

# **Developing a Measure of CAM Orientation among Allopathic Primary Care Providers**

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by

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CERTIFICATE OF APPROVAL

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## **ABSTRACT**

*Background:* Nearly forty percent of Americans use some form of complementary and alternative medicine (CAM). A large proportion of CAM users do not disclose their use to their primary care physician, and many allopathic physicians do not ask their patients about CAM use. Lack of open dialogue about CAM leaves physicians uninformed about the health behaviors and practices of their patients, compromising the quality of care provided. Physicians' orientation toward CAM may influence their level of engagement in open dialogue about alternative health practices with their patients.

*Purpose:* The purpose of this study was to develop and assess the validity of a conceptually driven measure of CAM orientation using survey data collected from 795 allopathic providers across the United States.

*Methods:* Structural equation modeling was used to examine possible factor structures of a measure of CAM orientation using existing survey items. Correlations between CAM orientation and measures of cultural competence were performed to assess convergent validity. Multiple regression analyses were performed to identify predictors of CAM orientation.

*Results:* The resulting 7-item measure included three sub-constructs of CAM orientation; *receptive*, *closed*, and *active*. Overall CAM orientation scores were highest among female physicians and physicians who spend >15 minutes with each patient. Physicians who spend more time with each patient are also significantly more *active*. Male physicians were significantly less oriented toward CAM overall, less *receptive*, less

*active* and more *closed*. Increasing number of years in practice was associated with lower CAM orientation.

*Conclusions:* We have developed a measure of CAM orientation with potential for use as a tool in medical education to evaluate the impact of CAM curriculum on CAM orientation. The final factor structure informs our understanding of the broad concept of CAM orientation. Further validation in a unique sample of allopathic primary care providers is warranted.



## **INTRODUCTION**

Public use of complementary and alternative medicine (CAM) has dramatically increased in recent years. The 2007 National Health Interview Survey (NHIS), which included a comprehensive survey of CAM use by Americans, showed that approximately 38% of all adults and 12% of children use complementary health practices (1). Smaller surveys of primary care clinic populations have also demonstrated high CAM use, showing that between 21% and 58% of patients use CAM; often for the same conditions for which they are receiving conventional allopathic care (2, 3). Many Americans use complementary therapies along with multiple other therapies to manage chronic medical conditions such as cancer, diabetes, back pain, and depression. Patients report using CAM for a number of reasons, including to improve their general health and well-being (3–5), to promote emotional health (6), to treat symptoms associated with chronic diseases, and to relieve side effects of conventional treatments (7).

The definition of CAM has evolved over recent years. Generally, CAM includes a broad range of therapeutic practices and diagnostic methods, including ancient healing therapies and new-age approaches to disease prevention and treatment. As explained by the National Center for Complementary and Alternative Medicine, ‘complementary medicine’ refers to therapies that are not part of conventional allopathic medicine, but are used along with conventional therapies, while ‘alternative medicine’ refers to the use of unconventional therapies in place of conventional therapies. The term CAM refers to both of these; systems of medicine that exist outside of (alternative) and alongside of (complementary to) biomedicine (8). Practitioner provided services such as acupuncture and naturopathic medicine, as well as self-administered therapies and nutritional supplements are all included in the definition of CAM.

## **Ensuring High Quality of Care**

One of the most influential frameworks for health care quality assessment is the one put forth by the Institute of Medicine (IOM), which includes specific aims for health care systems (9). Two important aspects of quality of care are patient-centeredness and attending to patient safety. It is the physician's role to strive to accomplish both aspects in every step of the process of patient care.

Patient-centered care refers to the coordination of health care around the needs of the patient. Customized treatment recommendations and shared decision-making between patients and physicians are key components of this approach to care (10). This includes working with patients as partners in their healing process, understanding the whole person, promoting health, and enhancing the doctor-patient relationship (11). In order to provide this level of individualized care, physicians must be engaged and committed to examining the specific circumstances that contribute to the patients' health. Physicians who practice patient-centeredness strive to understand their patients' personal health behaviors, coping skills, beliefs about disease and illness, and preferences for healing practices and therapies, including those that may fall outside of biomedicine. The therapeutic partnership that results when care is patient-centered supports open dialogue about health care practices and beliefs about illness and well-being. Medical doctors need not be experts in complementary therapies in order to practice this type of patient-centeredness, but they need to be open to dialogue with each patient about all relevant healing practices.

Active communication is an essential element of high-quality care, and patients should feel safe discussing their concerns and preferences for treatment with their physician. Unfortunately, many CAM users fear stigma from primary care providers for their CAM use

(12, 13). Don Berwick, the leading advocate for high-quality health care in the United States, describes a culture of safety as one of openness, honesty, and disclosure (9). Interactions in which patients fear stigma from their providers are not productive interactions. Physicians who do not specifically ask about CAM therapies may miss important information about their patients' self-care practices and medical preferences. When understudied therapies are used as a complement to conventional therapies, the potential for interactions can be concerning. This is especially true when the prescribing physician is unaware of other therapies that their patients may be using. As such, it is the duty of the primary care physician to inquire about their patients' use of CAM therapies in order to provide high-quality health care and appropriate referral.

### **Disclosure of CAM Use**

Despite increased CAM use and acceptance in the United States, many patients do not proactively disclose CAM use to their primary care physicians (14, 15). A large national household telephone survey conducted in 1991 showed that 34% of respondents had used at least one alternative therapy in the prior 12 months, and only 1% of them had disclosed their use to their primary care physicians (16). This was the first survey to alert allopathic providers that many of their patients were using CAM therapies on their own. A 1997 follow-up survey demonstrated an increase to 40% in CAM use, with no significant change in disclosure rates (17). A 2010 survey of adults aged 50 or older demonstrated improvements in disclosure among this age group, where 58% of those who reported ever using CAM practices had discussed them with a health care provider (18). Across these studies, the primary reasons for nondisclosure of CAM use to medical providers were that

patients did not know that they should tell their providers about their use of CAM practices, and that providers did not ask their patients about CAM use.

Nondisclosure of CAM can threaten patient safety and quality of care. The use of herbs, drugs and nutritional supplements in combination presents the potential for dangerous interactions to occur. Some natural products can increase or potentiate levels of other medications in the body. In addition, many natural products sold over-the-counter are not standardized to specific ingredients or amounts, and herbal constituents may differ depending on what plant parts are used and method of extraction (19). Patients do not always consider these supplements as medicines, and often do not inform their primary provider that they are using natural remedies or supplements. As such, primary care providers have a responsibility to discuss CAM use, and to educate themselves and their patients about the potential for various types of interactions (20).

