

Toward Some Fundamentals of Fundamental Causality: Socioeconomic Status and Health in the Routine Clinic Visit for Diabetes¹

Karen Lutfey
University of Minnesota

Jeremy Freese
University of Wisconsin–Madison

The concept of “fundamental causality” has gained increasing attention as a way of understanding the relationship between socioeconomic status (SES) and health outcomes. Using ethnographic data from a comparative study of two diabetes clinics, the authors further develop the fundamental cause concept in three ways. First, they provide an exposition of the constituent claims implied by an assertion of fundamental causality. Second, they show how ethnographic data can be used to explicate such claims by showing some of the mechanisms that might operate to preserve the fundamental relationship in diabetes treatment regimens. Finally, they offer elaborations and refinements of the fundamental cause concept.

Weber’s ([1921] 1968) concept of “life chances” highlights both the *diversity* of the biographical consequences of social standing and their *probabilistic* character. Most poignant among all the various kinds of life chances affected by socioeconomic standing may also be the most literal:

¹ We would like to thank Doug Maynard, Bernice Pescosolido, Shel Stryker, Bill Corsaro, Brian Powell, and Carroll Estes for commenting on earlier versions of this manuscript. We also thank seminar participants at the Robert Wood Johnson Foundation Scholars in Health Policy Research Program at the University of California, Berkeley/San Francisco, RAND Health, and the Department of Sociology at the University of Minnesota for their helpful feedback. This research has been supported by the American Association of University Women, Indiana University’s Diabetes Treatment and Research Center, and the Robert Wood Johnson Foundation Scholars in Health Policy Research Program. Direct correspondence to Karen Lutfey, Department of Sociology, University of Minnesota, 909 Social Sciences Building, 267-19th Avenue South, Minneapolis, Minnesota 55455. E-mail: lutfey@soc.umn.edu

the probabilities of actually staying alive or dying. Lower socioeconomic status (SES) is associated with worse health and higher mortality rates at virtually every point along the life course (Chapin 1924; Coombs 1941; Pappas et al. 1993; Feinstein 1993; Robert and House 1994). This association has been remarkably robust over time and across countries (National Research Council 2001), and SES effects on mortality have persisted across historical periods in which risk factors and disease profiles have changed radically (Link et al. 1998). In this article, we focus on the association between SES and adverse health outcomes among persons with diabetes. More specifically, we marshal ethnographic data to attempt to explicate some of the intervening mechanisms responsible for this quantitative association that are related to the design and implementation of diabetes treatment regimes.

Broadly speaking, this aim is hardly novel, as many have worked on specifying the mechanisms underlying this substantial and durable association between health and SES (see Mechanic 2000; Robert and House 2000; House et al. 1990; Williams 1990), as well as a diverse range of related topics. These efforts include, for example, studies of causal ordering between biological and social outcomes (Conley and Bennett 2000, 2001), population-level studies of income inequality and health (Ellison 2002; House 2001; Mellor and Milyo 2001), and studies of social psychological factors such as stress (Thoits 1995). Our goal is to contribute more specifically to how SES is understood as an explanatory variable accounting for health differentials. When identifying more proximate factors that affect health, SES is often conceptualized as a *placeholder* variable for real causes that have not yet been identified (Link and Phelan 1995). As part of a general criticism of sociology's alleged emphasis on "variables" at the expense of "mechanisms," Hedström and Swedberg (1998, p. 11) argue that this placeholder approach is ineffective because "a 'class' cannot be a causal agent. . . . A statistical 'effect' of a class variable in contexts like these is essentially an indicator of our inability to specify properly the underlying explanatory mechanisms." Similarly, Rothman (1986, p. 90) states that social class is "causally related to few if any diseases but is a correlate of many causes of disease."

Put more simply, these authors suggest that SES qua SES seems important only because the relevant science right now is far from mature. By contrast, Link and Phelan (1995) propose that SES should be thought of as a "fundamental cause" of health outcomes (see also Link and Phelan 1996, 2000, 2003, 2005). Their fundamental cause concept implies not a theory of the *specific proximate mechanisms* responsible for a persistent association, but rather that some *metamechanism(s)* is responsible for how specific and varied mechanisms are continuously generated over historical time in such a way that the direction of the enduring association is pre-

served—in their words, “factors that put people at risk of risk” (1995, p. 85). If an explanatory variable is a fundamental cause of an outcome, then the association cannot be successfully reduced to a set of more proximate, intervening causes because the association *persists* even while the relative influence of various proximate mechanisms *changes*.

Link and Phelan (1995, p. 81) conceive SES as a fundamental cause of health outcomes primarily because SES implies “access to resources . . . that help individuals avoid diseases and their negative consequences through a variety of mechanisms. Thus, even if one effectively modifies intervening mechanisms or eradicates some diseases, an association between a fundamental cause and disease will re-emerge. As such, fundamental causes can defy efforts to eliminate their effects when attempts to do so focus solely on the mechanisms that happen to link them to disease in a particular situation.” When knowledge exists of how to prevent, treat, or manage disease, then those with greater resources are better able to take advantage of this knowledge to attain lower likelihoods of adverse health outcomes.² Here Link and Phelan (1995) issue a call to consider the broader social contexts within which proximate risk factors are determined and to understand how resources and knowledge can preserve a persistent patterning of SES and health even amid dramatic changes in medical treatments and the prevalence rates of specific diseases. Their argument maintains an essential role for SES even while applauding the effort to elaborate the details of its causal potency for specific diseases in specific contexts. By asserting that social processes influence people’s health in ways that cannot be identified and contained by medical interventions, the fundamental cause concept claims an essential role for sociology in identifying pathways and mechanisms linking SES and health.

The idea of fundamental causality can be engaged empirically in a variety of ways. For example, Link et al. (1998) show how SES differences can be reproduced over time with changes in medical knowledge and the utilization of technology (e.g., Pap tests and mammography). Efforts to statistically decompose the SES-health relationship, however, indicate that there is no simple and proximate “magic bullet” that can explain away this association (see Robert and House 2000). We take an altogether different approach, using ethnographic data to identify and elaborate the multiplicity of mechanisms that may be responsible for the reproduction of a fundamental relationship within a particular domain at a particular

² Emphasizing resources and knowledge does not deny that additional factors are also responsible for an inverse association between SES and health, such as possibly stress and lower perceived control (see, e.g., Mirowsky, Ross, and Reynolds 2000; Thoits 1995). Cross-sectional associations between SES and health also partly reflect the consequences of health conditions for socioeconomic attainment (Mulatu and Schooler 2002).

time. That is, we use ethnographic materials to try to articulate concretely some of the ways that resources may be translated into health advantages and may thus be implicated in the reproduction of a pervasive, well-documented quantitative association.

