

APPENDIX 1: FURTHER ELABORATION OF METHODOLOGY

Analysis of Macro-Level Institutional Context over Time

The macro-level analysis details the cultural and political opportunities available in the institutional context of surgery over time. Tracking cultural opportunities requires a different method than tracking political opportunities because a measurement of cultural opportunities must capture changes in the availability of symbolic resources while a measurement of political opportunities must measure changes in objective material conditions.

To measure changes in cultural opportunities over time, I analyzed articles about interns and residents written in three major newspapers (The Chicago Tribune, The Los Angeles Times, and The Washington Post) in three different time periods for evidence of changes in cultural opportunities related to the challenge of traditional scutwork practices. The three time periods each included the 10 years just prior to and encompassing the interns' internship year.

Bosk and Pratt and colleagues do not reveal the geographic areas in which Pacific and Boot Camp hospitals are located, so it is not possible to analyze only newspapers from that particular geographic area. I selected the Chicago Tribune, the Los Angeles Times, and the Washington Post for analysis because these newspapers were in the top ten daily newspapers in both the 1970s and the early 2000s and they represented a range of geographies. I used more than one newspaper because individual newspapers may provide uneven reportage of relevant opportunities since news coverage is affected by particular editorial policy or the interests of readers in a particular region. I did not use New York newspapers because the Libby Zion case and subsequent New York regulation likely resulted in a higher degree of coverage than that present in newspapers in other areas of the country.

I selected relevant articles for analysis by searching on the key word combinations of "surgical interns," "medical interns," "internship and hospitals," "residents and scut work," "residents and work hours," "medical residents and patients," "surgical residents and patients," "medical residents and education," "surgical residents and education," "medical residents and work," "surgical residents and work," "medical residents and wages," and "surgical residents and wages." I then examined the abstract of each reference uncovered by the search to eliminate articles in which medical or surgical interns or residents were only cursorily discussed. For example, I excluded classified ads, marriage announcements, obituaries, articles that reported on non-medical topics (e.g. area resident work days lengthened due to traffic), and articles that reported on a particular intern or resident not discussed as representative of interns or residents as a group.

To develop indicators to measure strength of cultural opportunities in each time period, I used the literature as a starting point. The literature names three important kinds of cultural opportunities for less powerful organization members--frames, identities, and tactics supporting change. I randomly selected twenty articles from each of the three newspapers in each of the three time periods and read them for evidence of frames, identities, and tactics used by those supporting change in traditional intern work practices. Once I had developed a comprehensive list of potential indicators for frames, identities, or tactics supporting change, I created a final list (shown in **Table 1** in the paper) by combining indicators that were similar to one another.

Once I had created a final set of indicators, I recoded every article using this set of indicators for frames, identities, and tactics. For each article, I assigned a score of 1 to the indicator if it was present and a score of 0 if it was not. I chose to assign a dichotomous score (1 or 0) rather than a continuous score (0 to x) for each indicator for each article on the assumption that an idea's repetition in a given article is less important to shaping reader interpretations than is the mention of the idea. Finally, I calculated a total score for each kind of cultural opportunity for each time period by analyzing the percentage of articles in that time period containing each indicator. A high percentage on an indicator is taken to indicate that a high level of cultural opportunities existed in the time period; differences in frequencies between the three time periods reveal differences in cultural opportunities in these time periods.

To measure the strength of political opportunities in each time period, I measure diversity of workforce, supply versus demand for surgical residents and changes in public policy supporting change in each of the three time periods. I developed this final list of indicators in the following manner. I started with a comprehensive list of potential indicators for political opportunities derived from the social movement literature. I narrowed this list down based on knowledge gained from my fieldwork. For example, from my fieldwork, I knew that the change in public policy in the form of new work hours regulation was very important for shaping change in practices while the strength and number of political parties was not. Once I had determined a final list of indicators, I searched for data that would allow me to measure each indicator in each time period.

Analysis of Micro-Level Data

In Manufacturing Consent (1979), Buroway describes how, as he began work as a miscellaneous machine operator at the engine division of Allied Corporation, he was reminded of Donald Roy's famous accounts of output restriction. As he read Roy's papers more closely, he realized that he was conducting his study in the very same factory that Roy had studied thirty years before. One of the central tasks of his study became to discover what had remained the same on the shop floor and what had changed in the thirty years separating Roy's experience and his own. He did so by comparing empirical data taken from Roy's published work to the empirical data he collected himself (Buroway 1979, p. ix-x).

Unlike Buroway, I did not conduct my study in the exact same organization as did Bosk or Pratt years earlier. Yet, Pacific, Boot Camp, and Advent hospitals are well matched on each of the organizational characteristics that have been previously shown to affect less powerful organization members' challenge of traditional practices that disadvantage them. Thus, I was able to employ Buroway's methodological approach of using empirical data from published work written about similar organizations in different time periods and comparing it to data I collected myself.

All three hospitals were elite teaching hospitals whose organizational structures--as manifested in roles and relationships among the directors, attending surgeons, residents, and interns-- were remarkably consistent. In the professional bureaucracies of hospitals, directors of the surgery department were surgeons who managed administrative issues associated with the activities of the other attending surgeons and the surgical residency program but had little authority over the day-to-day practices of these attending surgeons. "Attendings" (surgeons who had already completed their residency training) brought revenue to the hospitals by bringing in surgical patients. These attendings both depended on the work of the surgical residents and provided these residents with hands-on training.

