

Acupuncture Outcomes, Expectations, Patient–Provider Relationship, and the Placebo Effect: Implications for Health Promotion

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As the future of public health unfolds, it is important to recognize the potential contribution of complementary and alternative (CAM) treatments such as acupuncture.¹ The World Health Organization has provided guidelines for safe administration of acupuncture and effective training of practitioners.² The US Food and Drug Administration estimated that 9 to 12 million acupuncture treatments by Chinese medicine practitioners took place annually in the United States in the early 1990's.³ A 1994 estimate indicated that the number of US medical doctors and osteopaths increased 6 times, from 500 to 3000, in the preceding decade, and that about 7000 nonphysicians nationally used acupuncture in conjunction with herbs, massage, and other traditional Eastern techniques to treat a broad range of illnesses.⁴

Many Americans who seek Chinese medicine for relief of biological, musculoskeletal, and psychosomatic symptoms that are commonly managed by family physicians, chiropractors, or mental health professionals do so because they are dissatisfied with medical treatment (55.7%) or need a last resort (9.2%). Others (33.5%) are curious, pressed by friends, or attracted to holistic treatment.⁵ A survey of 200 first-time users of Chinese medicine in San Francisco indicated that only about 10% of the patient–subjects were referred to an acupuncturist by a medical doctor (1%) or nonmedical health care professional (8%); most (91%) of these users were referred by acupuncture student practitioners (28%), people in their lives (41%), or published advertisements and articles (15%), or were self-referrals (8%).⁵

Acupuncture embraces mind–body holism, pragmatism, naturalism, harmony of the opposites, and the manipulation of *qi* or *chi*.^{6–7} According to acupuncture theory, *qi*, the life energy, flows in the body through channels called the Meridian (*jing-luo*). Any dishar-

mony or blockage of *qi* will lead to dysfunction. Acupuncture involves inserting needles into acupoints in the Meridian. Acupuncture and *qi* are incredible to some scientists, who wonder if acupuncture users are just collectively deluded; other critics cite the placebo effect as the reason for acupuncture's alleged positive outcomes. Randomized clinical trials, however, have demonstrated acupuncture's promising results and efficacy in adult postoperative pain, chemotherapy, pregnancy-related nausea, emesis, and postoperative dental pain.^{8–12} Even the least promising clinical findings suggest that acupuncture should be included in a comprehensive treatment program for substance abuse and asthma.^{13–14}

High-quality anecdotal reports of acupuncture outcomes are now required, and a forceful debate has begun to challenge the total reliance on randomized clinical trials to control placebo effects.^{15–17} It is important to determine whether any confounding variables, such as placebo effects, patient expectations, client–practitioner relationships, and other general factors such as demographics and so-

ciopolitical issues, may affect patients' perceived outcomes. This study attempted to explore how health and acupuncture treatment goals and outcomes may be affected by a patient's degree of hopefulness, treatment expectations, health locus of control (i.e., attributions of health status), beliefs about mind–body dualism, health maintenance behaviors, and other relationship factors in treatment.

METHODS

Sample and Procedures

Participants were new acupuncture patients who completed both the initial and follow-up interviews (n = 62). The sample represents a highly educated population that is acquiring acupuncture as a relatively novel treatment. More than 75% are women; more than 90% are White. About 60% are between 30 and 49 years; roughly 65% completed college, and of these, 30% received at least 1 graduate degree. Ninety-two percent of the sample are US-born, and 95% speak English as their first language.

Objectives. To explore whether treatment outcomes are associated with a patient's degree of general hopefulness, expectations regarding treatment, attributions of health status, beliefs about mind–body dualism, and patient–provider relationship factors, I studied acupuncture patients' goal attainment.

Methods. Sixty-two acupuncture patients were interviewed before and after acupuncture regarding goal attainment, mind–body beliefs, hopefulness, and attributions of health status. Demographics, acupuncture treatment, and health care usage information was also collected. Acupuncturists provided 3 months of treatment.

Results. Patients reported treatment goal attainment from acupuncture. Their perceived outcomes were not associated with previous treatment, patient demographics, or the expected and actual numbers of needle insertion. Successful outcomes were related positively to number of different CAM treatments used in the past year but negatively to patients' expectations and the "Powerful Others" health locus of control dimension.