Common concerns among allopathic providers regarding complementary medicine include the perceived lack of evidence to demonstrate effectiveness, possible harmful effects, and lack of FDA regulation for most natural products (21). Allopathic physicians' apprehension regarding CAM therapies usually arises from concerns that patients will forgo "proven" biomedical therapies for alternatives with limited evidence for their safety and efficacy. The facts that most CAM users also receive care within the biomedical health care system, and patients frequently do not mention CAM use to their primary providers underscore the need to evaluate patient-provider communication about CAM use. A failure of openness on the part of the provider and lack of dialogue about CAM can compromise the doctor-patient relationship and the quality of care provided, which may have harmful consequences.

## **Training Allopathic Medical Students in CAM**

Eisenberg's 1993 article was the first to describe the widespread use of CAM in the U.S (16). Since then, several studies have demonstrated the prevalence of CAM.

Unfortunately, most medical school curricula did not include discussions of CAM or integrative medicine until recently. Allopathic physicians are not systematically trained to administer or understand the mechanisms of most complementary therapies. In addition, most are not prepared to discuss CAM modalities with their patients who ask them for guidance. Without some level of introduction to CAM in medical school, allopathic physicians are limited in their ability to navigate the complex systems of CAM.

As consumer use and demand continues to increase, medical doctors will need to be prepared to knowledgeably discuss CAM use with their patients, and to provide appropriate referrals for CAM services. These skills are important components of ensuring safe, effective, coordinated care. In order to engage in conversations about CAM, allopathic physicians should have a fundamental awareness and understanding of CAM philosophies and modalities. Without this basic level of familiarity, physicians are left to field questions about CAM therapies without adequate tools at their disposal.

Allopathic physicians' discomfort with discussing CAM with patients may be alleviated by structured CAM education (22, 23). Medical schools now recognize the need to prepare physicians to help their patients integrate safe and effective CAM therapies into their care, and are beginning to incorporate CAM content into medical curricula. Today, over 60% of U.S. medical schools offer some form of CAM education. (24). Some offer electives, while others have integrated CAM across multiple core courses. Current initiatives aim to provide medical doctors with basic knowledge of CAM therapies and educate them to

communicate effectively with, and make referrals when appropriate to CAM practitioners (25–27).

While several studies have gathered allopathic physicians' attitudes toward CAM, there are no established measures of openness, or orientation toward CAM among allopathic primary care providers. Likewise, barriers to open dialogue about CAM have not been widely explored. To achieve a health care environment in which there is open dialogue about CAM, it is important to first identify barriers to dialogue; second, determine which types of providers are receptive to CAM and which are closed; and third, develop interventions to create more open dialogue. Developing a measure of CAM orientation that assesses openness to CAM among allopathic physicians is the first step toward understanding lack of open dialogue about CAM. This process will support improved doctor-patient communication about CAM and improved quality of care, and represents an important step in the movement toward integrative medicine and collaborative coordinated care.

The purpose of this project was to develop a measure of CAM orientation using existing survey data from a sample of United States general internists and family medicine physicians. The Culture and Medicine Survey asked allopathic physicians to self-rate their level of cultural competence. In the current study, we observed allopathic physicians' awareness, attitudes and behaviors related to CAM use among their patients based on a conceptually related subset of survey items.

The specific aims of this study were:

1. to examine possible factor structures of a measure of CAM orientation using seven conceptually related survey items
2. to test the validity of the resulting CAM measure and specific constructs within it, and
3. to explore predictors of CAM Orientation

## **METHODS**

This project involved secondary analysis of data from a national survey measuring physician cultural competence (CC) among 795 U.S. internists and family physicians. For this project, seven survey items were identified as having central relevance to CAM. Structural equation modeling was used to assess the relationship between these items and their collective relationship to an overall latent construct. Three sub-constructs were included in this modeling technique, representing three specific aspects of CAM orientation. Validity testing was then used to assess how these aspects of CAM orientation correlate with other measures of cultural competency. Multiple regression analyses were used to assess the relative contribution of specific physician characteristics to their level of CAM orientation.

### *Data Source*

A group of investigators from the Oregon Health & Science University designed the Culture and Medicine Survey (referred to as the primary study), and administered it to a random sample of U.S. physicians in 2009. The sample for the primary study was provided by a vendor who maintains a database of practicing U.S. physicians, which is continually updated and verified (28). The database contains physicians' name, home and office address, medical school and year of graduation, gender, birth date, residency training, type of practice, present employment, and practice specialty.

### *Procedures*

This study and all recruitment procedures were approved by the Institutional Review Board of the Oregon Health & Science University. The 59-item questionnaire was mailed to a random sample of 1800 U.S. internists and family physicians in zip codes with at least 25% nonwhite population. African-American and Latino physicians were oversampled. Each



physician was mailed a survey, cover letter, and addressed, stamped envelope in which to return the completed survey. Envelopes each included a \$20 “honorarium” and were delivered by courier service (FedEx). Respondents were given the option to complete the questionnaire on paper or online.

Among 1516 eligible physicians, 795 (52%) responded. Respondents were mostly white (55%) or Asian (21%) and male (65%).

### *Survey Instrument*

The Culture and Medicine survey was comprised of five sections of questions with response options including multiple choice, 6-point Likert scales for agreement (1 = strongly disagree and 6 = strongly agree), and 6-point Likert scales for frequency (1 = never and 6 = always).

Using responses to the 59-item pool, the parent study investigators conducted factor analysis to derive discrete scales and labeled the scales based on item content. Analyses favored a 7-factor solution with the following scales: Cultural Awareness (7 items), Cultural Self-Efficacy (5 items), Awareness of Racial Disparities (5 items), Valuing Diverse Perspectives (6 items), Support for CLAS Standards (6 items), Strict Biomedical Orientation (2 items), and Relationship-Centered Practice (10 items). In addition to the cultural competency items, the survey included questions addressing provider demographic characteristics, years since completing training, hours per week in direct patient care, average number of patients seen per day, prior cross-cultural education and communications training, and proportion of patients in different racial/ethnic and socioeconomic groups.

The current project employs secondary data analysis from the primary study to explore the relationship between seven specific survey items from the original analysis that are conceptually related to CAM, but that were incorporated in a variety of original factors.

