What Accounts for the Appeal of Complementary/Alternative Medicine, and What Makes Complementary/ Alternative Medicine "Alternative"?

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*The goal of this study was to elucidate the basis for the appeal of complementary/alternative medicine (CAM) and the basis upon which people distinguish between CAM and conventional medicine. Undergraduates (*N = *173) rated 19 approaches to the treatment of chronic back pain on 16 rating scales. Data were analyzed via 3-mode factor analysis, which extracted conceptual dimensions common to both the scales and the treatments. A 5-factor solution was judged to give the best description of the raters' perceptions. One of these 5 factors clearly reflected the distinction between conventional versus CAM approaches, and a 2nd factor clearly referred to treatment appeal. The other 3 factors were invasiveness, health care professional versus patient effort, and "druglikeness." To the extent that treatment was seen as a CAM treatment (as opposed to a conventional treatment), it was seen to be more appealing, less invasive, and less druglike. Simple and partial correlations of the dimension weights indicated that both the appeal of CAM and the distinction between CAM and conventional medicine were largely driven by the view that CAM is less invasive than conventional medicine.* ***Key words:*** *alternative medicine; complementary (natural) versus conventional (or traditional, biomedical) treatment; intractable pain; factor analysis; attitude toward health; psychological models; lay beliefs; PARAFAC; 3-way; multi-mode.* ***(Med Decis Making 2002;22:431–450)***

The appeal of nonconventional or alternative/complementary (CAM) therapies has recently increased at a considerable pace in both the United States and Canada.[1–4] CAM therapies are often used for chronic musculoskeletal pain conditions.[1,4–8] Eisenberg et al.[4] estimated that in 1997, "out-of-pocket expenditures relating to alternative therapies were conservatively . . . $27.7 billion, comparable to the projected 1997 out-of-pocket expenditures for all US physician services" (p. 1573).

The effectiveness of many CAM approaches has yet to be demonstrated empirically. If it turns out that CAM therapies are less effective than is currently assumed, then their continued use not only means wasted health care dollars but also poses a threat to public health, especially when nonconventional therapies are used as alternatives rather than as complements to conventional therapies. If, however, it turns out that CAM therapies are more effective than is currently assumed, it

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would be important to understand what effective components/elements of CAM therapies are distinguishable from that which conventional medicines offer, and attempt to incorporate these elements into our health care interventions.

Either way, it is important to understand why CAM appeals to health care consumers. By understanding the appeal of CAM, and by elucidating features of CAM versus conventional approaches that are salient to people, we will be in a better position to comprehend the reasoning underlying their ("good' or "bad") treatment choices, and also to communicate with them concerning treatment alternatives.

There are, to our knowledge, no published studies aimed specifically at clarifying the appeal of CAM and the features of CAM versus conventional treatments that are salient to the layperson (or patient). There is, however, both theoretical and empirical work on what drives the appeal of CAM therapies. For example, it has been theorized that individuals use CAM because conventional medical approaches are ineffective,[5,6] produce adverse effects,[5,6] are too expensive,[6,9] and do not accord them sufficient control and autonomy over their own health care.[10,11]

Empirical studies, mostly conducted by Furnham and colleagues,[12–14] have indeed shown that complementary medicine patients, as a group, are more skeptical and critical of the effectiveness of conventional medicine than are those drawn from general medical practices. Moreover, Vincent et al.[15] found that users of complementary medicine believed less in the scientific basis of conventional approaches and were more concerned about their adverse effects than were patients drawn from a "conventional" (i.e., general medical) practice. Astin,[16] surveying a random sample of American adults, found that those who had used alternative medicine in the previous year were more likely to be "cultural creatives" (cf. Ref. 17). That is, they were more likely to endorse values consistent with environmentalism and feminism, were more likely to be drawn to the "foreign and exotic," and were more invested in personal growth psychology and self-actualization than were those who had not used alternative medicine in the previous year.

Although it is useful to learn what beliefs/attitudes distinguish users of conventional from users of alternative treatment approaches, such research does not directly address the appeal of CAM to the lay public, nor does it help to illuminate the basis upon which people distinguish between alternative and conventional approaches.

These were the 2 goals of this study. That is, our aim was to ascertain both the structure (i.e., salient attributes) and content (specific beliefs) of lay views about CAM and conventional medical treatment. Given that chronic musculoskeletal conditions are one of the leading impetuses for the use of alternative/complementary treatments,[18] we addressed our questions with regard to CAM within the context of treatment for chronic back pain. Naturally, this raises the issue of the generalizability of the results (i.e., to treatments for other health conditions), but we considered this to be a noncritical issue for this initial exploratory case.

The methodological tool we used, 3-way parallel factor analysis (PARAFAC),[19–24] is particularly well suited to help us assess both the structure and content of beliefs about CAM and conventional treatments. In the section that follows, we briefly describe PARAFAC, contrast it with the more widely used and known 2-way factor-analytic techniques, and contrast it with other 3-way factor-analytic approaches.

PARAFAC

Factor analysis is a generic term used to describe a range of methods aimed at discerning the interrelationships among a group of variables.[25] In 2-way factor analysis, the data typically consist of a matrix of correlations among variables. However, the method can also be applied to a rectangular (or square) array of observations. Such data sets are organized according to 2 ways of classification. For example, if we were to have a group of individuals rate a given treatment (e.g., massage therapy) on a set of rating scales (e.g., costly, painful, effective, etc.), the 2 ways (or modes) of classification would be "rating scale" and "person." The analysis of this 2-way array would give us a summary of the features of massage therapy that are salient to our population. Recall, however, that our goal was to discern the salient features by which people distinguish among different treatments. To do so, we would need to start off by having our participants rate each of a range of treatments (e.g., massage, relaxation, surgery, oral prescription drugs) on the same set of rating scales. This would result in a 3-way (or mode) (i.e., rating scale, treatment, person) array.

Using a 2-way factor-analytic approach, we would have to analyze these data by either averaging over 1 of the 3 modes or by analyzing all the 2-way data sets contained in the 3-way array sets separately. However, either of these 2-way factor-analytic approaches would result in a loss of information, in that they would not al-

low the analysis to incorporate any of the 3-way structural relationships in the data set.[26,27] In contrast, 3-way factor-analytic approaches enable us to simultaneously analyze variation across all 3 modes, and do so efficiently.[27]

A detailed description of PARAFAC and its advantages over the more widely used 2-way factor analysis (for certain data, such as those analyzed here) and sometimes other 3-way approaches is beyond the scope of this article; both have been outlined elsewhere.[21–23,28–30] Briefly, however, parallel factor analysis simultaneously fits multiple 2-way "slices" (or levels) of a 3-way array, thereby yielding a common set of factors, with differing relative weights in each slice. In some sense, PARAFAC slices a "cube" of data 3 ways at once.

This 3-way slicing of the data produces the 1st advantage of the 3-way approach; each factor has loadings or weights for each of the 3 modes (in this case, person, treatment, and rating scale). Hence, using PARAFAC, we can interpret a factor by looking at how it is related to the different treatments, but we can also examine how the very same factor is related to the different rating scales (and to persons when relevant information on raters is available). Accordingly, using a 3-way analysis, we can use the treatment weights *and* the rating scale weights to aid in the interpretation of each factor. That is, an additional advantage of 3-way over the more widely used 2-way factor analysis is that it not only yields the standard set of factor loadings but also yields 1 or more additional sets of loadings to help in the interpretation of the factors.

The 2nd advantage of PARAFAC over the more conventional 2-way factor analysis, as well as most other 3-way factor-analytic approaches (e.g., T3, or Tucker's 3-model factor analysis[31]), is that the extra information conveyed by the 3rd mode can often be used to determine the one best-fitting axis orientation, and so no subsequent rotation is necessary. (In fact, other rotations would cause loss of fit.) Thus, when the PARAFAC model is appropriate, the factors are determined solely on the basis of the data; the 3rd mode in essence fixes the orientations of the solution in space, thereby eliminating the need for a rotation phase of the analysis.* The original impetus for PARAFAC came from Cattell's argument that the problem of rotational indeterminacy of (2-mode) factor analysis can be overcome by obtaining parallel proportional (factor) profiles in 2 solutions at once.[32–34] As Harshman and Lundy[22(p40)] elaborated (cf. Ref. 33, section 6.3),

> If the same factors are present in two different datasets, but change their relative proportions of variance-accounted-for by distinct amounts from one dataset to the next, then there is only one *unique* set of axis orientations in both spaces which will reveal this parallel proportional relationship; hence, by discovering that unique position, one can empirically determine the approximate orientation that the factors must have had when the data were generated.

PARAFAC has been applied broadly to assess the dimensions underlying a wide range of phenomena, including the properties of chemicals,[24,35] metaphors,[36] causal explanations for success and failure,[37] and emotional reactions to trampoline exercises.[38] This study, however, represents, to our knowledge, the first time PARAFAC has been applied to study health-related views and beliefs.

Study Goals

The primary goals of this study are to investigate, by means of PARAFAC and carefully selected stimuli and scales, the basis for the appeal of CAMs, as well as the basis for the distinctions people make between CAM and conventional medicine. We should note that in the process of addressing these questions, the data we collected also illuminate the basis on which people distinguish between treatments in general (and not simply CAM versus conventional treatments). This broader issue, however, is not the focus of this article.

METHOD

Participants

Of the participants ($N = 173$), 94 (54%) were women (mean age = 19.8 ± 3.1 years). The participants were 1st-year university undergraduates enrolled in an introductory psychology course who signed up for a study on beliefs about treatment of chronic pain. They were run in 1-hour testing sessions in groups of 3 to 20 and received course credit for study participation. Among the measures participants completed was a background questionnaire that assessed their experience with pain as well as with a range of conventional and CAM treatment modalities.

