

Organizational Culture and Physician Satisfaction with Dimensions of Group Practice

James L. Zazzali, Jeffrey A. Alexander, Stephen M. Shortell, and Lawton R. Burns

Research Objective. To assess the extent to which the organizational culture of physician group practices is associated with individual physician satisfaction with the managerial and organizational capabilities of the groups.

Study Design and Methods. Physician surveys from 1997 to 1998 assessing the culture of their medical groups and their satisfaction with six aspects of group practice. Organizational culture was conceptualized using the Competing Values framework, yielding four distinct cultural types. Physician-level data were aggregated to the group level to attain measures of organizational culture. Using hierarchical linear modeling, individual physician satisfaction with six dimensions of group practice was predicted using physician-level variables and group-level variables. Separate models for each of the four cultural types were estimated for each of the six satisfaction measures, yielding a total of 24 models.

Sample Studied. Fifty-two medical groups affiliated with 12 integrated health systems from across the U.S., involving 1,593 physician respondents (38.3 percent response rate). Larger medical groups and multispecialty groups were over-represented compared with the U.S. as a whole.

Principal Findings. Our models explain up to 31 percent of the variance in individual physician satisfaction with group practice, with individual organizational culture scales explaining up to 5 percent of the variance. Group-level predictors: group (i.e., participatory) culture was positively associated with satisfaction with staff and human resources, technological sophistication, and price competition. Hierarchical (i.e., bureaucratic) culture was negatively associated with satisfaction with managerial decision making, practice level competitiveness, price competition, and financial capabilities. Rational (i.e., task-oriented) culture was negatively associated with satisfaction with staff and human resources, and price competition. Developmental (i.e., risk-taking) culture was not significantly associated with any of the satisfaction measures. In some of the models, being a single-specialty group (compared with a primary care group) and a group having a higher percent of male physicians were positively associated with satisfaction with financial capabilities. Physician-level predictors: individual physicians' ratings of organizational culture were significantly related to many of the satisfaction measures. In general, older physicians were more satisfied than younger physicians with

many of the satisfaction measures. Male physicians were less satisfied with data capabilities. Primary care physicians (versus specialists) were less satisfied with price competition.

Conclusion. Some dimensions of physician organizational culture are significantly associated with various aspects of individual physician satisfaction with group practice.

Key Words. Physician, satisfaction, medical group, organizational culture, multi-level model

Most physicians in the United States now work in group practice settings (Wassenaar and Thran 2003). The reasons why physicians have integrated into group practices are well known (Charns 1997; Robinson 1999). Much less is known, however, about the organizational arrangements of such groups and their effects on physician attitudes and behaviors. Given the movement of physicians into groups, and the traditional tensions between organizational requirements and professional norms of autonomy and freedom from external control, it is important to understand how these groups are organized and, perhaps more importantly, whether such factors are associated with physician satisfaction with various aspects of these organizational arrangements. From a practical standpoint, satisfaction is important because it has been demonstrated to be related to retention and turnover across a variety of organizational settings and among many different types of workers (Tett and Meyer 1993). Physician satisfaction has also been linked to patient satisfaction (Linn et al. 1985; C. Haas et al. 2000), patient adherence to medical treatment (DiMatteo et al. 1993), prescribing patterns (Melville 1980), physician performance (McGlynn 1988; Warren, Weitz, and Koulis 1998; Kerr et al. 2000), and the willingness of physicians to work with hospitals (Grumbach et al. 1998).

Because physician organizations typically lack the formalized structures that other delivery organizations (e.g., hospitals) possess, the organizational culture of physician groups may be a particularly important contextual determinant of physician satisfaction. However, the extant literature on the culture of health care organizations sheds limited light on this question because much of it: (1) is descriptive, (2) does not relate organizational culture to

Address correspondence to James L. Zazzali, Ph.D., M.P.H., RAND Corporation, 1776 Main St. Santa Monica, CA 90407. Jeffrey A. Alexander, Ph.D., is with the University of Michigan, Ann Arbor, MI. Stephen M. Shortell, Ph.D., is with the University of California, Berkeley School of Public Health, Berkeley, CA. Lawton R. Burns, Ph.D., M.B.A., is with The Wharton School, University of Pennsylvania, Philadelphia, PA.

meaningful measures of outcomes, and/or (3) addresses the culture of only one organization. Indeed, only a handful of studies have examined either the structure or culture of physician group practices (Kralewski et al. 1996, 1998; Shortell, Alexander et al. 2001; Williams et al. 2002) and only one has considered the relationship between organizational culture and the satisfaction of physicians working in group practice settings (Williams et al. 2002). Our study is a significant departure from the previous published accounts of health care organizational culture insofar as we address the analytic question of the relationship of organizational culture and physician satisfaction with the managerial and organizational capabilities of the groups in which they work. This approach to assessing satisfaction is distinct from the more typical global measures of overall job satisfaction, as well as satisfaction with particular facets of physician's jobs, like pay and rewards, relationships with coworkers, etc. The capabilities of physician groups are assuming increased importance with the growth in the number of patients with chronic illness. Such patients often require a team-based approach to care with strong organizational supports (Wagner 2000; Shortell et al. 2004). Managerial and organizational capabilities are also growing in importance due to increased need of medical groups to implement electronic health records, and respond to financial incentives for improved quality and increased public reporting demands.

BACKGROUND

The culture of an organization consists of its norms, values, and beliefs, and is reflected by its stories, rituals and rites, symbols, and language (Daft 2000). The notion that organizations have a culture is a relatively new idea, with the concept first entering the academic literature in 1979. In 1982, two books popularized the concept, *Corporate Culture* by Deal and Kennedy and *In Search of Excellence* by Peters and Waterman. In much of the writings on culture assumptions about the importance of culture in organizational settings have been made, yet little empirical work has been conducted to support such claims.

