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Physicians' Perceptions of Autonomy across Practice Types: Is Autonomy in Solo Practice a Myth?

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Abstract

Physicians in the United States are now less likely to practice in smaller, more traditional, solo practices, and more likely to practice in larger group practices. Though older theory predicts conflict between bureaucracy and professional autonomy, studies have shown that professions in general, and physicians in particular, have adapted to organizational constraints. However, much work remains in clarifying the nature of this relationship and how exactly physicians have adapted to various organizational settings. To this end, the present study examines physicians' autonomy experiences in different decision types between organization sizes. Specifically, I ask: In what kinds of decisions do doctors perceive autonomous control? How does this vary by organizational size? Using stacked "spell" data constructed from the Community Tracking Study (CTS) Physician Survey (1996–2005) (n=16,519) I examine how physicians' perceptions of autonomy vary between solo/two physician practices, small group practices with three to ten physicians, and large practices with ten or more physicians, in two kinds of decisions: logistic-based and knowledge-based decisions. Capitalizing on the longitudinal nature of the data I estimate how changes in practice size are associated with perceptions of autonomy, accounting for previous reports of autonomy. I also test whether managed care involvement, practice ownership, and salaried employment help explain part of this relationship. I find that while physicians practicing in larger group practices reported lower levels of autonomy in logistic-based decisions, physicians in solo/two physician practices reported lower levels of autonomy in knowledge-based decisions. Managed care involvement and ownership explain some, but not all, of the associations. These findings suggest that professional adaptation to various organizational settings can lead to varying levels of perceived autonomy across different kinds of decisions.

Keywords

US; physicians; professions; autonomy; organizations; healthcare

Introduction

As the result of significant change in the American healthcare system over the last half a century, physicians in the United States now work in a plethora of different organizational types (Gray, 1991; Scott, 1982; Starr, 1982). For instance, physicians are now less likely to work in small solo practices, and more likely to work in larger group practices. In 2008, less

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than 45 percent of practicing physicians worked in practices with fewer than five physicians (Boukus et al., 2009; Landon & Normand, 2008), and this proportion continues to fall as physicians join larger practices (Shih et al., 2008).

With every step away from smaller traditional practice types, questions have arisen concerning how these larger, newer organizational types may influence medical work. Some fear that administrative regulation infringes on the autonomy of medical authority, influencing the quality of care provided by medical professionals (Relman, 2008; Wynia et. al., 1999). Though older theory predicts conflict between organizational bureaucracy and professional autonomy (Freidson, 1970; Haug, 1973; McKinlay & Stoeckle, 1988), studies have shown that professions in general, and physicians in particular, have adapted to organizational constraints (Derber & Schwartz, 1991; Engel, 1970). Physicians are not always antagonistic towards managerial control (Hoff, 2003) and may even benefit from employment in large organizations (Briscoe, 2006). These findings have led to a new chapter in professions research examining how professions adapt to different organizational settings (Leicht & Fennell, 1997; Montgomery, 1997).

Though this line of research has deepened our understanding of the interactions between professions and organizations, much work remains in clarifying the nature of this relationship. While we have observed professional adaptation, exactly *how* physicians have adapted to various organizational settings remains an open empirical question. For instance, although we have seen cooperation between physicians and administrators (Hoff, 2003, 2011), specifically over what kinds of decisions has the medical profession ceded control? Conversely, over what kinds decisions has it retained autonomous control?

Moreover, much of the work on professional adaptation to organizational settings has employed qualitative and cross-sectional study designs (Briscoe, 2006; Hoff, 2003, 2010). While qualitative studies have provided rich information on the ways in which organizational type may influence physician autonomy, the observed relationships have not been widely tested on population level data. Cross-sectional studies also cannot account for physician selection into practice types. If certain personal attributes both lead physicians to select into certain practice types, and also to report certain levels of autonomy, then the relationship between organizational setting and physician autonomy would be spurious. Longitudinal data permit the analyses of within-person change, accounting for such selection issues. I thus contribute to the literature on physician adaptation to different organizational settings by testing the relationships found in qualitative studies in a national and longitudinal sample of US practicing physicians.

Additionally, research in this line of inquiry has largely focused on how physicians in large organizations have attempted to protect or otherwise given up their autonomy. Fewer studies compare the autonomy experience between types of organizations. In particular, few studies examine the experiences of solo practitioners. While dwindling in number, solo/two physician practices still make up a non-negligible one-third of practices in which physicians work (Boukus et al., 2009). I thus also extend existing work by comparing physicians' autonomy experiences between organizational types, specifically allowing for an examination of solo/two physician practices.