*This is similar to INDSCAL[20] in multidimensional scaling (MDS). It should be noted that the assumptions associated with INDSCAL and PARAFAC are stronger than those required by most other 3-way approaches.

Table 1 Approaches to the Treatment/Management of Chronic Back Pain

Surgery
Stretching
Relaxation
Taking oral prescription drugs
Taking oral nonprescription (over the counter) drugs
Adopting a positive attitude
Staying physically active
Losing weight
Massage
Using spirituality
Ignoring the pain
Electrical stimulation under the skin (i.e., direct electrical stimulation of the nerves involved with the pain at the affected site)
Electrical stimulation over the skin (TENS*) (i.e., surface stimulation of the nerves involved with the pain at the affected site)
Improving body alignment (e.g., through postural training, corrective devices, orthotics)
Herbal remedies
Acupuncture
Getting psychological treatment
Getting a chiropractic adjustment
Injections of prescription medication into the affected site

*Transcutaneous electrical nerve stimulation.

Generation of the Set of Treatments to Be Rated

The stimuli rated by participants were 19 approaches to the treatment of chronic pain. To generate the list of treatments to be rated, the principal author and a research assistant jointly performed an Ulrich's periodicals search on articles published between June 1996 and June 1998 in high-circulation magazines (i.e., more than 1 million per annum in the United States) of general interest, women's interest, men's interest, home economics, physical fitness and hygiene, and sports and games. Our assumption was that the content of these widely read magazines would reflect (and/or shape) popular lay views. Our search terms were *chronic pain*, *muscle pain*, *muscular pain*, *musculoskeletal pain*, and *back pain*. Articles that mentioned any treatment for an unspecified chronic pain were also included. However, articles that focused on specific conditions associated with chronic pain (e.g., arthritis, rheumatism, neuralgia), surgical pain, or other acute pain conditions were excluded. Any treatments or management approaches mentioned in these articles were listed verbatim, and duplicate items were eliminated.

A total of 117 treatments/approaches to the management of chronic pain were identified through this procedure. Six naive judges (3 men and 3 women) individually sorted these 117 approaches into 10 to 20 categories of their creation and were asked to label each category. The principal author and 1 coauthor (JB) examined the 6 category sets created by the participants and produced a 19-item list that seemed to best capture the commonality among the 6 sets. The wording of some of the items was changed (e.g., from "seek treatment from an acupuncturist" to "acupuncture"; from "seeing a psychologist" to "getting psychological treatment") so that all stimuli referred to treatment/management approaches.

This final set of 19 treatment approaches served as the stimuli to be rated. The treatments were presented and, where appropriate, clarified on a sheet (see Table 1), which participants read before, and if necessary could refer to during, the rating procedure.

Rating Scales

Participants rated each of the 19 treatments/approaches (presented in 1 of 3 randomly determined orders) on 16 nine-point rating scales (see Table 2). The rating scales underwent an extensive review process by several members of the research team to ensure that they were unambiguous and effectively tapped the properties we were aiming to measure.*

The rating scales tapped perceived treatment properties that drive health behavior, according to the large body of research guided by the health belief model,[39,40] the theory of reasoned action,[41,42] and the multi-dimensional health locus of control.[43] These treatment properties include perceived effectiveness (no. 4), adverse effects and other physical costs (nos. 1, 2, 8, and 16), monetary costs (no. 9), disruptiveness to routine (no. 10), and health care professional control/effort versus patient control/effort (nos. 3, 6, 14, and 15). As suggested by our earlier review, these are the same properties that are hypothesized to account for the appeal[14–16,44] of CAM therapies.

We also included a rating scale (no. 13, very appealing to you/not at all appealing to you) to enable us to directly tap the appeal of the treatment/management approaches. Moreover, 2 additional rating scales (no. 7, a

*We did not do an empirical pretest; such a pretest would have required almost as many subjects as the test itself in order to establish an adequate multidimensional framework to determine whether a specific item was anomalous.

Table 2 Positive Pole of Rating Scale/Negative Pole of Rating Scale

Invasive/not invasive
Painful/pleasurable
Requires considerable effort on the part of the patient/does not require any effort on the part of the patient
Very effective/not at all effective
Very well researched/not researched at all
Requires considerable effort on the part of the health care professional/does not require any effort on the part of the health care professional
A very natural approach/a very unnatural approach
Has serious side effects/has no side effects
Very expensive/free of cost
Very disruptive to the patient's routine/not at all disruptive to the patient's routine
A traditional medical approach/an alternative treatment
Empowering/dehumanizing
Very appealing to you/not at all appealing to you
Totally under the patient's control/not at all under the patient's control
Totally under the health care provider's control/not at all under the health care provider's control
Very dangerous/not at all dangerous

Note: Ratings range from 1 (*negative pole*) to 9 (*positive pole*).

very natural approach/a very unnatural approach, and no. 11, a traditional medical approach/an alternative treatment) were included to provide potential anchors for the conventional versus CAM dimension.

Data Analysis

The data were analyzed via PARAFAC.[19,21,22] The 3 modes were rating scales (mode A), treatments (mode B), and subjects (mode C). In order to achieve adequate stability, it was necessary to constrain the solution so that factor loading patterns were orthogonal in mode A.

RESULTS

All analyses are based on data from 162 of the 173 participants. Data from 11 participants who omitted more than 76 (i.e., 25%) of 304 (i.e., 16 × 19) explicit ratings were excluded from the analysis. There appeared to be nothing systematic in the pattern of these missing data.* Less than 1% (i.e., 319/49,248 = .006) of the explicit ratings from the final sample of 162 participants were missing.† There also appeared to be nothing systematic in the pattern of these missing data.§ Any locations in the data set where a value was missing were ignored or "skipped over" in the analysis and had no effect on the solution.

Characteristics of the Sample upon Which Data Analyses Are Based

Characteristics of the final sample (n = 162) upon which the analyses are based are presented in Table 3. Overall, participants judged themselves to be moderately knowledgeable about chronic back pain and its treatments. Moreover, almost 40% reported having visited/consulted with what some people might consider CAM practitioners over the previous year.

Descriptive statistics on the appeal of the various treatments/management approaches are presented in Table 4. There was a reasonable distribution of ratings for all the treatments (i.e., standard deviations ranged from 1.66 to 2.83). In general, management approaches that involve health habits (i.e., staying physically active, relaxation, stretching, losing weight) were rated as most appealing by this sample, whereas approaches that involve physical penetration (e.g., surgery, injections of medication into the affected site, electrical stimulation under the skin) were the least appealing. There were 2 notable exceptions to this general pattern: massage, which is not a health habit, was the 2nd most appealing approach, and ignoring the pain (which does not involve physical penetration) was by far the least appealing approach.

Characteristics of a subsample of 114 (72%) participants who indicated that they had "within the past 12 months . . . experienced pain that was severe enough to interfere with daily activities" are presented in Table 5. On average, their pain reportedly lasted 32 weeks (although the median was 3 weeks), was judged to be moderate in intensity, and was reported to interfere with some activities.

*That is, participants who were excluded had not omitted specific rating scales or treatments. Rather, they either omitted the entire set of ratings (n = 3) or large chunks of consecutive pages on the questionnaire.

†This very small amount of missing data is probably attributable, in part, to the fact that participants were not explicitly given the option to answer "don't know." Including a "don't know" option would have given them clear permission to avoid answering challenging items. We also encouraged participants to respond to every item by instructing them to answer the questions based on what they know or would guess. The option to omit items (without penalty) had, of course, been noted in the informed consent statement.

§Data from 9 subjects accounted for 84% of the missing data. Of these 9 subjects, 4 omitted blocks of ratings corresponding to 1 or more treatments, but the treatments omitted varied across subjects. The other 5 tended to omit ratings for scale 1 (invasive) and/or scale 12 (empowering) for most, but usually not all, of the treatments.

Table 3 Total Sample Characteristics (n = 162)

Sex	Male: 74 (46%)	Female: 87 (54%)
Age	Mean = 20.0 ± 3.16, median = 19, range = 17-46	
Self-rated knowledge about chronic back pain and its treatment[a]:		
	Mean = 5.00 ± 1.9, median = 5, range = 1-9	
Health care professional use in previous year[b]:		
Family doctor/general practitioner		95%
Nurse		30%
Medical specialist		26%
Chiropractor*		19%
Physiotherapist		17%
Massage therapist*		16%
Psychologist*		10%
Herbalist*		6%
Homeopath*		5%
Acupuncturist*		3%
Occupational therapist		3%
Spiritual/religious healer*		3%
Reflexologist*		3%
Relaxation therapist*		2%
Biofeedback therapist*		0%
Percentage having seen a health care professional designated by an asterisk		39%

a. Response to the following statement: Please indicate how much you feel you know about chronic back pain and its treatments (1 = *nothing at all*, 5 = *a moderate amount*, 9 = *a lot*).
b. Percentage indicating having seen or talked to this health care practitioner in the past year.