We recognize that ours may seem a somewhat unconventional approach to ethnography insofar as we rely on exogenous information about the aggregate relationship between health and SES in order to examine what the in situ work of regimen design may tell us about the instantiation of risk for poor health outcomes. We also recognize the tension inherent in connecting particular ethnographic observations to quantitative evidence about risk, especially when the risks are of long-term consequences most likely to occur after the period of ethnographic observation. We posit that one can see in individual interactions evidence of more systematic disadvantages consistent with evidence both about what increases risk and who disproportionately suffers adverse outcomes, even if the very nature of risk means that some particular individuals observed might happen to escape these negative outcomes. While probabilistic reasoning compromises inference from qualitative data in some contexts (Lieberson 1991; Goldthorpe 2000), this kind of ethnographic investigation into fundamental causality is utterly dependent on it, as the focus of observation is not the *outcome* but the *instantiation of risk factors known to be probabilistically related to the outcome*.

We restrict our inquiry to a single disease, diabetes, and a single recurrent site within the illness career of those with this disease, the routine clinic visit. Within this *intentionally narrow* domain, our goal is to use ethnography to capture *in depth* the multiplicity, complexity, and particularity of pathways that, on balance and in the aggregate, may operate to sustain the fundamental relationship. We will attempt to specify in detail—drawing on observational and interview data—many of the possible ways that SES differences among diabetes patients can affect the design and successful implementation of treatment regimens. These regimens influence long-term average glucose levels, and glucose levels strongly affect the risk of long-term adverse health outcomes for those with diabetes. Our results are intended both as a specific contribution to the social epidemiology of diabetes and as a general contribution to how social scientists conceptualize the relationship between encompassing variables like SES and health. We can be seen as using ethnographic data to provide a “thick” illustration of what Link and Phelan’s idea of fundamental causality *looks like* in a site of naturalistic observation. At the same time, we seek to use insights from the data to elaborate and refine understanding of the fundamental cause concept.

We begin by trying to provide a more general articulation of the concept of fundamental causality than what now exists and delineating the con-

stituent claims that we take as implied by an assertion of a fundamental cause relationship. We then provide some necessary background on diabetes, its treatment, our data, and the conceptualization of the routine clinic visit that organizes our inquiry. Afterward, we set about providing a detailed description of many of the potential mechanisms preserving the inverse association between SES and health that are visible in the routine clinic visit data, and how these mechanisms are grounded in the constituent claims of fundamental causality. Finally, we discuss the contributions of the inquiry for refining our understanding of fundamental causality.

FUNDAMENTAL CAUSALITY

As noted, the proposition that low SES can be thought of as a “fundamental cause” grants SES an essential relevance in sociological health scholarship instead of viewing it as merely a placeholder until the “real” mechanisms underlying its observed effects are known. While the concept is most closely associated with Link and Phelan (1995), earlier articulations of it can be seen elsewhere in medical sociology (e.g., House et al. 1990; Williams 1990), and, indeed, the concept was importantly presaged by the more general sociological discussion of causality by Lieberman (1985, pp. 185–95). That said, as the term “fundamental cause” becomes more prominent, we worry that it risks devolving into a nearly empty catchphrase or a way of rhetorically asserting the primacy of the social without supporting evidence. In contrast, we consider the assertion that “*X* is a fundamental cause of *Y*” to advance a specific set of claims about *X*, *Y*, and the relationship between them.³ Toward strengthening the defenses against conceptual devolution, we briefly here recount what we take as the constituent claims of a proposition of fundamental causality, after which we proceed to engage the concept of fundamental causality further with our empirical materials.

To begin, *X* must be *multiply realized*, meaning that it has diffuse proximate consequences. For our purposes, SES is not only itself a diffuse variable encompassing a constellation of intimately related (but not fully collapsible) variables like education, income, and occupational prestige, but it is also understood to have proximate consequences for inter alia, attitudes, values, social support networks, workplace flexibility, and in-

³ These are claims beyond the assertions of *covariation*, *temporal consistency*, and *nonspuriousness* that are regular fare in discussions of causality (e.g., Stinchcombe 1968; Maxim 1999). We should also note that *X* being a fundamental cause of *Y* does not rule out possible reciprocal relations in which *Y* also influences subsequent levels of *X*.

surance arrangements. Meanwhile, Y must be *multiply realizable*, in the sense that there are many different ways in which Y can occur. For health outcomes, it is obvious that there are many routes to poor health and death, and a central task of epidemiology has been to identify the risk factors associated with individual subclassifications of morbidity and mortality.

Putting these together, a fundamental relationship implies the potential for a *massive multiplicity of connections* between the realizations of X and the ways in which Y is realized. There must be a large number of ways in which the manifold implications of variations in X are potentially connected to manifold proximate causes of Y . Each actual connection comprises a *mechanism* contributing to the observed relationship between X and Y ; that is, we use the term *mechanism* to refer to a specific means by which X can affect the probabilities of different outcomes of Y . In fundamental relationships, no individual mechanism is so dominant that it alone is responsible for the bulk of the observed association between X and Y .⁴ Instead, the association is the product of the accumulation of a large number of factors operating mostly in the same direction, and the relative importance of specific mechanisms varies in individual circumstances and can be expected to change for a population over historical time.

Fundamental relationships can be generally expected to be *holographic*. Just as each piece of a broken hologram retains a reasonable and whole replication of the original image, decomposing Y into subclasses will tend to reproduce the relationship between X and Y within each subclass. In other words, to the extent that Y can be divided into different domains, the effect of X should be observed within most or all of them. In the case of mortality, the SES gradient is observed within all 14 of the major cause-of-death categories of the International Classification of Diseases (Illikey and Mullen 1985; Link and Phelan 1995). Exceptions to the general pattern are of course possible, but they are proposed to be anomalous and to imply particularistic explanation. Moreover, variation in the magnitude of the association within subclasses may provide important indications regarding how the fundamental relationship is preserved, as when Phelan et al. (2004) found the SES-mortality gradient to increase with the relative “preventability” of different causes of death.

Finally, fundamental relationships imply the *predictive claim* that

⁴ More precisely, there may be specific cultural/historical moments in which an individual mechanism dominates the determination of the outcome, but, given the character of the mechanism-generating process, we would expect other mechanisms preserving the fundamental relationship to gain in importance if this singular mechanism is removed, but systematic variation in the outcome remains.

changes in the structure of realizability of Y , as long as they do not eliminate variation in Y , will have only modest effects on the observed relationship between X and Y . As new pathways to Y emerge, the standing conjecture is that these will, on balance, either work to preserve the relationship between X and Y immediately or at least come to do so over time. Disruption of a relationship of fundamental causality would thus seem to require a radical transformation of either the diffuse consequences of X or the ways in which Y is realized. The predictive claim is critical because it implies that the fundamental relationship is not itself explained by a complete accounting of the intervening mechanisms at a given cultural/historical moment: an assertion of fundamental causality is not just an assertion about the generation of Y but also about *the generation of the set of causes* of Y . That resources improve the capacity to defend one's health would thus seem to imply persistence in the relationship between SES and health even given large changes in the actual intervening mechanisms over time.

