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Permalink

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Journal

Medical Anthropology, 16(1-4)

ISSN

0145-9740

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Publication Date

1994-11-01

DOI

10.1080/01459740.1994.9966119

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Peer reviewed

Knowledge, Power and Experience: Variation in Physicians' Perceptions of Breast Cancer Risk Factors

Juliet M. McMullin, Leo R. Chavez, and F. Allan Hubbell

Recent theory in anthropology has increasingly been concerned with issues of power. Anthropology also has a long history of interest in variation in cultural knowledge, which, we argue, benefits from attention to power relations. To show this, we examine perceptions of breast cancer risk factors among physicians. Although physicians share a general cultural model of breast cancer risk factors, variation exists, especially between university-based physicians and community-based physicians. The nature of the work performed in these two settings influences the acquisition of various sources of information and frames what is considered valid information. Similar to Foucault's argument, we find that physicians working in a university setting are more disciplined in discussing their perceptions of breast cancer risk factors, compared to community-based physicians, who move away from the centers of knowledge and power (universities).

Key Words: power relations; variation in medical knowledge; knowledge, power and medicine; consensus analysis, breast cancer risk factors

In a critique of the representation of biomedicine as "monolithic and uniform," DiGiacomo (1992) states that "this sort of broad-stroke generalization seems incautious, given the cultural diversity to be found even in the 'advanced industrial world'." Rather than assuming biomedicine is monolithic, anthropologists studying biomedicine as a cultural system have explored how biomedicine is socially, culturally, and historically constructed (Good and Good 1993; Lindenbaum and Lock 1993; Amarasingham Rhodes 1991; Good, et al. 1990; Lock and Gordon 1988; DiGiacomo 1987). In addition, researchers have examined how physicians have maintained their dominant positions, vis-à-vis non-physicians and peripheral medical practitioners, through the use of "technology, engaging in scientific and objective research, and the ability to measure biological aspects of illness" (Lock

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1986; Freidson 1970). Such a characterization of the battles engaged in by biomedicine suggests the importance of power. Power, in the Foucauldian sense, draws our attention to knowledge and the power knowledge systems create. Foucault (1979) has posited that knowledge and power are inseparable in modern life. The production of knowledge produces power in that "power and knowledge directly imply one another; that there is no power relation without the correlative constitution of a field of knowledge, nor any knowledge that does not presuppose and constitute at the same time power relations" (Foucault 1979:27).

Anthropology is particularly well positioned to examine the relationship between knowledge and power (Abu-Lughod 1990; Martin 1987). Through the use of ethnographic research and extensive open-ended questioning, anthropologists pay attention to diverse voices, and to the social and cultural construction of concepts and their meanings. In addition to open-ended questioning, some anthropologists have developed a method for systematically collecting qualitative data that can then be analyzed using a statistical technique called consensus analysis. Consensus analysis examines the extent to which members of a group share knowledge within specific domains (Romney, Weller, and Batchelder 1986). Our objective is to demonstrate that issues related to contemporary theories of power such as those of Foucault can be examined using a combination of these analytic techniques.¹ We attempt this by examining a cultural domain—perceptions of breast cancer risk factors—among a sample of physicians in the northern part of Orange County, California.

Even though a high level of overall consensus exists among the physicians concerning cancer risk factors, we found that physicians working in a university hospital setting (university-based) differed in important and observable ways from physicians working in the private sector (community-based). We attempt to show that once removed from the cultural influences of the research setting or medical school, community-based physicians rely more on experience when discussing breast cancer risk factors than do university-based physicians. We argue that the nature of the work performed in these two settings influences the relative importance given to various sources of information, and frames what is considered valid information. This is understandable given Foucault's notions about the relationship between knowledge and power. For physicians, medical school is the mechanism which disciplines their thoughts and behaviors, thus promoting an enclosed system and normalization. As noted by Foucault, "Like surveillance and with it, normalization becomes one of the great instruments of power at the end of the classical age. For the marks that once indicated status, privilege and affiliation were increasingly replaced—or at least supplemented—by a whole range of degrees of normality indicating membership of a homogeneous social body but also playing a part in classification, hierarchization and the distribution of rank" (1979:184). Physicians not only wield power through creating and transmitting knowledge, they are subject to it and disciplined by it through normalization, hierarchy, and classification. The effects of power as relational and the production of knowledge are made apparent through the examination of the distributions created through normalization. A primary objective of this article, then, is to show how the existing distribution of perceptions about breast cancer risk factors in a

medical community tell us something about relations of power, especially the disciplining effect power has on those who create and transmit knowledge (university-based physicians) (Foucault 1972).

CENTERS AND MARGINS OF MEDICAL KNOWLEDGE

If power disciplines, as we suspect it does, then one area where we might observe the results of this disciplining is in the variation of physicians' perceptions of disease. Although Freidson's (1970) research has focused on the quality of physicians' performance, his work also has implications for variation of beliefs among physicians. He argues that performance is affected more by the physicians' immediate work place than by their formal training. In addition, recent research has argued that physicians' perceptions of themselves vary by work place (Kumpusalo et al. 1994). While physicians generally learn the same core material in medical school, theoretical material and first-hand experience have different values depending on whether the physician is a medical researcher or solely a clinical practitioner. Freidson (1970:168) has argued that the medical researcher represents the norms of the medical profession; they are "the formal spokesmen, the leaders and sometimes the models of the profession." He points out that clinical practitioners, on the other hand, perform the daily tasks of medicine and rely largely upon experiential aspects of medical knowledge. "[T]he clinician is prone in time to trust his own accumulation of personal, first-hand experience in preference to abstract principles or 'book knowledge,' particularly in assessing and managing those aspects of his work that cannot be treated routinely" (Freidson 1970:169). As a consequence, researchers speak less about experience than the clinicians for whom "the aim of the practitioner is not knowledge but action" (Freidson 1970:168).

Building upon Freidson, we propose that the work setting also affects the way physicians perceive cancer risk factors. We suggest that it is the nature of the primary work that occurs in particular settings that has an important influence on knowledge acquisition. More specifically, the primary job (role) of university-based physicians is research and pedagogy—the training and teaching of medical students—often supplemented by clinical practice. The primary job of community-based physicians is to provide medical services.

