studies tend to indicate that, in health care situations in which the behavior of the patient is taken into consideration, some knowledge of the Locus of Control status of the patient or patients could be very useful in obtaining results. Instruments have been developed for measuring health-related Locus of Control. Wallston, et al. (1976) describe the development of a scale, known as the Health Locus of Control Scale, to examine personal beliefs about control of health and how it relates to health-related behavior. This was followed by the development of the

Multidimensional Health Locus of Control Scales (Wallston, Wallston and DeVellis 1978).

Although these instruments have been judged successful, Coreil and Marshall (1982:131) noted that "few studies have examined the construct from a cross-cultural perspective." Basing their survey instrument upon similar studies of perception using standardized psychological tests, they developed the Locus of Illness Control Scale as an instrument for comparing perceptions of illness control between different cultural groups, in contrast to studies of individual differences.

In the process of constructing this study, they wished to avoid a criticism often leveled at cross-cultural studies of cognition: that any cultural group represents a heterogeneous collection of persons, and that to study a group as if all members share the same cultural traits equally is to be oblivious to important internal variation (Coreil and Marshall 1982:131). Coreil and Marshall stated that they did not wish to treat their two groups as having no internal variation. Indeed, their use of two subscales within their instrument was an attempt to gain a clearer picture of some of this variation. They distinguished between a "prevention" and a "cure" dimension within the survey instrument, presenting the hypothesis that "a person's expectancy level for one dimension might contrast with that for another" (Coreil and Marshall 1982:133). The two groups were distinguished by differences in local disease etiology and access to medical care.

The Locus of Illness Control Scale, as presented by Coreil and Marshall in 1982, is given in Appendix A. The scale consists of 15 items, nine

concerning the prevention of illness and the other six concerning the cure. The difference in size between the two dimensions "was intended to give more weight to that dimension [prevention] in the composite score" (Coreil and Marshall 1982:133). They do not explain why this is necessary, although they note that the 11-item Health Locus of Control Scale developed by B. S. Wallston et al. (1976) contains no cure subscale, focusing on prevention alone (Coreil and Marshall 1982 133). The illness cure dimension is in fact described as being unique to the Locus of Illness Control Scale (Coreil and Marshall 1982:133).

The items are also distinguished by their phrasing: Six of the questions are worded internally, while the other nine are externally worded (Coreil and Marshall 1982:133). The answers "yes," "sometimes," and "no" received scorings of 3, 2, and 1, respectively, if they corresponded with an externally-worded question, while they were scored 1, 2, and 3 otherwise. A score of 3, therefore, indicated a response regarded as external regardless of the wording of the question.

For this original study, the survey instrument was administered to people in two geographic areas. In 1978, Coreil administered the scale in Haiti, where she had been conducting other work (Coreil 1979). During the summer of 1979, Marshall administered the scale in eastern Kentucky, where she had been working (Marshall 1979). The authors describe the two groups as being similar with respect to "societal position, fatalistic stereotype, and barriers to health care" (Coreil and Marshall 1982:137). They note that the results seem to substantiate "two distinct components of illness control,"

which they refer to as "control through health behavior" and "control through illness behavior" (Coreil and Marshall 1982:136). They found significant differences, both between groups and within groups. The Appalachians displayed more internality on the prevention subscale and externality on the cure subscale, while the situation for the Haitians was reversed. The authors make the conclusion that differential scoring between groups on both subscales reflects regional disease patterns (eg-chronic versus acute etiology), as well as the different histories of medical treatment in the two regions (Coreil and Marshall 1982:136). Coreil and Marshall argue that this instrument may shed light on the effects of differential disease patterning on the health-related beliefs of people in different regions. In other words, "the data generated by means of this scale clarify to what degree someone either accepts or displaces responsibility for the onset of illness and its effective treatment" (Logan 1991:82).

Logan has suggested (1991) that the city of Fortaleza, capital of the Brazilian state of Ceará, provides an environment similar to that described by Coreil and Marshall for their study areas. Logan chose, however, to focus on the providers of health care, rather than the consumers, arguing that "their orientation, particularly as it pertained to curing, should be decidedly internal in nature...since they actively 'control' the process of recovery" (Logan 1991:83). Logan's research was conducted in the mid 1980s in the *Mercado Central*, a traditional market in Fortaleza, in which there were 40 herbalists (*raizeiros*), among other types of vendors. Logan interviewed 26 herbalists using Coreil and Marshall's Locus of Illness Control Scale. Because of the

nature of their profession, item 15 was revised to read, "most diseases can be cured by a good doctor with the right medicines or through the use of appropriate medicinal plants" (Logan 1991: Table 1). Because the herbalists are, in a sense, in control of the cure of certain illnesses, he predicted an internal cure orientation for the herbalists.

Logan found that the herbalists were "in complete agreement on item 15. All felt that illness can be cured through appropriate therapeutic action, including the use of medicinal plants" (Logan 1991:84). As to item 1, "not one of the informants believed that patients are powerless to reverse the course of sickness" (Logan 1991:84). On the other hand, herbalists view staying healthy to be a product of luck and fate (Logan 1991:86). Like the two groups studied by Coreil and Marshall, the herbalists displayed scores on the prevention subscale that were quite different from those on the cure subscale (Logan 1991:85).

A relationship between disease patterning and popular opinion concerning disease onset and cure would seem to be substantiated. Although Logan expresses general approval of Coreil and Marshall's findings, he has reservations about the analyses their data underwent. His suggestions as to the future application and processing of the Locus of Illness Control Scale will be discussed in Chapter Three, where I explain my own methods. At this point I wish to stress the satisfactory results obtained thus far with the use of this instrument. Further exploration and application of the Locus of Illness Control Scale would be useful, not only as a continued examination of the relationship between disease patterning and popular opinions about disease, but also may help to shed further light on the relationship between such

popular opinions and personal motivation to do something about disease status.

CHAPTER III

DATA AND METHODS

During the course of Logan's analysis (1991), he "became increasingly aware...that certain features of Coreil and Marshall's (1982) study required greater clarification, features pertaining not only to the survey instrument itself, but ones pertaining to more fundamental issues of data analysis and interpretation". One issue of immediate concern to those interested in further application of the Locus of Illness Control Scale is that the original study does not easily lend itself to replication (Logan 1991:83). Coreil and Marshall do not provide in their publication the raw data which would facilitate comparison with other data. Instead they provide mean and percent scores, arguing that this is necessary in order for the prevention and cure subscales to be comparable units.

Logan demonstrates that this form of presentation can obscure important information. In Coreil and Marshall's Table 2, "Mean Raw and Percent Scores for Haiti and Appalachia" (Coreil and Marshall 1982:135), they present their data, already processed. Logan begins his analysis by pointing out that their percent scores are incorrect. He corrects their percent scores, and presents percent scores for his own data, in his Table 2, "Mean of the Sum and Percent Scores for Herbalists, Haitians, and Appalachians" (Logan 1991:84). A comparison of these data as presented would seem to indicate that "the herbalists differ surprisingly little from the other groups (especially Appalachians) when it comes to curing. This finding was surely not

anticipated" (Logan 1991:84). He argues that this finding results, not from any real opinions held by the herbalists, but from the manner in which the data were manipulated.

Logan finds that when the data are analyzed on an item-by-item basis, rather than as percentages, the results better reflect what might have been expected. In addition, information that is hidden within percentages becomes clear when the data are examined in a more raw form. In his Table 3, "Responses of Herbalists to the Locus of Illness Control Scale Items " (Logan 1991:84), one can see actual scores on each item of the scale. The results of using the different methods can even be contradictory. As Logan notes, "if one follows the approach of Coreil and Marshall, the herbalists appear to be more *externally* oriented towards *curing* than Appalachians (57% vs. 55%), when in fact they are quite *internally* oriented (a mean of 1.7)" (Logan 1991:85; emphasis in original).

Because of these findings, Logan suggests (1991:87) that future application of the Locus of Illness Control Scale involve the use of raw data, rather than mean and percent scores. He also advises that in future research on this topic, "sufficient detail on one's original data and methodological design must be published so that other researchers can assess the merits of the data (as in factor analysis) or replicate the study for comparative purposes (as in analysis of variance)". Because the two subscales used by Coreil and Marshall were of unequal size, they chose to present mean and percent scores, masking important information contained in the data. Had they chosen to present raw scores, they could have utilized, for example, the chi-square technique, which is appropriate for such data sets.