The present study thus demonstrates how the medical profession has adapted to various organizational settings by examining the physicians' autonomy experiences in different decision types. Specifically, I ask: In what kinds of decisions do doctors perceive autonomous control? How does this relationship vary by organizational size? First, I describe two kinds of decisions physicians may encounter in their workplace–logistic and knowledge-based decisions—and how perceived autonomy in these decisions may vary

between organizations. Then, using nationally-representative, stacked "spell" data constructed from the Community Tracking Study (CTS) Physician Survey (1996–2005) I examine how physicians' perceptions of autonomy vary in these two kinds of decisions between solo/two physician practices, small group practices with three to ten physicians, and large practices with ten or more physicians. I capitalize on the longitudinal nature of the data and estimate how changes in practice size are associated with physicians' perceptions of autonomy, accounting for previous reports of autonomy. Finally, I also test whether managed care involvement, practice ownership, and salaried employment help explain the relationship between practice size and physicians' perceptions of autonomy.

Background and hypotheses

Autonomy, a defining characteristic of the professions allowing professionals freedom to practice their skilled craft (Freidson, 1970), can be exerted at both the collective and individual levels. Autonomy at the collective level speaks to a profession's ability to police its boundaries and regulate the initiation of new members, and autonomy at the individual level involves individual discretion and control over the terms and content of daily work. Earlier theories of professional autonomy argued that the medical profession had lost its autonomy when both third-party payers and the state started to regulate the medical realm (Freidson, 1970; Haug, 1973; McKinlay & Stoeckle, 1988). This work observed that with the implementation of Medicaid and Medicare, and the growth of the managed care industry, the medical profession became just one of many voices in the healthcare conversation (McKinlay & Marceau, 2002). Applied at the individual level, these earlier theories noted that as doctors were no longer the sole medical decision-makers, they had lost autonomous control over their work (McKinlay & Stoeckle, 1988).

More recent work from organization scholars showed that, despite such external influences, the day-to-day professional autonomy of physicians varied by organization. Rather than question the state of autonomy in the professions, this new chapter in professions research examines how professions have negotiated with external influences, and adapted to different organizational settings (Leicht & Fennell, 1997; Montgomery, 1997). Studies in this vein demonstrate that working in organizations did not necessarily lead to conflicted relationships between professional workers and management, decreased professional autonomy, or dysfunctional organizations (Derber & Schwartz, 1991; Montgomery, 1997; Scott et al., 2000). For instance, with regards to medicine, studies have shown that physicians actively negotiate within organizational constraints to maintain a degree of satisfaction in their own workspace (Hoff, 2003, 2011).

Such observations suggest that levels of autonomy in everyday professional work may vary by decision type, such that professional workers can maintain a degree of autonomy in certain decisions, but forego it in others. According to Derber and Schwartz (1991), an archetype for modern day professionals is the skilled craftsmen of the late nineteenth century—masters of the skilled tasks that require their knowledge and creativity, but possessing almost no power over larger organizational decisions such as scheduling, division of labor, and overall management. This observation suggests at least two different kinds of decisions over which professionals can exercise autonomy: logistic-based and knowledge-based. Logistic-based decisions consists of decisions regarding the maintenance of the organization, such as financial investments, division of labor, the hiring and firing staff, and internal communication policy (Derber & Schwartz, 1991). This is a crucial component of professional autonomy as it allows professional workers to control the structure in which they do their work. Larger organizations require greater administrative regulation in order to operate (Madison & Konrad, 1988) and thus practitioners working in

larger organizations may need to cede more control on logistic-based decisions over to administrators. This leads to the first hypothesis:

H1
Physicians in larger practices perceive less autonomy in logistic-based decisions, compared to those who work in smaller practices.

Knowledge-based decisions consist of decisions that require specialized knowledge imparted to the profession during a prolonged training period (Derber & Schwartz, 1991; Freidson, 1970). Prior work has shown that physician clinical behavior changes little in response to an altering of both financial incentives and the organization of practices, demonstrating the resilience of professional autonomy in knowledge-based decisions (Armstrong, 2002). For example, though widely implemented, clinical guidelines have had little influence in changing physician behavior (Armstrong, 2002; Cabana et al., 1999; Timmermans & Kolker, 2004; Timmermans & Oh, 2010). This suggests that while physicians who work in larger organizations may perceive decreased autonomy in logistic-based decisions, physicians in general may still perceive autonomy in clinical, or knowledge-based decisions. As physicians remain the “cultural authority” in the medical realm (Starr, 1982), they may still maintain authority over medical decision-making. This generates the second hypothesis:

H2
Physicians’ perceived autonomy in knowledge-based decisions does not vary by practice size.

The relationship between perceived autonomy and practice size may be explained by a number of factors. Literature suggests that greater managed care involvement is negatively associated with autonomy and positively associated to practice size (Feldman et al., 1998; Stoddard et al., 2001). Managed care here is defined broadly as any healthcare system that integrates the financing with the delivery of medical services, aiming to control cost and quality (Feldman et al., 1998). With greater managed care involvement comes more rules and regulations physicians must abide by that may influence their perceptions of autonomy. Moreover the type of involvement is important. For instance, if a practice has many managed care contracts but receives only a small percentage of practice revenue from managed care reimbursement, physicians working in such a practice may not be strongly held to a single set of regulations such that physicians may perceive greater autonomy (Madison & Konrad, 1988). This leads to a third hypothesis:

H3
Accounting for managed care involvement will decrease the strength of association between practice size and physicians’ perceptions of autonomy (both logistic-based and knowledge-based).