Early research on culture focused on developing measures of culture or on empirically describing the culture of various organizational settings. Recent interest in the culture of health care organizations, however, has begun to address the importance of culture for key organizational outcomes. For example, some have argued that the culture of physician organizations is important in the care of chronic illnesses, in that culture may be related to the ability of these organizations to support quality improvement efforts and

develop needed information systems to provide better patient care (Rundall et al. 2002). In a study of ICUs, “caregiver interaction” (culture, leadership, coordination, conflict management abilities, and communication) was found to be significantly related to several measures of organizational effectiveness. However, the reporting methods prevent one from distinguishing the effects of culture on clinical effectiveness from the effects of other components of caregiver interaction (Shortell et al. 1994). In a study of culture and patient outcomes for CABG, a supportive group culture was associated with shorter postoperative intubation time (a positive outcome), but also associated with longer operating room times (a negative outcome) (Shortell et al. 2000). When examining whether implementation of evidenced-based medicine in physician organizations was related to organizational culture, no significant relationships were found (Shortell, Zazzali et al. 2001). Others have examined attitudinal measures of effectiveness, like job satisfaction, as a function of group culture, and demonstrated that organizational “culture” is a determinant of physician job satisfaction (Williams et al. 2002). However, the measures of culture and satisfaction were assessed at a global level, and do not provide a fine-grained understanding of how culture and satisfaction are related. Two other studies found positive relationships between culture and organizational outcomes in mental health services settings (Morris and Bloom 2002; Morris, Bloom, and Wang 2006), using measures that jointly assessed dimensions of the organization’s climate and culture.

In the broader management literature, several empirical studies have linked organizational culture with individual-level attitudes, such as job satisfaction and organizational commitment. These studies have been conducted in diverse organizational and country settings among a variety of occupational groups. Many of these studies utilize typologies of cultures, such as (1) Wallach’s (1983) distinction between bureaucratic, innovative, and supportive cultures, (2) Cameron and Freeman’s (1991) distinction between clans, adhocracies, markets, and hierarchies (which are conceptually similar to the group, developmental, rational, and hierarchical cultural types in the Competing Values framework), (3) Quinn and Rohrbaugh’s (1983) distinction between group, developmental, rational, and hierarchical cultures, and (4) Hofstede et al.’s (1990) measurement of six cultural practices (results versus process orientation, job versus employee orientation, professional versus parochial, closed versus open system, tight versus loose control, and pragmatic versus normative). As evident from the labels, the cultural types resemble one another across typologies. Not surprisingly, these studies find that similar types of cultures have positive impacts on employee job satisfaction. Thus, satisfaction is higher in organizations with innovative, supportive, group, clan, and

adhocracy cultures. Conversely, some studies find that satisfaction is lower in organizations with rational, hierarchical, and market cultures (Cameron and Freeman 1991; Quinn and Spreitzer 1991; Zammuto and Krakower 1991a; Nystrom 1993; Lok and Crawford 1999, 2004; Goodman, Zammuto, and Gifford 2001; Lund 2003; Chen 2004).

Another line of inquiry in the broader management literature has investigated how employee attitudes and behaviors are influenced by the "fit" or congruence between the organization's culture and the individual's own values or beliefs about what the organization's values should be. Several studies have found that greater congruence is associated with more positive employee attitudes (cf. Koberg and Chusmir 1987; Shockley-Zalabak and Morley 1989; O'Reilly, Chatman, and Caldwell 1991; Vandenberghe 1999; Chow et al. 2002)

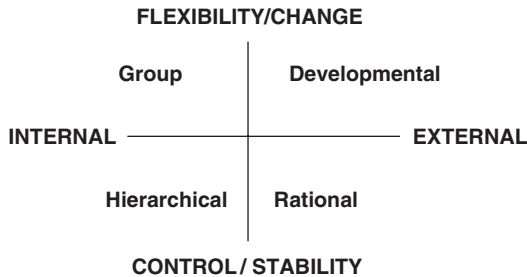
Two major issues face those interested in examining organizational culture in the health care sector. The first concerns the conceptualization and measurement of organizational culture and the second involves the inconsistency of findings to date. On the first point, the field of health care organizational research has both benefited and been hindered by the plurality of frameworks available for conceptualizing organizational culture and the attendant instruments used to measure it. This plurality has been beneficial in that no one framework is valid across all organizational settings. A recent review of instruments used in health care settings demonstrated differences in validity and the types of settings in which these instruments have been used (Scott et al. 2003). Furthermore, examination of existing instruments raises issues of whether culture is being measured or other organizational constructs like climate or structure.

In regard to the second issue, much of the work to date has failed to clearly demonstrate consistent statistically significant relationships between culture and key organizational outcomes. When looking at this body of work, lack of consistent findings could suggest that culture is not relevant to organizational outcomes, that researchers have yet to examine outcomes relevant to physician group culture, that an appropriate set of measures for culture, or organizational outcomes has yet to be used, and/or that the appropriate statistical methods have not been used.

Conceptual Framework and Hypothesis Development

There are numerous ways to conceptualize and measure organizational culture (Scott et al. 2003). Because of the well established divergence between

Figure 1: Competing Values Framework of Organizational Culture



Original Sources: Quinn and Rohrbaugh (1983) and Quinn and Kimberly (1984).

organizational and professional principles, the Competing Values framework is particularly relevant for assessing the organization culture of physician groups (Quinn and Rohrbaugh 1983). The Competing Values framework, pictured in Figure 1, specifies two axes: the extent to which a culture is internally or externally focused, and the degree to which it emphasizes stability/control or adaptability/change. The resulting four quadrants reflect ideal cultural types: group, developmental, hierarchical, and rational. Every organization has elements of each ideal cultural type and this instrument thus allows one to assess the degree to which each ideal type is represented relative to the other types. This framework has been previously used in health care settings (Goodman, Zammuto, and Gifford 2001; Shortell, Zazzali et al. 2001).