Logan suggests further (1991:87) that the Locus of Illness Control Scale

"should be changed so that finer grained ordinal data will be produced." He goes on to suggest the use of an equal number of subscale items, so that the quandary faced by Coreil and Marshall—the use of percent scores—could be avoided altogether.

Logan suggested another interesting point: "Do those who seek the service of these herbalists share similar beliefs?" (Logan 1991:86). I will examine this question as well. First, however, I will discuss the populations that I will use in my applications of the Locus of Illness Control Scale as developed by Coreil and Marshall, incorporating revisions suggested by Logan.

First and foremost, I wish to apply the Locus of Illness Control Scale to some additional data, so that "we can begin to reach the 'generalizations' about locus of illness control to which Coreil and Marshall refer" (Logan 1991:87). Some of these as yet unpublished data have been collected using a three-point scale, and some using a five-point scale. Any in-between or noncommital response, such as "sometimes," "don't know," "no opinion," or "*as veces*," was scored as 2 on a three-point scale, and as 3 on a five-point scale.

Three groups have been surveyed using the Locus of Illness Control Scale as modified (Item 15) by Logan (1991). The first is a group of consumers of medicinal plants in Fortaleza, Brazil. These data (n=28) were collected in 1987 by Logan in the *Mercado Central* in order to compare them with the distributors of this form of healing in the same marketplace, and are used with his permission. A subjective impression of each subject's socioeconomic status was obtained through observation of his or her dress. From these data it can be seen that these consumers comprise a rather heterogeneous group.

Medicinal plants are not utilized by the poorer citizens alone, but also by the wealthy. Although this group can be seen to be considerably more heterogeneous than the group of herbalists, we can at least examine the question of control of the healing process that interested Logan. All of these data were collected in the same marketplace, among people who have in common a belief in the curative nature of these herbs. One might predict that the herbalists, being in control of the supply of these plants, would be more internal with regard to the prevention and cure of disease than the consumers of their wares.

The second groups of subjects collected using Logan's scale consists of 92 Brazilian students in a political science class at the State University of Ceará, in Fortaleza. These data were collected in 1991 by Josênio Parente, a faculty member at this university. Only 84 of the informants completed every item, and only these will be used. Although a small number of economically disadvantaged Brazilians can, through tremendous effort, attend the university, most of these students are rather wealthy. The herbalists, on the other hand, are comparatively very poor. By compressing the data taken from the university into the 3-point scale used previously (Logan 1991; Coreil and Marshall 1982), I will attempt to examine differences in Locus of Control due to socioeconomic advantage. I will do this by combining the answers "strongly agree" and "agree" into "agree/yes" (Portuguese *sim*), and the answers "strongly disagree" and "disagree" into the answer "disagree/no" (Portuguese *não*). One might predict that the University students, consisting of the economically advantaged, plus those who achieved their educational opportunity through a great deal of work, would tend to score more internally than did the herbalists.

Data have also been collected from a group of students at the University of Tennessee in Knoxville. These students were attending an introductory course in anthropology in 1991, and 91 of them completed the questionnaire. A five-point scale was used, as with the students in Brazil, and the only difference between the questionnaires seen by the two groups was the absence, on the instrument used at the University of Tennessee, of any mention of medicinal plants in item 15. This was because the use of herbs for curative purposes is not at all common in American cities, as it is in Brazil, and students in the United States might have been confused or biased by the presence of that statement.

With these data, I wish to examine the points raised above, though for reasons of clarity, I will restate them here. First, I wish to apply the Locus of Illness Control Scale to new data in order to further an understanding of its utility, as well as to learn something about the Locus of Control beliefs of the populations studied. These data will be presented in raw form, so that the results of this study may be later compared with other data. I also wish to examine the relationship of Locus of Control directionality with such factors as socioeconomic advantage (university student vs. herbalist in Fortaleza), relative supply-side control of the healing process (herbalists vs. their customers), and location (students—Brazil vs. United States). This last comparison needs further elaboration. Although both groups are composed entirely of students at large universities, their situations are somewhat different. Most students at the State University of Ceará are from a privileged segment of a population which has very little in the way of a middle class. Those attending the university who are not so situated exerted a tremendous effort to get there. In the United States, it is very easy for an individual to

attend a major university without wealth *or* tremendous effort. The relationship between Locus of Control and effort exerted to achieve a goal was discussed above. It could be said that the Brazilian students, through virtue of either effort exerted or their societal position relative to the surrounding population, would feel more control over their environment than their counterparts in Tennessee, who are not as markedly divided from the surrounding population.

The interpretation of these results will be made in the light of Coreil and Marshall's statement that "any explanation of group differences in perceived control over illness must take into consideration both the current patterns of disease and the kinds of medical care available in the respective settings" (Coreil and Marshall 1982:136). Further, Logan's suggestion that a greater prevalence and risk of acute disorders allows us to predict "greater externality for prevention and greater internality for curing" (Logan 1991:87) can here be examined with more extensive evidence from both Brazil and Appalachia. As I discussed above in my review of the literature, Coreil and Marshall (1982) and Logan (1991) described the situation among their informants with regard to local disease etiology and access to medical care. In Appalachia, people are faced with a series of chronic, degenerative diseases for which there is no cure, and access to medical care is described by Coreil and Marshall as being considerably better than for the Haitians studied. Acute infections are generally viewed as curable by means of medicines prescribed by a licensed physician. Among the Haitian subjects, acute infection is a far greater problem, as with the herbalists described by Logan. The herbalists, although they distribute medicinal plants, do not have ready access to practicing physicians because of their low socioeconomic status. Most

Brazilian university students, because of their privileged position, have immediate access to whatever medical care they need. In the United States, university tuition generally includes basic medical care, including limited medication dispensed free of charge.

The students are younger than members of the other two groups tested. Age could have an influence on an individual's perception of chronic illness, as the young have, for the most part, not been personally exposed to the types of degenerative illnesses associated with age. The beliefs of the Brazilian students should be influenced by a feeling of insulation from degenerative illnesses because of their youth, in addition to their perception of control over their surroundings. In addition, the students in Brazil have a greater *need* for insulation from acute illness, as the environment in Fortaleza provides a greater risk of exposure to acute infection than that in Knoxville.

Based on the above information, one could make the following predictions:

(1) Because of their greater access to whatever medical care they might need, as well as their socioeconomic position relative to the herbalists, university students in Fortaleza should tend to be more internal with respect to both prevention and cure than those who sell medicinal plants for a living.

(2) Because of the control they wield over the distribution of an instrument of the healing process, the herbalists should be more internal with respect to cure than those who purchase these plants from them.

(3) Because the disease pattern in Fortaleza tends to primarily reflect the prevalence of acute infection, and because they have ready access to medical care, the Brazilian students should score internally with respect to cure, and externally with respect to prevention.

(4) The Brazilian students' relative position in their society is markedly in contrast with that of those at the University of Tennessee, and one might therefore predict that the Brazilian students would score somewhat more internally on many items than those from Tennessee.

In the following section, I will examine the data to see the extent to which the above predictions are valid. In addition, directions for future study may be discerned from these results.

CHAPTER IV

ANALYSIS

1. Comparison of Subscales

Appendix B contains the raw scores resulting from these applications of the Locus of Illness Control Scale. The results of the five-point scale administered to the students in Ceará and in Tennessee are given first, for comparison of these two groups. Then I have given the scores of all four groups together, with the scores of the students reduced to a three-point scale, in the manner described above, for comparison with the herbalists and the consumers. Mean scores by group, including means for the prevention and cure subscales, are given in Table C-1[1]. On a five-point scale, 3 is taken to be the midpoint, while on a three-point scale, 2 is the midpoint.