## **Analysis**

*Specific Aim 1: To examine possible factor structures of a measure of CAM orientation using seven conceptually related survey items.*

The approach to specific aim 1 was to determine which survey items conceptually reflected the idea of CAM orientation, and to then examine factor structures of these items. Survey items related to use of home remedies, CAM and natural therapies, and aspects of provider communication were chosen by the investigative team to represent the concept of CAM orientation; openness to CAM concepts, and willingness to engage in CAM with patients. Based on face validity, we chose seven of the original survey items that reflect this concept of CAM orientation. These items are presented in the survey as follows:

- I am interested in hearing about home remedies from my patients.
- Patients' ideas about what is causing their illness are often helpful.
- I have difficulty accepting the value of most forms of Eastern Medicine
- Patients who trust popular beliefs about disease and treatment over scientific fact are frustrating.
- Patients who do not accept scientific facts about their illness are difficult to work with.
- For patients who prefer "natural" (e.g. herbal) remedies, I work with them to find the best option.
- I ask my patients about complementary and alternative therapies they may be using.

Each item was rated on a 6-point Likert scale (strongly disagree to strongly agree). Using these seven items as a scale allows us to score CAM orientation based on the mean score of all seven items.

Structural equation modeling (SEM) is a methodology for representing, estimating, and testing a network of relationships between variables (measured variables and latent constructs). Using IBM® SPSS® AMOS software (Arbuckle, J. L. (2006) Amos (Version 7.0) [Computer Program] Chicago: SPSS), we conducted SEM to test the relationships among the seven conceptually related survey items. To examine whether the latent construct of CAM orientation would be more accurately represented as a combination of second order latent constructs (i.e., factors), we then created a model representing three second order latent constructs that were conceptually derived (labeled *receptive*, *closed*, and *active* orientations).

*Specific Aim 2: Test the validity of the measure and specific constructs*

We approached measure validation in two ways. First, we took the three scales that were modeled through aim 1 and examined their association with measures of cultural competence from the original survey. We then performed known groups validity testing by examining the relationship between CAM orientation scores and hypothesized demographic correlates of CAM orientation. Data were analyzed using Stata 11 (StataCorp. 2009. Stata Statistical Software: Release 11. College Station, TX: StataCorp LP).

Independent variables of interest were examined for the presence of outliers and data entry errors by reviewing histograms and stem-and-leaf plots. Additional data screening was conducted after measure subscales (dependent variables) had been established to determine the distribution of each. Data imputation was not used in this study. As such, sample size

varied across analyses, but within each analysis, only participants who had complete data on all variables being analyzed were included.

*Aim 2A.* The construct validity of the measure was assessed by testing subscales of CAM orientation against two specific constructs of cultural competence. In order to assure that results were not based on spurious correlational relationships among items, all hypotheses were stated a priori (Figure 1).

To establish convergent validity, we assessed correlations between the three second order constructs of CAM orientation and constructs of cultural competence that we conceptualize similarly. Since medical therapies that are complementary or alternative represent a deviation from mainstream medicine, we hypothesized that physicians who are oriented toward CAM would also value diverse perspectives. We also expect that being highly oriented toward CAM would be positively associated with the practice of relationship-centered care. Specifically, physicians who are open to CAM (those with *receptive* and/or *active* orientations toward CAM) should also score highly on the Valuing Diverse Perspectives (VDP) and Relationship-Centered Care (RCC) scales of the cultural competence measure.

To assess whether our CAM measure was unrelated to constructs that we presume to be dissimilar, we examined the relationships between these two cultural competence measures and *closed* CAM orientation. Considering CAM as a diverse perspective, we do not expect that physicians who are closed to CAM would score highly on the VDP scale. We expect the same relationship with RCC score, such that closed orientation and practicing relationship-centered care are dissimilar constructs and weakly or negatively associated.

Figure 1

Hypothesized Significant Correlations Between Specific Constructs of CAM Orientation and Cultural Competency Measures

	Receptive Orientation	Active Orientation	Closed Orientation
Valuing Diverse Perspectives	+	+	-
Relationship-Centered Care	+	+	-

CAM items that were originally included in the VDP or RCC scales were removed from their respective cultural competence scales. We conducted an additional factor analysis after removing the overlapping CAM items. The results directly mirrored the original factor analysis; excluding the CAM items resulted in no items obtaining cross-loadings above 0.30 on more than one factor. Since removing these items did not upset the factor structure of the original survey, we feel confident that we have not fundamentally changed the CC scales by removing those CAM items. New mean scores were calculated for the remaining items in the VDP and RCC scales, and assigned to each survey respondent. Statistical correlations were assessed using mean scores for the cultural competence measures and CAM orientation measures.

*Aim 2B.* The second method of assessing the validity of our measure was through conceptually driven known groups validity testing. We included a set of variables (age, gender, and race/ethnicity) that we consider to have face validity for their associations with CAM orientation and assessed their relationships statistically using simple linear regression for the continuous variable (age) and analysis of variance (ANOVA) for categorical variables (gender, race/ethnicity).

For these analyses, we used the factor-weighted CAM orientation score. We created this score by multiplying the raw score for each CAM item by its factor weight (derived through SEM), and taking the mean of those seven weighted scores. The weighted score provides more relevance, since each of the seven items is weighted according to its relative contribution to the latent construct of CAM orientation. This is the most quantitatively precise score to develop for research purposes. We also conducted the same analyses using the raw score for overall CAM orientation and observed a similar pattern of associations with each independent variable. The subscales for *receptive*, *closed*, and *active* orientations are treated as individual factors, which add specificity to the overall construct of CAM orientation. The variables for each subscale score are presented in their raw forms for ease of comparison across these second order constructs.

*Age.* We hypothesized that practitioner age would be negatively associated with CAM orientation, and as such, younger physicians would be more oriented toward CAM. This hypothesis is based on the recent growth in popularity of CAM and consequential inclusion of CAM discussions in conventional medical schools (29). Older physicians may have had much less professional exposure to CAM, and may therefore be less CAM oriented.

*Gender.* CAM users tend to be female, as do CAM practitioners (1;30). In addition, female physicians tend to be more patient-centered, providing more preventive services and psychosocial counseling (31). As such, we hypothesize that female physicians will be more CAM oriented (score highly on the overall measure of CAM orientation) compared to male physicians.

*Race/Ethnicity.* We hypothesized that nonwhite physicians would be more CAM oriented than white physicians. Nonwhite physicians may come from ethnic groups that

practice CAM therapies and may be more familiar with the relationship between many CAM and cultural traditions. Nonwhite physicians scored higher in overall cultural competence in the parent study using the Culture & Medicine Survey. Since we expect CAM orientation to be associated with dimensions of cultural competence, we expect nonwhite physicians to score higher on this measure. In addition, nonwhite physicians may have a closer connection to and relative understanding of ethnomedical practices, upon which CAM is heavily based.