This basic distinction between community- and university-based physicians has an implication vis-à-vis the knowledge-power relationship. Building upon Foucault, theorists have argued that all physicians gain authority from their expert knowledge (Aronowitz 1988; Turner 1987; Rouse 1987). Community-based physicians apply medical knowledge and their authority derives from this application of medical knowledge.² The university-based physicians' relationship to knowledge is different, and their authority and status are thus different. University-based physicians may engage in clinical practice, but they gain additional authority and status from their position at the forefront of biomedical research and training.³ They have the power to create knowledge through research and to define what is contemporary "truth," or knowledge worth knowing, which must then be transmitted to students. These two differing relationships to knowledge and power

have implications for what information becomes incorporated into physicians' knowledge.

Medically relevant information can come from a number of sources, but especially from two: clinical practice and medical literature (textbooks and scientific journals). This is true for all physicians, both university- and community-based. Community-based physicians can be characterized as learning biomedical knowledge in medical school, and then moving away from the centers of biomedical knowledge creation and transmission (universities and medical schools). The fact that physicians are required to seek continuing medical education is a recognition of this process of moving away from the "current" core of knowledge over time. Community-based physicians, distant from the center of training and research, are likely to gain additional knowledge from a variety of sources, especially their experience in clinical practice (Freidson 1970). As Lock (1982), in trying to understand variations in clinical practices among physicians, has noted:

Information in medical texts is concerned almost exclusively with anatomical and cellular structures and processes, or with inferences based on statistical sampling. This information *must* be re-interpreted by a clinician to be relevant to individual patient care; an experienced clinician is inclined, with time, to draw on empirical, clinical evidence which, because of its direct and immediate nature, is likely to be more compelling than literate abstractions in justifying medical decisions. [emphasis in original, Lock 1982:270-271]

In other words, physicians must transform the "science of medicine" into the "art of medicine" in the clinical setting (Good and Good 1993; Gordon 1988).⁴ We argue, however, that even though university-based physicians also engage in clinical practice, their role as the physical embodiment of the "science of medicine" influences the extent to which they draw upon clinical experience in constructing their models of disease and disease risks, at least when compared to the community-based physicians. We suggest that the role of university-based physicians as definers of truth and knowledge makes them even more selective than purely clinical practitioners when it comes to allowing something to be defined as "truth." University-based physicians will be less likely than community-based physicians to venture too far from the scientifically "proven" and acknowledged. These assertions should be supported by the data presented here. It is important to note, here, that only about 25% of all breast cancer cases exhibit any of the scientifically determined risk factors; this leaves ample room for speculation about the possible risks for breast cancer.

EXPERIENCE, DISCIPLINE, AND KNOWLEDGE VARIATION

Cognitive anthropologists have always been interested in the organization of cultural knowledge (D'Andrade 1995). It is generally accepted that culture, in part, consists of shared knowledge and that groups or individuals vary in the degree to which they accept or share that base of knowledge (Goodenough 1981; Roberts 1964). In an attempt to understand why knowledge varies among members of a society, Roberts (1964) suggests the metaphor of the "information economy." In such a marketplace, knowledge is "created, or borrowed, distributed, and used,"

but individuals have differential access to that information.⁵ Finding variation in knowledge among groups who generally share a culture can be used to draw attention to the effects of normalization, classification, and hierarchy which are the instruments of power and discipline. The relative importance given to experience, as we will argue, is a mechanism which works against the constraints of the dominant ideology. In other words, examining intracultural variation gives us insight into the power relations at work within a group and potential mechanisms which are used to break through the normalizing process.

Consensus analysis has been successfully used to examine the degree of shared knowledge and the distribution of knowledge within and between communities (Boster 1986, 1985; Garro 1986, 1988; Weller 1984; Weller et al. 1993). Many of these studies have shown the importance of expertise, agreement and experience in knowledge variation. For example, Boster's (1985) work on the knowledge of manioc production among the Jivaro illustrates the role of experience in knowledge variation. He attributes variation in knowledge of manioc production to social factors such as the sexual division of labor, kin ties, and individual expertise. Women had more knowledge of, and agreement on, plant names because they maintained the gardens and collected the plants. Closely related women shared their knowledge and therefore agreed more with each other than with more distantly related women. Moreover, informants who agreed with others on a large proportion of plants names were also more consistent in their answers when retested. The consistency of informants is a good indicator that agreement does represent knowledge. In addition, Boster argued that only by examining the distribution of manioc knowledge would one know which informants were more knowledgeable.

In another example, Garro (1986, 1988) showed that experience was an important factor in knowledge about disease and illness. Garro (1986) conducted a comparison of curers and non-curers in Mexico. Her analysis showed that both groups share a cultural model of cures, but that older women and the curers, because of the increased experience as healers, had higher agreement on the cultural model than others. In this case, variation was likely due to an individual's experience with curing, rather than the healer's formal training.

The research discussed above underscores the role of experience in knowledge variation. D'Andrade (1984) has summarized this relationship well:

There is always interplay between the world of experience and cultural meanings; in some cases cultural meanings have the potential of giving form and depth to private experience, in some cases cultural meanings may conflict with the individual's experiences, and in other cases there may be no relation established by the individual between particular experiences and cultural meanings. Just as there is a dynamic between cultural meanings and systems of materials flow that creates a potential for change, so, too, there is a dynamic between cultural meanings and private experience that also creates a potential for change [D'Andrade 1984:114].

This discussion has a number of important points for the issues discussed here. The dynamic between cultural meaning and private experiences help us to understand the role of experience in agreement variation among physicians. Reliance on individual experience as a basis of knowledge sometimes leads to greater agreement, as in the case of the Jivaro (Boster 1986) and the Mexican curers (Garro 1986).

Experience can also lead to idiosyncratic views, especially when there is a pre-existing dominant and pervasive "correct view" or ideology. For example, Garro (1988) studied beliefs and variation of beliefs concerning high blood pressure among the Ojibway.⁶ She found that experience conflicted with the existing cultural model resulting in more variation, and that experience had definite effects on established biomedical knowledge concerning high blood pressure. This discussion of experience and knowledge among cognitive anthropologists brings us back to the relationship between knowledge and power. If we find variation in the way physicians perceive breast cancer risk factors, we must ask to what extent is this variation a product of the various forms of knowledge physicians draw upon when thinking about illness.