T-tests were performed on the raw scores. Similar tests were also performed separately upon the prevention scores and the cure scores. The results of comparisons between the two groups of university students are given in Table C-2. These results would seem to suggest that the Brazilian subjects are significantly more internal than the students in Tennessee ($p < 0.0001$). This is in accord with prediction (4), above, in which I suggested that the students in Fortaleza, because they exhibit a more strikingly different socioeconomic station relative to the residents of the surrounding city than do the students in Knoxville, should score more internally. However,

[1]All Tables are located in Appendix C.

prediction (3) would seem from these data to be incorrect. The prevalence of acute disorders in the region would suggest that the students in Fortaleza, like the herbalists, would score more internally with respect to cure and externally with respect to prevention. However, the students scored internally with respect to both cure *and* prevention, with the prevention score being slightly more *internal*. The internality of *all* of the Brazilian students' mean scores would suggest that something other than disease pattern is having an effect on these scores.

A comparison of the mean scores of the students with those of the herbalists makes this more clear. The herbalists scored internally on the cure subscale, and externally on the prevention subscale, while the students, as stated above, scored internally on both subscales (Table C-3). The herbalists fit the model of a group of people living in an area with a greater prevalence of acute disorders. Their scores also agree with the hypothesis that, being in control of an instrument of healing (medicinal plants), they should score internally with respect to cure. However, the students' more internal score on the prevention subscale suggests that other effects are at work. The socioeconomic status of the students relative to the herbalists could be overriding both their shared ethnicity and the influence of the local disease pattern. In addition, the herbalists are generally much older than the students; more will be said on the effects of age below. The total mean scores of the students, as well as their mean prevention scores, are significantly more internal than those of the herbalists ($p < 0.0001$ in both cases), and this would be in accord with prediction (1), above. The cure scores, however, were not significantly different.

It must be stressed that only a small part of the variability in these

scores can be explained by group affiliation. In a comparison of the scores of students in Knoxville with those in Fortaleza, a t-test yields an R-square of 0.1474408. In comparing the Brazilian students studied with the group of herbalists, the t-test yields an R-square of 0.371943. Although it is obvious that there is a lot of internal variation in each of these groups, enough of the variation seen in the raw scores can be explained by group affiliation to make the results significant.

In prediction (2), above, it was suggested that, because of their control of one aspect of the healing process, the herbalists should score more internally with respect to cure than the people who purchase their herbs. However, it can be seen in Table C-4 that the consumers scored significantly more internally on both subscales than the herbalists ($p(T) = 0.0004$; $p(P) = 0.0009$; $p(C) = 0.0203$). The difference on the cure subscale, although much less than that on the prevention subscale, is nonetheless significant at $p < 0.05$. The composition of the group of subjects described here as "consumers" was discussed above, but I will describe this group again here for clarity. This group is far more diverse than the group of herbalists. The people who patronize these vendors come from a wide variety of socioeconomic backgrounds, and it could be suggested that it is the greater diversity of the group of consumers that has led to these results. More will be said about Prediction (2) below.

The results of comparing subscale means would seem to indicate that socioeconomic status and age are important factors associated with Locus of Control beliefs among the groups studied. However, it would seem appropriate to test these results by analyzing raw scores on an item-by-item basis, looking closely at the mean scores for each question on the Scale.

2. Item-by-Item Analysis of Variance

Raw scores for each item on the questionnaire were compared, two groups at a time, using a t-test analysis of variance. The results are given in Appendix C. It can be seen that, in a comparison of the two groups of university students, all items except 4, 5, and 8 are significant at $p < 0.05$, and several items are significant at $p < 0.0001$ (Table C-2). Items 4, 5, and 8 are on the prevention subscale; the students in Fortaleza are significantly more internal on all other items on this subscale. If items 4, 5, and 8 are not discriminating between groups of subjects, it may be appropriate to eliminate these items from the questionnaire. All three are on the prevention subscale, and eliminating them would produce a scale with an even number of items on both subscales. However, Items 4 and 8 do seem to discriminate between the students in Ceará and the herbalists (Table C-3).

On the cure subscale, the students in Tennessee are significantly more internal on three items (Items 1, 6, 12), while the students in Ceará are more internal on the other three (Items 3, 9, 15). This could account for the lack of much difference between the two groups on the cure subscale as a whole. Interestingly, the students in Tennessee scored more internally than the Brazilians on the three cure items (Items 1, 6, 12) which were phrased by Coreil and Marshall (1982) in what they referred to as an external direction (see Appendix A). Directionality could have an influence on these responses. One way in which this could be tested would be to develop a variation of this scale in which several items are phrased in both directions—internally and externally. If subjects respond to two versions of the same question differently, that would suggest that directionality is having an effect.

When the students in Fortaleza are compared with the herbalists in the same manner, only seven of the fifteen items are significantly different at $p < 0.005$ (Items 4, 7, 8, 11, 12, 13, 14), and on all of these, the university students are more internal (Table C-3). Six of these are on the prevention subscale, and only one (Item 12) on the cure subscale. This may explain why these two groups are not significantly different on the cure subscale as a whole. Interestingly, four of these seven items deal with the influence of luck or the Deity in human affairs. In particular, the one item mentioned above on the cure subscale was number 12: "When people get sick, it is up to God whether or not they get well." All but one of the seven are phrased in an external direction. The students did score more internally than the herbalists on one internally-worded item, number 11: "When people eat right and take care of their bodies, they seldom get sick."

These results raise the question of differences in religious beliefs between Brazilians of different socioeconomic status. This question is perhaps beyond the scope of this study, but it would seem that the herbalists view the forces of both chance and the Deity as having more control over their health than do the student subjects (Item 4: $p = 0.0007$; Items 7, 12, 14: $p < 0.0001$). It is possible that age is an important factor associated with these perspectives.

It was found above that the consumers scored more internally than the herbalists on both subscales. However, when the item-by-item scores of these two groups are examined (Table C-4), the consumers are significantly more internal on only four items of the questionnaire at $p < 0.05$ (Items 2, 6, 7, 13), and on only two items at $p < 0.001$ (Items 2, 6). For a closer examination of the relationship of the four groups to these variables, some sort of

multivariate analysis of the variance between these groups would be appropriate.

3. Discriminant Analysis

William R. Klecka notes (1980:11) that "when the values on the discriminating variables are defined as dependent upon the groups [being studied], discriminant analysis becomes an extension of multivariate analysis of variance." Discriminant analysis was chosen as the multivariate technique to be applied to these data. Application of discriminant analysis through the use of a computer yielded a Wilks' lambda value of 0.16 ($p < 0.0001$). This denotes high discrimination, and a plot of the group "centroids" would show them to be well separated relative to internal group variation. A maximum of three functions can be derived from these data, and a test of residual roots yielded significant results through the third function (chi-squares 400.3588, 176.9558, 45.2670; $p < 0.001$).

This suggests that a derivation of all three mathematically possible functions would be feasible, but it would be wise to first examine other factors. These are presented in Table C-5. The eigenvalue of Function 1 is much higher than that of the other two, and discriminates about 70.32% of the total inter-group variation relative to Functions 2 and 3. This would imply that Functions 2 and 3, although significant, do not substantively discriminate between the groups. Still, all three functions have fairly healthy canonical correlations, and squaring these correlations demonstrates that 18.7% of the variation in Function 3 is explained by group affiliation (see

Klecka 1980:37), a proportion high enough to justify giving it some attention.

For a look at the relations between these three functions and the fifteen variables within the questionnaire, total structure coefficients were obtained by computing the Pearson correlations between the functions and the variables (see Klecka 1980:67, note 13). The result of these calculations is given in Table C-6. The highest coefficients in Function 1 were displayed by items 7, 12, and 13 (see Coreil and Marshall 1982 for similar loadings by Items 7, 12 and 13 in a factor analysis). These three coefficients, plus that for Item 14, are all above |0.5|. They are all concerned with the influence of God, luck, or just blind fate (Item 13) upon the health of the subjects. This is interesting when compared with Mahalanobis distances (Table C-7) and the coordinates of group centroids in canonical space (Table C-8). It would seem that Function 1 seems to distinguish most readily between the students—both in Fortaleza and in Knoxville—and the subjects interviewed in the street market—the herbalists and the consumers. These groups appear from the coefficients given in Table C-6 to be distinguished primarily by their attitudes toward the powerful external forces described above.