Conclusions. Perceived acupuncture outcomes seem not to be related to placebo effects and patient expectations, but rather to client–practitioner relationship factors. (*Am J Public Health.* 2002;92:1662–1667)

All of the participants were recruited from an acupuncture institute and private practitioners in the metropolitan areas of Baltimore, Md and Washington, DC, through advertisements posted at acupuncture clinics and solicitation letters sent to acupuncturists. A snowballing sampling procedure was also used to ensure that the acupuncture treatments stemmed from the same technique, called Five Elements Traditional Acupuncture. A standard project description and confidentiality assurance procedure were used in the participant recruitment process. Patients who underwent more than 3 pre-enrollment needling sessions were excluded.

Two standardized, structured interviews were conducted with each participant privately. The initial 40-minute interview covered the background questionnaire and pretest measurements. A standard course of acupuncture was then administered by the participant's acupuncturist. After 9 sessions or 90 days from the initial interview, whichever came first, the researcher recontacted the participant for a brief interview to complete the posttest. In both interviews, participants were reminded that acupuncturists had no access to their responses.

Measures

Whereas all 5 measures were administered at the baseline interview, only 1 measure was administered at the posttest follow-up.

- The *Goal Attainment Score* (GAS) rates individualized potential outcomes on a 5-point scale and uses each patient as his or her own control.^{18–19} The scale requires participants to set treatment goals, weigh the importance of each goal on a 9-point scale, and describe the expected goals in measurable terms at 5 possible levels (1 = most favorable outcome; 5 = least favorable outcome). For each goal, participants rated their attainment of each goal twice, once at the intake and once at the follow-up. The difference between the 2 ratings provided a weighted GAS.

- The *demographic and health care questionnaire* asked about a participant's sex, age, race, education, country of origin, and language as well as his or her past and current acupuncture treatments and other forms of health care used in the 12 months prior to the study.

- The *Dualism Scale* requires participants to rate 27 statements about mind–body relationships on a 5-point scale. Items include “mental processes cause changes in brain processes” and “minds are in principle independent of bodies.”²⁰ The total score is the sum of item scores. A higher score represents a more dualistic conceptualization of mind–body relationships. Previous authors reported a Cronbach α of .71 for this scale.²⁰

- The *Herth Hope Index* measures degree of general hopefulness regarding by asking the participants to rate 12 items, such as “I see a light in a tunnel,” on a 4-point scale. Previous authors reported an α -coefficient of .97, a 2-week test–retest reliability of .91, and well-established criterion-related validity for this index.^{21–22}

- The *Multidimensional Health Locus of Control Scale* (MHLC) *Form A* captures people's attributions of their health status.^{23–25} On a 6-point scale, participants rate 18 statements, such as “health professionals control my health” and “my good health is largely a matter of good fortune.” Three dimensions were developed: (1) Internal Health Locus of Control; (2) Powerful Others Health Locus of Control; and (3) Chance Health Locus of Control. Previous authors reported Cronbach α coefficients ranging from .67 to .77 for this instrument, as well as reliability ranging between .83 and .86.²³ For this study, I used the term “physicians” instead of “health professionals.”

RESULTS

Perceived Outcomes

A paired sample *t* test on the GAS yielded a significant difference between the pretreatment and posttreatment conditions ($t^{62} = 14$; $P = .000$) that indicated improvements in posttreatment conditions as perceived by participants. To better understand how acupuncture might have resulted in perceived improvements, correlational analyses were conducted to examine the relationship between goal attainment and 2 acupuncture treatment variables. The first of these variables was the number of needling sessions a patient received before he or she agreed to participate in the study. Depending on the patient's cooperation level and rapport with the service provider(s), it might take more or fewer sessions before he or she agreed to participate in the study and underwent the initial

interview. Forty-three percent of the sample received 3 acupuncture sessions before the initial research interview, 23% to 25% received 1 or 2 treatments, and the rest received none. The average number of sessions before the initial interview was 2.09. A correlation analysis showed no association between the number of pre-enrollment sessions and perceived outcome: the number of sessions before the initial interview did not influence a patient's acupuncture goal attainment. In other words, a patient's prompt agreement to participate in the study did not enhance the perception of positive outcomes.