These hypotheses were explored using linear regression analysis and analysis of variance; both analyses were used to examine continuous and categorical predictors of overall CAM orientation score and sub-scale scores.

*Specific Aim 3: Explore additional predictors of CAM orientation.*

The goal of this aim was to create multivariable statistical models using physician and practice characteristics measured in the survey that we expect to be associated with physicians' level of CAM orientation. Specifically, we sought to examine the relationship between CAM orientation and the number of years that physicians had been in practice, the amount of time they spend with patients, and the sociodemographic make-up of their patient population, while adjusting for potentially confounding physicians' characteristics (age, gender, and race/ethnicity). Little research has been conducted on physicians' orientation toward CAM that reports descriptive characteristics of oriented versus non-oriented physicians. As such, the chosen variables are exploratory, based on informal hypotheses regarding the expected relationships with CAM orientation. First, we tested simple or one-way effects of each of these predictors on each of the identified CAM orientation variables. Second, we conducted multi-factor analyses of each of the four dependent variables of CAM

orientation, each testing the effects of all of the factors and covariates in a single linear model.

#### *Years of practice*

The variable **years** was created to represent the number of years that each responding physician has been in practice. As previously mentioned, medical education initiatives have only recently begun to add CAM curricula. Physicians who completed medical training several decades ago have probably had much less professional exposure to CAM, and may therefore be less CAM oriented. We explored whether a linear relationship exists between the number of years that a physician has been in practice and their level of CAM orientation. By controlling for **age** in each multiple regression model, we expect to tease out the covariance between physicians' age and the number of years they have been in practice.

#### *Minutes spent with each patient*

**Facetime** represents the amount of time physicians spend face-to-face with each patient they treat. Physicians who are CAM oriented are likely to spend more time discussing treatment alternatives and preferences with their patients. As such, face time may be a useful proxy for patient-centered care that includes dialogue about CAM. Studies have shown that women tend to be more patient-centered. Controlling for gender in these models will help tease out confounding effects of gender.

#### *Insurance status of patient population*

Physicians were also asked to estimate the proportion of their patient population that is **uninsured**. In general, CAM use is less prevalent among the uninsured (1; 32). However, having unmet needs in medical care or having delayed care due to cost are associated with a



higher chance of CAM use (33). We sought to explore whether a physicians' level of CAM orientation was associated with the proportion of uninsured patients to clarify these conflicting findings. We anticipate that providers working in settings with a large uninsured population are largely working in community health centers and other busy settings where there are fewer opportunities to discuss CAM use with their patients, and may therefore be less CAM oriented.

Table 1 provides an overview of all independent variables included in these analyses. Simple linear regression was used to test one-way effects of each of these predictors on each CAM orientation variable, and analysis of variance (ANOVA) was used to test the differences between means across categories of each categorical independent variable.

Table 1. Independent Variables: Categories and Summary of Coding

Variable	Survey Item	Categories	Description of Recoding
Age	What is your age?	Fill in	Unchanged
Gender	What is your gender?	1. Male 2. Female	Unchanged
Physician Race/Ethnicity (race)	What do you consider to be your <u>main</u> racial or ethnic group? (Choose only one)	1. White or Caucasian 2. Black or African American 3. Hispanic or Latino 4. American Indian/Alaska Native 5. Asian 6. Pacific Islander 7. Native Hawaiian 8. Other	1. White or Caucasian 2. Black or African American 3. Hispanic or Latino 4. Asian 5. Other <sup>§</sup>
Years of practice (years)	For how many years have you been practicing clinical medicine?	1. 5 or less 2. 6 to 20 3. 21 to 40 4. More than 40	Unchanged
Face time (facetime)	On average, how many minutes do you spend face-to-face with each patient you see?	1. 5 or less 2. 6 to 15 3. 16 to 30 4. More than 30	1. $\leq 15$ 2. $>15$
Uninsured (uninsured)	What proportion of your patients is uninsured?	1. 5% or less 2. 6 to 20% 3. 21 to 50% 4. More than 50%	1. $\leq 5\%$ 2. $>5\%$

<sup>§</sup>American Indian/Alaska Native, Pacific Islander, and Native Hawaiian were collapsed into “other” due to small cell sizes.

## RESULTS

The purpose of this study was to test possible structures of a measure of CAM orientation, assess its validity, and identify predictors of CAM orientation among a sample of 795 U.S. internists and family medicine physicians. Descriptive characteristics of respondents are presented in Table 2.

Table 2.

### Physician Characteristics

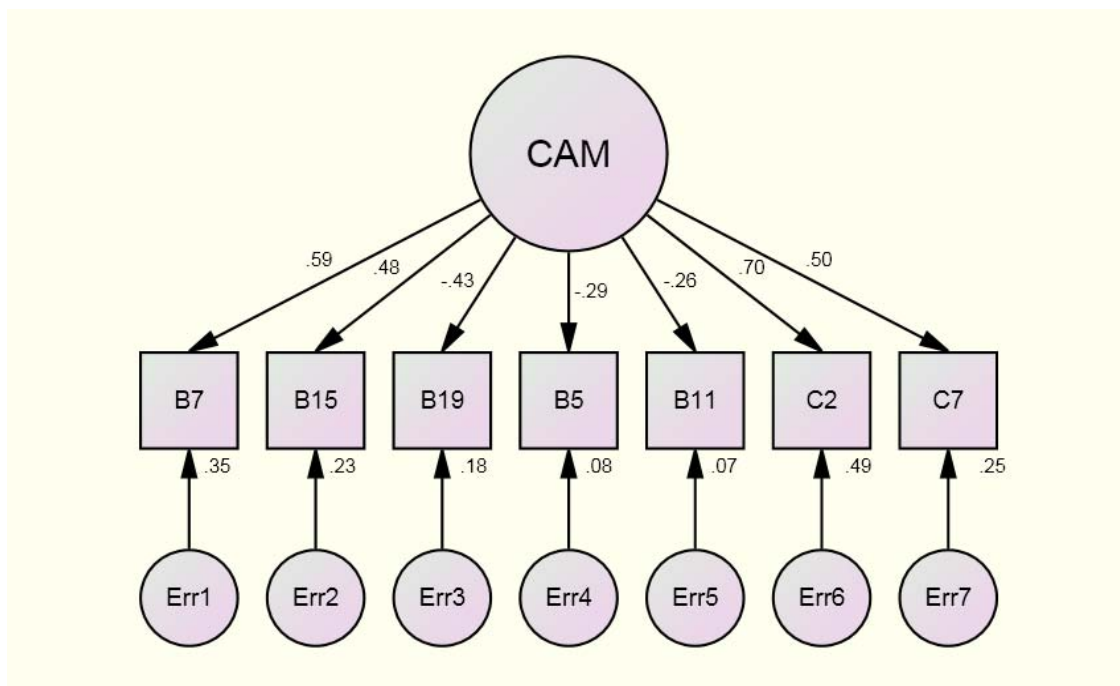
Variable	N = 795	
	n	%
Age, mean (SD)	49.8 (11.3)	--
Gender		
Male	514	65.1
Female	275	34.9
Race/ethnicity		
Asian	167	21.4
Black	91	11.6
Hispanic	69	8.8
White	429	54.9
Other	26	3.3
Years		
<= 5	101	13.0
6 to 20	349	45.0
21 to 40	290	37.4
>40	36	4.6
Facetime		
<=15 min.	326	41.5
>15 min.	460	58.5
Uninsured		
<= 5%	410	53.7
>5%	353	46.3