DIABETES

If fundamental relationships imply massively multiple mechanisms, then any concrete description of mechanisms must be confined to a sharply circumscribed domain. We focus on diabetes for several reasons. First, diabetes is a major cause of morbidity and mortality in the United States, shortening sufferers' life expectancies by 10–15 years—and its prevalence is increasing dramatically (from 4.9% in 1990 to 6.5% in 2003—an increase of 33%; Centers for Disease Control and Prevention 2004; Harris et al. 1998; Mokdad et al. 2000). According to leading experts, “diabetes has become a national public health crisis, in both human and economic terms” (American Diabetes Association 1998). Second, because diabetes is a long-term illness whose treatment depends heavily on patient self-management, it may offer insights into the implications of the more general increasing incidence of chronic illness (Glasgow and Eakin 1998). Third, the incidence of diabetes is already known to be related to SES, as documented in both national-level (Cowie and Eberhardt 1995; King and Rewers 1993; Blackwell, Collins, and Coles 1997) and state-level (Diamant et al. 2003; Hosler, Metivier, and Godley 1997) studies of the United States, as well as other developed countries (King and Rewers 1993; Tang, Chen, and Krewski 2003).⁵ Fourth, mortality and complications outcomes for people with diabetes are also related to SES in the United States (Jacobson

⁵ The incidence of diabetes in the United States has also been linked to other indicators which are closely associated with SES, such as obesity (Knowler et al. 2002), education, and race (Cowie and Eberhardt 1995; Kenny, Aubert, and Geiss 1995).

et al. 1997; Muhlhauser et al. 2000; Phelan et al. 2004; Smith et al. 1998; West et al. 2002) and other developed countries (Booth and Hux 2003; Forssas et al. 2003; Middlekoop et al. 2001; Nicolucci, Carinci, and Ciampi 1998).⁶ Finally, because diabetes complications are known to be linked to average glucose levels (Diabetes Control and Complications Trial Research Group 1993), the work of identifying potential mechanisms within an ethnographic inquiry is simplified. Conditions that probabilistically affect patients' capacities for controlling their glucose levels can be expected to likewise probabilistically affect their long-term health outcomes.

In diabetes, people either have insufficient insulin or are unable to use the insulin they have efficiently.⁷ Because insulin is the hormone allowing glucose to enter cells and be used, untreated diabetes results in a relatively high amount of glucose remaining in the blood. Glucose (or "blood sugar") levels for persons without diabetes are generally in the range of 80–120 mg/dl, while uncontrolled diabetes can lead to glucose levels several times higher, even over 1,000 mg/dl. In the short run, high glucose levels can produce flu-like symptoms, weight loss, chronic thirst, and, at extremely high levels, hyperosmolar or "diabetic" comas. Meanwhile, *chronically* high glucose levels greatly increase the risk of complications such as blindness, kidney damage, amputations, heart disease, and stroke (Diabetes Control and Complication Trial 1993). It is important to note, however, that controlling diabetes is not simply a matter of *lowering* glucose levels. Because patients' bodies do not regulate insulin levels properly, they can also become *hypoglycemic*: if glucose levels fall too low, patients can become confused, disoriented, and shaky, and can even have seizures or become comatose.

Consultation with health care providers offers patients a treatment regimen—a plan for attempting to maintain glucose levels as close to "normal" as possible. For our purposes, treatment regimens for diabetes can be seen as having four primary components. The first is *medication*: our study examines only patients whose regimens include prescribed in-

⁶ Similar to studies of incidence, complications and mortality resulting from diabetes have been linked to other indicators that are also closely associated with SES, such as race (Harris et al. 1999; Pastor et al. 2002) and education (Goldman and Smith 2002).

⁷ Type 1 diabetes occurs when the body produces no insulin at all (5–10% of all cases), while type 2 diabetes results from inadequate amounts of insulin or resistance to the insulin that the body does produce (90–95% of all diabetes patients). Our data include patients with type 1 and type 2 diabetes, although, as noted in table 1, the subspecialty clinics in our study serve populations with higher proportions of type 1 patients than exist in the general population.

jections of insulin.⁸ Second, patients must match the timing and content of their *food intake* with their insulin so that their glucose levels coincide with insulin peaks; different regimens offer patients varying levels of autonomy and flexibility with regard to their diet. Third, patients need to *monitor* their glucose levels, typically by placing a drop of blood into a small electronic meter.⁹ Patients are instructed to record the results in a log, which they and physicians use as a tool for monitoring patterns and making changes in insulin dosages. Fourth, physicians often urge patients to make *lifestyle adjustments* known to improve long-term prospects, like exercising regularly, not smoking, and minimizing alcohol consumption.

Most simply, a diabetes regimen may consist of one injection of long-acting insulin taken in the morning, accompanied by avoiding foods with high levels of sugar or fat. Regimens become more complex with the addition of multiple injections, mixing long- and short-acting insulins in the same injection, more extensive monitoring and assessing of food content, adjusting dosages of insulin to match meals or lower existing glucose levels, and more glucose testing. "Intensive" management generally involves four or five daily injections of mixed insulins, glucose testing six to ten times per day, and extensive monitoring of interplay between glucose and insulin levels. The most sophisticated diabetes regimens involve insulin pumps; these allow the closest mimicking of healthy pancreatic activity by administering a continuous "basal" rate of insulin throughout the day and allowing the patient to inject an adjustable "bolus" of short-acting insulin to cover meals. While the majority of the patients in our data had basic or mid-level regimens, "tight" control of glucose levels is much more likely to occur in patients with more intensive management or insulin pumps.

Despite the ideal goal of emulating nondiabetic glucose levels, diabetes regimens vary considerably across patients and for the same patient over time, and the acknowledgement and production of this variation within

⁸ Our exclusion of patients who are able to manage their diabetes *without* insulin also contributes to the high proportion of type 1 diabetes patients in our data, since, by definition, people with type 1 diabetes must use insulin.

⁹ While diabetes patients typically continue to use these types of meters, recent technological developments in glucose monitoring provide patients with the option of collecting blood from areas of the body other than their fingers, which reduces the pain involved in testing glucose. Various noninvasive models are currently available or in development which allow people to wear watches or skin patches to check glucose painlessly. At the time we collected this data, such options were unavailable.

the routine clinic visit comprises a central consideration of this article.¹⁰ Routine clinic visits are typically scheduled every three months.¹¹ During the routine clinic visit, the patients' ongoing management of diabetes is foregrounded, and practitioners attempt to identify and respond to patient needs, including by adjusting regimens. In our data, patients who were new to diabetes almost always began with a "basic" regimen, and then moved up, down, or stayed the same depending on what practitioners thought they had shown they could effectively manage. More aggressive regimens—increasing in complexity and potential glucose control—may be employed as a patient becomes more adept at managing diabetes, while concessionary regimens—decreasing in complexity and effectively resigning that the patient will have weaker glucose control and greater risk of long-term complications—may be deployed in an effort to accommodate any of several sources of resistance that emerge in efforts to implement a more effective regimen.

The routine clinic visit provides a site at which emergent resistances (from various sources) to treatment plans may become visible to clinicians, and accommodations can be developed in response to them, both in terms of treatment plans and the goals toward which they are directed (see Pickering 1993, 1995). As such, the clinic visit may be seen as a key point of collaboration in the efforts of patients and clinicians to generate a sustained control over glucose levels. The ethnographic data we present below will illustrate how SES can affect all of the following: (1) providers' assessments of problems patients face in diabetes management; (2) providers' acquisition of information about patients and their problems; (3) the identification of solutions that are available for patient problems; and (4) the assessed and actual likelihood that these solutions can and will be successfully implemented. As our observations suggest, if one thinks of low-SES patients simultaneously presenting—*on average*—more kinds of resistances, less available information to practitioners about these resistances, more restricted sets of strategies to accommodate them, and greater difficulties in actually implementing specific regimen changes intended as accommodations, then it is easy to imagine how these factors might combine to produce a persistently greater probability of negative outcomes. The treatment of high-status patients is not free from difficulties, and it

¹⁰ Because diabetes complications generally develop over the course of 10–15 years, patients who are not likely to live long enough to develop such complications are often treated with the goal of avoiding hypoglycemia as opposed to tightly controlling hyperglycemia. We exclude these patients from our investigation.