Table 4 Descriptive Statistics (n = 162) on the Appeal of the Treatment/Management Approaches for Chronic Back Pain

Approach	Mean	*SD*	Median	Mode	Skew	Kurtosis
Staying physically active	7.77	1.66	8	9	–1.61	2.54
Massage	7.66	1.96	9	9	–1.73	2.44
Relaxation	7.22	2.05	8	9	–1.36	1.32
Stretching	7.13	1.79	7	9	–0.92	0.39
Adopting a positive attitude	6.63	2.57	7	9	–0.89	–0.44
Losing weight	6.35	2.62	7	9	–0.73	–0.70
Chiropractic adjustment	5.90	2.35	8	6	–0.59	–0.59
Oral non-prescription drugs	5.41	2.07	6	6	–0.42	–0.54
Oral prescription drugs	5.38	2.07	6	7	–0.32	0.19
Improving body alignment	5.37	2.28	7	6	–0.30	–0.78
Herbal remedies	5.37	2.56	6	6	–0.34	–1.1
Acupuncture	5.10	2.77	6	1	–0.29	–1.28
Electrical stimulation over the skin	4.76	2.42	5	7	–0.17	–1.10
Using spirituality	4.74	2.83	5	1	0.09	–1.32
Psychological treatment	4.72	2.40	5	6	–0.08	–1.06
Surgery	4.35	2.70	5	1	0.17	–1.32
Injections of medication into the affected site	3.80	2.17	4	1	0.26	0.19
Electrical stimulation under the skin	3.73	2.21	4	1	0.46	–0.62
Ignoring the pain	2.45	2.20	1	1	1.47	0.93

Note: Presented in order of decreasing appeal, based on responses to the following question: Consider the following potential approach to the management and/or treatment of chronic back pain. Based on what you know or would guess, would this approach be *not at all appealing to you* (1) or *very appealing to you* (9)?

The PARAFAC Analysis

Although plots of the stress and r^2 by dimensionality pointed to a 3-dimensional solution, a 5-dimensional solution (stress = .73, r^2 = 0.47) proved to be most interpretable and informative. The stability of this 5-dimensional solution was explored by a split-half technique replicability analysis in which the total data set was randomly divided into 2 sets of 81 subjects and the "halves" were analyzed separately. With 1 exception, correlations between corresponding dimensions on the 2 split-halves were quite high in the treatment mode (0.93, 0.98, 0.97, 0.87, 0.57 for dimensions 1 through 5, consecutively), whereas the rating scale mode loadings showed more variability across the 2 half-sized samples (0.83, 0.88, 0.60, 0.64, 0.67 for dimensions 1 through 5, consecutively).

These results demonstrate the stability of the 2 largest dimensions (i.e., dimensions 1 and 2) in both the treatment and rating scale modes. That the other 3 dimensions were not as well replicated (in the rating scale mode) may be due to the relatively small size of the half-samples and the resulting conservative nature of the test, rather than actual unreliability of the dimensions found using the full sample. The treatment mode correlations for dimensions 3 and 4 indicate that they are "real" (i.e., not simply fitting noise in the data) and that the rotation is stable in the treatment mode (if not

Table 5 Descriptives on a Subsample (n = 114) Reporting Functionally Impairing Pain in Previous Year

Sex	Male: 48 (42%)	Female: 66 (58%)
Age	Mean = 20.1 ± 3.72, median = 19, range = 17-46	
Reported cause of pain	Sports injury	24%
	Menstrual	21%
	Problems with bones, cartilage, joints	13%
	Nonexercise-related injury	7%
	Too much physical activity	7%
	Stressors	6%
How long did pain last (in weeks)?	Mean = 31.9 ± 90.5, median = 3, range = 1-720	
How much pain interfered with daily activities?[a]	Mean = 3.2 ± 1.1, median = 3, range = 2-5	
Severity of the pain[b]	Mean = 2.1 ± 0.63, median = 2, range = 1-3	
Treatment/management approaches used for the pain condition		
	Usage[c]	Effectiveness[d]
Relaxation	61%	4.6 ± 1.7
Oral nonprescription medication	57%	3.9 ± 1.7
Physical activity	51%	4.5 ± 1.5
Oral prescription medication	50%	4.7 ± 1.6
Massage therapy	36%	4.9 ± 1.5
Chiropractic adjustment	26%	4.4 ± 1.9
Herbal remedies	18%	4.1 ± 1.8
Surgery	13%	5.6 ± 2.2
TENS[e]	13%	4.8 ± 1.5
Spirituality	12%	4.9 ± 1.4
Acupuncture	8%	3.7 ± 2.1
Injections of medication into site	7%	6.0 ± 1.2
Physiotherapy	7%	4.4 ± 1.8
Psychological treatment	1%	1.0
Are they currently experiencing the pain?	Yes: 39% (n = 43)	No: 61% (n = 66)
Of those currently experiencing pain (n = 43)		
How much pain interferes with daily activities?[a]	Mean = 2.5 ± 1.1, median = 2, range = 2-5	
Severity of the pain[b]	Mean = 1.6 ± 0.63, median = 2, range = 1-3	

a. 1 = *none*, 2 = *a few*, 3 = *some*, 4 = *most*, 5 = *all*.
b. 1 = *mild*, 2 = *moderate*, 3 = *severe*.
c. Percentage indicating that they had used this treatment/management approach for their painful condition.
d. Response to the following statement: Indicate how effective you found the approach to be in reducing your pain on scale from 1 (*not at all*) to 7 (*extremely*).
e. Transcutaneous electrical nerve stimulation.

so stable in the rating scale mode). For all 5 dimensions, any differences were largely rotational, and not due to some inherent difference in factor structure between the 2 data halves. This is indicated by the fact that the split-half correlations were all high after orthogonal rotation to congruence (rating scale mode: *r*s range from 0.96 to 1.0; treatment mode: *r*s range from 0.96 to 0.99). Stability of the solution selected and interpreted in this article will, of course, be substantially better than the split-half solutions because of the larger sample size. The rating scale and treatment plots of the 5 dimensions are presented in Figures 1 through 5.*

*Readers accustomed to 2-way factor analysis will note the seemingly large loadings, which are the result of different scaling. Two-way factor loadings typically range between –1 and +1 because they reflect the scale of the correlational data. Here, the subject loadings (not shown) absorbed the data scale whereas the rating scale and treatment factors were scaled so that the root mean squared loading was equal to 1. This is the same scaling convention often used in multidimensional scaling, and is exactly the same convention that is the default in INDSCAL.[20,21,23] Issues related to scaling PARAFAC loadings are discussed in more detail elsewhere.[21]

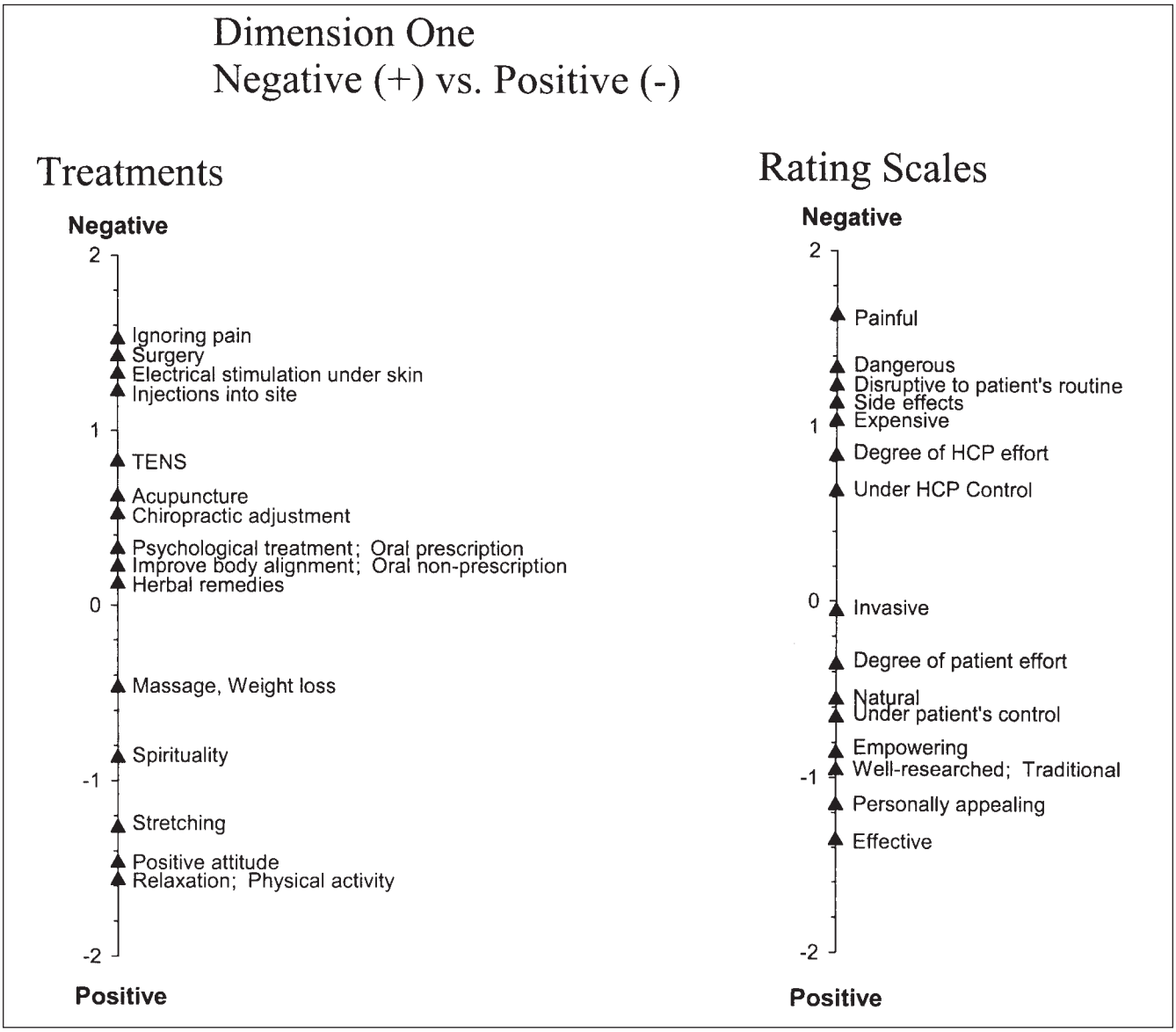

Figure 1 Dimension 1 (negative vs. positive) plots. TENS = transcutaneous electrical nerve stimulation; HCP = health care professional.