To summarize, we argue that subtle and yet important variation in how physicians view breast cancer risk factors may result from their relationship to their clinical practice. Physicians in private practice and physicians employed in medical schools may both practice primary care medicine, but they are influenced differently by their work settings and the demands on their professional status. As a result, we argue that compared to physicians affiliated with a medical school, physicians in private practice will be more likely to include lessons from clinical experiences in their discussions of breast cancer risk factors. This occurs we argue, even though university-based physicians also spend some time in clinical practice. University physicians are at the center of medical discourse, knowledge production, and dissemination, that is, at the center of power. Community-based physicians are at the margins of power, that is, not at the center of knowledge production in the Foucauldian sense. Why this pattern might occur must be understood from the perspectives of both research on variation in knowledge and ideas about the relationship between power and knowledge. We test these assertions below.

RESEARCH AMONG PHYSICIANS

Between August 15, 1991 and August 15, 1992, we interviewed a total of thirty physicians: fourteen were employed at the University of California at Irvine, College of Medicine (university-based) and sixteen were in private practice (community-based). The interviews with physicians were conducted as part of a larger study on Latinas and cancer (Chavez et al. 1995a). Community-based physicians were sent letters and asked to participate in the study. We then made follow-up phone calls to those who responded to our letter. Physicians affiliated with the University of California, Irvine, College of Medicine were contacted directly and their participation requested. Interviews with the physicians consisted of many open-ended questions as well as systematic data collection techniques of freelist and ranking (Weller and Romney 1988).

Leo Chavez, the Co-Principal Investigator of the study, conducted the interviews, which lasted approximately one hour and were conducted at each physician's place of employment. Among the university-based physicians, six practiced internal medicine and eight practiced family medicine; seven were female and seven were male. Community-based physicians consisted of twelve specialists in obstetrics and gynecology, two in internal medicine, and two in family practice; five were female and eleven were male (Table I). All of these physicians provided

TABLE I. Characteristics of physicians.

	All physicians N = 30	University-based N = 14	Community-based N = 16
Age (mean)	41.9	37.8	45.5
Years practicing medicine (mean)	16.7	11.7	21.1
Females (n)	12	7	5
Specialties (n)			
Internal medicine	8	6	2
Family practice	10	8	2
Ob/Gyn	12	0	12
Training and birthplace (n)			
Foreign-trained	7	1	6
Foreign-born	9	2	7
Ethnicity (n)			
Latinos	3	1	2
Asians	6	3	3
African-Americans	1	0	1
East Indian	1	0	1
Iranian	1	0	1
European-American	18	10	8

primary care to women, including pap and breast exams, and made recommendations for mammograms, in North Orange County.

Freelisting and ranking tasks were undertaken in three steps. First, early in the interview physicians were asked to freelist anything that, in their perception, would cause or increase the chance (risk) of getting breast cancer. After they answered a series of open-ended questions about breast and cervical cancer, they were read the list of items they mentioned and asked if they would like to add anything to the list. Although this analysis focuses on physicians, the larger study included interviews with European-American women, Chicanas (U.S.-born women of Mexican descent), and Mexican and Salvadoran immigrant women, whose freelisted items for risk factors were included in the overall final list of 29 most salient risks for breast cancer (for further information on the larger study see Chavez et al. 1995b).

Each risk factor was printed on a separate index card. We then asked respondents to put the cards in order, with the items most likely to cause or increase the risk of breast cancer at one end, and the items least likely to cause or increase the risk of breast cancer at the other end. This produced a rank order of the 29 risk factors. When the task was completed, the respondents were asked what organizing principles they used to rank the items.

DETERMINING AGREEMENT

We used cultural consensus analysis to test for the existence of cultural models that would explain the respondents' rank ordering of the risk factors (Weller and Romney 1988; Romney, Batchelder, and Weller 1987; Romney, Weller, and Batchelder 1986). Cultural consensus analysis is a mathematical model that determines

the degree of shared knowledge within groups and estimates the "culturally correct" answers according to the group interviewed. In other words, the "right answer" is determined by the interviewees' answers, not by a previously designed answer key. The analysis contains a measure known as "competence" that assesses the individual's expertise in relation to a set of culturally correct answers (the model) derived from a group of respondents' answers to questions concerning a specific domain of knowledge. We have chosen to use the term "agreement" in lieu of competency to express the quantitative relationship of the individual's expertise to the "culturally correct" answers, in this way avoiding any confusion over the intended or unintended meaning of "competency." Cultural consensus analysis provides estimates of each individual's agreement and the average agreement level of the group. The analysis initially solves for individual estimates of agreement by factoring an agreement (correlation) matrix among informants. The ratio between the first and second eigen values determine whether a single factor solution exists, indicating a single, shared cultural belief system. Researchers in this field generally accept a ratio of three to one, and all agreement scores falling between 0 and 1 (no negative agreement scores), as a minimum threshold for asserting that there is a single factor (cultural) solution. Cultural consensus analysis thus helps us determine physicians' agreement on the relative importance of the risk factors for breast cancer, and on which risk factors they disagree.

Sample size determination for cultural consensus analysis follows the same principles as those in other types of analyses. For ordinal data, two parameters are necessary: the degree of concordance among respondents (the average Pearson correlation coefficient) and the desired level of validity (estimated by the correlation between the answers obtained from the sample and the "true" answers). If there is a great deal of agreement about a topic, the number of subjects necessary to obtain a high level of validity is small. The lower the average agreement, the larger the number of respondents must be to maintain a specified validity level. Because we had no prior knowledge regarding the amount of agreement about risk factors for breast cancer in our subjects, we chose a low agreement score of 0.36 and stringent criteria for proportion of items ordered correctly (95% validity). Using these criteria, a minimum of 17 respondents in each group were necessary (Weller and Romney 1988).

Multidimensional scaling is used to visually represent the level and pattern of agreement among physicians (Figure 1). This was done by applying the scaling routine to the agreement matrix (respondent by respondent correlation matrix on all the ranked items). Physicians represented as close together agree more than physicians that are farther apart.

RESULTS

Physicians' Explanations of Breast Cancer Risks

All physicians mentioned heredity as a principal risk factor (Table II). As Table II indicates, the percentage of physicians listing any of the other risk factors is notably smaller. For example, obesity, the next most frequently mentioned risk

factor, was listed by 37% of all physicians. In addition, community-based and university-based physicians perceive breast cancer risk factors differently. As Table II indicates, community-based physicians mentioned 16 more possible risk factors than university-based physicians. On the other hand, university-based physicians mentioned only two possible risks that were not mentioned by the community-based physicians.