*Specific Aim 1: Test possible structures of a measure of CAM orientation*

Structural Equation Modeling

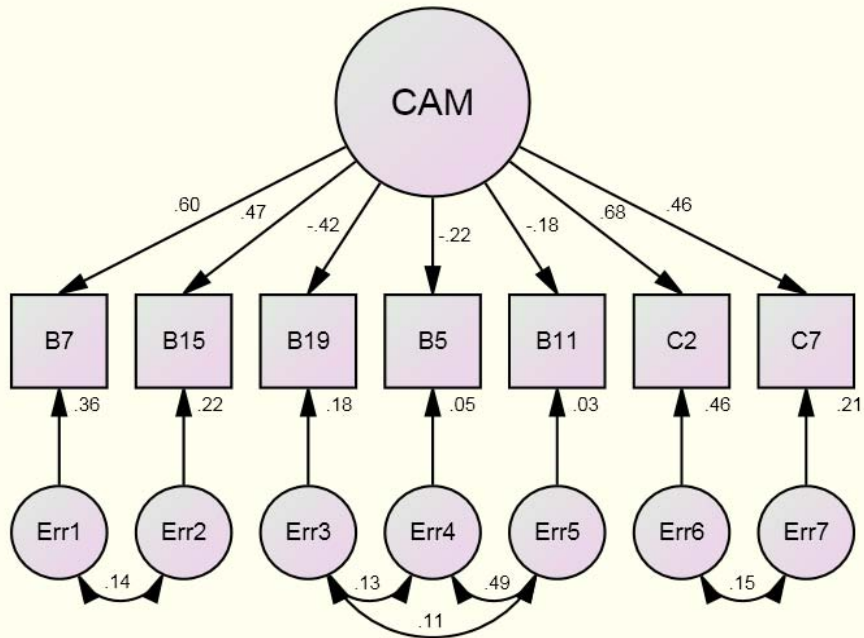
We first developed a model that included each of the seven CAM items in a single factor structure (Model 1). We evaluated model fit using standard goodness of fit indices including Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), and Tucker Lewis Index (TLI; Figure 2) (34).

**Figure 2.** Relationship between Specific Survey Items in a Conceptual Model of CAM Orientation (7-item single factor structure –Model 1)



Though each item was related to the latent construct, which we labeled ‘CAM orientation’, the single factor model would not converge. We then created a second model with separate latent constructs. We represented these second-order latent constructs by correlating the error terms of the clusters of items comprising each (Figure 3) (35).

**Figure 3.** Three-Factor Model of CAM Orientation (Model 2)



The three-factor model (Model 2) was a good mathematical fit for the latent construct, as measured by standard goodness-of-fit indices including Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), and Tucker Lewis Index (TLI; Figure 1) (34). Since adding additional paths such as correlation paths between items improves model fit if the correlation is even marginal, we used standard cutoff indices to assure that improvements in model fit were significant enough to justify retention of a more complex model (36). Using these established criteria, we determined that there was a statistically significant improvement in model fit of the more complex model with the three second order latent constructs (Table 3).

Table 3.

Summary and Comparison of Model Fit Statistics				
	$\chi^2$ (p-value)	CFI	TLI	RMSEA
Model 1	260.506 (.000)	.702	.405	.149
Model 2	15.01 (.091) <sup>†</sup>	.993 <sup>†</sup>	.977 <sup>†</sup>	.029 <sup>†</sup>
Cutoff	p < .05 <sup>‡</sup>	≥ .95	≥ .95	≤ .06

<sup>†</sup> = All standard goodness-of-fit indices for Model 2 are within established cutoff values (34)

<sup>‡</sup> = A non-significant  $\chi^2$  is desired; the observed covariance matrix is similar to the matrix predicted by the model

The three second-order latent constructs (sub-constructs) that resulted from Model 2 were labeled for particular aspects of CAM Orientation (Table 4).

Table 4.

Constructs of CAM Orientation and Associated Survey Items

Item #	Item wording	CAM Orientation Construct
B7	I am interested in hearing about home remedies from my patients.	<i>Receptive</i>
B15	Patients' ideas about what is causing their illness are often helpful.	
B19	I have difficulty accepting the value of most forms of Eastern Medicine	<i>Closed</i>
B5	Patients who trust popular beliefs about disease and treatment over scientific fact are frustrating.	
B11	Patients who do not accept scientific facts about their illness are difficult to work with.	
C2	For patients who prefer "natural" (e.g. herbal) remedies, I work with them to find the best option.	<i>Active</i>
C7	I ask my patients about complementary and alternative therapies they may be using.	

*Specific Aim 2: Test the validity of the measure and specific constructs*

Aim 2A. To establish convergent validity, we assessed correlations between *receptive* and *active* orientation scores and the VDP and RCC scale scores. We expected these scales to be positively associated with *receptive* and *active* orientations and negatively associated with *closed* orientation.