The PARAFAC Solution

The 1st dimension, which we labeled *negative versus positive (i.e., valence)* (Fig. 1), clearly tapped the appeal of a treatment. It was anchored at the negative pole of the rating scale plot by painful, dangerous, disruptive, and side effects and at the positive pole by effective and appealing. Notably and unexpectedly, traditional loaded more closely to the positive pole than did natural. In the treatment scale plot, ignoring pain and surgery had the highest loadings on the negative pole, and relaxation, physical activity, and positive attitude had the highest loadings on the positive pole.

The 2nd dimension (Fig. 2) seemed to capture the distinction between *health care professional (HCP) effort* and *patient effort*, with HCP effort, expensive, and HCP control anchoring one pole of the rating scale plot and patient effort anchoring the other. In the treatment plot, massage anchored the HCP effort pole and ignoring pain very strongly anchored the patient effort pole.

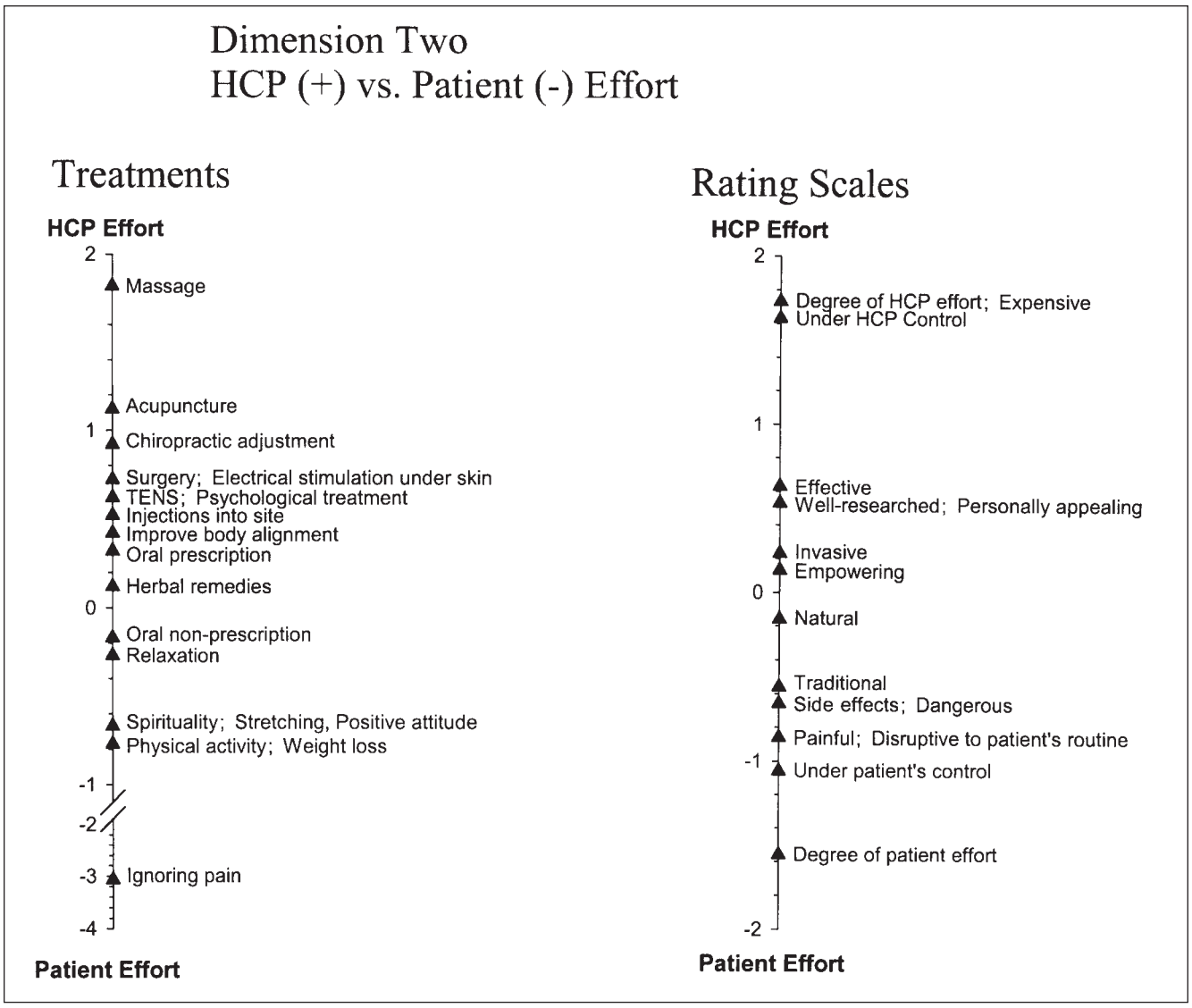

Figure 2 Dimension 2 (health care professional [HCP] effort vs. patient effort) plots. TENS = transcutaneous electrical nerve stimulation.

The distinction between *conventional versus alternative* treatments was clearly evident in the 3rd dimension (Fig. 3), which was anchored by traditional on one pole of the rating scale plot and by natural on the other pole.* That traditional, well researched, effective, disruptive, and painful load near the conventional end of the pole suggests that these were attributes participants ascribed to conventional medical treatments. In contrast, natural, empowering, and under the patient's control were the attributes most closely associated with alternative treatments. That personally appealing loaded closer to the alternative than to the conventional pole suggests that alternative treatments held more personal appeal for this sample than did conventional treatments. Perhaps conventional treatments were regarded more positively in an abstract sense (i.e., dimension 1), yet alternative approaches held more personal appeal (dimension 3).

An examination of the plot of the treatment loadings for dimension 3 indicates that surgery, oral prescription drugs, and injections of medication into the affected site were seen as the most conventional treatments, whereas spirituality, positive attitude, herbal remedies, and relaxation were seen as the most alterna-

*This conventional/alternative dimension was also very apparent in the 3- and 4-dimensional solutions.

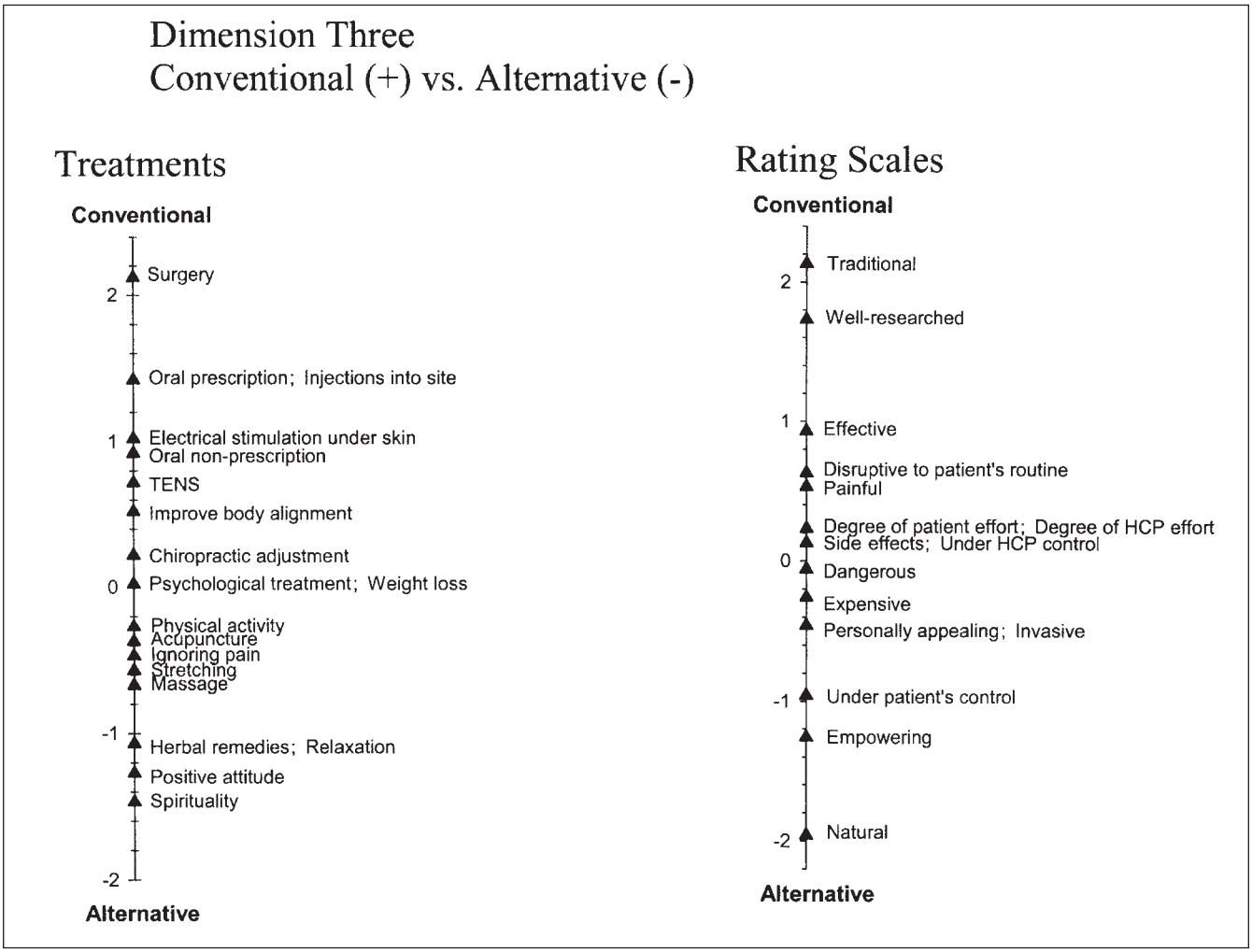

Figure 3 Dimension 3 (conventional vs. alternative) plots. TENS = transcutaneous electrical nerve stimulation; HCP = health care professional.

tive approaches. The large distance between herbal remedies and oral nonprescription drugs (which are arguably equally disruptive to routine, have similar routes of administration, and involve equivalent degrees of patient control/effort) is consistent with our interpretation of this dimension.