The frequency of mentioned cancer risk factors also showed a difference between the two groups of physicians. Community-based physicians mentioned thirty-four items, eighteen of which were only mentioned once. University-based physicians mentioned a total of twenty risk factors, eight of which were only mentioned once. Clearly, university-based physicians not only mentioned fewer cancer risks, but also agreed more on the salient risk factors than the community-based physicians.

Some of the risk factors become particularly important in the analysis that follows and need to be highlighted here. Thirty-eight percent of the community-based physicians mentioned high-fat foods as a possible risk for breast cancer compared to 21% of the university-based physicians. Community-based physicians also mentioned never breastfeeding (19%) and environmental pollution (13%) as breast cancer risk factors, and yet these were not mentioned by any of the university-based physicians.

Physicians' responses to open-ended questions reveal variation between community-based and university-based physicians in how they discuss breast cancer risks. When giving the causes or risks for breast cancer only one of the

TABLE II. Comparison of freelisted breast cancer risk factors.

Items listed by both university and community-based physicians n = 30		Items listed by university-based physicians n = 14		Items listed by community-based physicians n = 16	
	% ^a		%		%
Family history	100	Exposure to radiation	14	Not breastfeeding	19
Obesity	37	Imbalance in body	7	Few pregnancies	13
Hormone supplements	33			Environmental pollution	13
First child after age 30	30			Higher SES	13
High-fat diet	30			Large breasts	6
Prior history of cancer	30			Altered immune status	6
Age	27			Never warned	6
No children	20			Diabetes	6
Smoking	17			Prone to cysts	6
Fibrocystic disease	13			Too much caffeine	6
Ethnicity	13			Hypertension	6
Early menses	13			Eating red meats	6
Birth control pills	13			Problems lactating	6
Late onset of menopause	13			Carry fat above the belt	6
Too much alcohol	10			Pathological conditions of breast	6
Living in an industrial area	7			Multiple sex partners	6
Breast implants	7				
Being a woman	7				

^aRespondents often listed more than one risk factor. Consequently, percentages do not add up to 100.

fourteen (7%) university-based physicians expanded on his response by going beyond established biomedical risks. We define "beyond established biomedical risks" as any reference to other diseases or experiences with patients or personal experiences. Whereas five of the sixteen (31%) community-based physicians referred to items that were beyond established biomedical risk factors. Although all physicians draw upon the same core knowledge, some go beyond the scientifically established risk factors when discussing breast cancer.

The university physicians, when talking about things that cause or increase a woman's risk of breast cancer, listed items that were currently found in the medical literature on breast cancer. Moreover, they prefaced their responses with phrases such as: "Well, as we were taught in medical school ..." and "The risk factors for breast cancer that we teach the medical students are family history..." Also, university-based physicians did not speculate or stray too far from what was found in contemporary medical literature. For example, one physician mentioned "family predisposition" as the only cause, saying "as far as I know that is pretty much my knowledge of what is truly known." By "truly known" he meant scientifically known. University-based physicians talked about associations, correlations with factors, and recent seminars but did not make many inferences from patients or from other disease risks. This was a marked contrast to the community-based physicians' discussions.

Community-based physicians made inferences from causes for other diseases and from their own life experiences. Moreover, they displayed a noticeable skepticism at times. For example, when speaking about various risk factors, one community-based physician said, "all those factors we've been sort of told that they cause [cancer] but nobody definitely knows." Another community-based physician begins by listing "scientific" factors but then goes on to discuss other possibilities:

Well, the things that are known are: One, just to be a woman. The risk of breast cancer increases with age in a pretty linear fashion. The other risk factors are the duration of estrogen production ... I think there is some controversy about whether number of pregnancies is relevant or not. Probably not. Also, there's been some controversy regarding lactation. And, that's probably not relevant ... In the Boston study, the largest on-going epidemiological study that I'm aware of, interestingly indicated alcohol ... Of course, smoking is a risk factor for so many things, and probably for breast cancer as well. In fact, I think there's pretty good data on smoking. Another thing is environmental ... Or they tried to indict high-fat diet for example, but I don't think that the data support that high-fat diet theory for breast cancer. It does for colon cancer....

This same physician also talked about autoimmune disease as another possible risk. Clearly, this physician suspected the veracity of some of the bewildering array of medically identified risk factors for breast cancer. On the other hand, he perceives as plausible factors that are not considered important risks by university-based physicians.

Another community-based physician says he looks for "... family history. The same things that may cause other diseases. In other words, I'm looking for if she is hypertensive, overweight, high cholesterol and has those other risks." This physician shows a definite willingness to draw inferences from risks and causes

for other diseases affecting a patient's health. Finally, this is an example of a community-based physician making inferences from his patients' experiences:

We feel that anytime you have so much irritation you always have inflammation of the tissue. Example, number one might be from using any kind of cosmetic, like we've been talking about those implants, you know the irritation leaking there and also, this is, I don't know, it's just my own personal opinion, maybe patients who are sexually promiscuous. And you can see those people they might be still young age, nineteen, twenty, but the breast looks so bad, so lumpy.

In sum, the statements from university-based physicians showed minimal variation, both in the items listed as risk factors and in their discussions about their risk factors. In contrast, community-based physicians cited many sources of information for their opinions on breast cancer risk factors, and their statements varied a great deal. Instead of quoting lines from text books, community-based physicians drew upon their experiences and general medical knowledge. As a female community-based physician put it, "Now, when you take up all the risk factors it probably only counts for about twenty percent of cases and therefore we have to look for it in everybody. We can't rule it out on the basic risk factors."

We believe the existence of variation among the physicians has to do with the type of information that is allowed to enter into their explanatory model. In contrast to the university-based physicians, community-based physicians were more likely to include experiential knowledge in their explanatory model for breast cancer risks. How the physicians rank-ordered the potential breast cancer risks supports the argument for variation in knowledge between these two groups of physicians.

RANK ORDERING OF BREAST CANCER RISK FACTORS

This rank ordering procedure allows us to determine the extent of agreement among the interviewees concerning the relative importance of the risk factors. We can also examine individual variation as well as determine differences between subgroups in the study. We have also examined the respondents' explanations of these rankings (why they ordered them the way they did).⁷

The ranking task reveals that, as one might expect given their medical training, university- and community-based physicians agree a great deal. Indeed, consensus analysis finds that they share a single model of breast cancer risk factors. We define that single model as consisting of all the physicians' aggregate rank ordering of all the possible breast cancer risks (Table III, column 1). This ranking shows us which of the possible breast cancer risks the physicians generally ranked high and which they generally ranked low.