There are several advantages in using this framework, but perhaps the most important is that it explicitly incorporates multiple dimensions of an organization’s culture (group, developmental, hierarchical, and rational), which allows one to formulate targeted hypotheses in relating dimensions of culture to physician satisfaction or other organizational outcomes. Because of the ease of administration and scoring and the quantitative nature of the instrument, it also allows for the assessment of culture and cross-organizational comparisons that other, particularly qualitative frameworks, make more difficult to achieve.

A group culture emphasizes teamwork, cohesiveness, and participation. It places a high emphasis on commitment and morale, mentoring, and rewarding team players. The developmental culture is characterized by the promotion of innovation and risk-taking. It is oriented towards growth;

entrepreneurial, and risk-taking leaders are supported, and people are rewarded for taking and sharing risk. The rational culture emphasizes achieving competitive advantage and people are rewarded for acquiring the needed resources to meet organizational goals. Finally, the hierarchical culture emphasizes stability, rules, policies, and regulations. People are rewarded for adhering to rules and regulations, and leaders are supported for emphasizing order and achieving predictability in operations. Every organization's culture will be reflective of these four ideal types to some degree, and the Competing Values framework allows one to assess where a particular organization stands with regard to these different dimensions.

In understanding how organizational culture is related to physician satisfaction, it is important to recognize that physicians are a highly professionalized group. Cultures that conflict with the norms and values of the medical profession are likely to be associated with low levels of physician satisfaction because there will be a dissonance between the cultures of the organization and how physicians have been socialized to operate as professionals. One of the key hallmarks of any profession is autonomy or control (Abbott 1988; Freidson 1994). The degree to which the medical profession has defended its professional authority has been well documented (Starr 1982). As professionals, physician's value autonomy over how they do their work, freedom from external control, and voice in how the organizations they work in are managed.

Accordingly, group culture will be positively associated with physician satisfaction, because such cultures emphasize inclusion and shared decision making authority. Such forms of participation and authority are likely to be consistent with physicians' professional values and norms. Certainly, a case could be made that physicians would prefer work environments where they could function as nonparticipants in organizational life, and that a group culture may run contrary to this desire. However, given those physicians who work in group practice settings self-selected into such organizational arrangements, we believe that group culture will have a positive effect on physician satisfaction. Therefore:

- H1:** A group-oriented culture in physician group practices will be positively associated with all dimensions of satisfaction of individual physicians who work in such groups.

A hierarchical culture emphasizes stability, rules, and regulations and can be thought of as the degree to which the organization's culture reflects the norms and values of a bureaucracy. This culture, with its emphases on structure, formalization, rule-enforcing, and stability, conflicts with the

professional status of physicians, and the attendant need for physician autonomy and control.

H2: A more hierarchically oriented culture in physician group practices will be negatively associated with all dimensions of satisfaction of individual physicians who work in such groups.

The developmental, entrepreneurial, or risk-taking aspects of the culture of a group practice may be congruent with the ability of the group to effectively respond to environmental changes. Given the competitive environment of many group practices, and the increased demands on physician practices to incorporate more technology, an organization whose culture emphasizes change and adaptation to the external environment may lead to increased physician satisfaction, particularly with respect to the technological and competitive capabilities of the groups.

H3: A more developmental culture in physician group practices will be positively associated with satisfaction with the technological and competitive capabilities of the group among individual physicians who work in such groups.

A rational or task-oriented culture emphasizes efficiency and productivity. Such values may run counter to the desire of physicians to control their allocation of time, particularly with respect to the amount of time they spend with patients. For example, a more rational culture might pressure physicians to “churn” their patients. Practice competitiveness and price competition are two dimensions of satisfaction that may be affected by a rational culture. Practice competitiveness, which emphasizes the group’s image, reputation, quality, uniqueness, skill of its physicians, and loyalty of patients and referring physicians, is likely to be negatively associated with a culture that stresses productivity and efficiency because such a culture will make these objectives harder to achieve in a manner consistent with the professional norms and interests of physicians. On the other hand, satisfaction with price competition, which relates to a group’s service costs and its ability to compete on price, is likely to be positively associated with a rational culture because such a culture may allow the groups to achieve lower service costs and a greater ability to compete on price.

H4: A more rational culture in physician group practices will be negatively associated with satisfaction with practice competitiveness and positively associated with satisfaction with price competition among individual physicians practicing in such groups.

METHODS

Sample

This analysis is part of a broader investigation, the Physician System Alignment (PSA) Study, the goal of which was the identification of ways to align physicians with the larger, integrated delivery systems with which they were affiliated. Although the broader PSA study surveyed both employed and contracted physicians, this particular analysis focuses on those physicians who were employed by the groups for which they worked. Of the 14 participating health systems in the PSA study,¹ 12 are represented in this analysis. Two systems chose not to have their physicians complete the organizational culture questionnaire. A more detailed accounting of the PSA study methods is published elsewhere (Shortell, Alexander et al. 2001).

The majority of the data for this analysis are derived from surveys of physicians, administered October 1997–1998. These surveys assessed physician perceptions of the culture of the medical groups in which they worked and their satisfaction with various aspects of group practice. The organizational sample consisted of 52 medical groups affiliated with 12 integrated delivery systems. Larger medical groups and multispecialty groups were over-represented as compared with the U.S. as a whole (Gillies et al. 2003). The individual level sample for the study consisted of 1,593 physicians affiliated with these groups (38.3 percent response rate). To assess nonresponse bias we obtained sociodemographic information on 138 respondents and 543 nonrespondents to an earlier 1995 PSA study survey that used three of our sample systems and two hospitals in two other systems. In the earlier survey, there were no significant differences between respondents and nonrespondents for age, gender, percent primary care physicians, and type of practice, Medicaid participation, or number of HMO relationships. This is evidence that non-response bias was not likely a factor either in our measures of physician group culture or in physician assessments of satisfaction.