Payment structure may also help explain the association between practice size and perceived autonomy. Physicians who have a financial stake in, or full ownership of, their practice may perceive greater logistic-based autonomy as they are more likely in control of the management and financial decisions of the practice. Salaried physicians may not perceive as high levels of autonomy as they are employees of an organization, and thus subject to more rules and regulations. Alternatively, some work suggests since salaried physicians have guaranteed income and thus may feel less financially unstable, they may relatedly feel more autonomous, compared to physician-owners who rely on services disbursed for income (Hoff, 2010). Furthermore, solo practitioners tend to own their practices, whereas physicians employed by large group practices tend to draw salary. Thus, though the direction is unclear, the relationship between practice type and perceived autonomy may be explained in part by payment structure, generating the final hypothesis:

H4
Accounting for physician payment structure (salaried/ownership status) will decrease the strength of the association between practice size and physicians' perceptions of autonomy (both logistic-based and knowledge-based).

Data and Methods

Data

I use four waves of the Community Tracking Study (CTS) Physician Survey (1996–97, 1998–99, 2000–01, and 2004–05), a national sample of physicians involved in direct patient care in the contiguous United States. Response rates for each wave varied from 52.4% to 65.4%, comparable to other physician surveys (Campbell et al., 2007; Delnevo et al., 2004). Each wave's sample was drawn from a random sample of sixty nationally representative communities, defined in 1996, stratified by region, community size, and metropolitan/non-metropolitan status (S. Williams et al., 2006). The longitudinal component of the study replenishes a random selection of physicians from the previous wave with a random fresh sample of physicians from the current wave. More information about the study is available elsewhere (S. Williams et al., 2006).

The CTS Physician Survey is one of the few data sets suitable for testing these hypotheses because it collects both physicians' perceptions and practice characteristics from a large, nationally representative sample of physicians across almost ten years of time. As such, these data present a unique opportunity to estimate multivariate models that examine physicians' perceptions of autonomy on a national sample. As the restricted version of the data was used for analyses, the study received ethical approval from the Health Science and Behavioral Sciences Institutional Review Board at the University of Michigan.

Measures

I measured physicians' perceptions of autonomy with two separate survey items:

I have adequate time to spend with my patients during typical office/patient visits. (type of logistic-based decision)

I have the freedom to make clinical decisions that meet my patients' needs. (type of knowledge-based decision)

The first survey item measures a respondent's perception of being able to have enough time with patients, tapping into their sense of autonomy in schedule control, a kind of logistic-based decision. The second survey item measures a respondent's perception of autonomy in clinical decision-making, a kind of knowledge-based decision. Responses were coded 1-5, with 1 indicating strong disagreement (less autonomy) and 5 indicating strong agreement (greater autonomy). A correlation coefficient of 0.26 between the two measures indicates that, while autonomy in logistic-based and knowledge-based decisions may be related, the two are distinct constructs.

I examined three categories of practice size: solo/two physician practices, group practices with three to ten physicians, and large practices which included group practices with ten or more physicians, medical schools, public and private hospitals, and health maintenance organizations. These measures were coded using information from both a continuous measure of practice size as well as a categorical measure of practice type. The cutoff of 10 physicians was made after examining the distribution of practice sizes in the data and reviewing empirical literature (Landon et al., 2008; Landon et al., 2003; E. S. Williams et al., 2002). Results were robust to changing the cutoff to 30 physicians. Physicians practicing in government clinics, physician/hospital collaborations, community health centers, free-

standing clinics, and other types of practices were dropped from the sample as the practice sizes varied greatly within each practice type. This amounted to less than 10% per wave of the sample.

Models included controls for physician and practice characteristics. Physician characteristics included gender (male=1), years practicing, primary care physician (PCP) status (PCP=1), career satisfaction, logged annual income, and hours providing patient care in the past week. Practice characteristics control for patient demographics, and included percent revenue from Medicare, percent revenue from Medicaid, and urbanicity of practice (urban (ref), suburban, and rural).

Managed care involvement is measured in three ways: percent practice revenue received from managed care, number of managed care contracts, and percent revenue received from prepaid plans. Interactions between percent managed care and number of managed care contracts were initially considered, but as coefficients did not reach significance, they were dropped from the models. Physician payment structure is measured with two binary indicators: an indicator for ownership (includes full and partial owners), and for salaried status. Though the two indicators are related, there are physicians who both draw salary and have ownership stake in a practice, and thus both measures are included in the models.

Analytic Strategy

Stacked "spell" data was first constructed, consisting of physicians who responded in both 1996–1997 and 1998–1999, 1998–1999 and 2000–2001, and 2000–2001 and 2004–2005. Using spells as the unit of analyses accounts for unmeasured physician characteristics that can influence perceptions of autonomy by allowing the estimation of physicians' perceptions of autonomy at time *t*, or the second survey wave of each spell, taking into account perceptions at time *t−1*, or the first survey wave of each spell.