¹¹ Unlike clinic visits for some other chronic health issues, it is difficult for even unmotivated diabetes patients who are insulin dependent to indefinitely postpone these appointments if for no other reason than that they needed to obtain prescriptions for insulin.

is certainly possible for low-SES patients to achieve good glucose control. However, our data elaborate many different ways in which lower SES is implicated in conditions that would be expected in sum to imply a greater risk of adverse diabetes-related outcomes for these patients relative to higher-SES patients, which corresponds to the observed probabilistic relationship between SES and diabetes outcomes. Given others' arguments and evidence that a fundamental relationship between SES and health exists, our goal here is not to "test" or "prove" the existence of a fundamental relationship, but to identify and elaborate mechanisms that may in part constitute it. In so doing, we call attention to the multiple, complex, and dynamic nature of the mechanisms mediating part of this gradient, and we explicate some of the more general principles underlying the fundamental cause argument.

DATA AND ANALYTIC STRATEGY

Data

The data are from a year-long ethnographic study conducted by the first author in 1997–98.¹² The fieldwork sites were two weekly, four-hour endocrinology clinics at two different hospitals that are both part of the same university-based medical center located in a large midwestern city. We caution that the patients seen in subspecialty clinics should not be mistaken for a representative sample of the general population of diabetes patients. Most diabetes patients are instead routinely treated by practitioners of internal or family medicine. For our purposes, a central attraction of studying subspecialty clinics was the expectation that such clinics would, as compared to generalist settings with lower volumes of diabetes patients and less-serious cases, provide a focused opportunity to observe substantial variation in prescribed regimens.¹³

The two clinics were selected to provide an optimal contrast of the socioeconomic diversity of persons with diabetes: Park Clinic serves a primarily white, upper- and middle-class population, while County Clinic

¹² The first author collected the data for this paper. We use the pronoun "we" to describe data collection activities to avoid the cumbersomeness of repeatedly saying "the first author."

¹³ To be more precise, according to our physician interview data, the patients in Park and County Clinics have self-selected into subspecialty clinics for a variety of reasons: they may have relatively severe problems with their diabetes, they are high-SES patients who choose to be seen by specialists (using their private insurance) because they expect to receive better care that way, or they are low-SES patients who take advantage of the public services and Medicaid coverage at County.

has a largely minority, working-class, and underinsured clientele.¹⁴ Survey data collected from patients and displayed in table 1 reveal that those at County Clinic are less likely to be white, are more likely to be uninsured, and have lower incomes and education than patients at Park Clinic. Moreover, County patients also have lower self-rated general health than Park patients, and attending physicians rate the County patients as having less control over their diabetes than Park patients. However, the two clinics are similar to one another in terms of the age of patients and the relative distribution of type 1 and type 2 diabetes patients.¹⁵ We thus have indications that the general SES gradient on health is reproduced among the patients at the two clinics, while they are similar to one another in terms of the age of patients and the distribution of patients with type 1 versus type 2 diabetes.

We collected several different types of ethnographic data. First, we observed approximately 250 hours of activity at these clinics, including approximately 200 different consultations between diabetes patients and medical practitioners. Second, we videotaped over 20 hours of these consultations and transcribed them for more detailed examination. Third, we conducted semistructured qualitative interviews with 25 practitioners, including all of the physicians in the university medical center who treat diabetes, as well as nurses, dietitians, social workers, and diabetes educators. Fourth, we conducted brief telephone surveys with 170 diabetes patients (86% of all the diabetes patients seen at both clinics over a three-month period) to collect information about patients' demographic characteristics, beliefs about diabetes, and expenses related to the disease.

Analytic Strategy

We pursue systematic connections between considerations of regimen design we observed in the clinics—resulting in differences in designs or their implementations that are known to affect the probabilities of different health outcomes—and the socioeconomic conditions of patients' lives. The thesis of fundamental causality implies that we should expect to observe a variety of mechanisms, and indeed this is what we find. However, their

¹⁴ Park and County are pseudonyms.

¹⁵ The percentages of patients with type 1 diabetes reported in table 1 may be questionable because they exclude the substantial number of patients who reported not knowing which type of diabetes they had (11% in Park and 53% in County, which itself might speak to differences in patient education between the two clinics). As an alternative, we coded observational data to determine the percentages of people with type 1 vs. type 2 diabetes; the results here suggest that 42–59% of the observed patients in our study from County Clinic had type 1 diabetes, as compared to 53–59% in Park Clinic.

TABLE 1
COMPARISON OF PATIENTS BETWEEN PARK AND COUNTY CLINICS

	Park Clinic	County Clinic	<i>P</i> -Value for Difference
% black/Hispanic	12	45	< .001
Mean family income	\$56,000	\$12,000	< .001
% family income \$15,000 or less	12	75	< .001
% without health insurance	3	42	< .001
% college graduates	41	9	< .001
% less than high school education	11	36	< .001
Patients' self-assessments of health (0–10 scale, 10 is most healthy)	6.79	5.59	.0015
Physicians' assessments of diabetes control (0–10 scale, 10 is best con- trolled)	6.63	4.91	< .001
Mean patient age	51	54	NS
% type 1 diabetes	44	46	NS
<i>N</i>	137	33	

number and complexity poses a problem of exposition that we suspect would be endemic to any ethnographic analysis of fundamental causality, which is how best to order a description of a pervasively interconnected set of mechanisms. The decomposition we use in the exposition that follows is based on successive binary classifications derived from different senses of the “location” of the mechanism, including physical location of the clinic, factors inside and outside the clinic, and those internal and external to individual patients (see figure 1). The resulting decomposition of mechanisms is presented in four parts: those that can be seen as manifested in the differences between Park and County Clinics, those manifested as differences in external constraints on potential regimens, those manifested as differences in patient motivation, and those manifested in differences in patient cognitive capabilities.

Within each of the four parts, we draw on the ethnographic materials to describe some of the potential ways in which the fundamental relationship between SES and outcomes for diabetes patients is sustained. The point of our doing so is not to make some wild-eyed proclamation that “SES is everywhere,” but instead to consider the potential pervasiveness of this causal relationship (that is, the potentially massive multiplicity of its mechanisms) and, in so doing, to give the budding concept of fundamental causality an empirically grounded thickness that ethnographic investigation is especially well suited to provide. Afterward, we will discuss our findings explicitly in terms of what they might add to our understanding of fundamental relationships.