MEASURES

Physician Satisfaction

The dependent variables were developed as part of the original PSA study's conceptual framework that specified factors associated with physician–system alignment, including various dimensions of physician satisfaction (Shortell, Alexander et al. 2001). As part of the PSA Survey, the original PSA study team developed a series of 50 questions about physicians' satisfaction with various

aspects of their group practice. These 50 questions employed a 5-point Likert scale, from “very dissatisfied” to “very satisfied,” and fell under six headings: managerial capabilities (13 questions), competitive capabilities (12 questions), human resources capabilities (nine questions), technical capabilities (seven questions), facility capabilities (four questions), and financial capabilities (five questions). We applied confirmatory factor analysis to the 50 questions to determine whether they could be collapsed into scales. We used a principal components method, with a varimax rotation. To be included in a scale, all eigenvalues had to be greater than one, each item had to have a factor loading greater than or equal to 0.5, and no item could load on multiple scales greater than 0.5.² The factor analysis resulted in eight scales.³ All of the scales were psychometrically reliable with a Cronbach’s α coefficients above 0.70. The final dependent variables include six scales measuring satisfaction with: managerial decision making, practice competitiveness, staff and human resources, technological sophistication, price competition, and financial capabilities (see Appendix A for items contained in these scales).

Organizational Culture

The PSA study measured organizational culture with a series of 20 questions developed using the Competing Values framework. These questions are broken out into five sections with four questions each. Within each section physicians assign a total of 100 points across the series of four statements as to how each statement reflects the culture of their group practice. The five sections were: (1) character of the medical group (e.g., “Group A is a very *personal* place. It is a lot like an extended family. People seem to share a lot of themselves.”); (2) leaders of the group (e.g., “The head of our group is generally considered to be an *entrepreneur*, an *innovator*, or a *risk taker*.”); (3) group cohesion (e.g., “The glue that holds our group together is *formal rules* and *policies*. Maintaining a smooth running operation is important here.”); (4) group emphases (e.g., “Our group emphasizes *competitive actions* and *achievement*. Measurable goals are important.”); and (5) group rewards (e.g., “Our group distributes rewards based on *individual initiative*. Those with innovative ideas and actions are rewarded.”). Cronbach’s reliability coefficients for the culture scales were reported in Table 1, and range from 0.66 for the developmental culture scale, to 0.82 for the group culture scale. We aggregated this individual physician-level data to the group level to derive measures of group-level organizational culture. To justify aggregation of individuals’ responses to single, group-level variable, there needs to be “substantial” within-group agreement about those factors (James 1982; Klein, Dansereau, and Hall 1994).

Table 1: Descriptive Statistics

<i>Individual-Level Variables</i>	<i>N</i>	<i>Mean</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>	<i>α</i>
Satisfaction with managerial decision making	1,502	3.13	0.84	1.00	5.00	0.92
Satisfaction with practice competitiveness	1,503	3.88	0.65	1.00	5.00	0.85
Satisfaction with staff and human resources	1,502	3.24	0.87	1.00	5.00	0.85
Satisfaction with technological sophistication	1,500	3.60	0.77	1.00	5.00	0.88
Satisfaction with price competition	1,501	3.20	0.75	1.00	5.00	0.83
Satisfaction with financial capabilities	1,491	2.97	0.86	1.00	5.00	0.84
Perception of culture—group	1,483	28.09	19.35	0.00	96.00	0.82
Perception of culture—developmental	1,482	17.13	10.85	0.00	73.00	0.66
Perception of culture—hierarchical	1,482	25.21	18.01	0.00	100.00	0.77
Perception of culture—rational	1,482	29.61	15.09	0.00	96.00	0.69
Physician age	1,525	45.27	9.22	27.00	84.00	N/A
Physician gender (1 = male)	1,546	0.77	0.42	0.00	1.00	N/A
Primary care (1 = yes)	1,593	19.20	10.55	0.00	59.00	N/A
% patients from HMOs and PPOs	1,593	34.40	29.21	0.00	100.00	N/A

<i>Group-Level Variables</i>	<i>N</i>	<i>Mean</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>	<i>ANOVA</i>
Group culture	52	33.17	10.77	15.50	59.50	0.00
Developmental culture	52	19.14	4.99	9.12	36.55	0.00
Hierarchical culture	52	20.83	8.09	6.00	39.34	0.00
Rational culture	52	26.89	7.54	10.48	49.00	0.00
Group size	52	82.29	170.44	4.00	958.00	N/A
Mean % male	52	0.78	0.17	0.00	1.00	0.02
Primary care group	52	0.31	0.47	0.00	1.00	N/A
Specialty group	52	0.10	0.30	0.00	1.00	N/A
Multispecialty group	52	0.60	0.50	0.00	1.00	N/A

We calculated the Rho-within-group (RWG) coefficient for this purpose, which estimates interrater reliability (on a scale of 0–1) across members within each team. The average value for groups in this sample was 0.82 for group culture, 0.71 for hierarchical culture, 0.80 for rational culture, and 0.90 for developmental culture, all of which were above the acceptable threshold of 0.70 indicating high levels of within-group agreement (James, Demare, and Wolf 1984; Cohen, Doveh, and Eick 2001). We also conducted one-way ANOVA tests to ensure that there was more variation between groups than within groups as an additional check before aggregating the data to the group level (*F*-statistics ranged from 4.5 to 8.9).

Prior research has demonstrated that this framework and the instruments used to measure it correlate with more anthropological methods of assessing an organization’s culture (i.e., intensive qualitative methods) (Zammuto and Krakower 1991b). Although qualitative methods for assessing

culture may provide for “thick description” and a much greater level of detail, they do not readily lend themselves to implementation across organizations due to the resources required to implement them.