Using spells also allows the construction of four different categories of exposures to a particular practice size: those who are *never* exposed to the practice size at both times *t* and *t −1* (ref), those who *stay* exposed to the practice size at both times *t* and *t−1*, those who were not exposed to the practice size at time *t−1* but subsequently *entered* the practice size by time *t*, and those who were exposed to the characteristic at time *t−1* but subsequently *exited* from the setting by time *t*. By grouping physicians into these four exposure categories I account for the temporal ordering needed to establish causal direction. As the data are stacked, an additional control for which wave-to-wave transition the spell is from is also included in the models.

Separate models were estimated for each of the practice size categories. While the reference group of "never" for solo/two physicians practices and large practices are a homogenous group (for solo practice, all physicians in the reference group practice in larger practices, and vice versa for larger practices), this is not the case for the middle practice size, as physicians in the reference category can be in either a larger or smaller practice. Thus, for the small group practitioners, I estimate two sets of models—one dropping all physicians in solo/two physician practices, such that all physicians in the reference group work in larger organizations, and one dropping all physicians in large group practices, such that all physicians in the reference group work in solo/two physician practices.

I estimated a series of nested ordinary least squares regression models predicting physicians' perceptions of autonomy for each practice size.[1] Model 1 presents unadjusted estimates of

[1]Logistic and ordinal logistic models were also estimated to ensure that the results did not rely on modeling specification. Results did not differ substantively, so OLS estimates are presented for ease of interpretation.

the influence of each practice size exposure category on physician perceptions of autonomy (H1, H2). Model 2 adjusts estimates by controlling for both physician and practice traits at time *t*. Model 3 further adjusts estimates by including managed care involvement at time *t*. If the influence of practice size on physicians' perceptions of autonomy operates through managed care involvement, the coefficients on the practice size categories would decrease relative to Model 2 (H3). Model 4 adjusts estimates from model 2 by adding measures of ownership and salary status at time *t*. If the influence of practice size on physicians' perceptions of autonomy operates through physician payment structure, then the coefficients on the practice size exposure categories would decrease relative to Model 2 (H4).

To enter the analytic sample, a physician had to be observed at least twice consecutively in the four waves of data (n=17,266 unique physicians), practicing in one of the three practice size categories (n=14,919 unique physicians) and have provided responses to all key measures (n=9,854 unique physicians). Physicians excluded from this sample reported fewer years in practice, were less likely to be full owners or practice in a solo/two physician practice, and were more likely to be PCPs, practice in a small group practice, have higher percentage revenue from Medicare or Medicaid, and lower incomes. Three wave-to-wave panels were constructed, yielding 16,519 spells. Standard errors were corrected for clustering within individuals as physicians could contribute up to three spells. Estimates were obtained using Stata 11.0 with the command *regress*, applying appropriate panel weights (*pw=weightvar*) and clustering the standard errors with the command *vce(cluster id idvar)*. Due to the CTS sampling structure, models were also run with the survey suite of commands. As results did not differ substantively, results from the regular regression commands are reported.

Results

Table 1 reports weighted descriptive characteristics of the physician spells. While both measures of physicians' perceptions of autonomy were moderately high, physicians reported lower levels of having adequate time with patients (logistic-based decision) compared to freedom in clinical decision-making (knowledge-based decision). Male physicians contributed about 80% of the spells in the sample, and PCPs contributed about 43% of the spells. Spells on average represented physicians who have been practicing 14 years, reported an average career satisfaction score of 4.12 out of 5, and spent a little over 46 hours a week in direct patient care. Physicians who contributed spells received on average about 32% of practice revenue from Medicare and 14% from Medicaid. The bulk of the spells are contributed from physicians working in urban practices, with about 7% coming from sub-urban practices, and 11% from rural practices. Spells represented physicians in practices that had on average 12 managed care contracts, with an average of almost 43% of practice revenue coming from managed care and 15% of revenue coming from prepaid plans. Physicians who reported salaried status contributed almost half of the spells and about 60% of the physicians reported some ownership stake in their practice.

Table 2 shows the weighted percentage of the analytic sample that falls into each exposure category for solo/two physician and large practices. Information about small group practices can be found in a web-accessible file. While the majority of physicians did not change practice sizes over a given spell, 10% – 12% experience a change in practice size between time $t-1$ and t, yielding enough variation in the key independent variable to allow estimation of multivariate models.

Table 3 presents the OLS estimates of the association between exposure category and physician perceptions of adequate time with patients (logistic-based decision), controlling for perceptions in the previous wave. The left column displays results for the solo/two

physician practice size and the right column for the large group practice size. Model 1 shows that those who stayed in a solo/two physician practice, relative to those who have never been in solo/two physician practice, perceived higher levels of having adequate time with patients, with a coefficient of 0.304. Physicians who entered these practices, relative to those who have never worked in these practices (and therefore working in larger practices), also perceived higher levels of having adequate time with patients, with a coefficient of 0.317. In contrast, those who stayed in large practices relative to those who have never been in large practices (therefore practicing in smaller practices), perceived lower levels having adequate time with patients, with a coefficient of −0.265. Those who entered large practices also reported lower scores, with a coefficient of −0.251.