The contribution of the second acupuncture treatment variable, patients' anticipated frequency of treatments, to goal attainment was examined because higher expected treatment frequency often implies more severe conditions. Seventy-four percent of our participants anticipated weekly sessions in the first 2 months of treatment. The average anticipated frequency was 3.77 sessions per month. The Pearson *r* showed no association between anticipated treatment frequency and goal attainment, which implies that patients' chances of attaining their treatment goals did not depend on the severity of their conditions.

To examine whether the number of acupuncture treatments received would predict goal attainment, an analysis of covariance was conducted with GAS as the dependent variable and number of needling sessions between the initial and follow-up interviews as the predictor variable. The main effects for number of needling sessions were adjusted for a covariate: number of different types of health care used during the 12 months preceding the study. Although the analysis failed to demonstrate significant main effects for number of needling sessions, it again showed a significant effect for number of different health care modalities used in the 12 months preceding the study ($F^1 = 4.59$; $P = .04$). One interpretation of these results is that the number of treatments received is not as important as the fact that patients received some acupuncture treatment.

Sociodemographics of Sample

Another series of analyses was conducted to examine the determinants of patients' perceived positive outcomes. In analyses of the

associations between the sociodemographic variables and acupuncture treatment outcome, GAS did not correlate with participants' sex, age, race, education level, place of birth, or first language. To examine the possible sociopolitical influences of competing health care systems, I analyzed 2 client–practitioner relationship variables hypothesized to influence patients' perceptions of positive acupuncture outcomes. In the context of the first of these variables, patients' willingness to tell their physicians that they are receiving acupuncture treatment, “physicians” refers to the physicians whom patients consulted about the same health issues.

Many acupuncture patients, disappointed with conventional Western biomedicine, try acupuncture as an alternative, long-term health care approach. As previously mentioned, only about 1% of acupuncture patients are referred to an acupuncturist by their physicians.⁵ Although at the outset of this study some patients reported that they had minimal contact with their physicians, most (77%) reported that they had already told or would tell their physicians that they were receiving acupuncture treatment. Patients' willingness to tell their physicians about such treatment depends at least partly on their confidence in their health care providers (both physicians and acupuncturists). Our analysis did not find any association between goal attainment and patients' willingness to inform their physicians about their acupuncture treatment, which indicates that patients who were willing to inform their physicians of their acupuncture treatment were *not* more likely to perceive positive outcomes from acupuncture.

The second client–practitioner relationship factor examined was physician gender. Whereas most of the patients in the sample were female, about two thirds of the patients' physicians were male. Most of the acupuncturists were female. An inference could be made that the female patients in the current study were dissatisfied with the male-dominated biomedical health care system and thus were more likely to report positive outcomes from acupuncture, a field in which women are much better represented as both providers and clients. However, in another correlation analysis, goal attainment was not associated with physician gender.

Use of CAM Treatments

Patients' use of CAM treatments was also examined. Forty-one percent of participants had used 4 or fewer different types of health care services in addition to acupuncture in the previous year, and 59% had used at least 5 different types of such services. A test of association conducted with the point-biserial correlation coefficient (r_{pb}) indicated a significant relationship between GAS and number of different CAM treatments used in the past year ($r_{pb} = .36$; $P = .004$), which means that high goal attainment correlated with use of a high number of intervention types. This predictive utility of prior use of CAM interventions raises the question of whether acupuncture patients' goal attainment depends on current acupuncture treatment or past CAM interventions. One possible explanation for the associations observed is the presence of a spurious correlation between goal attainment and number of CAM treatments used in the previous year. A more probable interpretation is the presence of other important confounding factors. For example, patients who engage in a higher number of health maintenance activities may be more aware of changes in their health and thus more ready to report positive outcomes. Their illness recovery may also have been enhanced by their positive coping strategies or by the CAM health care, or both.