Consensus analysis on all of the physicians' rankings revealed that the ratio between the first and second factor value is 8.8, well above the 3 to 1 minimum required, indicating strong agreement on a single cultural model of breast cancer risks. Similarly, the mean agreement for all physicians was .73, which shows a relatively high level of shared knowledge. For example, in Garro's (1988) study of the Ojibway, the ratio between the first and second factor was 4.0 and the mean agreement was .56.

TABLE III. Order of breast cancer risk factor rankings for physicians.

Item	All physicians n = 30	University-based physicians n = 14	Community-based physicians n = 16
Heredity, Family history	1	1	1
Getting older	2	2	2
Having first child after age 30	3	4	3
Not having a baby	4	3	6
Obesity	5	5	5
Hormone supplements	6	7	7
Exposure to radiation	7	8	9
Early menstruation	8	6	11
Fatty, greasy foods	9	11	4
Smoking cigarettes	10	10	8
Lack of medical attention	11	9	13
Never breastfeeding	12	16	10
Birth control pills	13	12	14
Chemicals in food	14	15	12
Breast implants	15	13	17
Drinking too much alcohol	16	14	16
Large breasts	17	19	15
Poverty	18	17	21
Medications, such as antibiotics	19	18	18
Polluted environment	20	20	20
High stress	21	21	22
Problems with milk production	22	24	19
Illegal drugs	23	22	23
Breastfeeding	24	23	29
Dirty work environment	25	25	26
Blows, bruises, hits to the breast	26	27	25
Lack of hygiene	27	28	24
Disorderly, wild life	28	26	28
Excessive fondling of the breast	29	29	27

Physicians' training and expertise raises the expectation of high agreement on their perceptions of breast cancer risk factors. But is there variation in the physicians' perceptions? To explore this question, we examined separately the rankings of community-based and university-based physicians (Table III).

Although physicians agreed in general, as we expected, there is a definite pattern of variation in the level of agreement. University-based physicians showed a much higher level of agreement among themselves, reflected in a ratio between the first and second factors of 11.22. Community-based physicians showed less agreement, with a ratio of only 5.2 (Table IV). This difference is also indicated in the mean agreement scores. University-based physicians had a mean agreement of .82, compared to a mean agreement of .65 among community-based physicians (a difference in means significant at the .002 level).⁸

This analysis suggests that even though physicians had a high degree of shared information, different degrees of that sharing existed among them. The primary work setting of the physicians appears to influence variation in agreement among

TABLE IV. Summary of consensus analysis statistics.

	All physicians n = 30	University-based physicians n = 14	Community-based physicians n = 16
Mean	.726	.818	.651
Standard deviation	.157	.074	.175
1st factor (eigen value)	16.538	9.433	7.237
2nd factor (eigen value)	1.878	.840	1.391
Ratio between 1st and 2nd factor	8.807	11.224	5.203

them. A graphic display of this observation is provided by Multidimensional Scaling (Figure 1), which visually displays the pattern of agreement and disagreement among the physicians based on their rankings of possible breast cancer risks. As Figure 1 shows, most of the physicians cluster around a central point, and this clustering indicates that they generally share the same biomedical model of breast cancer risks. Note, however, that the university-based physicians' (the U's) cluster is tighter than that of the community-based physicians (C's). Community-based physicians tend to fall around the main core of university physicians. This pattern reflects the greater level of agreement among university-based physicians compared to community-based physicians. In a Foucauldian sense, this graphically represents the extent to which university physicians are at the core of knowledge and power and community-based physicians are at its margins.

These patterns of agreement suggest that community-based physicians' perceptions of the relative importance of some risk factors differed from their university-based colleagues. We attempted to tease these differences out by comparing the aggregate rankings of the university-based physicians to those of the community-based physicians. To clearly observe differences, we created Figure 2, which is a plot where the X axis equals the community-based physicians' aggregate ranking of breast cancer risk factors found in Table III (column 3), and the Y axis equals the university-based physicians' aggregate rankings, also found in Table III (column 2). Items ranked high (1-highest) are at the bottom left of the figure. For example, heredity is located on the bottom left of Figure 2 because it was ranked number 1 by both sets of physicians.

In examining Figure 2, we found that all the physicians generally ranked the cancer risk factors along a dimension with three clusters: scientifically proven risk factors, possible risk factors, and discardable risk factors (those which were not considered as actual risk factors. Physicians, themselves, often explained their rank ordering along this dimension, using words such as "proven" and "accepted" risk factors, i.e., those found in the medical and scientific literature, to explain the highly ranked risk factors. In this category are risks such as heredity, having a first child after age thirty, not having a baby, and early menstruation (Figure 2).⁹

Physicians referred to the second tier of ranked factors as those for which the scientific evidence is not yet conclusive. Such risks were "possible, but not proven" risk factors for which the "the verdict is still out." Such still-pending risk factors

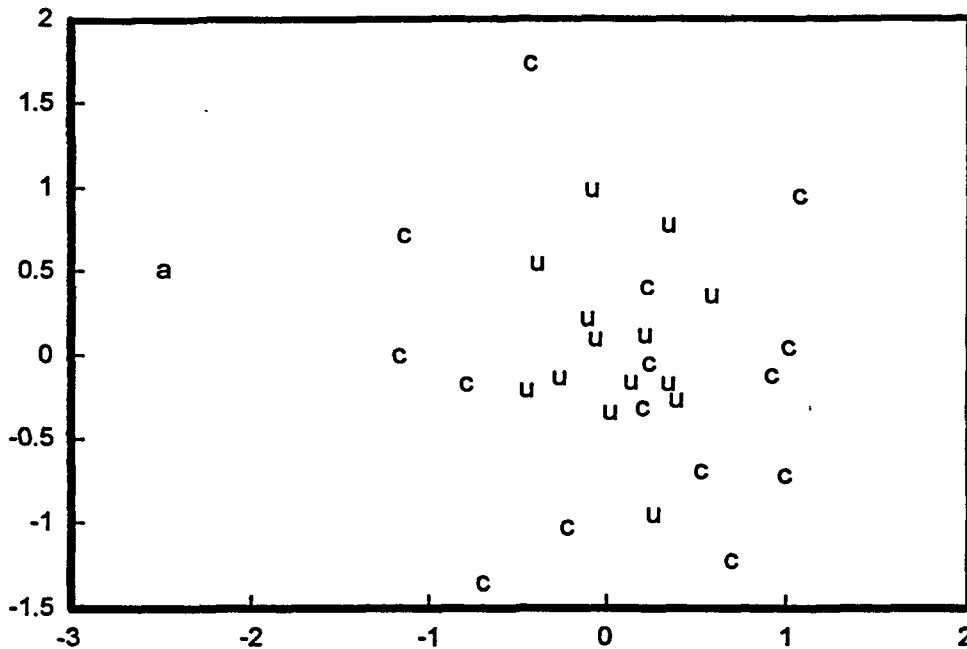


Figure 1. Visual representation of physicians' agreement on ranking of breast cancer risk factors. (Note: c = community-based physicians, u = university-based physicians a = outlier community-based physician. The figure was obtained by plotting the first (X-axis) and second (Y-axis) dimensions of a Multidimensional scaling analysis. The closer the letters appear, the more the respondents agreed about the risk factor rankings.)

included exposure to medical X-rays (radiation), smoking cigarettes, chemicals in food, and a polluted environment.