Model 2 adjusts model 1 estimates by adding in physician and practice characteristics. The addition of these measures does not significantly change coefficients. The coefficients increase slightly, from 0.304 to 0.314 for those who stayed in solo/two physician practices, and from 0.317 to 0.352 for those who entered this practice size. Similarly for physicians who entered large practices, the coefficient changes from −0.251 to −0.267 between models 1 and 2. In contrast, accounting for physician and practice characteristics decreases the magnitude of the coefficient for those who stayed in large practices from −0.265 to −0.258.

Model 3 considers the influence of managed care involvement. The direction of the coefficients on the managed care variables indicates that increased involvement with managed care is associated lower levels of having adequate time with patients. The addition of the managed care measures also decreases the magnitude of the coefficient substantially for those who stayed working in solo/two physician practices from 0.314 to 0.286, and those entered solo/two physician practices from 0.352 to 0.332. The addition of these measures also decreases the magnitude of the coefficient for those who stayed working in large group practices from −0.258 to −0.227, and for those who entered large group practices, from −0.267 to −0.243.

Model 4 considers the influence of physician payment structure. The direction of the coefficients on the ownership variable indicates that having ownership stake is associated with higher levels of having adequate time with patients, though not significantly so. In contrast, the direction of the coefficient for salaried status indicates that salaried employment is significantly associated with lower levels of having adequate time with patients. Furthermore, accounting for ownership and salaried status substantially decreases the magnitude of the coefficient for those who stayed in solo/two physician practices from 0.314 to 0.252. Similarly, the coefficient for those who entered solo/two physician practice decreases from 0.352 to 0.309. The magnitude of the association between those who stayed in large group practices is reduced from −0.258 to −0.180, and for those who entered large group practice, from −0.267 to −0.199.

With regard to the control variables, in general, there is a slight gender difference in having adequate time with patients ($p<0.10$), where men reported marginally higher scores. Both number of years practicing and level of career satisfaction were positively related to reporting adequate time with patients. In contrast, PCPs, physicians with higher annual income, and physicians who spent more time in direct patient care reported lower levels of having adequate time with patients.[2] Compared to physicians in urban areas, physicians in rural areas reported higher levels in having adequate time with patients. Reimbursement from Medicare or Medicaid is not significantly associated with reporting having adequate time with patients.

[2]Models were also run on specialty-stratified samples and results, with regard to the association between practice size and perceived autonomy, did not differ substantively.

Table 4 displays the same model progression as table 3, with the dependent variable changed to perceptions of freedom in making clinical decisions to meet patient need (knowledge-based decision). In contrast to the earlier result, physicians who stayed in solo/two physician practices perceived lower levels of freedom relative to those who have never worked in these practices, with a coefficient of −0.197. The coefficient for those who entered solo/two physician practice is not significant, though it is in the same direction as the coefficient for those who stayed in solo/two physician practice. Relative to those who have never been in large practices, physicians who stayed in large practices perceived higher levels of freedom in making clinical decisions, with a coefficient of 0.173. Furthermore, those who entered large group practice also report marginally higher levels of autonomy with a coefficient of 0.106 ($p<0.10$).

The addition of physician and practice characteristics in model 2 decreases the magnitude of the association for those who stayed in solo/two physician practice from −0.197 to −0.151. Accounting for physician and practice characteristics also decreases the magnitude of the coefficient for those who entered large group practice from 0.171 to 0.161.

Model 3 shows a negative association between number of managed care contracts and percent revenue from managed care and reports of freedom in making clinical decisions, as demonstrated by the negative coefficients for these measures. In contrast to having adequate time with patients, increased percent revenue from prepaid plans is associated with a marginal increase in reports of freedom in making clinical decisions ($p<0.10$). The addition of involvement with managed care slightly increases the magnitude of the coefficients for those who stayed in solo/two physician practices from −0.151 to −0.162, and for those who stayed in large group practices, from 0.161 to 0.166.

The direction of the ownership coefficients suggests a negative relationship between ownership and reports of freedom in making clinical decisions, though only marginally so for the model considering solo/two physician practices ($p<0.10$). There is no association between salaried status and reports of freedom in making clinical decisions. Accounting for both salary and ownership status, however, decreases the magnitude of the coefficient for those who stayed in solo/two physician practice from −0.151 to −0.140, and for those who remained in larger practices from 0.161 to 0.149.

There is no significant gender difference in reports of freedom in making clinical decisions. Both the number of years practicing and the primary care status of physicians have no significant association with reports of freedom in making clinical decisions. Career satisfaction is significantly and positively related to this measure. Physicians with higher levels of annual income and increased hours spent in direct patient care report lower values on this measure. Percent revenue from Medicaid and Medicare are not significantly associated with this measure. Compared to those practicing in urban areas, those practicing in sub-urban and rural areas reported marginally higher levels of freedom in making clinical decisions.