I attempted to identify which types of CAM interventions might have contributed to perceived acupuncture outcomes. Among the 24 types of CAM interventions and self-care activities on our list, only 12 were used by more than 10% of the patients: chiropractic (19%), exercise (68%), dietary/nutrition therapy (26%), herbs (23%), homeopathy (14%), medical care with medical doctor (59%), psychotherapy (23%), prayer/meditation (48%), support group/12-step program (15%), tai chi/yoga/qigong (14%), therapeutic massage (31%), and vitamins/minerals (57%). The association between each modality and acupuncture goal attainment was evaluated by an analysis of variance (ANOVA) for each of the 12 CAM interventions. Each of these ANOVAs used GAS as the dependent variable and presence/absence of each type of treatment as the predictor variable. Only use of homeopathy in the past year was found to be significantly associated with GAS ($F^{1,61} = 5.82$;

$P = .0188$). This association is interpreted below, with cautions upon future analyses.

Correlates of Acupuncture Outcomes

I hypothesized that acupuncture goal attainment would be associated with beliefs regarding mind–body dualism, degree of hopefulness, treatment expectations, and health locus of control. Use of homeopathy and of other CAM interventions were added as control variables. Table 1 shows the following significant correlations: (1) GAS is correlated with patients' expectations from acupuncture, use of homeopathy in the preceding year, and number of different CAM treatments used in the preceding year; (2) hopefulness is also correlated with the “Chance” health locus of control dimension; (3) expectations from acupuncture are correlated with the “Powerful Others” health locus of control dimension and with homeopathy use; and (4) among the health loci, chance is correlated with the “Internal” and the “Powerful Others” health locus of control dimensions.

A multiple regression analysis was employed with 2 control variables (homeopathy use and number of CAM treatments used in the year preceding the study) to test the relationship between GAS and 6 patient predictor variables: (1) belief in mind–body dualism, (2) hopefulness, (3) positive expectations from acupuncture treatment, (4) “Internal” health locus of control, (5) “Chance” health locus of control, and (6) “Powerful Others” health locus of control. All 8 variables were entered simultaneously. Table 2 shows that these variables together accounted for 37% of the variance in GAS.

An F test in the ANOVA format revealed a linear relationship between the patients' GAS and the predictor and control variables combined ($F^{8,53} = 3.94$; $P < .01$). The β weights of all 8 variables in Table 3 indicate that (1) patients' expectations from acupuncture and the “Powerful Others” health locus of control dimension significantly determined GAS; (2) the first control variable, number of different types of CAM interventions used in the 12 months preceding the study, showed significant associations with goal attainment, and (3) the second control variable, homeopathy use, was not significant with regard to patients' self-perceived goal attainment.

TABLE 1—Correlation Matrix for Goal Attainment Score, 6 Dependent Variables, and 2 Control Variables (n = 62)

	GAS	Belief in mind-body dualism	Hopefulness	Treatment expectations	IHLC	CHLC	PHLC	Use of homeopathy	No. of CAM treatments used
GAS03	.20	-.36**	.17	-.07	-.18	.31**	.36**
Belief in mind-body dualism	19	-.17	.16	.04	.01	-.03	.21
Hopefulness			...	-.18	.17	-.29*	-.11	.03	.06
Treatment expectations				...	-.19	.10	-.23*	-.25*	-.09
IHLC					...	-.60**	-.16	.13	.19
CHLC					33**	-.09	.07
PHLC							...	-.11	.10
Use of homeopathy							12
No. of CAM treatments used									...

Note. GAS = Goal Attainment Score; IHLC = Internal Health Locus of Control; CHLC = Chance Health Locus of Control; PHLC = Powerful Others Health Locus of Control; CAM = complementary and alternative medicine.

*P < .05; **P < .01.

trast, a patient's beliefs about mind-body dualism, degree of hopefulness, the "Internal" and the "Chance" health locus of control levels, and use of homeopathy in the 12 months preceding the study are not related to GAS.