Fundamental Causality

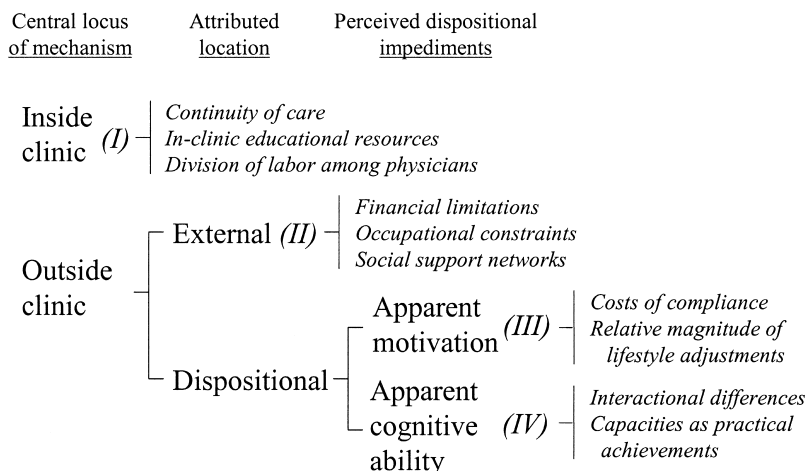


FIG. 1

DIFFERENCES BETWEEN PARK AND COUNTY CLINICS

Because Park Clinic serves a much higher-SES clientele on average than County Clinic, we begin by considering whether differences in the organization of the two clinics may affect the process of regimen design within the routine visit or the likelihood of treatment recommendations being carried out afterward. Any differences that place County Clinic patients at a systematic, probabilistic disadvantage relative to Park Clinic patients can be considered potential mechanisms by which differential access to health care may contribute to preserving the fundamental relationship among diabetes patients.

Park Clinic has two endocrinologists and two nurse practitioners; there is also sometimes a single resident participating in the clinic as part of a four-week rotation. The two endocrinologists see most of the patients, although one of the nurse practitioners also sees patients independently. Based on how full the physicians' schedules are, they may ask a resident or nurse practitioner to see a patient first to do a basic assessment, which is then followed up with the endocrinologist. An adjacent Diabetes Education Center includes two full-time and one part-time certified diabetes educators, two dietitians, a medical social worker, and a full-time secretary.

By contrast, County Clinic is usually supervised by four attending physicians, but, as we will describe, residents play a much larger role in

working with patients than in Park.¹⁶ Two of the attending physicians participate in the clinic every week, while the other two are part of a pool of research physicians who also rotate through this particular clinic once every six weeks. All of the attending physicians in County are fully credentialed endocrinologists with extensive experience in their fields, but, compared to the physicians at Park, they are more diverse in their specializations, spend a smaller percentage of their time seeing patients, and do not maintain their own ongoing patient caseloads. There are also two endocrinology fellows (advanced residents) who are appointed to County Clinic for two years, and there are typically two to four residents attending the clinic in any given week as part of a four-week rotation. A certified diabetes educator attends the clinic weekly on a volunteer basis.

How might organizational differences between the two clinics affect the treatment of diabetes patients within them? We focus on some potential implications of three differences. First, Park Clinic offers patients much higher “continuity of care” than County Clinic, by which we mean that patients are seen by the same practitioners in successive visits. Second, Park Clinic offers superior resources for in-clinic diabetes education. Third, residents play a much more prominent role in care at County Clinic than at Park Clinic. For each, we will describe ways in which the differences between clinics might contribute to better average outcomes for the higher-SES patients at Park Clinic compared to the lower-SES patients at County Clinic.

Differences in Continuity of Care

Classic work in medical sociology has long considered the importance of continuity of care for patients’ ongoing utilization of medical services and adherence to medical recommendations (Freidson 1988; Parsons 1951; Waitzkin 1991). Park Clinic is similar to many private medical organizations in that the continuity of care is extremely high. In contrast, at County Clinic, even though patients are technically assigned to either an attending physician or fellow, in practice they spend a great deal of time with residents (and some students), who are never there for longer than a month. (In our observations, County patients often did not know who their assigned physician was, either by name or face.)

In our data, perhaps the most obvious benefits of high continuity of care concern the quality of information available to practitioners in making assessments and designing regimens. High continuity of care enables

¹⁶ At Park, patients are offered free parking during their clinic visits if they are willing to be seen by a resident, while patients at County have no practical choice in the matter.

providers to become much more familiar with patients' medical histories and their familial and work situations, so that they tend to have more information about the patient available from the outset of any given visit. One physician complained that the low continuity of care at County Clinic required the physicians to rely too heavily on objective indicators that, while providing important data, are limited and even potentially deceiving when not considered within a broader array of patient information. This physician complained specifically about an overreliance at County Clinic on the hemoglobin A1c test (a means of estimating average glucose levels over the previous three months): "The outcome [should not be] based on a single test. Nor a single blood sugar, nor a single week, nor a single visit, nor a single anything. . . . The outcome [should be] based on the totality of the things that you assess over the period of time that you see the patient. The focus that you see in the clinic like we have [County] is that the totality of the assessment comes down to 'What's your last hemoglobin A1c?' Which doesn't mean jack." While most physicians would likely regard the last sentence as an overstatement, a hemoglobin A1c result can be potentially misleading insofar as it can produce results that look like the diabetes has been well controlled when actually the patient has undergone extreme highs and lows (that is, the same average can be produced by distributions of either low or high variance). In one example from our field notes, residents at County Clinic were pleased by one patient with a seemingly reasonable hemoglobin A1c, but additional probing by a suspicious attending physician revealed that this patient regularly had severe episodes of hypoglycemia because he drank a six-pack of beer every night. For physicians concerned with avoiding risks associated with hypoglycemia, then, this test may not provide all the information they need. High continuity of care may thus allow the physicians at Park Clinic to assemble a more complete "totality" of information that, in turn, allows them to provide more helpful treatment recommendations.

Continuity of care also facilitates patterns of open patient-provider communication, increasing the likelihood that useful information is obtained during the visit. Objective indicators may suffice to show that a patient plainly has not been following treatment recommendations, but they often provide no information about why. Continuity of care may give the doctor a greater sense of the patient from which to make better inferences about the sources of resistance to improved adherence. As one physician we interviewed said:

[Another physician] might say, "Well, you know, that patient's not very compliant." And that's their view. Maybe you have a different view. Or maybe [the patient] just hasn't been given the proper education. Or maybe they've been bounced around so much and they keep hearing different

things and they don't know what to think, so they're getting frustrated. The more you have continuity or follow up with that patient, the more you're going to get a more accurate picture of what they do and don't understand and how compliant they may or may not be.

For patients, continuity of care may lead to increased comfort in volunteering information useful for physicians in understanding nonadherence. One physician described potential benefits of long-term relationships with patients in this way: "[In a long-term treatment situation], a patient can say, 'I'm sorry, but I've just been totally freaked out the last three or four months and this is why. I realize things ought to be better, but they're not.' I think if patients have a level of trust and comfort that they might be more willing to share some things with you that might make it easier for you to understand what's either happening or not happening." The following example, excerpted from our videotaped data, illustrates how such candor can emerge when doctors and patients are familiar with each other:

[Patient starts crying after an extended discussion of why her glucose levels are elevated.]