The analyses of the small group practice size reinforce the above findings. Results are obtainable through a web-accessible file.

Limitations

Though the CTS data are among the few surveys available to test my hypotheses, it is not without limitations. First, the measure of logistic-based decisions assumes that if physicians perceive autonomous control, they would also perceive having adequate patient time. While this is likely the case, the measure may also capture feelings on time spent with patients that are unrelated to autonomy. Thus, estimates for this measure may be biased downwards if

physicians with high levels of perceived autonomy report low values for this item, or biased upwards if physicians with low levels of perceived autonomy still report high values for this item. Furthermore, single-item measures of autonomy may not capture the full range of physicians' perceptions of autonomy. Validity of the measure would increase if a scale were calculated from more survey items, such as asking physicians' roles in negotiating managed care contracts or hiring new staff. However, as these measures have been used to measure autonomy in other studies and both measures are highly correlated with career satisfaction (Landon et al., 2003; Stoddard et al., 2001; Warren et al., 1998), they suffice as an initial attempt to document perceived autonomy across decision types. Additionally, as only the first four waves of the CTS contain a longitudinal component, findings extend only through the year 2005. While more recent data show physician employment patterns during the study period are comparable to present day patterns (Boukus et al., 2009), the 2008 recession may have led physicians to increasingly seek employment in larger organizations (Felland et al., 2011). Thus we may expect differences in perceived autonomy between small and large practices to have intensified in more recent years.

Additionally, other practice characteristics may influence both changes in physician practice settings and physician perceptions of autonomy, leading to spuriousness. Moreover, as the practice variables were obtained through physician self-report, these measures may be prone to measurement error. To better account for spuriousness and measurement error, future studies should collect administrative records from organizations in which physicians work to get accurate measures of practice characteristics and patient demographics. Finally, non-response bias has been documented in physician surveys wherein physicians who are busier are less likely to respond to surveys (Campbell et al., 2007; Delnevo et al., 2004). This would bias estimates if non-responders were also more likely to report lower levels of autonomy. While reasonable variation in the dependent measures suggests that factors influencing response rates are not highly correlated with measures in this study, and weighted estimates adjust for response rates, future studies should collect information about non-respondents in order to adjust estimates for non-response bias.

Discussion and Conclusions

This study used longitudinal, nationally representative data to examine how physicians perceive varying amounts of autonomous control in both logistic and knowledge-based decisions between practice sizes, and the role of managed care and physician payment structure in these associations. The modeling strategy allowed for a more accurate estimation of the size of these associations by accounting for physician selection on unobserved stable traits into practice types, and the national level data allows for generalizability of the results, thus improving upon previous research. This study thus illustrates how the medical profession has adapted to various organizational settings, providing a more rigorous examination of how professional autonomy varies across different organizational types and decision types.

The results reinforce the importance of examining different decision types when examining physician autonomy in organizations, as levels of autonomy may vary across decision types. In line with Derber and Schwartz (1991), this study demonstrates that there are at least two decision types over which physicians may perceive autonomous control. I find that, as predicted, physicians practicing in larger settings, compared to those who practice in smaller settings, perceived lower levels of autonomy in one type of logistic-based decision, having adequate time to spend with patients, even after controlling for various physician and practice characteristics (H1). Furthermore, this relationship can be explained in part by greater managed care involvement of larger practices, as well as the likelihood that a physician is salaried in these types of organizations (H3, H4). These findings reinforce, with

large-scale, longitudinal data, what previous qualitative studies have shown—that managed care guidelines and being an employee of an organization subjects physicians to more administrative regulations that may infringe on autonomy in logistic-based decisions (Briscoe, 2006; Hoff, 2003).

In contrast, I do not find support for hypothesis two. Instead, I find that knowledge-based autonomy does vary by practice size. Solo practitioners report lower levels of autonomy in clinical decision-making compared to those working in larger practices. This indicates that while solo practices may preserve a sense of autonomy in logistic-based decisions, they do not similarly shelter autonomy in knowledge-based decisions. This may be explained in part by physician ownership status—while ownership status is positively related to logistic-based autonomy (though not significantly so), it is negatively related to knowledge-based autonomy (though only marginally so). Models that account for ownership status see a sizeable decrease in the strength of the association between practice size and perceptions of autonomy in knowledge-based decisions for solo/two physician practitioners, with the coefficient changing from −0.151 to −0.140. These results are surprising in light of previous work that suggests the resilience of professional autonomy in the clinical domain (Armstrong, 2002; Cabana et al., 1999; Timmermans & Kolker, 2004; Timmermans & Oh, 2010), and suggest that future work should consider examining the autonomy experience of physician owners of solo practices. Focusing on solo practitioners, instead of exclusively physicians in larger practices, and examining their workplace constraints, daily autonomy, and interactions between financial and medical concerns, can lend further insight into the relationship between professional autonomy and organizational size.