The physicians viewed the lowest-ranked factors as absolutely not risk factors for breast cancer. As one physician said, these are "old wives tales." Examples included excessive fondling of breasts, lack of hygiene, and blows and bruises to the breast, a wild life, and a dirty work environment.

It was in the importance, or relative ranking, given to some of the factors in the second cluster that differentiated the university-based physicians from the community-based physicians. Community-based physicians ranked a diet rich in fatty foods, smoking, and never breastfeeding as greater risks than did the university-based physicians. University physicians ranked lack of medical attention and early menstruation as more of a risk than the community-based physicians. These variations influenced the relative levels of agreement among our physician interviewees, as we have shown in the previous discussion.

Another way to determine distance from the university is to examine years of experience practicing medicine. Years of experience are highly correlated with the agreement measure ($r = -.62$). This means that the longer a physician has been practicing medicine, the lower his or her agreement will be. One argument, therefore, is that years of medical experience are the dominant influence on variation in

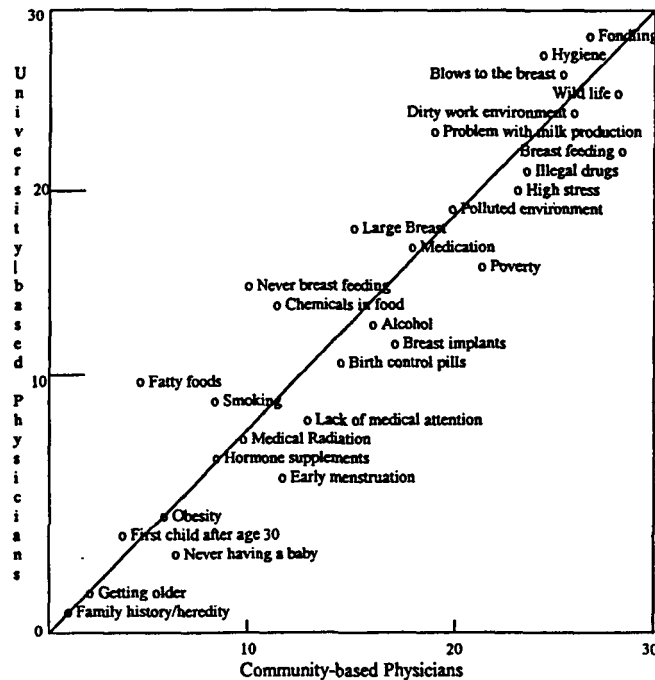


Figure 2. Physicians' Rankings of Breast Cancer Risk Factors—Note: Twenty-nine breast cancer risk factors. 1 = Most likely to cause or increase a woman's risk of getting breast cancer. 29 = Least likely to cause or increase a woman's risk of getting breast cancer.

perceptions of cancer risks among physicians. We would argue, however, that length of experience is relative: it will affect community-based physicians more than it will university-based physicians, who will stay closer to the center over time.¹⁰

The community-based physicians in our sample generally had more years of experience than the university-based physicians. Years of experience range from five to thirty-nine years, with a mean of seventeen years for all physicians. The community-based physician who has been in practice 39 years is coded "a" in Figure 1 and Figure 2. His low agreement score is indicated by his distance from the other physicians. What is interesting about this community-based physician is the way he dismisses possible causes of breast cancer:

Well I think there's some hereditary factors. I don't feel that pregnancy per se has any, it may have a protective effect, but I don't think it causes it. I don't think any hormones cause it, I think they generally have a protective effect—(interviewer: for breast cancer?)—Yeah. This is an old controversial thing that estrogen may be causing breast cancer. No. It won't prevent it, but I do think it does bring the patient in when they're on medication, and exposes them to exams where they can maybe pick it up earlier. But as far as what causes any cancer, I don't know.—(interviewer: ... what about increasing a woman's risk of having cancer too, not necessarily cause it?)—Yeah, well there's family history and there's some racial characteristics, too. But I don't know what causes breast cancer.

This physician reveals his skepticism by making the question purely an issue of causation rather than risk. Besides heredity, he does not share with the university physicians a perception of relative importance for what are considered contemporary biomedical risks for breast cancer.

Experience also explains why some community-based physicians that are in the midst of the university-based physicians in Figure 1. The three community-based physicians around the center of Figure 1 have been practicing medicine for seven, eleven and seventeen years, all at or below the mean years of experience for all physicians. The community-based physician with the highest level of agreement has also been practicing the fewest years. This finding reinforces the hypothesis that the longer community-based physicians are away from the center of medical knowledge (medical school) the less they will agree with university physicians.

Evidence supporting this hypothesis is found in a plot of the physicians' agreement scores by their years of experience (Figure 3). Community-based physicians' agreement scores decrease with experience, which is indicated by the C's drifting to the upper left of the picture, away from the central agreement point in the lower-right quadrant. This same trend is not apparent for the university physicians. Even the most experienced university physician still has a high degree of agreement.