All correlations were significant. Using Pearson's correlation coefficient as a measure of effect size, we take  $r = .10$  as a small effect size,  $r = .30$  as medium, and  $r = .50$  as large. These correspond to Cohen's  $d$  (guide to effect size) of .20, .50, and .80 (37). As we expected, there was a significant positive correlation between *receptive* and *active* orientations ( $r = .45$ ), and a significant negative correlation between *receptive* and *closed* ( $r = -.22$ ) and *active* and *closed* ( $r = -.27$ ). We found a medium effect size in the correlation between *receptive* orientation score and relationship-centered care ( $r = .35$ ), and a large correlation between being *receptive* to CAM and valuing diverse perspectives ( $r = .56$ ). Active orientation is moderately correlated with valuing diverse perspectives ( $r = .32$ ), and strongly correlated with relationship-centered care ( $r = .62$ ). *Closed* orientation was negatively correlated with both VDP and RCC scores. These findings are in line with our hypotheses, demonstrating the construct validity of our measure.

Table 5.

Observed Correlations between CAM Subscales and Measures of Cultural Competence

	Receptive Orientation	Active Orientation	Closed Orientation
Valuing Diverse Perspectives	.56	.32	-.16
<i>Effect size</i>	<i>large</i>	<i>medium</i>	<i>small</i>
Relationship-Centered Care	.35	.62	-.18
<i>Effect size</i>	<i>medium</i>	<i>large</i>	<i>small</i>

\*All correlations are significant at  $p < .001$

*Aim 2B.* Analysis of the relationships between age, gender and race/ethnicity and our dependent variable CAM orientation was used to assess known groups validity. Using linear regression, we assessed the relationship between age and the four dependent variables. As predicted, age is significantly associated with overall CAM orientation. As shown in Table 6, CAM orientation score is predicted to decrease by .0005 with each year increase in age and by ~ .01 point with every 20-year increase in age. The range of the factor-weighted CAM orientation score is from .007 to .471 ( $m = .25$ ,  $sd = .06$ ). This change of .01 with every 20-year increase in age, though statistically significant, is extremely small. *Closed* orientation score also significantly increases with age, by approximately .12 points per 10-year increase in age (unweighted scale range = 1-6).



Table 6.

One-way Analyses Between Age and Dependent Variables

	Unstandardized B	Standardized B	P-value
CAM Orientation (weighted)	-.0005	-.0903	.013*
Receptive Orientation	-.0015	-.0205	.573
Closed Orientation	.0123	.1532	.000**
Active Orientation	-.0065	-.0697	.055

Weighted CAM Orientation Score:  $m = .25$ ,  $sd = .06$ ,  $min = .007$ ,  $max = .471$

Subscale scores range from 1= strongly disagree to 6 = strongly agree

Unstandardized B: increase in outcome associated with 1-year increase in age

Standardized B: increase in standard deviation (SD) of the outcome with each SD increase in age

\*  $p < .05$ , \*\*  $p < .001$

As shown in table 7, gender is also significantly associated with overall CAM orientation, such that women have a higher mean CAM orientation score. ANOVA did not reveal a significant association between race and CAM orientation score.

*Specific Aim 3: Explore additional predictors of CAM Orientation.*

Individually, **years** of practice, **facetime**, and proportion of **uninsured** patients were significantly associated with overall CAM orientation score (Table 7). As we hypothesized, CAM orientation score significantly decreases as the number of years of practice increases. Practitioners who spend more than fifteen minutes per patient have significantly higher CAM orientation scores than those who spend less than fifteen minutes per patient. In addition, practitioners who report that their patient population is more than 5% uninsured are more CAM oriented than those with fewer than 5% uninsured patients. The observed differences between means are small, but significant.

Table 7.

## Analysis of Variance for Categorical Variables with Overall CAM Orientation

	Mean	SD	df	F	P-value
Gender			1	41.7	.000**
Male	.24	.06			
Female	.27	.06			
Race/ethnicity			4	0.9	.447
Asian	.25	.06			
Black	.26	.06			
Hispanic	.26	.07			
White	.25	.06			
Other	.25	.07			
Years			3	6.5	.000**
<= 5	.26	.06			
6 to 20	.26	.06			
21 to 40	.25	.07			
> 40	.21	.08			
Facetime			1	16.8	.000**
<=15 min.	.24	.06			
> 15 min.	.26	.06			
Uninsured			1	5.4	.020*
<= 5%	.25	.06			
> 5%	.26	.06			

Weighted CAM Orientation Score:  $m = .25$ ,  $sd = .06$ ,  $min = .007$ ,  $max = .471$

\*  $p < .05$ , \*\*  $p < .001$

As shown in table 8, **gender** and **facetime** are most predictive of *receptive* orientation. Female physicians are significantly more *receptive*, less *closed*, and more *active* compared to male physicians. While we did not see a significant association between **race** and overall CAM orientation score, we did observe a significant relationship with *closed* orientation specifically. There is a significant increase in *closed* orientation as years of practice increases. **Facetime** is significantly associated with each subscale, such that doctors

who spend more time with patients are significantly more *receptive*, more *active*, and less *closed*.

### Multivariable Analysis

The final models are presented in Tables 9 and 10. **Facetime** and **years** of practice are significant predictors of overall CAM orientation when adjusting for **age**, **gender** and **race**. Physicians who spend more than 15 minutes with each patient on average are more CAM oriented overall compared to those who spend less than 15 minutes. CAM orientation score decreases as years of practice increases, with physicians who have been in practice for greater than 40 years showing a significantly lower CAM orientation score than those who have been in practice for five years or less.

**Facetime** and **years** of practice are also significant predictors of *receptive* orientation. Physicians who spend more than 15 minutes on average with each patient are more receptive to CAM.

In the model for *closed* orientation, we find that **gender** and **race/ethnicity** are statistically significant predictors. Female physicians are significantly less *closed* than male physicians. Asian physicians are significantly more *closed* compared to the reference groups of White physicians. Years of practice was nearly significant among physicians who had been in practice for >40 years having higher *closed* scores than the referent group of <5 years of practice (p=.06).

**Facetime** is the only significant predictor of *active* orientation in the model controlling for age, gender and race/ethnicity.

While proportion of **uninsured** patients was significantly associated with overall CAM orientation in univariable analysis, it did not come out as a predictor in any of the four regression models.

Table 8.