DR: I apologize if I was too hard on you. My goal is not to be hard on you or to beat you up that was just—

PT: I came in already upset.

DR: Why are you upset?

PT: I've been upset all week. I guess I've got some personal issues that are bothering me and [worrying about the stress raising my blood sugars] doesn't help it. I finally resigned myself to the fact that I need to call [my psychologist] and go in and see her.

DR: Why is that such a bad thing to do?

PT: I don't know, it just seems stupid to me. Maybe I don't want to deal with some things that are going on.

DR: Are there some new things though that have cropped up?

PT: I don't know if it's really anything new. Part of it's depression, part of it's relationships, part of it's physical, part of it's [wondering], "Why can't I get back on this weight track thing and get the rest of it off?" Part of it's just feeling out of control.

[Patient goes on to elaborate how her marital difficulties interfere with her diabetes care.]

When we consider how high continuity of care might benefit patients at Park Clinic, then, part of the contribution may be *both* physicians' having better information about the patient before the medical interview begins (through having seen the patient multiple times before) and being able to obtain better information during the medical interview (because of the rapport that has developed over time).

In addition, high continuity of care also seems to put physicians in a better position to recommend aggressive regimens because the physicians

are assured, as long as patients return to the clinic, that they will be able to follow up personally on individual cases. For example, one patient at Park Clinic regularly sought to make various modifications to his regimen, and the physician usually agreed because, based on their shared history, he felt that the patient could be counted upon to closely follow the terms of the new regimen, and, if it was not working by the next visit, they would then revert to the physician's original suggestion. When this patient complained about the bad-tasting fish-oil pills prescribed to improve his lipid profile, the physician agreed to temporarily lower the dosage of the pills, at least long enough to measure the impact on his lipids.¹⁷

By contrast, providers in County are much less likely to have the opportunity to personally monitor or follow patients they treat. An attending physician we interviewed complained about having to make regimen decisions at County while knowing virtually nothing about how the patient would behave outside the clinic. His colleague elaborated this assessment by highlighting a first-order difficulty posed by low continuity of care: the acquisition of basic information about patients who have not been seen before by a given provider. He explained,

You have to glean everything from the chart. You don't get a nice letter written to you [about a patient's status], it's a note on a chart, and depending on how busy the [providers who saw the patient last] are in the clinic, they write a longer or shorter note, usually a shorter one because everybody's pretty busy. And that's sometimes a little bit of a struggle to really get a comprehensive picture of what [a patient's] complication status is and what other doctors who are taking care of them are thinking about how their medication[s] should be adjusted and these kinds of things.

Beyond the challenges of interpreting information from patients' charts, low continuity of care generates the additional problem of learning about a patient's habits and how those habits are connected to his or her diabetes management, as another County physician described:

I think that's where continuity of care is important, because the more you know somebody's habits—and there's so many different habits to learn about with diabetes, exercise, how much do each of those things vary, how

¹⁷ Still another benefit of continuity of care may be that physicians have time outside the clinic visit to think about how "their" patients' regimens can be improved. A Park physician described a biochemist who "wanted to stay in his lab all the time" and not expend much effort on managing his diabetes. The physician said "I really like this guy a lot, and so it really came down to me spending a few nights lying in bed thinking" about how to best handle this patient. In addition, given that perceived similarity tends to increase liking (e.g., Byrne and Nelson 1965), one can speculate that similarity in status characteristics between physician and patient may increase the likelihood that a patient will be the object of this kind of nocturnal contemplation.

sensitive are they to exercise and to diet, how compliant are they with their diet, how much does their diet vary from day to day. If you've got somebody whose control is all over the map, it could be due to any one of those factors. . . . You can address that a lot more effectively with continuity or follow-up over a longer period of time than to try and just see a patient cold and do all that on one visit.

Furthermore, as other practitioners noted, all of their treatment decisions had to presume that the next doctor to see a patient would be likewise ignorant of his or her behavior and might also have different ideas about diabetes treatment. Under these circumstances, providers in County often favored conservative treatment regimens, which they regarded as the safest option in the absence of close follow-up. In the aggregate, these evaluations and treatment decisions may result in a relative bias among County physicians toward simpler, more hypoglycemia-averse regimens when compared to Park physicians. If so, because these regimens afford only weaker control over glucose levels, they would be expected to increase the risk of long-term complications and thus preserve the fundamental relationship.

Differences in In-Clinic Educational Resources

Because glucose control depends so heavily on patients' self-management, diabetes education is central to diabetes care, and Park and County Clinics differ considerably in their educational facilities. When Park patients or practitioners feel a patient needs continued diabetes education, the patient is referred to the formal Diabetes Education Center, usually for a session immediately following the clinic appointment. As an educator at Park Clinic describes the services the center provides: "You can't climb a mountain if you don't know where the mountain is or you don't have the right tools. So I see our job in helping them understand what diabetes is and what self-management is, because if 98% of diabetes is patient self-management then we need to provide them with the education and information relevant to them so that they can go home and be successful at that." The absence of such a center in County Clinic places more of a burden on residents and attending physicians to provide education while also trying to learn about patients whom they have often never seen before. As noted, County does have a diabetes educator who works at the clinic every week on a volunteer basis. While the personnel in the Park Diabetes Education Center each have their own office and extensive professional teaching materials, the volunteer in County has no office and works from a collection of index cards she keeps in her pocket, on which she has written the name and background information of patients she has seen in the clinic.

The superior educational infrastructure at Park may contribute to the fundamental relationship by providing Park Clinic patients with more resources for gaining information useful for managing the disease, as well as bringing them in contact with a wider array of providers, perhaps increasing the likelihood that education will be effectively tailored to patient needs. Furthermore, this disparity in in-clinic educational resources should be considered alongside evidence that middle-class patients are much more likely to pursue educating themselves about diabetes compared to poorer patients (e.g., Cockerham et al. 1986). If we think about in-clinic education as partly providing a potentially compensating resource for education that patients could pursue themselves outside the clinic, then the distribution of education between Park and County Clinics constitutes what we call a *compensatory inversion*: the same patients that are the most likely to educate themselves about diabetes outside the clinic also have the best resources for education inside the clinic.

In addition to teaching patients about the specifics of diabetes care, the center also benefits Park Clinic patients by providing moral support, various types of social support, and guidance as to the expectations patients should have of their physicians. These other purposes are evinced in the following excerpts from four different interviews with the center's diabetes educators and its social worker:

Q: Do you feel like patients tell you things that they might not be telling physicians?

Definitely, and the reason I think is because when they sit down here we take a few minutes to try to really get them comfortable, and I try to help them understand that we're a team and we're working together at this. So suddenly they feel a little bit more like they're on equal grounds.

We move to a little bit more of a personal level. . . . Even though I know the physicians do that, they don't have the kind of time we have.

There are times when we need to inform the patient of what standards of care are expected so that they can work through their back door with their physician.

It's not appropriate for us to call a physician and say, "We don't think you're managing this patient appropriately—his [hemoglobin] A1c has been high for six months and his medication dose has never been changed." . . . What we can do is show a patient what standards of care are, and what the American Diabetes Association says is good control or adequate control.