The highest coefficients within Function 2 belong to Items 6, 3 and 1 (in that order). These items deal with control over the cure of disease, specifically with *internal* control over cure, indicated by the coefficients of externally-worded items 6 and 1 being negative numbers, and the coefficient of internally-worded item 3 being a positive number. Function 2 seems to distinguish between the students in Fortaleza and all other groups. When group scores were subjected to t-tests two groups at a time, patterns within differences in cure scores between groups had been difficult to discern, even though it is apparent that there is some intergroup variability. Discriminant

analysis also hints at variability in cure scores, but again, it is difficult to see a definite pattern.

Once Function 3 is reached, not a great deal of substantive discrimination is left. However, this function would seem from an examination of coordinates to distinguish between the consumers and the herbalists. It is a curious fact that comparisons of their scores using t-test analysis of variance suggested that the consumers and the herbalists are distinct on both subscales, while item-by-item t-tests revealed only four items significantly different at $p < 0.05$ (Items 2, 6, 7, 13). If $|5.0|$ is used as a cutoff for coefficients high enough to be noticed, only one item on the questionnaire seems to be strongly correlated with Function 3: Item 2 (0.5740). This item deals with the relationship between leading a "good life" (portuguese *vida boa*) and health. It might be questioned just how these subjects are interpreting the phrase "good life." The herbalists were evenly divided on this question (13 yes, 13 no). The consumers all answered yes except for two *não*s and two *as veces*. Two of the consumers elaborated on their responses. One poorly-dressed woman in her late 50s who answered "yes" added "but God's first," while a poorly-dressed woman in her mid 40s who answered "*as veces*" added *sorte e Deus* ("luck of God"). The consumers' scores were significantly more internal than the herbalists on Item 2 ($p < 0.001$). On no other item in the prevention subscale were they significantly different to such a degree, and no other item on Function 3 had such a high total structure coefficient. I would suggest, based upon these findings, that the wording of Item 2 be more closely examined. Perhaps a study could be conducted to discern the extent to which this item is interpreted as having religious connotations among different groups.

The only other item along Function 3 with a structure coefficient noticeably higher than the others is Item 6, in the cure subscale (0.4918). Item 6 is also notable as being the only item on the cure subscale on which the scores of the consumers and the herbalists were significantly different ($p < 0.0001$). The wording of this item should be examined closely: "Most illnesses will be cured in a matter of time regardless of which treatments are used." This would seem to be adequate falsification of the hypothesis stated above as Prediction 2: that the herbalists, because of the control they wield over the distribution of an instrument of the healing process, should be more internal with respect to cure than those who purchase their plants.

However, this question becomes problematic when it is examined with regard to how subjects may be interpreting it. The fact that this item includes the words "which treatments are used" could be taken to imply that treatment *is being pursued*, so that the question is interpreted, "If you are pursuing treatment, regardless of the kind of treatment, you will most likely be healed." I would argue that Item 6 is being interpreted in this manner, and that the directionality of Item 6 is therefore *internal*, rather than external. If this is true, then Prediction 2 is not falsified. If this question is indeed being interpreted in a manner inconsistent with its design, than I would suggest that the question be reworded to say the following: "Most illnesses will be cured in a matter of time regardless of whether or not therapy is pursued." This wording does not imply to the subject that treatment is indeed being pursued, and better reflects the intended external design of the question.

4. Comparison of Scales

The form of the Locus of Illness Control Scale administered to students at the University of Tennessee and at the State University of Ceará featured a 5-point scale, in contrast to the 3-point scale used previously. Subjects given questionnaires with the 5-point scale were encouraged to distinguish between degrees of agreement or disagreement on each item. Subjects from these two groups can be compared directly, but comparison with groups tested using the 3-point scale requires combining the responses "agree" and "strongly agree" into "agree," and combining the responses "disagree" and "strongly disagree" into "disagree." This was done *after* the actual scoring had taken place. The numbers 1 and 2, representing degrees of internality, were combined into the number 1, representing internality as a whole. Similarly, the numbers 4 and 5 were combined into the number 3, representing externality as a whole. The number 3, representing an in-between response of "sometimes/don't know/no opinion/*as veces*," was changed to the number 2. In this way, the scores 1-5 on the 5-point scale were converted into the matching scores 1-3 on the 3-point scale.

In order to more closely examine the effect of this combining of scores, the scores of the university subjects, after having been treated in the above manner, were subjected to item-by-item t-tests. The results, along with item-by-item means, are given in Table C-9. When these results are compared with those displayed in Table C-2, it becomes apparent that the significance levels have changed considerably. When these two groups are compared using the 5-point scores, 12 items are significantly different at $p < 0.05$, 10 items at $p < 0.01$, and 9 items at $p < 0.001$. When their scores on the 3-point

scale are compared, only 8 items are significantly different at $p < 0.05$, 7 items at $p < 0.01$, and 6 items at $p < 0.001$. When these figures are broken down into their respective subscales (Table C-10), it can be seen that it is the prevention scores which are severely affected by changing to a 3-point scale. Results on the cure subscale are hardly affected at all.

The reason for these effects, of course, is that, when these scores are compressed, much of the variability among the subjects disappears. A scale of five degrees simply discriminates more finely than a scale of three degrees. It appears that *degrees* of agreement or disagreement are more varied along the prevention subscale than along the cure subscale. When these scores are compressed for discriminant analysis, they are reduced to that level of effective discrimination on which the herbalists and the consumers were tested.

5. Discussion

At the end of Chapter 3, four hypotheses were presented. For the purpose of clarity, I will restate these four hypotheses below.

(1) Because of their greater access to whatever medical care they might need, as well as their socioeconomic position relative to the herbalists, university students in Fortaleza should tend to be more internal with respect to both prevention and cure than those who sell medicinal plants for a living.

(2) Because of the control they wield over the distribution of an instrument of the healing process, the herbalists should be more internal with respect to cure than those who purchase these plants from them.

(3) Because the disease pattern in Fortaleza tends to primarily reflect the prevalence of acute infection, and because they have ready access to medical care, the Brazilian students should score internally with respect to cure, and externally with respect to prevention.

(4) The Brazilian students' relative position in their society is markedly in contrast with that of those at the University of Tennessee, and one might therefore predict that the Brazilian students would score somewhat more internally on many items than those from Tennessee.

T-tests indicate that prediction (1) is partially falsified. Although the students at the State University of Ceará do score more internally on the prevention subscale than the herbalists, there is no significant difference between them on the cure subscale as a whole. On only one item of the cure subscale, Item 12, were they significantly different ($p < 0.0001$). The herbalists are much more likely than the students to say that it is up to God whether or not they are cured.

Prediction (2) has served to illuminate the problematic wording of Item 6. Although Coreil and Marshall, in presenting this instrument (1982), assign an external directionality to Item 6, I would argue that this question is being perceived by subjects as being internally worded. I recommend that the wording be changed in future studies to: "Most illnesses will be cured in a matter of time regardless of whether or not therapy is pursued." This would allow us to continue treating this item as external in orientation in future studies.

Prediction (3) would seem to be based on an inaccurate, or overly simplified, picture of the local disease pattern. Although the region does display a prevalence of acute disorders, the students are, by virtue of their

position, somewhat insulated from the effects of the local disease pattern. They are not experiencing the same disease load as are the herbalists. In such a situation, variation between these two groups could be more readily explained through differences in class or status. It could be predicted that, in a stratified society, those occupying a higher socioeconomic position should score more internally with respect to prevention than those occupying a lower one. The students' socioeconomic status not only overrides their shared ethnicity with the herbalists, but also insulates them from the local disease pattern. This interpretation suggests that, in future research, the influence of socioeconomic status upon other variables should be tested.

There is also an age difference. The herbalists are mostly in their forties and fifties, generally much older than the students. Age could be strongly related to feelings of mortality, of being at risk of degenerative diseases. Age could also be related to religious world view in this study. More will be said on this below.

Prediction (4) has been to a certain extent substantiated. Although the Brazilian students do score more internally than those from Tennessee on the prevention subscale, results for items on the cure subscale have been mixed. The Brazilian students are more internal on three of the items on this subscale, and the students in Tennessee are more internal on the other three. The cure subscale is unique to Coreil and Marshall's (1982) Locus of Illness Control Scale. Although use of this instrument has resulted in findings of considerable variation on the cure subscale in previous studies, there seems to be little variation in the present study when the subscale is taken as a whole, although variation on *individual items* has sometimes been quite significant. As noted above, the students in Tennessee scored more internally

on cure items described by Coreil and Marshall as being phrased in an external direction, while the students in Ceará scored more internally on cure items phrased in an internal direction. Although the directionality of each item is erased in the scoring process, it is conceivable that the same question, phrased in a different direction, could yield a different response. This possibility is, however, beyond the scope of the present study.