The 4th dimension clearly reflected a dimension we labeled *invasiveness* (Fig. 4). The plot of the rating scale loadings is somewhat unipolar, with invasive very strongly anchoring the invasive pole, followed by traditional. The remaining descriptors (including some—dangerous, side effects, painful—that one would have thought would be more closely linked with invasiveness) cluster closely together near the center (i.e., near 0) of the dimensional plot. The plot of the treatment loadings indicates that surgery, electrical stimulation under the skin, and injections of medication into the affected site are regarded as most invasive, whereas positive attitude, relaxation, and physical activity are seen as least invasive. Again, there is a large distance between herbal remedies and oral nonprescription drugs, which suggests that the former are considered less invasive than the latter.

The 5th dimension appeared to reflect the *druglike* attribute (Fig. 5). The plot of the treatment loadings is somewhat unipolar, with oral prescription drugs and oral nonprescription drugs very strongly anchoring the druglike pole. Psychological treatment and spirituality were regarded as the least druglike. Yet again, there is a large distance between herbal remedies and oral nonprescription drugs, which suggests that the former are considered less druglike than the latter. An examination of the loadings of the rating scales indicates that, to the extent to which a treatment is perceived as being

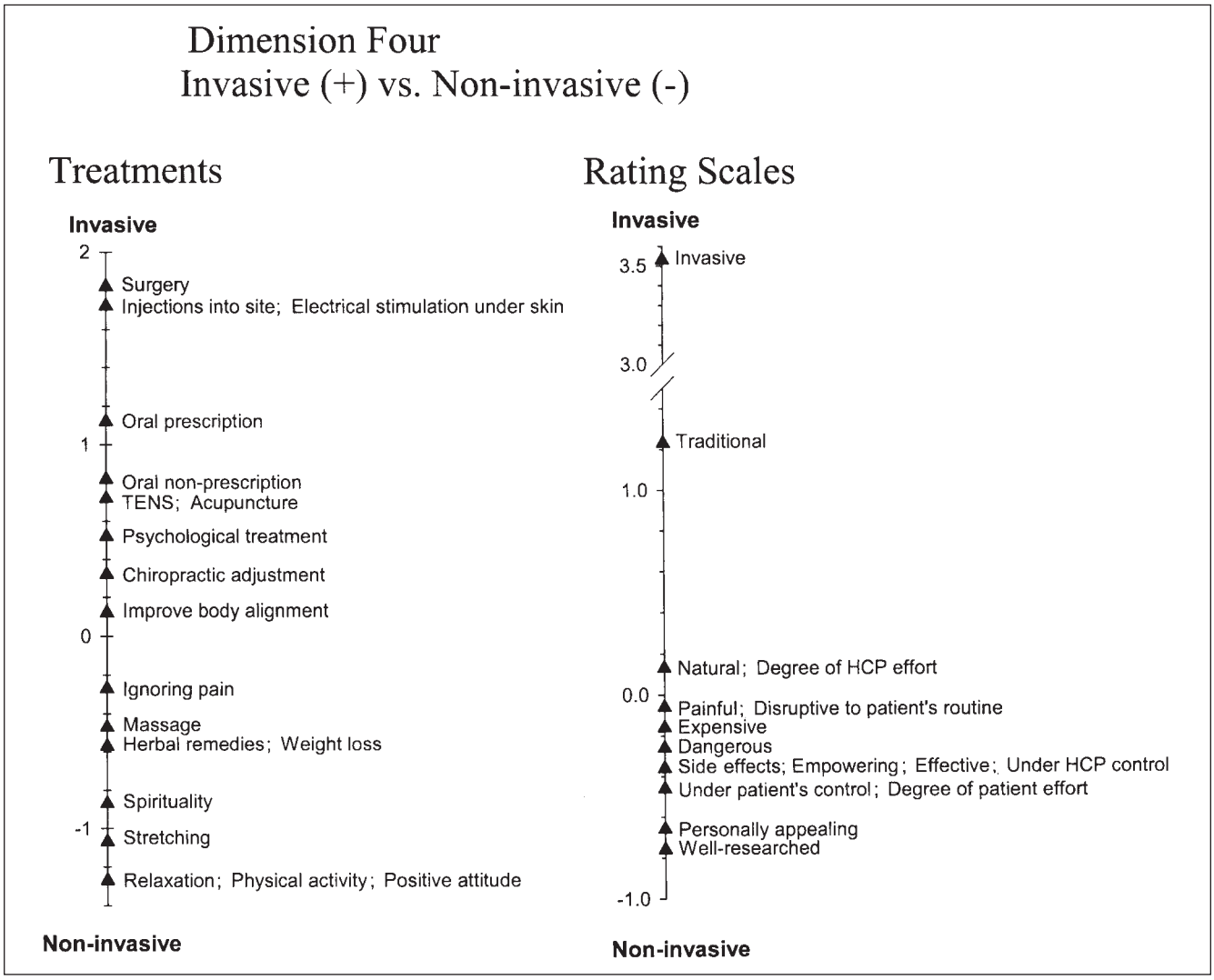

Figure 4 Dimension 4 (invasive vs. noninvasive) plots. TENS = transcutaneous electrical nerve stimulation; HCP = health care professional.

druglike, it is seen to have side effects and be dangerous and *not* be disruptive to the patient's routine or requiring patient effort.

The differences in the positionings of 2 stimuli—nonprescription medications and herbal remedies (both of which are readily available without prescription at pharmacies and, as noted earlier, are equally disruptive to routine, involve equivalent degrees of patient and HCP effort and control, and have the same [oral] route of administration)—provided an interesting vehicle through which to examine how conventional and alternative treatments are differentiated. We further capitalized on this opportunity to differentiate these conventional and alternative treatment exemplars by directly comparing the ratings of these 2 stimuli on each of the 16 rating scales. These data are presented in Table 6.

As one would predict, herbal remedies were rated as much more natural and much less traditional than nonprescription medications. Moreover, as would be predicted by the relative placement of the 2 treatments on the invasive dimension, herbal remedies were seen as less invasive than nonprescription medications. They were also seen as less painful, as less dangerous, and as having fewer side effects.

The 2 treatments were also seen as different with respect to several attributes that had not emerged as salient dimensions in the PARAFAC analysis. Namely,