For Park patients, then, the education center may not only provide educational benefits, but also improve patients' motivation for adhering to

treatment regimens and their ability to engage in self-advocacy in their own medical care. In County, by comparison, we observed fewer instances in which providers offered diabetes education that was tailored to specific patients, and more often heard what might be regarded as generically paternalistic comments such as, "You'll stop smoking when it becomes important to you," as a way of attempting to motivate patient adherence to a regimen.

Differences in the Division of Labor among Physicians

As noted, most of the Park Clinic visits involved patients working primarily with their regular endocrinologist and support staff, while at County Clinic, residents on rotation (and/or fellows, who are advanced residents) are importantly involved in every patient's visit. Our ethnographic materials indicate that residents, interns, and students are responsible for at least 75% of the face-to-face contact with patients at County Clinic. Residents are fully credentialed to treat patients, but because this is a weekly clinic and rotations are only four weeks long, the residents who provide most of the actual face-to-face contact with patients during the clinic visit have *at most* three days' prior experience in the clinic.¹⁸ The short rotations guarantee not only permanent inexperience within these specific clinics, but also that the patient will never see the same resident twice in routine visits.

Beyond the low continuity of care associated with rotating medical personnel, however, the nature of residents' work presents several additional challenges that affect regimen design. First, although County residents are responsible for only preliminary strategic decisions about regimens, attending physicians do not have the same time, resources, or information to contemplate decisions that they would have if dealing with "their own" patients like at Park Clinic. Second, the array of responsibilities residents have in their clinical rotations (e.g., working with unfamiliar patients and diseases in a new setting, dealing with attending

¹⁸ Of course, there may be advantages to having a resident as one's primary point of care; perhaps some are more enthusiastic, caring, or attentive than some experienced specialists. We observed at least one case where a Park resident discovered an undiagnosed heart problem and was commended by the attending physician, but there were many more instances where residents needed assistance from attending physicians to collect basic information. On the whole, the possible superior performance of some residents over some experienced specialists for some patient visits seems unlikely to counterbalance the expected average benefit of having experienced physicians providing continuity of care over time. Likewise, we would expect the presence and prominence of residents to vary even among clinics that serve a similar-SES clientele; in terms of tendencies, however, medical education has a long history of relying on residents to treat patients from disadvantaged populations (see Light 1988).

physicians, and adhering to a schedule with required afternoon or lunch-hour activities) may well reduce their information-gathering or decision-making capacities. For example, one resident we observed was trying to rush through her last medical interview of the day in order to attend to other obligations firmly required as part of her residency, and she even rolled her eyes at us in exasperation a couple of times when the patient's problems understanding her questions required her to repeat several of them.

Beyond this, resident inexperience with medical interviewing—both generally and with regard to diabetes specifically—might result in residents often not eliciting relevant information as successfully as do experienced endocrinologists. Such a difference in interview quality, both in terms of collecting information from patients and imparting it to them, was both indicated by our own observations and asserted by several physicians we interviewed. Indeed, toward the end of the data collection, it was not uncommon for us to know more seemingly relevant details—problems with medications, living situations—about the lives and diabetes management of specific patients than did the County residents.

Residents use this information in making their preliminary treatment decisions, but attending physicians also rely importantly on it in evaluating these decisions and deciding how their own interaction with patients should proceed. We have space for only one example that illustrates how deficient information gathering by residents can affect the attending physician's own consultations. A patient's food diary reported that he was eating bacon sandwiches twice a week for breakfast and having gravy several times a week. The resident told the patient that he should avoid these foods, and, when presenting the case to the attending physician, she urged him to discuss dietary adherence with the patient. The attending physician then entered the examination room and began to lecture the patient about his diet—including an ominous warning that this would be his “last Christmas” if his diet did not dramatically change. However, he discovered through more detailed questioning that the patient had made significant improvements in his diet in previous months, and his diary reflected those efforts (in fact, it turned out that the patient used the term “gravy” to refer to low-fat tomato sauce). As a result, the attending physician softened his approach in an attempt to support and encourage the patient.¹⁹ Later this physician told us:

¹⁹ While such instances may point to disadvantages of having residents do the main interviewing of patients, they also may point to an aspect of the organization of County Clinic that may work in the patient's favor—namely, being seen by multiple doctors in a consultation may reduce erroneous information gathering by any one physician.

I did not get [that the patient had made these changes] until he started to say that, because I went in based on what the resident said. The resident said, "Look at his diet." . . . She didn't ask the right questions even about that, and that is, "What the hell does [the information in the diary] mean?" The answer was [what] he told me, and I had to back off because he said, "Look what I'm doing, I'm trying to do something better," and I had to back off and say, "Yeah, you are doing something better. Thank God, let's keep on going." But I was sandbagged in there.

Based on the resident's reports, the attending physician planned to be stern with the patient, but then he realized that affirmation or encouragement was more what the patient needed. In other instances, of course, such misalignments may not always be recognized by the physicians, and, in such instances, they may have the effect of alienating struggling patients further from the demands of their regimens.

EXTERNAL CONSTRAINTS ON REGIMEN DESIGN

While our data are taken from two very different diabetes clinics, our inquiry should not be taken as suggesting that all mechanisms would be eliminated if the patients we observed were treated at the same clinic. To the contrary, we assert that a series of additional phenomena would continue to pattern health outcomes according to SES. Extensive research has considered the ways social factors such as environmental risk factors (Evans and Kantrowitz 2002) and life circumstances (Trostle, Hauser, and Susser 1983; Conrad 1985; Bissell, May, and Noyce 2004; Koenigsberg, Bartlett, and Cramer 2004) often impede patient adherence to medical recommendations. In the context of diabetes care, such impediments may preclude the implementation of regimens that would permit greater control over patient glucose levels. These constraints—as well as the putative psychological differences we discuss below—can operate to create SES differences among patients receiving care at the same clinic.²⁰ We focus on three sources of external constraint on regimen design, all of which our materials suggest disproportionately affect lower-SES patients: (1) constraints imposed by finances, (2) constraints imposed by the specific demands of one's occupation, and (3) constraints imposed by one's surrounding social network. Again, constraints that more often interfere with the regimen design of lower-SES patients comprise more mechanisms sustaining the fundamental relationship.

²⁰ Importantly, our focus on constraints as they make themselves visible during routine clinic visits obscures many possible mechanisms responsible for disparities, not the least of which are discussed in the growing literature on neighborhood SES and health (e.g., Sampson, Morenoff, and Gannon-Rowley 2002).

Financial Constraints

Physicians recognize that financial constraints stratify the futures of patients on socioeconomic lines. As one physician we interviewed described it:

It's like the legal profession. . . . If you have endless money, you can buy the best of lawyers and get out of the jam. Not that money buys you understanding in diabetes or allows you to negate your responsibility, but money can put you in a position where you either have more time to devote to it or you have more resources to devote to it. . . . How much difference does it make in patients? It varies from patient to patient, but I think there's no question. People that are financially strapped are going to be in trouble.