Overall, these results indicate that medical professional autonomy in complex organizations is not dichotomous. Professional adaptation to various organizational settings hasn't led to a uniform process of deprofessionalization, but rather has resulted in varying levels of perceived autonomy across different kinds of decisions. The same organization may be associated with differing levels of autonomy in different types of decisions. In particular, whereas larger organizations may not protect autonomy in logistic-based decisions, physicians in these settings still perceive autonomy in knowledge-based decisions. Previous work has shown that physicians may favor workplaces that provide benefits such as flexibility in career choices, protection against turbulent healthcare markets, and ease of negotiation with managed care entities, many of which can be achieved through salaried employment in large organizations (Briscoe, 2006; Casalino et al., 2003; Hoff, 2003). Thus, it may be the case that physicians perceive themselves as autonomous as a salaried employee protected in a larger organization.

In contrast, though lacking the administrative regulation that physicians in large organizations are subject to, physicians in more traditional solo or smaller practices also face constraints, albeit of a different nature. Smaller practices may not be able to keep financial and clinical considerations separate due to their decreasing share of the healthcare market, and thus physicians in such situations may feel limited in their choice set of clinical actions, leading to lower levels of perceived autonomy. As such, unconstrained autonomy afforded by solo practice may be a myth.

As the constant attempts to improve healthcare delivery in the United States will no doubt continue to change physician work environments, further work elucidating physicians' adaptations to these changes is crucial. These results suggest that current and future changes in healthcare delivery, from organizational restructuring to the widespread implementation of electronic medical records, may have the dual effects of enhancing and restricting physician autonomy. Changes to healthcare delivery that influence both logistic and knowledge-based decisions can thus both reinforce and reduce physicians' perceptions of

autonomy. Care must be taken to differentiate between the kinds of decisions professionals make in their daily work lives, with respect to the implications for physician autonomy. As physician experience of perceived autonomy has ramifications for career satisfaction, quality of care delivered, and eventual job burnout (E. S. Williams et al., 2007), studies that attend to the negotiations of physicians in different work environments do much needed work to uncover pathways through which health policy influences the behavior of healthcare providers, and ultimately, the quality of healthcare delivery.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Research Highlights for *Physicians' Perceptions of Autonomy*:

- Perceptions of autonomy differ in logistic-based vs. knowledge-based decisions
- Physicians in smaller practices perceive more autonomy in logistic-based decisions
- Physicians in larger practices perceive more autonomy in knowledge-based decisions
- Managed care and ownership/salary status explain part of the association
- Findings reveal how medical profession in the US has adapted to organizational settings

Table 1

Weighted descriptive characteristics (N=16,519)

	Mean or %	Std. Dev
Physicians' perceptions of autonomy*		
In logistic-based decisions	3.44	(1.49)
In knowledge-based decisions	4.00	(1.30)
Physician demographics		
Male	79.80%	(40.12%)
Years practicing	13.98	(9.78)
PCP	40.92%	(49.17%)
Career satisfaction	4.12	(0.91)
Log(Annual Income)	5.15	(0.57)
Hours in patient care	46.01	(15.55)
Practice characteristics		
% revenue Medicare	31.99%	(22.53%)
% revenue Medicaid	13.59%	(15.41%)
*Urbanicity of practice***		
Urban	81.96%	
Sub-urban	6.60%	
Rural	11.44%	
Organizational finance characteristics		
# of managed care contracts	12.41	(14.58)
% revenue managed care	42.87%	(26.52%)
% prepaid plans	14.78%	(23.95%)
Physician payment type		
Salaried	45.41%	(49.79%)
Owner	65.32%	(47.60%)

* Autonomy in logistic-based decisions measured by: "*I have adequate time to spend with my patients during typical office/patient visits.*" Autonomy in knowledge-based decisions measured by: "*I have the freedom to make clinical decisions that meet my patients' needs.*"

** Urbanicity is a categorical variable, and thus standard deviations were not calculated.

Table 2

Weighted percentage of analytic sample in each exposure category (Solo and Large group practices) (N=16,519)

	Solo/2 physician practice	Large practice
Never in practice type	52.70%	56.52%
Stayed in practice type	36.53%	31.87%
Exit practice type	5.01%	5.99%
Enter practice type	5.77%	5.62%

Table 3

OLS regressions predicting perceptions of autonomy in logistic-based decisions (N=16,519)