Control Variables for Physician Characteristics

Several physician sociodemographics and practice characteristics were included as statistical controls in the models. They included: age, gender, specialist or general practitioner, and individual perceptions organizational culture. The latter variable was included to partially control for selection of physicians into groups with particular cultures. A measure of physician involvement in managed care was also included as a control. Higher involvement with managed care might make physicians more satisfied with group practice because it allows them to negotiate better contracts and achieve economies of scale. Alternatively, one might argue that physicians might resent increased managed care involvement and that such involvement might lead to greater dissatisfaction with their work. Physicians were asked to report the percent of their patients from HMOs and PPOs; these percentages were summed to arrive at the overall percent of patients from managed care. All of the aforementioned control variables were derived from the physician survey.

Control Variables for Group Characteristics

We included several characteristics of the groups as additional statistical controls, including size of the group, type of group (primary care, single specialty, and multispecialty), and the percent of male physicians. Group size was obtained from the groups themselves, as was the type of group. As part of the broader PSA study described earlier, each group was asked to complete a separate survey on organizational characteristics of the group, including size and type of group. A key informant from each group, usually the group administrator, completed these surveys. The percent of male physicians in the group was derived from the sampling frame of the physician survey.

Statistical Models

Our analysis was based on multilevel modeling techniques due to the nested nature of the data: individual physicians are nested within physician group practices. Ordinary least squares (OLS) regression cannot be used to analyze nested data such as these because it violates the assumption that the individual observations are independent (Hofmann 1997; Raudenbush and Bryk 2002). Multilevel models have the advantage of not only providing robust estimates

of the standard errors for the coefficients at each level of analysis, but they also allow one to decompose the variance in the dependent variable accounted for by each level of analysis. This allows us to understand whether more variance in the dependent variable, physician satisfaction, is accounted for by individual physician characteristics or physician group practice characteristics.

We used hierarchical linear modeling (HLM) software to perform a two-level analysis using a restricted maximum likelihood estimation method. To obtain the coefficients and standard errors to test our hypotheses, HLM estimates a series of equations. The first equation estimates the effects of individual physician characteristics on the dependent variable, physician satisfaction (level-1 model). In the subsequent equations, the level-1 intercept and coefficients become the dependent variables with the physician group practice characteristics as predictors (level-2 model). In the level-2 model the overall intercept, β_{0j} , was allowed to randomly vary across physician group practices (a so-called “means as outcomes” model), while the coefficients from the level-one model were fixed and not allowed to vary across group practices. We choose a random intercept model because we did not expect the relationships between level-1 variables (i.e., age) and job satisfaction to randomly vary across group practices. A technical appendix explaining the rationale for HLM models and the decisions required to construct these models is included in the online version of this article (Appendix B).

Physician satisfaction with six dimensions of group practice was predicted using physician-level variables and group-level variables. Separate models for each of the four cultural types were estimated for each of the six satisfaction measures, yielding a total of 24 models. The models took the following forms:

Level-1 model:

$$\begin{aligned} \text{Physicianjobsatisfaction, } Y_{ij} = & \beta_{0j} + \beta_{1j}(\text{perception of culture})_{ij} \\ & + \beta_{2j}(\text{age})_{ij} + \beta_{3j}(\text{gender})_{ij} \\ & + \beta_{4j}(\text{primary care})_{ij} \\ & + \beta_{5j}(\% \text{ patients from HMOs and PPOs})_{ij} + r_{ij} \end{aligned}$$

Level-2 model : $\beta_{0j} = \gamma_{00} + \gamma_{01}(\text{organizational culture})_j + \gamma_{02}(\text{group size})_j$
 $+ \gamma_{03}(\% \text{ male})_j + \gamma_{04}(\text{specialty group})_j$
 $+ \gamma_{05}(\text{multispecialty group})_j + u_{0j}$
 where $\beta_{1j} = \gamma_{10}$, $\beta_{2j} = \gamma_{20}$, $\beta_{3j} = \gamma_{30}$, $\beta_{4j} = \gamma_{40}$
 $\beta_j = \gamma_{50}$ for the *i*th physician in the *j*th group

We first ran a fully unconditional model to examine the intraclass correlation coefficient (ICC). The ICC ensures that there is a statistically significant amount of variance between groups (i.e., physician group practices) to model. On all six dependent variables, the ICC was statistically significant (i.e., there was enough variation between groups to proceed with multilevel modeling).

RESULTS

Univariate Statistics

The descriptive statistics for the study variables are shown in Table 1. Seventy-seven percent of physicians in the sample were male, with an average age of 45 years. Nineteen percent were primary care physicians. At the group level, the mean group size was 82 physicians, with a range of 4–958 (median = 28). Thirty-one percent of the groups were primary care groups, 10 percent specialty groups, and 60 percent multispecialty groups. On average the group culture scale was rated the highest, at 33.17, followed by rational at 26.89, hierarchical at 20.83, and developmental at 19.14. Thus, the “average” physician organization in our sample has a culture with a higher emphasis on participation (the group culture scale), a moderate emphasis on productivity/efficiency (the rational culture scale), and a lower emphasis on rules and risk taking (the hierarchical and developmental culture scales). The six satisfaction measures range from 1 to 5. The areas of greatest satisfaction are with practice competitiveness and technological sophistication, whereas the lowest areas of satisfaction are with managerial decision making and financial capabilities.

Multivariate Models

There are 24 HLM models in total, four models (one for each of the six different culture scales) for each of the six satisfaction scales.⁴ The effects of culture in the 24 models are summarized in Table 2. The full HLM model results are presented in Tables B-1 to B-4, which can be found in Appendix C of the online version of this article, along with the correlation matrix (Table B-5).