DISCUSSION

Participants' reports of goal attainment levels indicated positive outcomes from acupuncture treatment. This finding coincides with the anecdotal clinical literature on acupuncture effectiveness, including a multisite, large-scale research project that studied patients from 2 of the same clinics accessed in this study and found that the overwhelming majority of patients felt very or extremely satisfied.²⁶⁻²⁷ Our finding illustrates the importance of examining outcome from the patient's perspective. Patients' beliefs and perceptions determine their satisfaction with their quality of life and health status, compliance with treatment, and future health-promoting behavior.

Our findings also indicate that acupuncture patients' perceived positive outcomes were consistent across sociodemographic subgroups. Patients' reports of improvement were influenced by only a few of the treatment variables, patient variables, and practitioner variables that I checked in our analyses. Nonetheless, the fact that number of CAM interventions used in the past year correlated with goal attainment raises the question of

TABLE 2—Simultaneous Regression Analysis for 6 Dependent Variables and 2 Control Variables Predicting Goal Attainment Score (n = 62)

Multiple R	0.61
R ²	0.37
Adjusted R ²	0.28
SE	2.38

Note. R = multiple correlation coefficient; R² = coefficient of multiple determination; SE = standard error.

Summary of Results

A patient's expectations from acupuncture treatment and "Powerful Others" health locus of control level are predictors of his or her GAS. The negative signs of the patient's β weight indicate that the lower a patient's expectations from acupuncture and the weaker his or her "Powerful Others" health locus of control, the higher that patient's GAS. By con-

TABLE 3—Summary of Regression Coefficients From Simultaneous Regression Analysis for 6 Dependent Variables and 2 Control Variables Predicting Goal Attainment Score (n = 62)

Predictor Variables	B	SE B	β	T	Sig T	Tolerance	VIF
Belief in mind-body dualism	-.03	.03	-.14	-1.15	.26	.86	1.16
Hopefulness	.07	.06	.13	1.43	.26	.85	1.17
Treatment expectations	-1.64	.55	-.37	-2.98	.004**	.78	1.28
IHLC	.03	.10	.04	.28	.78	.56	1.78
CHLC	.07	.09	.12	.80	.43	.52	1.94
PHLC	-.21	.08	-.30	-2.44	.02*	.79	1.27
Use of homeopathy	1.17	.96	.14	1.22	.23	.88	1.14
No. of CAM treatments used	1.95	.66	.34	2.96	.00**	.87	1.15
Constant	44.72	5.02		9.61	.00**		

Note. B = unstandardized coefficient; SE B = standard error of unstandardized coefficient; β = standardized coefficient; T = coefficient; Sig T = significance of T coefficients; VIF = variance inflation factor; IHLC = Internal Health Locus of Control; CHLC = Chance Health Locus of Control; PHLC = Powerful Others Health Locus of Control; CAM = Complementary and Alternative Medicine.
*P < .05; **P < .01.

Statistical Precautions

Special care was taken to ensure that the collinearity among the predictor variables did not invalidate the β weights. The high tolerances and low variance inflation factors for all 8 variables reported in Table 3 suggest a limited impact of collinearity on β weights. In addition, the eigenvalues and variance proportions of each β weight in Table 4 indicate that for the same eigenvalues, the variance proportions of the several variables are not consistently high, which suggests that the high correlations did not degrade the β weights. The regression coefficients and the β weights are thus meaningful.

TABLE 4—Collinearity Diagnostics for β Weights of Variables Predicting Goal Attainment Score

Index	Eigenvalue	Condition Index	Variance Proportions									
			Constant	Belief in Mind-Body Dualism	Hopefulness	Treatment Expectations	IHLC	CHLC	PHLC	Use of Homeopathy	No. of CAM Treatments Used	
1	7.72	1.00	.00	.00	.00	.00	.00	.00	.00	.00	.82	.00
2	.88	2.95	.00	.00	.00	.01	.00	.00	.00	.00	.82	.00
3	.21	6.13	.00	.00	.00	.69	.00	.00	.00	.03	.08	.00
4	.10	8.61	.00	.00	.01	.00	.02	.25	.06	.03	.03	.00
5	.05	12.88	.00	.02	.01	.14	.00	.22	.82	.03	.03	.00
6	.02	21.83	.00	.01	.64	.01	.22	.02	.01	.00	.00	.03
7	.01	25.62	.00	.95	.05	.04	.11	.11	.04	.02	.02	.04
8	.01	30.31	.00	.00	.02	.00	.36	.19	.00	.01	.01	.84
9	.00	50.54	.99	.02	.27	.11	.29	.21	.04	.00	.00	.09