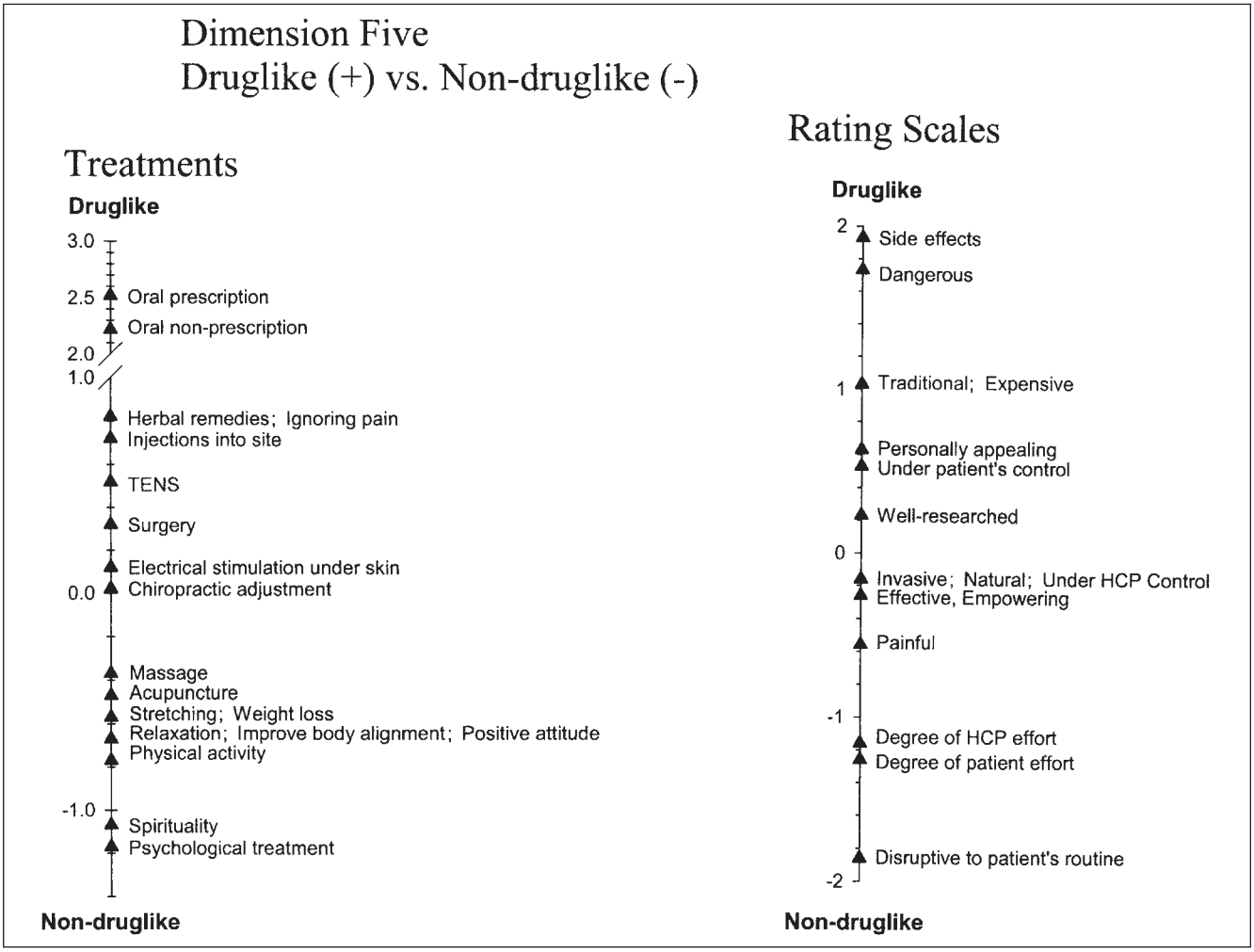

Figure 5 Dimension 5 (druglike vs. nondruglike) plots. TENS = transcutaneous electrical nerve stimulation; HCP = health care professional.

nonprescription drugs were seen as being better researched and, to a lesser degree, more effective than herbal remedies. Moreover, herbal remedies were rated as more "empowering" than nonprescription medications.

Finally, the 2 treatments were rated similarly on several attributes. Specifically, herbal remedies and nonprescription medications were, for the most part, seen as requiring equivalent degrees of patient and HCP effort and as being under similar degrees of patient and HCP control. This is congruent with their proximate loadings on dimension 2 (HCP effort vs. patient effort) (see Fig. 2).

Relationship among the 5 Emergent Dimensions

A matrix of correlations among the dimension weights in the treatment mode dimension for 18 of the 19 treatments/management approaches is presented in Table 7.* These correlations (and the partial correlations presented in Table 8) are presented not to formally test any hypotheses, but instead to provide a con-

*It would not be meaningful to present a correlation matrix of the rating scale mode dimensions, given that this mode was orthogonally constrained in the PARAFAC analysis.

Table 6 Comparison of Mean Ratings for Oral Nonprescription (OTC) Drugs and Herbal Remedies

Rating Scale	OTC Drugs		Herbal Remedies		Mean Difference	*t* Value
Invasive	4.97	(1.99)	3.58	(2.27)	1.38	7.63***
Painful	4.60	(1.16)	3.69	(1.45)	0.90	6.23***
Patient effort	5.30	(2.01)	5.65	(2.19)	–0.36	–2.02*
Effective	5.66	(1.54)	5.05	(2.10)	0.63	3.18**
Well researched	6.57	(1.77)	4.73	(1.96)	1.89	9.31***
Health care professional effort	3.80	(2.26)	4.16	(2.14)	–0.36	–1.51
Natural	4.18	(2.10)	7.32	(1.91)	–3.10	–12.26***
Side effects	5.96	(1.56)	4.69	(1.87)	1.30	7.37***
Expensive	6.35	(1.60)	6.10	(1.75)	0.25	1.60
Disruptive	4.32	(1.69)	4.03	(1.87)	0.30	2.01*
Traditional	6.63	(1.89)	2.51	(2.18)	4.10	15.57***
Empowering	4.83	(1.18)	6.03	(1.52)	–1.20	–7.70***
Appealing	5.41	(2.07)	5.37	(2.56)	0.06	0.23
Patient control	6.41	(1.99)	6.60	(1.88)	–0.17	–0.89
Health care professional control	4.10	(2.24)	4.27	(2.11)	–0.17	–0.71
Dangerous	5.49	(1.71)	4.25	(1.96)	1.26	6.98***

Note: $n = 162$. Possible range of ratings = 1–9.
*$P < 0.05$. **$P < 0.001$. ***$P < 0.0001$.

venient way of observing some potentially interesting general trends.*

It is instructive, for example, to examine the treatment mode correlations involving dimension 3—conventional/alternative. Treatment positions on dimension 3 were highly positively correlated with positions on dimensions 1 ($r = 0.78$) and 4 ($r = 0.88$). Given the interpretation of our dimensions, this would indicate that, to the extent to which a treatment was seen to be an alternative (as opposed to a conventional medical) approach, it was also seen to be noninvasive, and had a positive valence attached to it. It is also regarded as having less druglike properties (i.e., *r* between dimensions 3 and 5 = 0.58). To the extent to which a treatment was seen to be alternative, there was also a slight tendency for it to be regarded as requiring patient (as opposed to HCP) effort (i.e., *r* between dimensions 3 and 2 = 0.37).

It is also notable that variations in loadings on the negative/positive dimension were highly correlated with variations in loadings on the invasiveness dimension (as indicated by $r = 0.95$ between positioning of treatments on dimensions 1 and 4, respectively) and, to lesser degrees, with variations in loadings on the HCP/patient effort (*r* between dimensions 1 and 2 = 0.66) and druglike properties (*r* between dimensions 1 and 5 = 0.45) dimensions.

Given that loadings in several dimensions covaried with loadings on both the negative/positive dimension and the conventional/alternative dimension, it was of interest to determine which, if any, of these dimensions might be interpreted as accounting for the appeal of alternative approaches (i.e., might plausibly be hypothesized to mediate the strong relationship between the positions of treatments on dimension 1 and their positions on dimension 3). This question was addressed through a series of partial correlations, as described below.

*One of the stimuli, ignoring pain, was eliminated from the analysis because it was an outlier in scatterplots of relationships among treatments across different dimensions. Thus, it seemed to behave in a manner quite different than other treatments. As a result, it suppressed the correlations in general and markedly suppressed the correlation between dimensions 1 (negative/positive) and 2 (HCP effort/patient effort).

This is probably because ignoring pain was somewhat anomalous in that it was regarded very negatively, and as requiring high patient effort, whereas most other treatments seen as requiring high patient effort were regarded rather positively. That ignoring pain is seen to involve high patient effort comes as no surprise. However, that it is regarded so negatively is somewhat unexpected, given that distraction is considered to be an adaptive coping strategy for dealing with chronic pain. It may be the case that this young (and largely healthy) sample was spontaneously applying an acute model of pain to chronic pain.

A PARAFAC analysis of the data with ignoring pain omitted resulted in a 5-factor solution that was essentially identical to that obtained with the full set of 19 treatment/management approaches. That is, correlations between the corresponding dimensions on solutions based on 18 versus 19 treatment approaches generally were quite high for the rating scale mode (*r*s = 0.82, 0.92, 0.94, 0.88, 0.98 for dimensions 1 through 5, consecutively) and extremely high for the treatment mode (*r*s = 0.98, 0.98, 0.98, 0.99, 0.99 for dimensions 1 through 5, consecutively).

Table 7 Correlation Matrix of the 5 Treatment Mode Factor Weightings

	Dimension 2 HCP Effort/Patient Effort	Dimension 3 Conventional/Alternative	Dimension 4 Invasive/Noninvasive	Dimension 5 Druglike/Nondruglike
Dimension 1 Negative/positive	0.66	0.78	0.95	0.45
Dimension 2 HCP effort/patient effort		0.37	0.59	0.17
Dimension 3 Conventional/alternative			0.88	0.58
Dimension 4 Invasive/noninvasive				0.52

Note: $n = 18$ (treatments). HCP = health care professional. Because the loadings of the treatment are not independent in the required sense, standard significance tests are not valid. However, to provide a loose guide to what might be considered small versus possibly interesting r values, we note that based on 18 treatments (i.e., $df = 16$), the critical values for significance (2-tailed) would be $r = 0.47$ for $P \leq 0.05$, $r = 0.59$ for $P \leq 0.01$, and $r = 0.71$ for $P \leq 0.001$.

Table 8 Simple and Partial Correlations Elucidating the Appeal of Alternative Treatment Approaches

		Dimension 1 Negative/Positive	Personally Appealing	Effective	Well Researched
Dimension 3	0.78		–0.57	0.39	0.83
Conventional (+)/	*0.76*	(dimension 2 part.[a])	*–0.52*		
Traditional (–)	*0.71*	(dimension 5 part.)	*–0.51*		
	–0.41	(dimension 4 part.)	*0.53*		
	–0.16	(dimension 4 and effective part.)	*–0.07*		
	–0.19	(dimension 4 and well researched part.)	*–0.35*		
	–0.17	(dimension 4 well researched and effective part.)	*–0.38*		
Dimension 1 Negative (+)/positive (–)			–0.84	–0.13	0.43
Personally appealing				0.39	–0.09
Effective					0.74

Note: $n = 18$ (treatments). Partial correlations are italicized.
a. "Part." denotes that the preceding variable(s) has been partialled out.

Basis for the Appeal of Alternative Approaches

To gauge appeal, we used dimension 1 (negative/positive) loadings as well as the mean ratings (i.e., averaged across the 173 participants) for scale 13 (very appealing to you/not at all appealing to you). The correlation between these 2 indices of appeal was reasonably high ($r = –0.84$; see Table 8). Moreover, scale 13 is highly negatively correlated with weights on dimension 4 (invasiveness) ($r = –0.82$; this coefficient does not appear in Table 8), moderately correlated with dimension 3 (conventional/alternative) ($r = –0.57$), and only slightly correlated with dimensions 2 (HCP effort/patient effort) and 5 (druglike) (rs = –0.30 and –0.30, respectively).