With this in mind, I would make the following suggestions for future research. First, the possible influence of directionality upon responses seems at present to be a little unclear. After scoring, directionality is no longer represented in the data, so this question comes up only in the actual reading of the questions by the subject. A better understanding of the possible influence of directionality may help explain some results obtained through the use of this instrument. One means of examining this issue would be to construct a similar questionnaire, containing paired questions of different directionality. The same question would be asked twice; once worded internally, and once externally. Differential responses based on directionality would indicate that this is an important variable.

Socioeconomic status seems to be an important variable in this study. I think it would be beneficial to utilize this scale to do more studies similar to Battle and Rotter's (1963) study of the relationship of Locus of Control to class and ethnicity. The concept of powerlessness in society could be strongly related to Locus of Illness Control, and this could be explored using Coreil and Marshall's instrument. Based on the results of this study, I would suggest that factors such as status, class, and powerlessness are not only strongly related to the Locus of Control beliefs of these subjects in Fortaleza, but may actually influence other variables related to Locus of Control beliefs.

Socioeconomic status might affect how such factors as local disease pattern, shared ethnicity, and religious beliefs are related to Locus of Control; status may even override the effects of these variables.

Another thing which stands out in this study is the influence of the powerful external forces of nature, fate, and the Deity, particularly the latter. In the above discussion of the results of discriminant analyses, it was suggested that the influence of religious beliefs may be extremely important, although I do not feel that this survey instrument alone can explore this issue. Perhaps if there is more opportunity to question informants about their responses, we could begin to form hypotheses for testing. In particular, informants need to be questioned as to their interpretation of the "good life" referred to in Item 2. In an early, unpublished study by Rotter, Simmons, and Holden (1961; cited in Rotter 1966:24) the relationship between religious orthodoxy and Locus of Control was examined. Rotter later suggested that "it is the specific emphasis that is placed upon the role of external fatalistic determination by parents which is more likely to determine the attitude than the abstract doctrines of the sect" (Rotter 1966:24). That study concentrated upon differences in Locus of Control between people of different faiths. Perhaps a more likely determinant would be *degree* of religious orthodoxy, rather than *form*. I suspect that this may be an important variable among the herbalists and consumers, who are generally older than the students.

Age is another factor of importance to the use of this instrument. The young are generally less influenced by the fear of chronic degenerative diseases than are subjects who are older. In addition, age is probably related to the influence of a religious world view upon responses. In discriminant analysis performed during the course of this study, Function 1 was related to

items referring to the influence of powerful external forces such as Chance, Luck, and the Deity. Judging from an examination of the coordinates of group centroids, this Function would seem to be strongly discriminating between the university students on one hand, and the consumers and herbalists on the other. The consumers and herbalists were mostly in their forties and fifties, while the students tested were mostly in their late teens and early twenties. I would recommend that, in future studies, the age of each subject be obtained so that the influence of this variable can be further examined.

I would also suggest that, in future study using this instrument, the 5-point scale be used for finer discrimination among the diversity of popular beliefs about health and illness. In addition, I would argue that, although much useful information can be gleaned from differences on the two subscales, item-by-item examination of scores is vital to gaining an understanding of inter-group variability.

CHAPTER V

CONCLUSION

The relationship between Locus of Control and health has been discussed above. Pathogens and the dispensation of medicines, although important, are not the only variables related to health care, and it is important that popular beliefs about the onset and cure of disease be taken into consideration in any health care setting.

Of the many factors which may be related to the formation of Locus of Control beliefs, several would seem from this study to be deserving of special attention. One of these factors is the sense of either power or of powerlessness related to socioeconomic standing. It could be predicted that people in a higher socioeconomic position would feel more in control of the prevention of disease—more insulated from illness, if you will—than people less economically fortunate, or people occupying a lower stratum of a stratified society. Status could also influence others variables being tested using this instrument.

Another factor deserving of attention is the extent to which reinforcement is attributed to the Deity. I would suggest that there is a difference between control by God or by Fate, and control by other people or by natural forces. I would also suggest that, in future studies, it should be ascertained whether subjects interpret the term "good life" (Item 2) in reference to the noumenal realm (pleasing the Deity), or in reference to the phenomenal realm (living healthily). The interpretation, one way or the

other, of the meaning of Item 2 would affect a subject's response. The relative attribution of reinforcement to the supernatural forces of Fate and Deity would also, I believe, impact other items on the questionnaire. It is also very important that the wording of Item 6 be changed, so that confusion over its perceived directionality can be eliminated.

The age of each subject should be obtained, so that the influence of this variable can be more closely examined. An individual's age could have an effect on his or her perception of control over chronic degenerative diseases. This variable could also be related to subjects' responses to items which refer to Chance and the Deity.

A related questionnaire should be devised to test the influence of directionality on responses. Several questions could be devised in pairs—one worded internally, and one externally—to see if subjects respond to the same question differently depending on its phrasing.

Although Locus of Control is an important factor related to health, I would agree with Wallston, B. S. and Wallston, K. A. (1978:113) that "it should be recognized that locus of control is only one of a complex of factors (e.g., the value of health; motivation; social supports; previous behavior; perceived costs and benefits of special actions), which individually or in interaction with one another explain the variance in health-related behaviors." It is primarily important to keep in mind that there are a host of factors, many of them of a social, rather than a clinical nature, to be considered in health care.

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APPENDICES

APPENDIX A

APPENDIX A

The Locus of Illness Control Scale[2]

Items		Dimension	Direction
1.	When people get sick, there is usually not much they can do about it.	C	E
2.	If you lead a good life, you will rarely get sick.	P	I
3.	Almost all diseases have a cure.	C	I
4.	If the lord wants to send you an illness, there is nothing you can do to stop it.	P	E
5.	Some people get sick often while others always seem to stay healthy.	P	E
6.	Most illnesses will be cured in a matter of time regardless of which treatments are used.	C	E
7.	People who stay in good health are just lucky.	P	E
8.	If you become ill, it is because you live under a lot of pressure.	P	E
9.	In the future modern science will find a cure for all diseases.	C	I
10.	Most people get sick because they worry too much.	P	I
11.	When people eat right and take care of their bodies, they seldom get sick.	P	I
12.	When people get sick, it is up to God whether or not they get well.	C	E
13.	There is no use worrying about illness. What will be will be.	P	E
14.	When people are sick, it is usually the result of bad luck.	P	E
15.	Most diseases can be cured by a good doctor with the right medicines.	C	I

Key:

P—prevention
C—cure
E—external
I—internal

[2]Developed by Coreil and Marshall (1982).