Group-Level Effects. Partial support was found for our hypotheses relating organizational culture and physician satisfaction. We hypothesized that a group (i.e., participatory) culture would be positively associated with individual physician satisfaction, and found this to be the case for satisfaction with staff and human resources, technological sophistication, and price competition (Table B-1). It was also hypothesized that a hierarchical (i.e., bureaucratic) culture would be negatively associated with individual

Table 2: HLM Analysis: Summary of Relationships between Culture Scales and Physician Satisfaction with Dimensions of Group Practice

	Satisfaction with Managerial Decision Making			Satisfaction with Practice Competitiveness			Satisfaction with Staff and Human Resources		
	Culture Coefficient	Variance Explained by Culture Scale	Variance Explained in Full Model	Culture Coefficient	Variance Explained by Culture Scale	Variance Explained in Full Model	Culture Coefficient	Variance Explained by Culture Scale	Variance Explained in Full Model
Group culture scale	0.01	N/A	0.15	0.01	N/A	0.15	0.01*	0.01	0.13
Hierarchical culture scale	-0.02**	0.02	0.31	-0.02**	0.05	0.21	-0.01	N/A	0.15
Development culture scale	0.01	N/A	0.07	0.02	N/A	0.06	0.01	N/A	0.05
Rational culture scale	-0.01	N/A	0.00	-0.01	N/A	0.03	-0.02*	0.02	0.04

	Satisfaction with Technological Sophistication			Satisfaction with Price Competition			Satisfaction with Financial Capabilities		
	Culture Coefficient	Variance Explained by Culture Scale	Variance Explained in Full Model	Culture Coefficient	Variance Explained by Culture Scale	Variance Explained in Full Model	Culture Coefficient	Variance Explained by Culture Scale	Variance Explained in Full Model
Group culture scale	0.01*	0.01	0.08	0.01*	0.02	0.08	0.01	N/A	0.13
Hierarchical culture scale	-0.01	N/A	0.09	-0.01*	0.01	0.08	-0.02**	0.05	0.25
Development culture scale	-0.01	N/A	0.03	0.01	N/A	0.01	0.02	N/A	0.1
Rational culture scale	-0.01	N/A	0.03	-0.02**	0.02	0.03	-0.01	N/A	0.04

* $p < .05$,

** $p < .001$.

Notes:

- (1) Table summarizes 24 different multilevel models. The results of the full models are available in the online version of the paper.
- (2) The effects shown control for a standard set of individual physician covariates (perception of culture, age, gender, whether a primary care physician, and percent of patients from HMOs and PPOs), and organizational covariates (group size, percent male, and type of group—primary care, single specialty, or multispecialty).
- (3) The variance explained by the culture scale pertains only to models where a statistically significant culture coefficient obtained.

physician satisfaction, and found that it was negatively associated with managerial decision making, practice level competitiveness, price competition, and financial capabilities (Table B-2).

We hypothesized that a developmental (i.e., risk-taking) culture would be positively associated with individual physician satisfaction with the technological, data, and competitive capabilities of the groups; however, a developmental culture was not significantly associated with individual physician satisfaction (Table B-3). We hypothesized that a rational (i.e., task-oriented) culture would be negatively associated with individual physician satisfaction with practice competitiveness and positively associated with satisfaction with price competition. Our results, however, show that a more rational culture is negatively related to satisfaction with staff and human resources, and, contrary to our hypothesis, negatively associated with satisfaction with price competition (Table B-4).

In all four of the models predicting satisfaction with financial capabilities (i.e., Tables B-1 to B-4), having a higher percentage of male physicians was positively associated with individual physician satisfaction. In three of the four models pertaining to satisfaction with financial capabilities (the group, developmental and rational culture models shown in Tables B-1, B-3, and B-4), and being a single-specialty group, relative to a primary care group, were positively associated with individual physician satisfaction.

Physician-Level Effects. Individual physicians' ratings of organizational culture were significantly associated with most of the satisfaction measures. Higher individual ratings of group and developmental culture were positively related to all of the satisfaction measures, whereas higher individual ratings of hierarchical culture were negatively related to all of the satisfaction measures. Higher individual ratings of rational culture were negatively related to all of the satisfaction measures except satisfaction with facility capabilities. In general, older physicians were more satisfied than younger physicians on many of the satisfaction measures across all of the culture types. Primary care physicians were less satisfied with price competition than specialists in all four models. Male physicians were less satisfied with data capabilities in all four models. The percent of patients from HMOs and PPOs was not significantly related to individual physician satisfaction in any of the models.

Variance Explained. Our models explain up to 31 percent of the variance in physician satisfaction with group practice. As expected, models testing the

effects of group and hierarchical culture performed best in this regard. For example, three of the six models for hierarchical culture (Table B-2) explained more variance in the dependent variables, relative to the other models tested. The model with the highest percent variance explained (31 percent) was for hierarchical culture and satisfaction with managerial decision making.

In the nine cases where there was a significant coefficient for an organizational culture scale, we report the percent of variance in individual physician satisfaction explained by these culture variables. Taken individually, dimensions of organizational culture account for up to 5 percent of the variance in individual job satisfaction. Although modest in absolute terms, the contribution of organizational culture to explaining physician satisfaction is substantial in light of the total variance attributable to group level attributes. For example, the interclass correlation (ICC) diagnostics indicate that about 5 percent of the variation in individual physician satisfaction with price competition is attributable to differences across groups. The contribution of group culture to explained variance is 0.02 in our model, suggesting that this dimension of culture accounts for much of the variance potentially attributable to all group level factors.