As can be seen in the first column of Table 8, the strong positive correlation ($r = 0.78$) between dimension 1 (negative/positive) and dimension 3 (conventional/alternative) is virtually unchanged when dimensions 2 (HCP effort/patient effort) and 5 (druglike/nondruglike) are partialled out (partial rs = 0.76 and 0.71, respectively). However, when dimension 4 (invasiveness) is partialled out, the strong positive correlation between negative/positive and conventional/alternative is not only not eliminated, but reverses direction (to $r = –0.41$). The same pattern occurs when scale 13 (personally appealing) is used as the index of appeal (see column 2 of Table 8; as already mentioned, there is a strong negative correlation [$r = –0.82$] between scale 13 and dimension 4). These data indicate that, when the perceived invasiveness of conventional

approaches is taken out of the equation, participants actually prefer them to alternative approaches. Why might this be the case?

It occurred to us that this reversing of the preference might be due to the perceived effectiveness and/or degree of research support for conventional approaches. Given that neither effectiveness nor research support were dimensions that emerged from the PARAFAC solution, we used the mean ratings of scales 4 (very effective/not at all effective) and 5 (very well researched/not researched at all) to gauge effectiveness. These 2 items were moderately-strongly intercorrelated (r = 0.74). Notably, both were only slightly (and not significantly) correlated with dimension 1 (negative/positive) and the personally appealing rating scale.

The correlations also imply, as one might predict, that conventional treatments were seen as being well researched (i.e., r between dimension 3 and well researched = 0.83) and, to a much smaller degree, effective (r = 0.39). That the partial correlation between personally appealing and conventional/alternative (after partialling out dimension 4) decreases from 0.53 to –0.07 when effective is added as a covariate indicates that perceived effectiveness is an appealing aspect of conventional approaches.* The pattern of results involving the well researched ratings and dimension 1 (negative/positive) loadings similarly suggests that well researched is an appealing aspect of conventional treatments.

DISCUSSION

Methodological Considerations

Undergraduate sample. The first methodological issue concerns the fact that our findings are based on data from a relatively healthy 1st-year sample of undergraduates, who, although having a some experience with CAM approaches in general (see Table 3), and for the treatment of largely acute pain (see Table 4), did not have much direct experience with chronic low back pain nor its treatment. In addition, given their young age (mean = 20 years), they likely also have a relative lack of "world experience." Accordingly, we cannot assume that these findings would generalize to a clinical sample actually considering these treatments. Thus, our research group is in the process of extending this work to include clinical samples of chronic pain patients, namely, those with fibromyalgia and those with rheumatoid arthritis.

We acknowledge that our student population differs from clinical chronic pain samples in ways that could influence their views/ratings of specific treatments. However, based on other sets of data we have already analyzed[45] and are in the process of collecting,[46] we predict that the dimensional structure from the clinical population we are in the process of studying will not be too dissimilar from the one we obtained from our undergraduate sample.

Specifically, in a study aimed at elucidating the attributes of causes of chronic back pain relevant to the lay public,[45] 225 first-year undergraduates rated 17 causes of chronic back pain mentioned in an article appearing in high-circulation magazines, and rated each on 12 explicit rating scales. The data were subjected to PARAFAC analysis, and the 3-factor solution (treatability, HCP vs. patient responsibility/control, and psychological vs. physical) was the most interpretable.

We are currently in the process of obtaining the same set of ratings (albeit with reference to chronic pain rather than chronic back pain) from a clinical sample of chronic musculoskeletal patients drawn from local physical medicine and rehabilitation outpatient practices. We recently analyzed data[46] from our clinical sample thus far (n = 63). The solution suggested the same 3 factors as those apparent in the solution from the student sample. Moreover, the correlations between the corresponding 3-factor loadings of the causes and rating scales from the student and clinical samples were quite high (mean r = 0.85, ranging from 0.73 to 0.94). This suggests that, despite not having much personal experience with chronic pain, a young, healthy, undergraduate sample held views of potential causes of chronic pain that were very similar to those of a chronic pain sample. Thus, we feel that we have reason to be optimistic that the dimensional structure we obtained in this study with undergraduates will be replicated in our current research with the fibromyalgia and rheumatoid arthritis populations.

Choice of rating scales. The 2nd methodological issue to be addressed is the possibility that our study findings were constrained by the specific set of rating scales used. Whereas it was reasonable to attempt to generate a rather inclusive and comprehensive list of treatments using an empirical approach (i.e., with an Ulrich's periodical search as the starting point), this approach would not have been tenable for generating the rating scales. This is because the potential range of treatment properties is extremely large, and having participants provide ratings using a larger set of scales

*That effective and dimension 4 (invasive/noninvasive) are not intercorrelated (r = 0.01) should erase any concern that interpretation of this partial correlation is clouded by multicollinearity.

would have been quite taxing. As it was, the response burden (16 rating scales × 19 treatments = 304 items) to the undergraduate sample in this study was rather heavy, and the tolerance for lengthy ratings scales is likely to be even lower in clinical samples. Accordingly, in our future work with the fibromyalgia and rheumatoid arthritis samples, our aim is to considerably reduce the size of the sets of both the treatments and the rating scales. We will make decisions about what items to include largely on the basis of (treatment and rating scale) PARAFAC item loadings from this study, as well from an ongoing follow-up study with a 2nd undergraduate sample.

To summarize, we were necessarily constrained in the number of rating scales we could include in this study, and will be similarly constrained in future studies. As noted in the Methods section, our choice of rating scales was guided theoretically (as opposed to empirically), based on literature on the health belief model,[39,40] the theory of reasoned action,[41,42] and multidimensional health locus of control,[43] as well as the appeal of CAM therapies.[14–16,44]

These rating scales tapped properties ranging from those based on overall judgments (e.g., rating scale 13—appeal) to those with very specific properties (e.g., rating scale 8—side effects). The rating scales also spanned the spectrum from evaluative attitudes (e.g., rating scale 13—appeal; rating scale 16—dangerous) to judgments about objective descriptive characteristics (e.g., rating scale 5—well researched; rating scale 4—effective). Moreover, some of the items (e.g., rating scale 9—expensive) arguably gauged objective descriptive and evaluative features simultaneously.*

It is difficult to speculate, at this point, how our results were influenced by mixing scales with these different properties. However, we will be paying closer attention to, and indeed will be manipulating, some of these scale properties in our continuing research.

Findings

That a conventional (medical) versus alternative dimension was clearly apparent in the 5-dimensional PARAFAC solution (as well as in the 3- and 4-dimensional solutions) suggests that it is a salient attribute by which people distinguish between treatments (for chronic back pain, at least, and when both types are included in the comparison set). The distance between the placements of herbal remedies and oral nonprescription drugs on the conventional/alternative dimension confirms our interpretation of this dimension.

The most unexpected and striking result is that the data suggest that it is perceived invasiveness and neither efficacy nor patient versus HCP effort that accounts for the appeal of CAM and drives the distinction between CAM and conventional medicine. Although unanticipated, the salience of invasiveness makes intuitive sense. The challenge for us is to better understand the psychological underpinnings of the role that invasiveness plays in the CAM/conventional distinction and in the appeal of CAM approaches.

Before considering the role that invasiveness plays in the CAM/conventional distinction and in the appeal of CAM approaches, we need to consider the possibility that the emergence of this factor is due to our inclusion of surgery as a stimulus. It could be argued that because it is widely reported in the medical and (by extension, presumably) lay literature that surgery is not an effective treatment for chronic low back pain, the appeal of CAM approaches over surgery and the salience of invasiveness might have been driven by the known ineffectiveness of surgery for chronic lower back pain. We would counterargue, however, that these 2 suppositions (i.e., that surgery was seen to be ineffective by our sample, and that its inclusion drove the emergence of the invasiveness dimension) are not supported by our data. First, our participants did not regard surgery as an ineffective treatment/management approach. In fact, of the 19 treatments, it received almost the highest effectiveness ratings (mean = 7.4, *SD* = 1.24), second only to staying physically active (mean = 7.5, *SD* = 1.6). Moreover, an examination of the treatment mode plots for dimensions 1 (negative vs. positive) and 4 (invasive/noninvasive) shows that surgery clusters closely with electrical stimulation under the skin and injections of prescription medication into the affected site, and this cluster anchors the negative and invasive poles. Thus, it is quite likely that invasive would have been an evident dimension even if surgery had not been included in the stimulus set. We therefore conclude that the invasive dimension that we obtained is bona fide. What do we make of it?

An examination of the rating scale mode dimensional plots clearly reveals that invasiveness is not seen to be synonymous with the other arguably adverse properties (e.g., dangerous, painful, associated with side effects) of treatments. That is, "invasive" was the sole anchor of the invasive pole of dimension 4 (see Fig. 4), set quite apart from these other descriptors (which themselves loaded closely together). The disjuncture between invasive and these same descriptors (painful,

*The authors gratefully acknowledge an anonymous reviewer for making this point.

dangerous, associated with side effects) is also evident in loadings on the positive/negative dimension (i.e., dimension 1). In this case, invasive loads near the center (i.e., near 0) whereas these other descriptors load at the negative end of the pole.