APPENDIX B

APPENDIX B

RAW SCORES

1. University Students — 5 point scale

Key: UT — University of Tennessee
UC — University of Ceará

1	5	1	1	5	3	1	4	2	1	1	1	1	1	2	UC
2	2	2	1	4	2	1	4	3	1	2	3	1	1	2	UC
1	2	2	1	5	4	1	4	5	1	2	3	1	1	3	UC
1	2	1	1	5	3	1	1	1	2	2	3	2	1	2	UC
1	1	1	1	4	5	1	4	1	2	1	1	1	1	1	UC
1	1	1	1	4	5	1	4	3	1	1	3	1	1	1	UC
1	1	5	5	5	5	1	1	2	1	1	1	1	1	1	UC
2	1	1	1	4	1	1	2	1	1	2	1	1	1	1	UC
1	1	1	1	4	4	1	1	2	2	2	1	1	1	2	UC
5	1	2	4	4	5	2	4	1	2	4	2	5	1	1	UC
1	1	1	1	5	5	1	5	1	1	1	1	1	1	1	UC
1	2	1	1	5	1	1	4	3	2	2	4	1	1	1	UC
5	5	2	1	4	1	1	1	2	5	2	4	1	1	1	UC
1	2	5	1	5	5	1	4	3	1	5	1	1	1	2	UC
2	4	1	2	5	3	1	1	3	1	1	4	1	3	2	UC
1	4	2	1	4	4	1	4	2	2	2	4	1	1	1	UC
1	1	1	1	5	3	1	4	1	1	1	1	1	1	1	UC
1	5	2	5	5	5	1	4	1	1	1	4	1	1	4	UC
1	5	2	1	5	5	1	4	3	1	2	3	1	1	2	UC
1	5	2	1	5	5	1	1	2	4	2	2	1	1	1	UC
1	4	2	1	5	4	1	4	3	1	2	3	1	2	2	UC
1	5	5	5	5	4	1	4	3	1	1	3	1	1	3	UC
1	5	2	1	5	4	1	2	5	1	4	1	1	1	2	UC
4	5	2	5	5	4	1	4	3	2	1	1	1	1	2	UC
2	2	3	1	4	4	1	4	3	1	2	3	1	1	3	UC
1	5	1	1	1	1	1	2	3	4	1	2	1	1	1	UC
1	2	3	1	5	5	1	3	5	1	1	3	1	1	1	UC
1	2	1	1	1	1	1	4	1	5	1	2	1	1	1	UC
1	2	4	5	1	5	1	5	1	1	2	1	1	1	2	UC
1	1	1	5	5	1	1	1	1	5	1	5	1	1	2	UC
1	2	1	1	3	4	1	4	1	2	2	3	1	1	3	UC
1	1	5	1	3	4	1	1	1	5	1	3	1	1	1	UC
4	2	5	1	5	2	1	4	3	1	4	4	1	1	2	UC

1	2	1	1	5	5	1	1	3	1	2	3	1	1	1	UC
5	1	2	5	1	4	1	1	5	2	1	5	5	1	1	UC
4	2	1	3	5	5	1	2	2	3	2	3	2	1	1	UC
4	2	2	5	5	2	1	4	1	2	2	3	3	1	2	UC
3	4	1	3	5	4	1	1	1	3	1	4	1	1	1	UC
1	1	5	1	4	5	1	5	5	1	1	1	1	1	1	UC
1	4	1	2	4	4	1	2	2	2	2	4	1	1	2	UC
4	4	2	5	5	5	1	5	5	1	1	3	1	1	1	UC
1	4	1	3	5	4	1	4	3	2	1	3	5	1	2	UC
4	1	2	1	5	1	1	4	3	1	1	3	1	1	2	UC
2	5	1	3	4	3	1	1	3	5	2	3	4	1	2	UC
1	5	2	1	5	1	1	1	2	5	5	4	1	1	3	UC
1	2	1	3	5	4	1	4	3	1	1	5	1	1	1	UC
4	4	5	5	5	2	4	4	3	2	1	4	4	1	2	UC
1	1	2	1	5	1	1	4	3	2	1	1	1	1	1	UC
1	5	1	5	5	5	1	1	3	5	2	4	1	1	1	UC
4	2	1	1	5	5	1	1	1	1	2	3	1	1	1	UC
1	2	1	3	5	1	1	1	5	2	1	2	1	1	2	UC
1	2	1	4	5	4	1	4	5	2	1	4	4	1	1	UC
2	4	2	4	5	5	1	1	5	1	1	3	1	1	2	UC
1	5	1	1	1	1	1	1	1	5	1	3	5	1	1	UC
1	5	2	2	5	4	1	3	2	2	1	5	1	1	2	UC
1	1	2	3	5	4	1	4	3	2	1	4	1	1	2	UC
1	1	1	1	1	1	1	4	2	2	1	1	1	1	1	UC
1	2	1	3	4	1	1	3	3	3	2	3	1	1	2	UC
4	1	1	1	1	5	1	4	1	1	1	1	1	1	1	UC
1	2	1	1	5	2	1	4	1	2	1	3	4	1	2	UC
1	4	5	1	3	1	1	1	2	2	2	4	3	1	2	UC
1	2	1	1	5	4	1	1	3	2	1	2	1	1	2	UC
3	2	3	5	4	5	1	4	3	1	1	3	1	1	1	UC
2	2	2	5	5	5	1	1	3	1	1	4	4	1	1	UC
2	2	2	2	4	2	1	4	4	2	2	1	2	2	2	UC
1	5	2	5	5	1	1	1	1	5	1	5	1	1	1	UC
4	5	1	1	1	5	1	1	1	1	2	1	5	1	1	UC
3	5	1	1	4	4	1	2	3	2	2	4	1	1	2	UC
1	4	1	3	5	5	1	4	4	1	1	3	1	1	1	UC
5	2	2	5	5	5	4	4	1	1	1	5	1	1	2	UC
1	1	1	1	5	1	1	2	2	1	2	1	1	1	5	UC
1	1	1	1	5	2	1	4	5	1	1	5	4	1	1	UC
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4	2	2	1	5	4	1	1	3	5	2	3	5	1	2	UC
5	1	2	5	4	4	1	1	1	2	2	4	4	1	1	UC
4	3	5	1	4	5	1	2	3	2	2	5	1	1	2	UC
5	1	1	1	4	4	1	4	4	2	1	3	1	1	1	UC
4	1	1	1	5	5	1	4	1	1	2	1	5	1	1	UC

2	2	1	1	5	1	1	1	5	4	1	4	1	1	1	UC
1	1	1	4	5	1	1	4	5	2	1	1	1	1	1	UC
1	5	2	4	4	4	2	4	3	3	2	4	1	1	1	UC
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1	1	1	1	5	1	1	4	5	1	1	1	1	1	1	UC
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1	5	2	2	4	1	1	1	3	2	2	2	2	2	2	UT
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2	4	3	4	4	2	3	3	2	2	2	4	2	1	2	UT
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1	4	2	1	4	1	1	4	4	2	2	1	1	1	2	UT
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1	4	1	1	5	1	1	2	5	5	5	1	1	1	5	UT
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3	3	3	5	4	2	4	4	1	2	2	4	4	3	3	UT
2	3	3	4	5	4	2	4	2	3	2	3	4	2	3	UT
2	4	2	1	4	2	2	3	4	3	2	2	3	2	2	UT
2	4	1	3	4	4	1	1	1	5	1	1	1	1	2	UT
1	2	2	2	4	2	2	2	3	3	2	2	4	2	2	UT
2	2	3	2	4	2	2	3	3	3	2	2	2	2	2	UT
3	2	3	2	5	2	1	4	2	2	1	3	1	2	2	UT
1	5	4	1	2	1	4	2	2	4	2	2	1	2	2	UT
2	3	4	3	4	2	2	3	3	2	1	2	1	2	2	UT
1	1	1	3	4	2	1	4	3	3	1	2	2	1	1	UT
1	5	2	4	4	1	3	4	3	2	3	4	1	1	1	UT
2	2	4	4	4	2	2	2	3	4	2	3	4	2	2	UT
1	5	3	4	4	1	2	2	3	4	2	4	2	1	1	UT
5	3	2	2	4	2	2	4	2	3	1	1	2	1	1	UT
1	4	4	2	4	4	2	2	2	5	2	1	4	2	2	UT
1	4	4	3	4	2	2	2	1	4	4	3	2	2	2	UT
2	2	2	2	4	2	2	2	2	2	2	2	2	2	2	UT
1	2	4	1	4	2	2	4	3	4	2	2	1	1	2	UT
2	5	4	2	4	2	2	4	2	2	2	2	4	1	2	UT
1	1	5	3	4	4	2	4	2	2	1	1	5	2	2	UT
1	4	4	2	4	2	2	2	4	4	2	2	2	1	4	UT
1	1	2	1	5	3	2	4	3	2	2	1	3	1	5	UT
1	5	5	1	5	1	1	1	3	2	2	5	2	1	3	UT
1	2	2	1	5	2	1	4	4	3	1	1	1	1	2	UT
1	4	4	2	4	1	2	2	3	4	2	2	4	1	4	UT
1	2	2	3	4	2	2	4	3	3	2	2	2	2	2	UT
2	4	4	2	2	2	2	2	4	4	2	1	5	1	2	UT
2	3	1	1	4	2	2	2	4	2	2	2	2	2	1	UT
1	4	4	5	4	2	2	2	3	4	2	2	2	2	2	UT
1	2	2	2	4	2	1	2	1	2	1	1	2	1	3	UT
2	4	4	2	4	4	2	2	2	3	2	2	2	2	2	UT
1	5	5	3	4	1	2	2	4	4	4	4	2	2	4	UT
2	5	3	4	4	3	2	2	3	4	2	2	2	2	2	UT