One of the advantages of using the Competing Values framework is that it lends itself to graphically “mapping” the culture of organizations along the four dimensions that it measures. We “mapped” the culture of the groups that scored the highest and lowest on the eight physician satisfaction scales (Figures 2 and 3). This “mapping” provides a graphical display of the *overall* relationship between all of the satisfaction scales and each

Figure 2: Highest Satisfaction Group

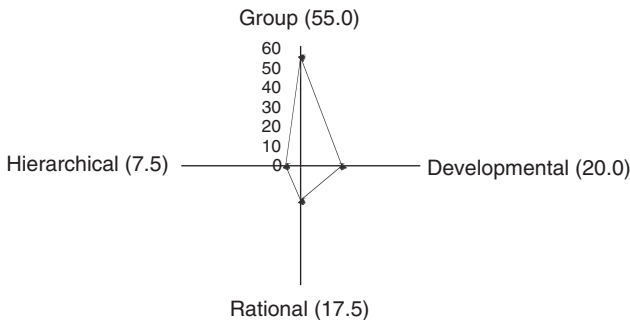
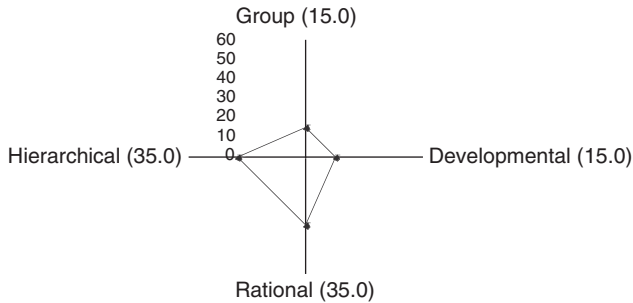


Figure 3: Lowest Satisfaction Group



The lowest and highest physician satisfaction groups were defined by aggregating the satisfaction scales to the group level and sorting the data based on the level of satisfaction on each scale. The highest satisfaction group scored highest on all of the satisfaction scales relative to all of the other groups in the sample, and the lowest satisfaction group scored lowest on all of the satisfaction scales. The culture scores for these two groups were then plotted to produce the figures.

of the cultural types. To illustrate, the “Highest Satisfaction” group scored the highest on the group culture scale (55.0) and lowest on the hierarchical scale (7.5). The “Lowest Satisfaction” group scored the highest on the hierarchical and rational culture scales (each 35.0) and lowest on the group culture scale (15.0). These results are illustrative of the broader pattern of results, which indicate that group culture is positively related to physician satisfaction and hierarchical culture is negatively related to satisfaction.

DISCUSSION

Interpretations and Implications of Results

Our results are generally consistent with our hypotheses regarding the relationship between group and hierarchical cultures and physician satisfaction. These findings suggest that culture represents an important contextual feature of group practices that may influence the attitudes of professionals towards the organizations in which they work. Specifically, we found that more positive physician satisfaction toward key aspects of their practice was associated with stronger group culture and negatively associated with groups dominated by a

hierarchical culture. These results have implications for the design and effectiveness of physician group practices. For example, promoting a positive group-oriented culture could help physician organizations in recruiting and retaining physicians, whereas a hierarchical and bureaucratic culture may make recruitment and retention harder to achieve. More importantly, perhaps, our findings identify what specific elements of physician satisfaction with the group's organizational structure and management practices are most influenced by culture. These factors may be particularly important in highly competitive markets as well as in underserved areas.

Our results are also consistent with prior studies in nonhealth care industries that have examined the organizational culture–satisfaction link, where satisfaction is higher in organizations with innovative, supportive, group, clan, and adhocracy cultures, and lower in organizations with rational, hierarchical, and market cultures (Cameron and Freeman 1991; Quinn and Spreitzer 1991; Zammuto and Krakower 1991a; Nystrom 1993; Lok and Crawford 1999, 2004; Goodman, Zammuto, and Gifford 2001; Lund 2003; Chen 2004). This suggests that the effects of organizational culture in physician groups may not be that different from the effects found in general industry.

Two of the satisfaction scales, price competition and staff and human resources, were predicted by more than one of the cultural types. Although each of the multivariate models is independent of the others, comparing results across these models provides a more complete picture of how culture is predictive of specific dimensions of physician satisfaction. For example, the group culture scale was positively associated with price competition and the hierarchical and rational culture scales were negatively associated with this satisfaction scale. This would suggest that when managers and leaders of physicians organizations want to increase physician satisfaction with price competition they should reinforce elements of their organization's culture that emphasize teamwork and cohesiveness (i.e., group culture) and deemphasize stability and rules (i.e., hierarchical culture) and productivity and a task-orientation (i.e., rational culture). This may be particularly important due to the continued and recent compressions in physician compensation. The issue of retention is likely to assume increased significance as CMS in their eighth scope of work proposes to reward Quality Improvement Organizations (QIOs), in part, on "culture" criteria measured by reducing turnover in provider organizations (CMS, March, 2005).

The culture of physician organizations is also likely to assume increased importance with the growth of financial rewards for improving quality of care. There are currently approximately 100 private sector "pay for performance"

programs of various sorts in addition to CMS-sponsored demonstration programs to improve the quality of chronic illness care (Rosenthal et al. 2004; Damberg et al. 2005). These incentives require physician organizations to implement recommended chronic care management processes (Wagner et al. 1996a, b; Bodenheimer et al. 2002; Casalino et al. 2003) and to make greater use of clinical information technology to achieve quality improvement targets. The culture and leadership of the physician practices have been identified as key variables influencing the ability of physician organizations to achieve higher quality performance (Rundall et al. 2002; Rosenthal et al. 2004). Recent research, for example, has found a significant association between having a balance of the group, developmental, rational, and hierarchical dimensions of the Competing Values culture framework and the perceived effectiveness of quality improvement collaborative teams (Shortell et al. 2004). In turn, team effectiveness has been found to be significantly associated with making a greater number of changes to improve chronic illness care and a greater number of in-depth changes (Shortell et al. 2004).

The findings may also have important implications for improving patient safety. For example, the Leapfrog Group has a major initiative to improve patient safety through the use of computerized physician order entry (CPOE) technology. Although we did not measure satisfaction with CPOE technologies directly, the present research suggests that a group-oriented culture is associated with greater satisfaction with the technological capabilities of the group. The findings suggest that a participative culture would be important for physician adoption and implementation of such new information technologies.