The results of three regression analyses also support this interpretation (Table V). In Model 1 we examined the years of experience on the university-based physi-

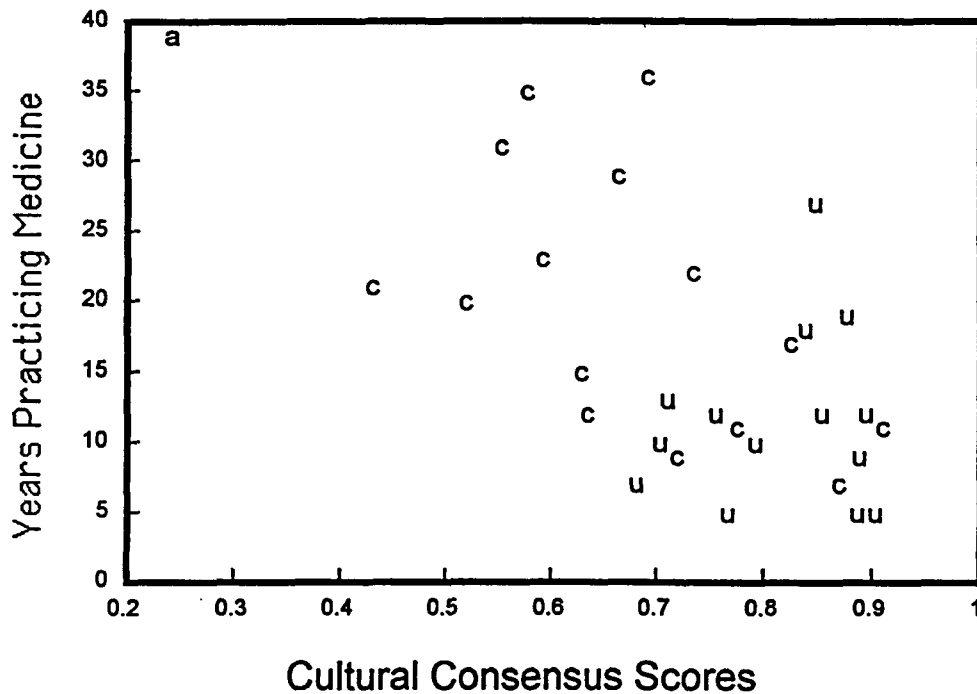


Figure 3. Scatterplot of physicians years of experience practicing medicine by consensus agreement scores. (u = university-based physicians, c = community-based physicians, a = outlier community-based physician.)

TABLE V. Regression analyses of physicians years of practicing medicine on agreement scores.

	Model 1 University-based physicians n = 14	Model 2 Community-based physicians (incl. outlier "a") n = 16	Model 3 Community-based physicians (excl. outlier "a") n = 15
Beta (S.E.)	0.002 (0.004)	-0.011 (0.003)	-0.007 (0.003)
Sig.	0.630	0.007	0.053
R ²	0.020	0.413	0.258

cians' agreement scores, which turned out to be not significant ($p = .630$). In addition, the slope coefficients reveal that the relationship between university physicians and experience is positive and small. More experience for university physicians does not indicate less agreement, rather, it has a positive effect. In Model 2 we did the same test on the community-based physicians' agreement scores and the result was significant ($p = .007$). The slope coefficients reveal a negative relationship; more experience among community-based physicians is related to less agreement.¹¹ Years of experience practicing medicine increases variation in agreement levels for community-based physicians more than university physicians.

ALTERNATIVE WAYS KNOWLEDGE CAN BE DISTRIBUTED

So far, we have focused on work setting (community or university) and years of experience practicing medicine as influential factors in the differentiation of knowledge agreement on perceptions of breast cancer risk factors. There are, however, other sources of knowledge that could influence perceptions of risk factors for breast cancer, such as gender, physician specialties, foreign-born physicians, and foreign-trained physicians. This section examines the extent to which these alternatives are more important than the differences we argue derive from the distinction between university-based physicians who constitute knowledge and power and community-based physicians who are on the margins of power.

Gender can influence patterns of knowledge sharing (Browner 1991; Mathews 1987; Romney, Batchelder, and Weller 1987; Boster 1986). Although the mean agreement for females is higher than for males in our sample, when work setting is controlled, there is no significant difference. There were more female university-based physicians than community-based female physicians in our sample. Because university-based physicians had an overall higher mean than community-based physicians, women in the university group also had higher means. For gender, the distinction between university- and community-based physicians is significant.

Another alternative hypothesis may be that there is a difference between foreign-born and U.S.-born physicians. The reasoning is that foreign-born physicians are drawing upon different cultural values or ideas. We had nine foreign-born physicians in our sample. There was, however, no significant difference

between foreign-born and U.S.-born physicians with regard to their rankings of breast cancer risk factors.

Following the idea of other systems of knowledge influencing biomedical knowledge, we tested for a difference between foreign-trained ($n = 7$) and U.S.-trained physicians ($n = 23$) (Figure 4). This test proved significant ($p < .05$).¹² We are unable, however, given the small sample size to determine if foreign-trained physicians working in university settings differ from physicians working solely in the community. Even though foreign medical schools may train students in a biomedical tradition similar to that found in the United States, this finding suggests that national level cultural differences are important. An interesting research project would be to conduct a similar study with medical schools in different countries as the unit of analysis.

Another hypothesis is that the medical specialty of the physician influences the level of agreement. The influence of this specific hypothesis cannot be fully tested because there are no specialists in obstetrics and gynecology in the university sample. We had originally thought that specialization had no influence because the majority of community-based physicians were obstetricians and gynecologists, and being specialists they would agree more. In this case the specialists (experts) varied more than the general physicians in their level of agreement on breast cancer risks.

We tested for a significant difference between the agreement means of the physicians in various specialties. There was no difference between internal medicine practitioners ($n = 8$) and family practitioners ($n = 10$). There were significant differences between both obstetricians and gynecologists ($n = 12$) and internal medicine practitioners ($n = 8$) ($p < .05$), and obstetricians and gynecologists and family practitioners ($p < .05$). The significant difference observed between obstetricians and gynecologists may be due to their greater degree of specialized experience with breast cancer. Without further research, however, this hypothesis remains inconclusive. As stated above, we are unable to test if there is a difference when community-based versus university-based work setting is controlled.

EXPERIENCE, AGREEMENT, AND POWER

This analysis has revealed that even though physicians do agree on a general model of breast cancer risk factors, they vary in their level of agreement. We have argued that while all physicians draw upon and share a scientific base of information, some physicians are more inclined to use experience and information about other diseases when considering risk factors. There are three possible factors that influence this specific pattern of variation: specialization, time in medical practice, and work setting. Each of these factors are areas where differences in physicians' status (community- or university-based) can be classified and placed within a hierarchy of power and knowledge, as Foucault suggests. Each of these classifications can be viewed as degrees of subjection to discipline or constraint on what is considered legitimate to discuss in scientific circles (Foucault 1972). While the issue of the relative importance of specialization and work setting has yet to be resolved, we submit the hypothesis that work setting is more influential. Individual experi-

ence can lead to variation from the dominant ideologies of scientific medicine when physicians are not primarily associated with hospital teaching centers. Therefore, community-based physicians, who practice in settings removed from the mechanisms of discipline that govern university-based physicians, agree less and vary more in their views on breast cancer risk factors, when compared to their university-based colleagues.