1	5	2	1	4	1	1	4	3	2	2	1	4	1	2	UT
1	2	2	1	4	2	1	2	4	4	1	1	1	1	2	UT
1	4	3	2	4	4	2	3	3	3	2	2	3	1	2	UT
2	2	2	3	4	2	2	4	3	3	2	2	2	2	2	UT
1	4	5	1	4	2	2	4	3	2	2	3	4	2	2	UT
3	4	2	4	2	2	1	2	5	4	1	2	3	1	2	UT
1	2	4	1	5	1	1	4	3	2	1	3	4	2	2	UT

2. All scores — 3 point scale

Key: ut — University of Tennessee
uc — University of Ceará
c — Consumers
h — Herbalists

1	1	2	1	3	3	1	2	1	1	1	1	1	1	2	ut
1	1	1	1	3	1	1	2	2	1	1	1	2	1	2	ut
1	3	3	1	3	1	1	1	3	3	1	1	1	1	1	ut
1	3	1	1	3	1	1	1	2	1	1	1	1	1	1	ut
1	3	3	1	3	1	1	1	3	3	1	1	1	1	3	ut
1	1	1	1	3	3	1	3	1	1	1	1	1	1	1	ut
1	3	1	1	3	3	1	3	1	2	1	1	1	1	1	ut
1	1	1	1	3	1	1	1	2	1	1	1	1	1	1	ut
1	1	1	2	3	3	1	3	3	1	1	2	3	1	1	ut
1	3	3	1	3	1	1	2	3	1	1	1	1	1	3	ut
1	1	1	1	3	1	1	3	1	1	1	1	1	1	1	ut
1	3	3	3	3	1	1	1	3	3	1	1	1	1	1	ut
2	3	3	2	3	1	2	1	3	3	3	1	1	1	3	ut
1	3	3	3	3	2	1	2	2	2	3	3	1	1	1	ut
1	3	3	1	3	1	2	2	3	2	1	1	1	2	1	ut
1	3	1	1	3	3	3	3	2	2	1	1	3	1	2	ut
1	2	2	2	3	3	1	3	3	3	1	1	3	1	3	ut
1	3	2	1	3	1	1	3	2	3	1	1	1	1	2	ut
1	3	2	1	3	2	1	3	2	2	1	1	1	1	2	ut
1	3	1	1	3	1	1	1	1	3	1	1	1	1	1	ut
1	3	2	3	3	2	1	3	1	1	1	3	1	1	1	ut
1	3	1	2	3	1	1	3	1	2	3	2	1	2	1	ut
1	3	3	2	3	1	1	1	2	3	1	2	1	1	1	ut
1	3	3	2	3	1	2	3	2	3	1	1	3	1	1	ut
1	1	1	3	3	1	1	3	2	1	1	2	2	1	1	ut
3	3	1	3	3	3	1	3	3	2	1	3	3	1	1	ut
1	3	1	1	3	1	1	3	2	1	1	1	1	1	1	ut

1	3	3	1	3	1	1	2	2	2	3	1	1	1	1	ut
1	3	2	2	3	1	2	3	3	1	2	2	1	1	2	ut
1	3	1	1	3	1	1	1	1	1	1	1	1	1	3	ut
1	3	3	1	2	1	1	1	2	3	1	3	1	1	1	ut
1	3	1	1	3	1	1	2	3	2	1	3	1	1	1	ut
1	3	3	1	3	1	1	3	1	3	1	2	3	1	1	ut
1	3	3	1	3	1	1	2	3	2	1	1	1	1	2	ut
1	1	1	1	2	2	1	3	3	1	1	1	1	1	1	ut
1	3	1	3	3	2	1	3	3	1	1	1	3	1	1	ut
1	3	3	1	3	1	1	1	3	3	1	1	1	1	1	ut
1	3	1	3	3	1	3	1	3	3	3	1	3	1	3	ut
1	3	3	1	3	1	1	1	3	1	1	1	2	1	1	ut
1	3	3	3	3	3	1	1	1	3	1	3	1	1	1	ut
1	3	1	1	3	1	1	3	3	3	1	1	2	1	1	ut
1	3	2	3	3	1	2	2	1	1	1	3	1	1	1	ut
1	3	2	1	3	1	1	2	2	3	1	1	1	1	1	ut
1	2	1	1	3	3	2	3	1	3	1	1	3	1	1	ut
1	2	1	1	3	3	1	3	1	2	1	1	1	1	1	ut
1	3	1	1	3	1	1	3	3	1	1	1	1	1	1	ut
1	1	1	3	3	3	1	1	2	3	1	3	3	1	1	ut
1	3	1	1	3	1	1	1	3	3	3	1	1	1	3	ut
1	3	3	1	3	1	1	1	2	1	1	1	1	1	1	ut
1	3	1	2	3	3	3	3	3	1	1	1	2	1	2	ut
1	3	1	1	3	1	1	1	3	3	1	1	1	1	3	ut
2	2	2	3	3	1	3	3	1	1	1	3	3	2	2	ut
1	2	2	3	3	3	1	3	1	2	1	2	3	1	2	ut
1	3	1	1	3	1	1	2	3	2	1	1	2	1	1	ut
1	3	1	2	3	3	1	1	1	3	1	1	1	1	1	ut
1	1	1	1	3	1	1	1	2	2	1	1	3	1	1	ut
1	1	2	1	3	1	1	2	2	2	1	1	1	1	1	ut
2	1	2	1	3	1	1	3	1	1	1	2	1	1	1	ut
1	3	3	1	1	1	3	1	1	3	1	1	1	1	1	ut
1	2	3	2	3	1	1	2	2	1	1	1	1	1	1	ut
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3	2	1	1	3	1	1	3	1	2	1	1	1	1	1	ut
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1	3	3	1	3	1	1	3	1	1	1	1	3	1	1	ut
1	1	3	2	3	3	1	3	1	1	1	1	3	1	1	ut
1	3	3	1	3	1	1	1	3	3	1	1	1	1	3	ut

1	1	1	1	3	2	1	3	2	1	1	1	2	1	3	ut
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1	1	1	1	3	1	1	3	3	2	1	1	1	1	1	ut
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1	1	1	2	3	1	1	3	2	2	1	1	1	1	1	ut
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1	3	2	1	3	3	1	2	2	2	1	1	2	1	1	ut
1	1	1	2	3	1	1	3	2	2	1	1	1	1	1	ut
1	3	3	1	3	1	1	3	2	1	1	2	3	1	1	ut
2	3	1	3	1	1	1	1	3	3	1	1	2	1	1	ut
1	1	3	1	3	1	1	3	2	1	1	2	3	1	1	ut
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1	1	1	1	3	1	1	2	1	2	1	1	1	1	1	c
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1	1	3	3	3	1	3	2	1	1	1	3	1	1	1	c
1	1	3	3	3	3	2	3	1	1	1	3	3	3	1	c
1	2	3	3	3	1	1	3	1	1	1	3	3	1	1	c
1	1	1	2	3	1	1	3	1	2	2	3	1	1	1	c
1	1	2	1	3	1	3	3	1	1	1	2	1	1	1	c
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1	3	1	3	3	1	3	3	1	1	1	3	3	3	1	c
1	1	1	3	3	1	3	2	1	1	1	3	3	3	1	c
1	1	1	2	3	1	2	2	1	1	1	2	3	2	1	c
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1	3	1	1	3	3	2	2	3	1	3	3	3	1	1	h
1	1	1	3	1	3	3	3	3	1	3	3	3	1	1	h

1	1	2	3	3	3	3	2	1	1	1	3	3	1	1	h
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1	3	1	1	3	3	3	3	1	1	1	3	3	3	1	h
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1	1	1	3	3	3	1	3	1	1	1	3	3	1	1	h
1	3	2	1	3	3	3	3	3	1	3	3	3	1	1	h
1	1	2	3	2	3	3	3	2	2	1	2	3	1	1	h
1	3	1	1	3	3	3	3	1	1	2	3	2	1	1	h
1	3	2	3	3	3	3	1	1	2	1	3	3	1	1	h
3	3	1	1	3	3	3	3	1	1	2	3	3	1	1	h

APPENDIX C

APPENDIX C[3]

• Table C-1 Group Means, Total and by Subscale

Group/Subscale	Mean
Students—UT[4]	
Mean (total)	2.54505
Mean (prevention)	2.64957
Mean (cure)	2.38828
Students—UC (5pt scale)	
Mean (total)	2.25556
Mean (prevention)	2.16667
Mean (cure)	2.38889
Students—UC (3pt scale)	
Mean (total)	1.60794
Mean (prevention)	1.57407
Mean (cure)	1.65873
Herbalists	
Mean (total)	2.00769
Mean (prevention)	2.17094
Mean (cure)	1.76282
Consumers	
Mean (total)	1.76905
Mean (prevention)	1.90079
Mean (cure)	1.57143

[3]All t-tests were performed upon raw scores, not means. Means are used here for inter-group comparison of internality versus externality.