Invasiveness, then, is clearly psychologically distinct from dangerousness, painfulness, and side effects. What, then, might invasive be taken to mean (at least by our participants)? A classic dictionary definition of invasive is "tendency to infringe," and invasion is defined as "incoming or spread of something usually hurtful."[47] Applying these definitions to the treatments of chronic pain, one would expect that the more treatments are seen to "penetrate" the body (and possibly psyche), the more intrusive they would be. This sense of the term invasive seems to fit with the dimension 4 treatment mode factor loadings. That is, physical interventions that penetrate the skin (e.g., surgery, injections of medication into the affected site, electrical stimulation under the skin) are seen to be more invasive than those that involve some sort of active musculoskeletal manipulation (i.e., chiropractic adjustment, improving body alignment). These, in turn, are seen as more invasive than more passive physical interventions (e.g., stretching, relaxation). The placement of psychological treatment near the invasive pole is not inconsistent with the popular (and possibly misguided) lay view of psychologists as "shrinks" who can "penetrate" your mind.

What, then, do we make of the fact that oral nonprescription drugs were seen as much more invasive than herbal remedies? Both are substances ingested orally, usually in pill (rather than liquid) form. Accordingly, logically, they should be seen as equally invasive. It is possible that herbal remedies conjured up, for our participants, images of teas, rather than of pills, and teas may be seen to be less invasive delivery vehicles compared to pills. It is also possible that herbal remedies, because they are perceived to be more natural, are less likely than oral nonprescription drugs to be seen as substances foreign to the body, and hence less likely to be judged as intruders or invaders.

Based on our data, we can only speculate about the nature of invasiveness. That is, we cannot determine to what extent invasive denotes an intrusive mode of delivery, denotes foreignness, or has other equally (if not more) important connotations. A deeper insight into this dimension will require further research, which would involve extending the treatment rating scales to include items that tap a range of properties that could be tied to invasiveness. These properties include (but are not necessarily limited to) harsh versus gentle, foreign to the body, and penetrating—all items to be included in the set of rating scales used in our current research project. With this insight, one might be better able to identify (and perhaps thereby minimize) invalid emotional distinctions between alternative and conventional treatments that lead people to make less than optimal treatment choices.

Although not an a priori focus of the study, we were surprised by the relatively little emphasis our participants placed on, and positive valence they attached to, the well researched and the effective treatment attributes. That is, neither the well researched (scale item 5) nor the effective (scale item 4) ratings of a treatment correlated with its personal appeal (scale item 13) (rs = –0.09 and 0.39, respectively). Moreover, the failure of either efficacy or well researched to form their own dimensions (or to both anchor the same dimension) is not attributable to our not having provided any rating scales to tap these attributes. Furthermore, it is not necessary for there to be a rating scale directly tapping a dimension for the dimension to appear; recall that druglike was a dimension even though it was not explicitly tapped by any of the rating scales.

It is possible that efficacy of pain treatments was not a salient dimension because judgments about efficacy (as opposed to judgments about patient vs. HCP effort, druglikeness, and invasiveness) require a knowledge of information that simply does not exist (i.e., the actual efficacy of these various conventional and/or alternative treatment approaches is generally not known) and/or is not available to our study participants.

Efficacy has emerged as a salient treatment attribute in other studies (in which participants likely had more knowledge about the efficacy of the treatments they were judging than our participants did). For example, Erickson[48] and Callan and Gallois,[49] who studied perceptions of contraceptive methods in sexually active Hispanic adolescents and university undergraduates, respectively (all of whom presumably had 1st-hand knowledge about contraceptive methods), found that efficacy of methods was a salient dimension for their study participants. Moreover, in a study of hypothetical treatment decisions among HIV patients where participants were given all the relevant information about 8 treatment options, Rosenfeld et al.[50] found that participants' decisions were not influenced by FDA approval status or by the degree of support in the published literature. Their decisions, however, were influenced by reported likelihood that a treatment would raise CD4+ cell counts—perhaps a more direct index of efficacy for these patients than either FDA approval status or research support.

Our finding that well researched ratings of a treatment did not predict the appeal of well researched is consistent with data from Yardley and Furnham,[51] who found that even medical students—who presumably are taught to appreciate the scientific method—did not take the degree of scientific evaluation into account when deciding how willing they were to try a wide range of CAM and conventional treatments.

It will thus be important to find out whether our rather surprising (and, frankly, troubling) observation that neither efficacy nor degree of research support are salient or desirable treatment attributes is replicated in other clinical/treatment domains, and whether it is manifested in actual (as opposed to hypothetical) treatment decisions about CAM and/versus conventional medicine use. Moreover, if these findings, particularly those with respect to well researched, an attribute closely associated with conventional treatment (see the rating scale plot of dimension 3), are replicated, it will be important to determine why this is the case. As Smith[52] noted, it might be because the lay public does not buy into the nomothetic approach, and thus is not convinced that "knowledge gained from clinical trials is valid in scientific terms [and] that these terms themselves are guarantors of truth" (p. 28). This phrase, "guarantors of truth," hints at the rejection of science as a basis for knowledge.[53] Smith[52] pointed out that "'facts' become . . . elusive when viewed through skeptical, postmodern lenses" (p. 29). Accordingly, it has been suggested that CAM use can be seen as a challenge to conventional medicine's "epistemological authority."[53(p207)]

Future Research Directions

With this initial study, we were able to get some answers to the question of what makes a complementary/alternative treatment alternative and what accounts for its appeal. Equally important is the fact that these results are also hypothesis generating, leading us, for example, to pursue notions of evidence and invasiveness as they pertain to CAM and conventional medicine. There are other new directions this research can take, some of which we consider below.

When one uses a CAM treatment, one is, by definition, choosing to use a nonconventional treatment instead of (i.e., alternative) or in addition to (i.e., complementary) conventional medicine. Thus, in addition to "cold" judgments about the features of treatments, "hot" evaluative judgments likely come into play. As noted earlier, our rating scales included items tapping evaluative attitudes (such as appealing and dangerous) as well as judgments about objective descriptive characteristics (such as well researched and effective). In our future research, we will collect a 1st set of data using scales that only tap judgments of descriptive treatment features and a 2nd set of data based on scales that exclusively tap evaluative attitudes, and will determine whether these different elicitation techniques yield different salient treatment attributes and/or alter the salience of the emergent attributes. This hot versus cold effect has been shown in the relatively emotionally benign domain of consumer product choice[54–56]; arguably it should have a stronger effect when patients' perceptions of treatments for their own illnesses are the focus of study.

In our follow-up research, we will also be using additional methodological approaches that will not involve rating scales, but rather would involve having participants sort treatments into categories of their own making (free-clustering tasks) or have them make judgments about the similarity (or dissimilarity) between pairs of treatments (multidimensional scaling). These methodologies have been used successfully to clarify the basis on which people make distinctions between various classes of health-related stimuli, including nursing interventions,[57] coping strategies,[58] contraceptive methods,[48,49] causal explanations of physical symptoms,[59] and elements of the doctor-patient relationship.[60]

One relative advantage of free-clustering tasks and multidimensional scaling approaches over 3-way rating scale techniques is that because they do not involve experimenter-generated rating scales, they impose minimal a priori structure on participants' judgments. However, a disadvantage of these approaches relative to 3-way rating scale techniques is that they produce only 1 set of factor loadings (rather than 2), which may render interpretation of the factors more difficult.

By comparing the results arising from various methodological approaches (3-way rating scale techniques vs. multidimensional scaling vs. free-clustering tasks; evaluative vs. descriptive ratings), we will be able to determine which treatment features are method invariant and which are not. Those treatment attributes that we observe regardless of the methodological approach by which they are elicited are obviously robust and are thus likely to be very important treatment features. In the case of attributes that are more method dependent, examining the (experimental) conditions under which they are more or less dominant can help clarify the nature of the attribute.

The methodological approach we took in this study, as well as the ones we plan to include in our future studies, enable us to begin to discern treatment attributes that were implicitly important to our participants;

we were not restricted to uncovering only treatment features that our participants were aware of and could report to us directly. Detecting implicit treatment features (via 3-way rating scale techniques, multidimensional scaling techniques, free-clustering tasks, etc.) will provide researchers and, ultimately, health care consumers with a fuller understanding of why they are drawn to the treatments they are choosing. Making implicit values explicit will lead to more informed consumers; only when people are aware of all the attributes upon which they are judging treatments will they be able to critically evaluate their subsequent treatment options.

Increasing recognition of the importance of having well-informed health care consumers has led to the development of patient-oriented decision aids for a growing number of health conditions such as breast cancer,[61,62] prostate cancer,[63] stroke,[64] and menopause.[65] As noted by O'Connor et al.,[66] it has been difficult to gauge the effectiveness of these decision aids, in part because of the absence of standardized measures for judging efficacy. Nevertheless, a review of the literature on the feasibility and effects of decision aids published in this journal concluded that the overall effects of decision aids on such outcomes as decisional uncertainty, satisfaction with one's decision, and health status have been "rather modest."[67] Molenaar et al. pointed out the need for more better-controlled studies, as well as ones in which the development of the decision aids are guided by an "explicit theoretical model of the important factors related to patient's decision making."[67] They further suggested that "this model should delineate the type of information that is important to patients while making choices."[67(p125)]

We are, however, of the view that a better starting point for the development of decision aids would be to determine the attributes (e.g., of treatments, outcomes) that are salient to patients. This information then can provide an empirical basis upon which a more informed theory of patient decision making can be derived. Moreover, by structuring decision aids around what actually *is* important to patients rather than what we theorize *should be* important, we will render them more useful to patients. Thus, answers from studies using methodologies similar to the one we have used here can help us make decision aids more user oriented (i.e., friendly) and thus probably more effective.

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