## Analysis of Variance for Categorical Variables with CAM Orientation Subscale Scores

	Receptive					Closed					Active				
	Mean	SD	df	F	P-value	Mean	SD	df	F	P-value	Mean	SD	df	F	P-value
Gender			1	7	.000**			1	0	.000**			1	38.0	.000**
Male	4.85	0.86				3.95	0.86				4.05	1.03			
Female	5.10	0.80				3.62	0.95				4.52	1.00			
Race/ethnicity			4	2.2	.065			4	4.8	.001*			4	1.1	.370
Asian	4.89	0.89				4.04	0.83				4.14	1.00			
Black	5.18	0.72				3.54	1.02				4.25	1.09			
Hispanic	4.87	0.95				3.77	0.89				4.43	1.24			
White	4.92	0.81				3.82	0.90				4.19	1.02			
Other	4.92	1.06				3.96	0.74				4.25	0.99			
Years			3	1.9	.125			3	8.5	.000**			3	2.7	.046
<= 5	5.02	0.83				3.82	0.82				4.25	1.02			
6 to 20	4.93	0.84				3.75	0.91				4.25	1.00			
21 to 40	4.96	0.82				3.85	0.92				4.20	1.06			
> 40	4.64	1.05				4.54	0.77				3.73	1.33			
Facetime			1	11.7	.001*			1	4.1	.043*			1	16.8	.000**
<= 15 min.	4.81	0.83				3.91	0.88				4.03	1.03			
> 15 min.	5.02	0.85				3.78	0.92				4.34	1.04			
Uninsured			1	3.5	.063			1	2.2	.143			1	3.5	.063
<= 5%	4.89	0.86				3.87	0.89				4.15	1.06			
> 5%	5.01	0.82				3.78	0.94				4.29	1.04			

Subscale scores range from 1 to 6

\* p &lt; .05, \*\* p &lt; .001

Table 9.

## Multiple Regression Model for Overall CAM Orientation

Variable	B	95% CI Low	95% CI High	P-value
Age	.000	.000	.001	.198
Gender				.000**
Male	--	--	--	--
Female	.027	.017	.038	.000**
Race/ethnicity				.549
Asian	-.005	-.017	.008	.416
Black	.005	-.010	.020	.502
Hispanic	-.002	-.018	.015	.835
White	--	--	--	--
Other	-.016	-.042	.010	.204
Years				.000**
<= 5	--	--	--	--
6 to 20	-.006	-.021	.010	.416
21 to 40	-.007	-.028	.014	.500
>40	-.063	-.100	-.027	.001*
Facetime				.001*
<=15 min.	--	--	--	--
>15 min.	.016	.006	.025	.001*
Uninsured				.082
<= 5%	--	--	--	--
>5%	.008	-.001	.017	.082
R-squared		.10		

Weighted CAM Orientation Score:  $m = .25$ ,  $sd = .06$ ,  $min = .007$ ,  $max = .471$

B = Unstandardized regression coefficients

\*  $p < .05$ , \*\*  $p < .001$

Table 10.

## Multiple Regression Models for CAM Orientation Subscale Scores

Variable	Receptive				Closed				Active			
	B	95% CI Low	95% CI High	P-value	B	95% CI Low	95% CI High	P-value	B	95% CI Low	95% CI High	P-value
Age	.01	0	.02	.027*	.01	-.00	.02	.241	.00	-.01	.01	.790
Gender				.003*				.002*				.000**
Male	--	--	--	--	--	--	--	--	--	--	--	--
Female	.21	.07	.35	.003*	-.23	-.38	-.08	.002*	.47	.29	.64	.000**
Race/ethnicity				.169				.001*				.686
Asian	-.06	-.22	.10	.476	.28	.11	.45	.001*	-.07	-.27	.13	.473
Black	.20	.00	.39	.049	-.21	-.42	.00	.057	-.02	-.27	.22	.867
Hispanic	-.08	-.30	.15	.488	.03	-.22	.27	.826	.14	-.14	.43	.312
White	--	--	--	--	--	--	--	--	--	--	--	--
Other	-.11	-.45	.23	.524	.29	-.07	.66	.113	-.13	-.55	.29	.548
Years				.010*				.002*				.135
<= 5	--	--	--	--	--	--	--	--	--	--	--	--
6 to 20	-.16	-.36	.05	.136	-.09	-.31	.13	.405	.03	-.22	.28	.818
21 to 40	-.20	-.48	.08	.170	-.14	-.45	.16	.351	.08	-.27	.43	.670
> 40	-.77	-1.26	-.28	.002*	.52	-.02	1.05	.057	-.40	-1.02	.21	.201
Facetime				.004*				.081				.002*
<=15 min.	--	--	--	--	--	--	--	--	--	--	--	--
>15 min.	.18	.06	.31	.004*	-.12	-.25	.15	.081	.25	.10	.40	.002*
Uninsured				.223				.437				.182
<= 5%	--	--	--	--	--	--	--	--	--	--	--	--
> 5%	.08	-.05	.20	.223	-.05	-.18	.08	.437	.10	-.05	.25	.182
R-squared		.06				.09				.08		

Subscale scores range from 1 to 6

B = Unstandardized regression coefficients, \* p &lt; .05, \*\* p &lt; .001

## DISCUSSION

To our knowledge, there is no existing measure of CAM orientation for allopathic providers. Through a variety of testing methods, we have developed what we think is a sound measure of CAM orientation. We assessed the relationships between our measure and specific constructs of cultural competence and physician characteristics. Our measure of CAM orientation demonstrated convergent validity on every predicted measure except for race/ethnicity.

We hypothesized that nonwhite physicians would be more oriented toward CAM, assuming that physicians of color may find CAM therapies to be in line with their cultural experiences and perspectives. We did not find this to be true in our analyses. Race was not a significant predictor of overall CAM orientation. However, Black physicians were more *receptive* ( $p=.05$ ), and were the only sub-group that did not decrease in *receptive* orientation or overall CAM orientation compared to whites. Blacks were also the only group to be less *closed* than whites ( $p=.06$ ). The pattern of association between black race and CAM orientation supports our original hypothesis regarding the relationship between race and CAM. However, the observed associations were not statistically significant, and were not consistent among other nonwhite groups of physicians.

The modern conceptualization of CAM in the United States may contribute to the fact that we did not see strong differences between nonwhite and white physicians in overall CAM orientation. As CAM therapies have become more popular, they have taken on a subculture of their own, which is often distant from their original ethnomedical origins. For example, yoga, while still considered CAM, has been largely adopted as a therapeutic exercise and is less often conceptualized as a school of Hindu philosophy. Likewise, the popularization of acupuncture has largely distilled it down to an individual therapy apart



from the holistic philosophy of Traditional Chinese Medicine. This trend of reductionism of CAM into specific therapies may have created a cultural shift that no longer engenders ethnomedical associations.

Multivariable analyses revealed that years of practice and spending more time with patients were significant predictors of both overall CAM orientation and of *receptive* orientation specifically. Physicians who have been in practice for more than 40 years are significantly less CAM oriented and less receptive to CAM. There was a small but significant difference between this relatively small group of older physicians and physicians who had practiced for less than 5 years. Despite the fact that the difference is relatively small, the fact that the confounding effects of age were controlled for in this model supports our hypothesis that medical training has an effect on physicians' level of CAM orientation.