In all three hospitals, teams of "chiefs" (5th year residents), "seniors" (2nd, 3rd and 4th year residents) and "interns" (1st year residents) took care of 10-20 patients on a particular surgery service (e.g. vascular surgery). Chiefs formulated daily plans for each patient on the service and assisted attendings in difficult "cases" (operations) throughout the day. Seniors cared for the complex issues of general surgery patients and assisted attendings with moderately difficult cases. Interns did all of the routine scutwork associated with implementing patient plans and assisted attendings with simple cases.

Data in all three studies were collected using a combination of observation and interviews with attendings, senior residents, and interns. Bosk's study and my study were based primarily on ethnographic observation, while the study completed by Pratt and colleagues was based primarily on interviews. The data from Pacific hospital come from a study by Bosk conducted in the 1970s and described in his dissertation (1976) and later his book entitled "Forgive and Remember (2003 [1979])." The data from Boot Camp hospital come from a study by Pratt and colleagues conducted in the 1990s and reported in two different papers, one entitled "Constructing professional identity" published in the *Academy of Management Journal* (Pratt, Rockmann, and Kaufmann 2006) and one entitled "Re-examining the link between organizational image and member attraction" published in *Qualitative Organizational Research* (Kaufman and Pratt 2005). The data from Advent hospital come from a study conducted by the author in the early 2000s.

Bosk details how he collected ethnographic data by following the schedule of residents in surgery at Pacific. He "visited patients twice-daily on rounds, drank coffee in the doctors lounge during timeout periods, scrubbed in and assisted on operations when hands were short, stood over bodies as they were pronounced dead, and stayed on call at night and felt the rush of adrenaline that a life-threatening emergency brings" (p. 30). Bosk observed daily activities on two general surgery services at Pacific, leaving the field only when he was convinced that his observations had reached the point of diminishing marginal utility. He also read the written evaluations of residents by staff surgeons and attended the faculty meetings of the department of surgery at which the decision to retain or terminate interns in the training program was made.

Pratt and colleagues' primary method of data collection involved semi-structured interviews with interns (n=29 interns), and with senior residents, staff doctors, and directors (n=11 senior residents, staff surgeons, and directors) in three specialties (surgery, primary care, and radiology) at several different points in time. Interns were each interviewed four times, the first three times during their first year (at 0 months, 6 to 8 months, and 12 months) and the last at the end of residency. Senior residents, staff doctors, and directors were also interviewed multiple times during the study. Interviews were performed at the hospital and lasted approximately one hour on average. The researchers recorded the interviews as well as took notes, and interviews were transcribed verbatim.

At Advent, I conducted a 15 month field study in which I followed the interactions of interns, senior residents, and attendings on four general surgery services. I interviewed the surgery interns, residents, attendings, and directors, and observed and talked to many of these informants multiple times throughout the study. From April 2002 through June 2003, I spent an average of 20 hours a week on site at the hospital observing these organization members at different times of day and night during surgeries in the operating room (OR), on the patient floors, and in conferences.

One potential problem with using data from published reports is that such reports typically provide less elaborated data than does an actual field study. Since Bosk's data are taken from his dissertation and book, they are much more descriptive than data presented in a journal article. Since Pratt's data are taken from journal articles, and since the interactions between interns, senior residents, and staff in surgery were only part of his focus, I met with Pratt to ask him about any actions he observed or heard about occurring at Boot Camp in surgery around scutwork practices that he did not report in his journal articles. While I only use quotes from the data reported in his articles, our meeting enabled me to check the robustness of my findings with the primary researcher who conducted the study.

Another potential problem with using data from published reports is that authors' interpretations can be shaped both by their own political interests and social identities and by the academic frameworks available to them (Martin 2002). Thus, I needed to make sure that the interactions around scutwork practices reported by Bosk on the one hand and Pratt and colleagues on the other were truly indicative of the kinds of interactions that occurred in hospitals during these two time periods rather than merely a result of different interests or different analytical frameworks employed by the authors. To do this, I examined secondary historical accounts reported in the writings of surgical residents who were interns during the time of Bosk's study (Carson and Murphey 1996; Collins 2005; Nolen 1970; Selzer 1982) and during the time of Pratt and colleagues' study (Chen 2008; Gawande 2002; Miller 2008). I found that Bosk's and Pratt's reports about interactions between interns, senior residents, and staff surgeons around scutwork were consistent with the reports of residents who participated in surgical residency during these time periods who had diverse social identities (and likely diverse political interests) and who were not likely influenced by frameworks available in organization theory.

I contrasted the three cases to identify how interns tried (or did not try) to change traditional scutwork practices in each hospital and the conditions that might account for the differences between the hospitals. My inductive analysis (Glaser and Strauss 1967) consisted of multiple readings of the Bosk and Pratt field study reports and of my own field notes and interview transcripts. I entered the text from the reports and my own field notes and interview transcripts into ATLAS/ti, a qualitative data analysis program. I analyzed the Pacific, Boot Camp, and Advent data to address three questions: 1) When did interns try to change traditional scutwork practices? 2) How did they do so? 3) What were the outcomes? Regarding my first question of when interns attempted to change practices, I grouped my data according to hospital and coded them to identify how cultural and political opportunities available in the institutional context appeared to shape the challenges of less powerful members at the three hospitals. To answer my second question about how interns tried to change scutwork practices differently in the different hospitals, I coded my data to identify change attempts occurring at each site. I used the existing literature on cultural toolkits as a starting point to identify the kinds of cultural tools interns might use to try to challenge scutwork practices. In all of my coding, I followed the method of constant comparison (Glaser and Strauss 1967); each time I analyzed the data, I added categories until I was satisfied that additional categories would add little to my understanding and fewer categories would weaken the conceptual scheme. Finally, to answer my third question about outcomes at the three hospitals, I analyzed the data to record interns' engagement in traditional scutwork practices at each site at the end of their internship year.

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