Work setting, whether the physician practices medicine in the private sector (community-based) or is based at the university, appears to influence perceptions of breast cancer risk factors. The argument put forward here is that the university setting determines the types of information physicians perceive as relevant. For university-based physicians, the "culturally correct" response is influenced more by claims of scientific proof than by experience or intuition. University-based physicians have high agreement because they restrict their range of valid knowledge to risk factors for breast cancer that have been scientifically identified. Their authority, prestige, and respect in the field derives from their position in the university, a position which involves creating knowledge through research and transmitting knowledge through teaching and training. University-based physicians, therefore, are associated with scientific medical knowledge in a way that community-based physicians are not. University-based physicians are at the core of medical knowledge and define the boundaries of the biomedical model. This gives them less leeway to improvise. They must, if you will, stick close to the script. In a Foucauldian sense, they are more "disciplined."

On the other hand, for community-based physicians, distance (which equals time) from the research university or medical school allows them to include experience to a relatively greater degree than their university-based colleagues as part of the "correct" response concerning disease risks. They are less constrained in the knowledge they bring to an understanding of disease risk. Their sources of information include what they learned as a student, the literature that they have chosen to read since beginning their own practice, and their individual experiences with their patients. Because they draw on various sources of information when thinking about causes of breast cancer, they produce lower levels of agreement and more individual speculation compared to the university-based physicians who rely almost exclusively on the scientific literature.

CONCLUSIONS

Physicians interviewed for this study agree on a general model of breast cancer risk factors. Agreement, however, can mask subtle but important differences among those who share an overall cultural model. Why there are subtle disagreements is also important to investigate, for they may reveal the ways in which power and experience influence variation from "core" knowledge.

For example, even among a group of highly-trained medical practitioners, we must not assume a homogeneity of knowledge or perceptions of disease, health, or curing practices. Our theoretical discussion on the power and knowledge relationship suggests that we need to focus a level above the distribution of knowledge to consider who creates and defines the information to be transmitted and who

controls the transmission. University-based physicians socially transmit knowledge, but are also responsible for creating and defining knowledge. As a consequence, they have high levels of agreement.¹³ Even though all physicians share a scientific model of breast cancer risk factors, the constraints of that model are loosened for community-based physicians, who include intuition and experience in their answers to questions of risk.

We make no claims to having definitively resolved the issues raised here. Indeed, the findings and arguments presented generate more questions than answers. Nevertheless, suggesting the importance of integrating theories of power into how anthropologists understand variation in cultural knowledge is meant to be provocative and to suggest directions for future research.

ACKNOWLEDGMENTS

The research reported herein was supported by grants from the National Cancer Institute (5 R01 CA 52931), the California Policy Seminar, UC Mexus, and UC Irvine. The authors are indebted to A. Kimball Romney, James S. Boster, and the anonymous reviewers for their comments and suggestions. The authors are solely responsible for any errors.

NOTES

1. Our objective here is to show how anthropological analytic methods can be used to examine issues raised by post-modern theorists such as Foucault (Rosenau 1992).
2. It has long been recognized that physicians develop a "store of clinical knowledge, folklore, and gossip about patients, practice, and the vicissitudes of the doctor-patient relationship" (Stoeckle, Zola, and Davidson 1963). In medical schools, students often find their training is guided by a mixture of physicians with competing claims of authority, either based on clinical experience or research (Good and Good 1993; Rosenberg and Golden 1992; Fox 1988; Hahn and Gaines 1985; Starr 1982).
3. Starr (1982), Osherson and Amarasingham (1981), and Freidson (1970) argue that biomedicine gains power and legitimacy through its formal organization, institutionalization, and professionalization.
4. By "art of medicine" we mean the practice of medicine, which includes both subjective and objective (scientific) interpretations of disease and health. As a Harvard medical student put it: "I think there are two components, neither of which can be done without, that are equally important and make up a physician. One is a thorough understanding of a wide range of disease processes, symptoms, diagnoses—you simply cannot do without the basic science, the basic medicine background ... And the other part of making a good physician is the ability to practice the art of medicine, to listen to a patient, to elicit information, which is important to make your diagnosis" (Good and Good 1993:91).
5. Building on Roberts (1964), Boster's (1991) information economy model posits that variation can be explained by examining the distribution of opportunities to learn a domain. According to Boster (1991:208), domains that can be directly observed will have higher levels of agreement and domains that require social transmission have lower levels of agreement.
6. Garro (1988) used consensus analysis to study high blood pressure among the Ojibway. She found that a culturally shared model of high blood pressure did exist for the Ojibway. There was, however, variation from the model. Some individuals had experiences that conflicted with specific attributes of the "prototypical" model of high blood pressure. For instance, respondents would refute a specific cause of high blood pressure because the cause was contrary to their personal experience with the disease. Other individuals varied from the model because they had alternative causal models that either drew upon knowledge from other diseases or were idiosyncratic.
7. The same tests of difference were run using only items mentioned by physicians in the freelist task. Results of this analysis are similar to those reported that include items mentioned by all groups.

8. This test was run again excluding the physician coded "a" in Figure 2. The same results were achieved for this second test, $p = .002$.
9. Recent epidemiological literature cites similar factors as high risk for breast cancer (Harris et al. 1992). An area not mentioned by either set of physicians was excision of an ovary or prior history of cancer in the ovary or endometrium (Marshall 1993).
10. We make this argument even though all licensed physicians are required by law to complete twenty-five hours of continued education per year (California Code of Regulations, Article 11, Sec. 1336, 1992).
11. The community-based physician labeled "a" in Figure 3 was withdrawn to insure that he did not have undue influence on the results of this analysis (Table IV). Although the significance decreases, the majority of the evidence supports the hypothesis that distance from the research university influences agreement levels.
12. The report of significance is not completely reliable because there were more U.S.-trained physicians ($n = 23$) than Foreign-trained physicians ($n = 7$). This does, however, indicate that further research should be done to verify this exploratory analysis.
13. It must be noted that even though the community-based physicians seem to be basing their judgments on direct observation, in actuality, factors contributing to disease cannot be observed in the same way as plant or animal types (see footnote 5).

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