It is not surprising that receptiveness and overall CAM orientation were fit by similar models. We expected that physicians who are receptive to CAM would take the initiative to inquire about CAM therapies and engage with patients to address their CAM needs. We also expected that *receptive* and *active* would also have common predictors, under the assumption that physicians who are open to CAM will actively engage in behaviors to learn about and support their patients' CAM use. While time spent with each patient was a significant predictor of both *receptive* and *active* orientation, years of practice was not. While newer doctors appear to be more *receptive* to CAM therapies, it is unknown whether they are actually engaging in discussions of those therapies and working with patients to find the best CAM option.

As years of practice increases, physicians appear to become significantly less CAM oriented, less *receptive*, and more *closed* to CAM. The differences are driven by the small

group of physicians who have been in practice for >40 years. Interestingly, facetime and the proportion of uninsured patients were not significant predictors of *closed* orientation. In addition to years of practice, significant variables in the model for *closed* orientation were female gender (females are significantly less closed than males) and Asian race (Asian physicians were significantly more likely to be closed toward CAM compared to the white references group). This association between Asian race and *closed* orientation is particularly surprising given the rich history of Traditional Chinese Medicine consisting of acupuncture and herbal medicine (38). Furthermore, research on acculturation and CAM use has shown that Asian-Americans use more CAM therapies with more time in the U.S. (39). However, we do not know the ethnic breakdown of the Asian race category in this data set. Further analyses of the perspectives of Asian physicians on CAM are needed to contextualize these findings.

In the model controlling for age, gender and race, the strongest predictor of *active* orientation was spending more than 15 minutes with each patient on average. There are two potential explanations for this association. First, it is possible that physicians who are more CAM oriented have a more patient-centered orientation and spend more time with each patient. In this case, patient-centered orientation may lead to more *receptive* CAM orientation, resulting in more time spent with each patient. The other explanation is that physicians who spend more time have the ability to discuss more CAM and be more patient-centered, and subsequently become more CAM oriented. Since this is a cross-sectional study, we have no ability to determine the directionality of this association.

The gender finding is not surprising if we view *closed* orientation as the opposite of *receptive* orientation. However, the correlation between *receptive* and *closed* was only

medium ( $r = -.22$ ). If they were indeed opposites, we would expect to find them more strongly negatively correlated. Our findings imply that the *closed* orientation scale measures something distinct from the absence of being *receptive*.

We found that male physicians are significantly less oriented toward CAM overall, and are less *receptive*, less *active* and more *closed*. In the primary analyses of the Culture and Medicine Survey, male physicians were found to be significantly less relationship-centered and to value diverse perspectives less than their female counterparts. Literature shows that male physicians use less patient-centered communication styles (40) which may affect their willingness to engage in discussions of patient treatment preferences and behaviors.

#### *Study Limitations*

There are some noteworthy limitations to these analyses. The first is that we did not specifically construct these items to measure CAM orientation. Items were selected from an existing survey, and were constructed for another purpose. Additionally, we tested the validity of our CAM orientation measure against cultural competence (CC) measures in the same population in which the CC measures were developed. It is likely that these measures will be associated, as we have found, since the respondents are the same. A future study administering our CAM orientation measure to a unique sample of allopathic primary care physicians is warranted for further validation.

The two CC measures of interest had items that overlapped with our CAM measure. We removed overlapping items before comparing scores on CC measures and CAM measures. By removing items, we were actually testing the CAM measures against new CC measures. However, as explained in the methods section, an additional factor analysis was

performed after overlapping items were removed and the remaining RCC and VDP items continued to factor together, demonstrating the consistency of their associations.

Finally, we used weighted and unweighted scores in our analyses. Although our SEM provided factor weights for all subscales, for ease of comparison, we chose not to present weighted scores for subscale comparisons. We did however, perform all analyses using weighted and unweighted scores for all dependent variables, and observed similar patterns of association.

Through our analyses we have uncovered a factor structure that might help us understand the broad concept of CAM orientation. Beyond the specific survey items that we have chosen, the observed factors provide a model of thinking about distinct aspects of CAM orientation that can inform future research. Our factor structure lends itself to the idea that a behavioral model could be applied to the concept of CAM orientation. Frameworks describing the stages of behavior change, such as the Transtheoretical Model of Behavior Change, may be useful in conceptualizing CAM orientation as a process through which physicians move (41). The stages of change model may provide a useful framework for further investigating the concepts of CAM orientation that we have identified in this study.

Objectives for future research include further validation of this instrument, and assessment of the impact of CAM orientation on health outcomes. In our development of this measure, we thoughtfully selected cultural competency scales against which we could validate our measures of CAM orientation. We expected to find convergence among concepts of CAM orientation, relationship-centered care, and valuing diverse perspectives. However, we were unable to identify scales measuring substantially dissimilar concepts in the original CC measure that could be used to test discriminant validity of our CAM measure.

The ability to demonstrate discriminant validity is needed to establish construct validity of our measure. A subsequent study should include validating the measure in another sample of physicians. The validity of the measure would be strengthened by the observation of similar patterns with larger differences between groups in a unique sample of allopathic physicians.

Provided that the measure holds its predictive value in future studies, there are a number of potential uses for this measure. Our measure could be used as a tool in medical education to evaluate CAM orientation among practicing physicians and medical school faculty, then later to target educational efforts or quality improvement efforts to train physicians to be more receptive to CAM. Our tool can be used for assessment purposes before and after implementation of CAM curricula, to assess the impact on a physicians' orientation toward CAM. The CAM orientation measure could also be used as a barometer in clinical settings to assess receptiveness to CAM among staff and physicians. Finally, it can be used as a research tool to look at how CAM orientation predicts quality of care by assessing the association with clinical and patient-centered outcomes.

## **SUMMARY AND CONCLUSIONS**

CAM orientation is a broad concept that may be useful to measure in assessing physicians' perspectives on CAM. We have developed a unique measure that shows promise for assessing CAM orientation among allopathic primary care providers, with female gender, increasing number of years in practice, and greater than fifteen minutes spent with each patient serving as useful predictors. Each subscale appears to measure a distinct construct of CAM orientation and have unique predictors. Further validation and scale refinement will strengthen the utility of this instrument in medical education settings, and can start us on the

road to testing the impact of physicians' level of CAM orientation on patient care and health outcomes.

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