	Model 1				Model 2				Model 3				Model 4			
	Solo/2 physician		Large practices		Solo/2 physician		Large practices		Solo/2 physician		Large practices		Solo/2 physician		Large practices	
Exposure type																
Never in practice type (ref)																
Stayed in practice type	0.304	***	−0.265	***	0.314	***	−0.258	***	0.286	***	−0.227	***	0.252	***	−0.180	***
Exited practice type	0.096		−0.003		0.091		0.053		0.075		0.062		0.085		0.077	
Entered practice type	0.317	***	−0.251	**	0.352	***	−0.267	***	0.332	***	−0.243	**	0.309	***	−0.199	*
Perceived autonomy in T1	0.426	***	0.380	***	0.391	***	0.382	***	0.377	***	0.381	***	0.379	***	0.383	***
Physician characteristics																
Male					0.090	+	0.077	+	0.084	+	0.071		0.083	+	0.075	
Years practicing					0.014	***	0.015	***	0.014	***	0.015	***	0.013	***	0.014	***
PCP					−0.202	***	−0.195	***	−0.178	***	−0.173	***	−0.197	***	−0.193	***
Career satisfaction					0.254	***	0.244	***	0.251	***	0.242	***	0.256	***	0.248	***
log(income)					−0.072	*	−0.088	**	−0.073	*	−0.087	**	−0.077	**	−0.089	**
Hours in patient care					−0.005	***	−0.006	***	−0.005	***	−0.006	***	−0.006	***	−0.006	***
Other practice characteristics																
% revenue Medicare					−0.001		−0.001		−0.001		−0.001		−0.001		−0.001	
% revenue Medicaid					0.000		0.000		0.000		0.000		0.001		0.001	
Urbanicity																
Urban (ref)					.		.		.		.		.		.	
Sub-urban					0.092		0.065		0.056		0.029		0.075		0.053	
Rural					0.133	*	0.140	**	0.094	+	0.099	+	0.129	*	0.137	*
Relation to 3rd party payers																
% revenue managed care									−0.002	*	−0.002	*				
# managed care contracts									−0.002	*	−0.003	**				
% revenue prepaid plans									−0.002	*	−0.002	+				
Physician payment structure																
Owner													0.052		0.020	
Salaried													−0.084	*	−0.137	***

	Model 1		Model 2		Model 3		Model 4	
	Solo/2 physician	Large practices	Solo/2 physician	Large practices	Solo/2 physician	Large practices	Solo/2 physician	Large practices
Constant	1.848 ***	2.068 ***	1.329 ***	1.683 ***	1.511 ***	1.840 ***	1.393 ***	1.704 ***
R^2	0.216	0.214	0.262	0.259	0.265	0.262	0.263	0.261

Note: + p<0.1, * p<0.05, ** p<0.01, *** p<0.001, two-tailed

Table 4

OLS regressions predicting perceptions of autonomy in knowledge-based decisions (N=16,519)

	Model 1				Model 2				Model 3				Model 4			
	Solo/2 physician		Large practices		Solo/2 physician		Large practices		Solo/2 physician		Large practices		Solo/2 physician		Large practices	
Exposure type																
Never in practice type (ref)																
Stayed in practice type	−0.197	***	0.173	***	−0.151	***	0.161	***	−0.162	***	0.166	***	−0.140	***	0.149	***
Exited practice type	−0.100		0.094	+	−0.122	+	0.070		−0.127	*	0.075		−0.120	+	0.066	
Entered practice type	−0.088		0.106	+	−0.091		0.060		−0.094	+	0.072		−0.084		0.051	
Perceived autonomy in T1	0.404	***	0.404	***	0.355	***	0.353	***	0.350	***	0.349	***	0.354	***	0.353	***
Physician characteristics																
Male					0.014		0.020		0.016		0.021		0.018		0.021	
Years practicing					0.003	+	0.003	+	0.003	+	0.002		0.003	*	0.003	+
PCP					−0.021		−0.026		−0.022		−0.027		−0.024		−0.027	
Career satisfaction					0.272	***	0.275	***	0.270	***	0.274	***	0.272	***	0.275	***
log(income)					−0.042	*	−0.035	+	−0.037	*	−0.030	+	−0.040	*	−0.034	+
Hours spent in patient care					−0.003	***	−0.003	***	−0.003	***	−0.003	**	−0.003	***	−0.003	**
Other practice characteristics																
% revenue Medicare					0.001		0.001		0.000		0.000		0.001		0.001	
% revenue Medicaid					0.000		0.000		0.000		−0.001		0.000		0.000	
Urbanicity																
Urban (ref)					.		.		.		.		.		.	
Sub-urban					0.151	*	0.162	**	0.120	*	0.132	*	0.154	*	0.163	**
Rural					0.070		0.073	+	0.043		0.046		0.072	+	0.073	+
Relation to 3rd party payers																
% revenue managed care									−0.002	***	−0.002	**				
# managed care contracts									−0.003	***	−0.003	**				
% revenue prepaid plans									0.001	+	0.001					
Physician payment structure																
Owner													−0.065	+	−0.028	
Salaried													−0.030		−0.010	

	Model 1		Model 2		Model 3		Model 4	
	Solo/2 physician	**Large practices**	**Solo/2 physician**	**Large practices**	**Solo/2 physician**	**Large practices**	**Solo/2 physician**	**Large practices**
Constant	2.482 ***	2.333 ***	1.712 ***	1.536 ***	1.848 ***	1.657 ***	1.743 ***	1.555 ***
R^2	0.190	0.189	0.236	0.235	0.239	0.238	0.236	0.235

Note: + p<0.1, * p<0.05, ** p<0.01, *** p<0.001, two-tailed