Despite these promising directions, it will remain a challenge to actively intervene to change organizational culture to support higher levels of physician satisfaction. The orientation of physicians and group managers toward individual behaviors and performance places primary emphasis on the individual and his/her actions rather than on the synergistic benefits of individual, group, and system-level successes. If the physician's world becomes circumscribed by these incentives/orientations, he/she will continue to see rewards resulting from his/her own actions rather than that of the group or organization.

Limitations and Future Research

Caution should be exercised in generalizing these results beyond the sample studied, as larger medical groups and multispecialty groups are over-represented in this analysis. Most physician groups are small, with 46 percent having only three to four physicians (Havlicek 1999). Further, our cross-sectional

data and nonrandomized design make causal inferences about the relationship between organizational culture and physician satisfaction problematic. Although our theory suggests that culture influences satisfaction, the reverse may be true. For example, physicians who are predisposed to view management and organizational support for clinical practice positively may be more likely to self-select into groups with strong group cultures. However, the nested structure of our data somewhat mitigates this possibility in our study insofar as the attitudes of an individual physician are unlikely to influence group level features such as culture.

Future research should focus attention on how group size is related to the development of organizational culture and how group size matters with respect to the relationship of culture to outcomes of interest, like satisfaction. Another area for future research pertains to the importance of cultural perception versus cultural context when assessing organizational outcomes. One of the interesting findings from this analysis is that the individual physician perceptions of organizational culture were significantly related to individual physician satisfaction. Although we included individual physicians' perceptions of culture in the models as adjusters and statistical controls, and did not develop hypotheses for these variables, the results were consistent with those hypothesized for the group-level effects.

The results of our study coupled with past research suggest that the cultural context of the group may be an important contributor to physician satisfaction and retention, independent of attributes of the individual group member. Future research, however, must consider whether such distinctions hold when other outcomes are examined. Likely candidates for study include actual physician quitting behavior and physician productivity (group and individual). Future research should compare the experience of physicians to other health care professionals and paraprofessionals working in similar cultural contexts. Further, there is need to explore the relationship between culture and physician satisfaction and retention as moderating or mediating variables influencing physician organization implementation of care management processes, achieving quality improvement objectives, and attaining financial rewards for improved performance.

CONTRIBUTIONS AND CONCLUSIONS

The contributions of this study lie in several areas. First, by deconstructing the broader concepts of satisfaction and organizational culture into their constitu-

ent dimensions, we have been able to demonstrate a more complex picture of physician satisfaction in physician groups than has been recognized heretofore. Physician satisfaction is described in terms of specific elements of organization and management practice, and their relationship to a particular cultural type (e.g., group, hierarchical). Single dimensions of organizational culture explained up to 5 percent of the variance in individual physician satisfaction in our models.

Second, our focus on physician satisfaction with elements of the organization and its management that impact clinical practice provides an important potential link between elements or organizational context (such as culture) and outcomes that have been commonly ascribed to culture (e.g., turnover, quality of care). Indeed, the relational perspective on attitude formation argues that “natural units of analysis for attitudes are not isolated individuals but social networks” (Erickson 1988). Attitudes are not formed simply as a direct response to individual predispositions and characteristics, but through social processes that emerge under different structural conditions. Research in other areas such as education, and mental health has emphasized the importance of elements of organizational context, such as culture, in explaining individual behavior and attitudes.

Third, our multilevel methods correct for several problems that have limited both the internal and external validity of previous studies of the effects of organizational culture. Specifically, we have attempted to control clustering within groups and have incorporated larger samples of physician groups in our analysis. Conventional techniques, such as assigning the same group value to all members of a group or aggregating individual values to the group level are inappropriate. In the first case, assigning the same group value to all members of a group results in a violation of the independence of observations assumption underlying traditional regression approaches. Individuals in the same group are exposed to common stimuli and this common effect needs to be taken into account using an appropriate multilevel method. In the second case, aggregating individual outcomes to the group level ignores potentially meaningful individual level variance in the outcome measure.

Finally, in an era of turbulence and uncertainty in the health care sector, managers cannot afford to ignore the role of culture in favor of retention strategies that focus only on the individual worker. Indeed, our results may suggest that changing physician group culture, in addition to promoting individual physician satisfaction, should constitute the primary approach to fostering physician retention. Such a “top down” approach suggests that “managing” organizational culture is an important building block for reinforcing positive physician attitudes and preferences.

ACKNOWLEDGMENTS

Support for this research was provided by the National Science Foundation under its Industry-University Cooperative Research Center Program, the Center for Health Management Research, and the Center for Organized Delivery Systems.

NOTES

1. The integrated delivery systems participating in the PSA study include: Aurora Health Care, Baylor Health Care System, Catholic Health Initiatives, Samaritan Health System (now banner Health—Arizona), Summa Health System, Virginia Mason Medical Center, Catholic Healthcare West, Fairview Hospital and Health Care Services (now Fairview Health Services), Henry Ford Health System, Intermountain Health Care, Mercy Health Services (now Trinity Health), Northwestern Health Care, Sisters of Providence (now Providence Health System), and SSM Health Care.
2. We also performed the factor analysis using an oblique rotation. Results were similar but varimax rotation resulted in slightly more reliable scales. We therefore used the factor solution obtained with varimax rotation.
3. Two of these scales were not included in our analysis because of a weak theoretical link between organizational culture (satisfaction with data capabilities and satisfaction with facility capabilities).
4. Because of the ipsative nature of the culture scales, only one culture scale at a time can be included in a multivariate model, thus resulting in 24 models.

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SUPPLEMENTARY MATERIAL

The following supplementary material for this article is available online:

Appendix A. Items Contained in Physician Satisfaction Scales.

Appendix B. Technical Appendix on Hierarchical Linear Models (HLM).

Appendix C. Tables B-1 to B-5 (Full HLM Models and Correlation Matrix).

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