[4]Throughout this appendix, the abbreviation "UT" refers to students tested at the University of Tennessee in Knoxville, Tennessee, while "UC" referes to students tested at the State University of Ceará in Fortaleza, Brazil.

•Table C-2 T-test Results: Students, UC (5pt) vs. Students, UT (5pt)

Item #	Mean - UC	Mean - UT	T-test Result
Item 1 (c)	1.94048	1.56044	0.0236
Item 2 (p)	2.64286	3.56044	<0.0001
Item 3 (c)	1.86905	2.93407	<0.0001
Item 4 (p)	2.20238	2.34066	0.5237
Item 5 (p)	4.30952	4.07692	0.0988
Item 6 (c)	3.42857	2.25275	<0.0001
Item 7 (p)	1.11905	1.90110	<0.0001
Item 8 (p)	2.83333	2.96703	0.4775
Item 9 (c)	2.63095	3.00000	0.0413
Item 10 (p)	2.05952	3.04396	<0.0001
Item 11 (p)	1.61905	1.98901	0.0048
Item 12 (c)	2.86905	2.23077	0.0004
Item 13 (p)	1.66667	2.45055	<0.0001
Item 14 (p)	1.04762	1.51648	<0.0001
Item 15 (c)	1.59524	2.35165	<0.0001
Total	2.25556	2.54505	<0.0001
Prevention	2.16667	2.64957	<0.0001
Cure	2.38889	2.38828	0.9935

•Table C-3 T-test Results: Students, UC (3pt) vs. Herbalists

Item #	Mean - Herb.	Mean - UC	T-test Result
Item 1 (c)	1.15385	1.48810	0.0563
Item 2 (p)	2.00000	1.72619	0.2136
Item 3 (c)	1.38462	1.27381	0.4645
Item 4 (p)	2.30769	1.60714	0.0007
Item 5 (p)	2.80769	2.77381	0.8015
Item 6 (c)	2.65385	2.32143	0.0963
Item 7 (p)	2.53846	1.05952	<0.0001
Item 8 (p)	2.73077	2.10714	0.0028
Item 9 (c)	1.53846	1.75000	0.2313
Item 10 (p)	1.15385	1.38095	0.1522
Item 11 (p)	1.53846	1.14286	0.0049
Item 12 (c)	2.84615	2.01190	<0.0001
Item 13 (p)	2.88462	1.35714	<0.0001
Item 14 (p)	1.57692	1.01190	<0.0001
Item 15 (c)	1.00000	1.10714	0.1556
Total	2.00769	1.60794	<0.0001
Prevention	2.17094	1.57407	<0.0001
Cure	1.76282	1.65873	0.1388

•Table C-4 T-test Results: Herbalists vs. Consumers

Item #	Mean - Herb.	Mean - Cons.	T-test Result
Item 1 (c)	1.15385	1.10714	0.6983
Item 2 (p)	2.00000	1.21429	0.0009
Item 3 (c)	1.38462	1.53571	0.4765
Item 4 (p)	2.30769	2.50000	0.4385
Item 5 (p)	2.80769	3.00000	0.0783
Item 6 (c)	2.65385	1.60714	<0.0001
Item 7 (p)	2.53846	1.85714	0.0061
Item 8 (p)	2.73077	2.42857	0.0938
Item 9 (c)	1.53846	1.50000	0.8685
Item 10 (p)	1.15385	1.07143	0.4211
Item 11 (p)	1.53846	1.17857	0.0702
Item 12 (c)	2.84615	2.60714	0.1204
Item 13 (p)	2.88462	2.42857	0.0254
Item 14 (p)	1.57692	1.42857	0.5224
Item 15 (c)	1.00000	1.07143	0.1711
Total	2.00769	1.76905	0.0004
Prevention	2.17094	1.90079	0.0009
Cure	1.76282	1.57143	0.0203

•Table C-5 Eigenvalues and Canonical Correlations

Discriminant Function	Eigenvalue	Relative Percentage	Canonical Correlation	Canonical Correlation^2
1	9.6743917	70.32%	0.8002	0.640
2	2.2968160	16.69%	0.6728	0.453
3	1.7871077	12.99%	0.4326	0.187

•Table C-6 Total Structure Coefficients (Pearson Correlations)

Item #	Function 1	Function 2	Function 3
Item 1 (c)	0.0260	-0.4447	0.0287
Item 2 (p)	0.3000	0.3290	0.5740
Item 3 (c)	0.2032	0.4469	-0.0133
Item 4 (p)	-0.4460	0.1313	-0.2588
Item 5 (p)	-0.0025	0.2050	-0.2171
Item 6 (c)	-0.3028	-0.5201	0.4918
Item 7 (p)	-0.7442	0.3411	0.2986
Item 8 (p)	-0.3170	0.0271	0.0862
Item 9 (c)	0.2858	0.1437	0.1274
Item 10 (p)	0.4680	0.3516	0.2274
Item 11 (p)	-0.1699	0.1016	0.2914
Item 12 (c)	-0.6885	-0.2251	-0.0826
Item 13 (p)	-0.6196	0.3571	0.0922
Item 14 (p)	-0.5204	0.1974	0.0197
Item 15 (c)	0.2917	0.2683	0.0326

•Table C-7 Mahalanobis Distances

Group	UT	UC	Consumers	Herbalists
UT	0.000	4.5774358	9.7268176	15.463110
UC	4.5774358	0.000	8.2727939	12.361534
Consumers	9.7268176	8.2727939	0.000	4.6315703
Herbalists	15.463110	12.361534	4.6315703	0.000

•Table C-8 Coordinates of Group Centroids in Canonical Space

Group	Canon. 1	Canon. 2	Canon. 3
UC	.286	-1.168	-.002
Consumers	-1.805	.497	-1.065
Herbalists	-2.751	.378	.865
UT	1.078	.817	.082

•Table C-9 T-test Results: Students, UT(3 pt) vs. Students, UC (3pt)

Item #	Mean - UT (3pt)	Mean - UC (3pt)	T-test Result
Item 1 (c)	1.08791	1.48810	0.0001
Item 2 (p)	2.38462	1.72619	< 0.0001
Item 3 (c)	1.91209	1.27381	< 0.0001
Item 4 (p)	1.57143	1.60714	0.7775
Item 5 (p)	2.91209	2.77381	0.0717
Item 6 (c)	1.47253	2.32143	< 0.0001
Item 7 (p)	1.18681	1.05952	0.0540
Item 8 (p)	2.01099	2.10714	0.5056
Item 9 (c)	2.04396	1.75000	0.0138
Item 10 (p)	2.01099	1.38095	< 0.0001
Item 11 (p)	1.19780	1.14286	0.5116
Item 12 (c)	1.41758	2.01190	< 0.0001
Item 13 (p)	1.58242	1.35714	0.0677
Item 14 (p)	1.03297	1.01190	0.3545
Item 15 (c)	1.39560	1.10714	0.0012

•Table C-10 Comparison of T-test Results: Students, UT vs. Students, UC Numbers of Items Significantly Different, 3pt vs 5pt Scale

p value/Scale	Items (Total)	Items (Prev.)	Items (Cure)
$p \leq 0.05$			
3 pt	8	2	6
5 pt	12	6	6
$p \leq 0.01$			
3pt	7	2	5
5pt	10	6	4
$p \leq 0.001$			
3pt	6	2	4
5pt	9	5	4