Note. IHLC = Internal Health Locus of Control; CHLC = Chance Health of Locus; PHLC = Powerful Others Health Locus of Control.

which variable was most important in determining acupuncture goal attainment: current acupuncture treatment, previous use of CAM interventions, or other confounding factors. Because I found a negative correlation between positive expectations from acupuncture and goal attainment, I conclude that the higher a patient's treatment expectations, the less favorable his or her outcome.

I explain this paradoxical finding by speculating that those with very high expectations about acupuncture are more likely to be disappointed with its results and thus are less likely to perceive and report positive outcomes than those who use acupuncture only as a last resort. A second, alternative interpretation is that perceived positive outcomes cannot be a placebo effect, because if they were, the more patients expected from acupuncture, the more, not less, positive their outcome would have been. Five Elements Traditional Acupuncture, the type of acupuncture received by our participants, emphasizes the client-practitioner relationship. This negative relationship between patient expectation and perceived outcome may be specific to Five Elements Traditional Acupuncture, because this technique requires patients to actively cooperate with treatment rather than passively await treatment results. The finding on the "Powerful Others" health locus of control dimension appears to support this second interpretation.

The negative relationship between acupuncture goal attainment and the "Powerful Others"

health locus of control dimension suggests that the more control a patient assigns to the treatment provider, the less likely that patient is to achieve his or her treatment goals. Again, I speculate that because of the collaborative emphasis in Five Elements Traditional Acupuncture, the treatment would not be as effective for a patient who believes that the acupuncturist has sole responsibility for improving the patient's health. The implication for health promotion is that if patients want to reach their health-related goals, they should not *passively expect* from health care providers but instead *actively cooperate* with them. Therefore, health care providers and educators should emphasize provider-patient collaboration and promote patients' self-care health behavior.

Study Strengths

A major strength of this study is that it was based on community field research involving people in realistic clinical situations. Noninvasive procedures were employed, and patients were interviewed in treatment rooms where they normally receive treatment. I did not attempt to manipulate any of the clinical variables and environments. Thus, this study has high generalizability and good face validity for acupuncture *effectiveness*—that is, positive perceived outcomes and self-reported improvement in quality of life. Studies of acupuncture *efficacy*, by contrast, address the question of improvements in placebo-controlled, experimental conditions, using ob-

jective outcome measures. Because our project did not propose to examine the question of acupuncture efficacy, our methodology was not designed to strictly control many clinical variables, as in randomized clinical trials. However, this study achieved more than a user satisfaction study can because its flexible use and standardized adaptation of the GAS allowed us to elucidate each acupuncture seeker's specific definitions of treatment goals.

Recommendations

Because all of our research participants received Traditional Acupuncture, a method that emphasizes the Five Element approach in Chinese medicine, interpretation and generalization of our findings should be done cautiously. It is also recommended that future research explore acupuncture's long-term impact, because acupuncture is often used both for long-term health maintenance and for short-term symptom reduction. Additionally, it seems appropriate to investigate further the client-practitioner relationship and relational factors involved in health care. The negative relationship between treatment expectation and perceived outcome and the relative salience of the "Powerful Others" health locus of control dimension should draw our attention to the client-practitioner relationship as well as factors such as trust, interpersonal style, rapport, and self-care. Better ways of measuring client-practitioner relationship and rapport are needed. Finally, patient-focused

effectiveness research should be continued with qualitative methods to tap into treatment *efficiency*, but balanced with randomized clinical trials and placebo-controlled laboratory experiments to tap into treatment *efficacy*. All in all, I recommend that further research evaluate general factors across treatment modalities and integrate variables in realistic situations in addition to isolating factors in laboratory experiments. ■

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Human Participant Protection

The University of Maryland Department of Psychology Human Subject Review Committee determined that participants in this study were not at risk and approved this study.

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