While only 3% of the patients at Park Clinic reported being uninsured, 42% of patients of County Clinic did. The hospital housing County Clinic maintained a state-funded program designed to subsidize the costs of health care for low-income patients. For eligible patients who completed the appropriate application materials, funds from this program could be used in combination with Medicare or Medicaid benefits to cover medications, clinic visits, and lab tests. To help surmount the paperwork barriers that might prevent utilization of these services, the hospital has implemented a system of "financial counselors." However, eligibility for these counselors requires patients to provide documentation of residence, earnings over the last three months, and other benefits, which can reduce the likelihood of patients' following through and using the system. To be sure, we observed patients at County Clinic not availing themselves of benefits to which they would have been entitled and reporting that they had failed to take prescribed medications as a result.

While various programs enabled County Clinic patients to have sufficient resources for basic medications and clinic visits, they were unable to invest additional monies that would be required to maintain tight control, like many patients in Park did. For example, at the time our data were collected, insulin pumps cost approximately \$5,000, and part of this start-up cost was usually incurred personally by patients, with subsequent equipment and education expenses reimbursed by insurance. In this case, direct financial constraints on regimens operate most strongly at the upper bounds of potential control, insofar as only higher-SES patients can obtain and maintain the equipment necessary for the regimens that allow for the best possible control presently available.

That said, however, existing government-based programs do not necessarily cover even the purchase of materials necessary for simpler, mid-range regimens. Daily glucose monitoring provides one example that we observed doctors and patients regularly negotiating. While glucometers

are often sold at very low cost or even given away for free as part of product promotions, the test strips used in the meter are more costly and are covered much less comprehensively by insurers; private insurance companies often limit the number of strips that are covered in a month, while public programs such as a Medicare and Medicaid did not cover them at all when these data were collected.²¹ Each strip can be used only once and costs approximately \$.75. The more frequently patients test their glucose, the more data physicians have at their disposal in making decisions about how to modify treatment regimens. While testing glucose once or twice a day will generate enough data for physicians to provide a basic regimen design, patients able to maintain tight control with injection therapy or insulin pumps regularly test their glucose six to eight times per day. Importantly, when physicians do not have data on how glucose levels vary throughout the day, they regard it as safer to design concessionary regimens where glucose levels are chronically high rather than risk hypoglycemia. Additionally, financial limitations can also be manifested in the aspects of regimen design that are further removed from the immediate cost of service, such as purchasing appropriate food—as one physician told us, “A diabetic diet is certainly a more expensive way to eat than going to Wendy’s”—and exercising (as we will discuss more later).

Occupational Constraints

Apart from having less money, low-SES patients might also be more likely to work at jobs that are less hospitable to implementing effective plans for managing glucose levels. Physicians noted that patients who work swing shifts have schedules that make it very difficult to design a regimen that gives them tight control. At County Clinic, one patient reported to a resident that he rarely administered his afternoon insulin, and when she asked why not, he suggested vaguely that he just never felt like it or that he forgot. When presenting the case to the attending physician, the resident conveyed that the patient was noncompliant with this part of his regimen. When the attending physician began asking about the patient’s daily schedule, however, he discovered that the patient often works nights and is usually *asleep* in the afternoon—a revelation that shifted

²¹ Since 1998, new federal legislation has reduced some of these discrepancies by providing limited reimbursement to Medicare and Medicaid beneficiaries for some diabetes-related expenses. For example, Medicare beneficiaries are now allowed to receive up to 100 lancets and test strips per month (and more if a physician indicates it is necessary).

his interpretation from one of a noncompliant patient to that of a patient facing constraints that his treatment regimen needed to accommodate.

Patients working in manual labor jobs can also have additional challenges because they often use glucose somewhat intensely and irregularly when they are at work, and so they are prone to have problems with hypoglycemia. Even worse, they are more likely to be in physical danger if they do become hypoglycemic, especially in cases where people operate heavy machinery or are working alone. Along similar lines, truck drivers are often hesitant to risk hypoglycemia, as such an episode not only puts themselves and others in physical peril, but also may result in the loss of their operating license and thus their job. In order to accommodate these risks, regimens for these people appeared to usually favor higher glucose levels over time (and therefore higher risk of complications) in order to avoid hypoglycemia.

None of this is to suggest that the demands of high-status jobs do not pose their own sources of interference; indeed, we will discuss this specifically later. However, people in our study who were working at white-collar jobs in offices were seen as better able to maintain regular eating and exercising schedules, to be at lower risk of physical danger, and to be better candidates to receive assistance from nearby and knowledgeable co-workers in the event of hypoglycemia than people who work alone or with less-educated co-workers. Once again, we are talking about *relative probabilities*; white-collar jobs can certainly pose their own sources of resistance, especially for those who travel frequently, but, in our ethnographic materials, we observed many more cases in which occupation appeared to compromise regimen design for poorer patients than wealthier patients. The following statement by a physician also attests to this and provides an example of how having financial means may better situate patients for working around difficulties that are posed by their work conditions:

Some patients don't wanna have more than one or two shots a day. For example, if you have a truck driver . . . you may be able to convince them if they're local drivers to take a shot at bedtime, but they [are] hardly ever going to have more than two shots a day and they are not gonna adjust their insulin dose while they're on the road. . . . [By contrast,] I've got patients that have a predictable lifestyle. . . . They go to the office and they come back and they have their lunch times. They can handle complex regimens much better in terms of adjusting their insulin.

The physician went on to say that some “smart executives” would “go on [an insulin] pump because they don't know how long they spend in court or how much time they spend with being on a plane without food.”

Constraints Imposed by a Lack of Social Support

In addition to perhaps more often having work conditions that hinder regimen design, lower-SES patients may also be more likely to have home lives that constrain the possible treatment recommendations. In the following examples, single motherhood and number of children are cited as factors compounding the difficulty of implementing effective diabetes management (the second with reference specifically to gestational diabetes):

You don't plan a regimen for instance with someone who has seven children, no help at home, so [that] they have to spend hours a day mixing, testing, dieting. You wanna do the simple things as opposed to someone who has tremendous amounts of time to consider options and take time to do [something] maybe more complex.

These are younger women, okay. They're not very well educated, dropped out of school, working at the seven-dollar-an-hour jobs. They have poor cars—they have all the issues of poverty. Okay, rarely the patients I work with are married and have a strong support system. Rarely do they have insurance. . . . So they've got all the issues of pregnancy, all the issues of diabetes, and all the issues of low income.

When other considerations are the same, patients with significant social support may thus be more likely to be prescribed regimens for tight control; we consider this point again later.

(APPARENT?) MOTIVATION

We have so far considered possible mechanisms preserving the fundamental relationship that result from organizational differences between Park and County Clinics and from external constraints of various kinds. In the next two sections, we will consider SES and two *putative psychological differences* among patients that physicians cite as relevant to regimen differences affording stronger or weaker control over long-term glucose levels: patient motivation and cognitive ability.

Twenty of the 25 practitioners we interviewed mentioned patient motivation as a salient consideration in designing treatment regimens. As one doctor said, "The bottom line is that if they don't want to do it they're not going to do it no matter what they tell you." As already noted, many doctors like to start patients on relatively simple regimens, and then change to more aggressive regimen when patients demonstrate that they can and will execute the regimen prescribed. Some patients never move beyond the initial regimen, or they even move to simpler concessionary regimens. For instance, one doctor described a patient who consistently

skipped the second of his two daily prescribed insulin injections, significantly increasing his risk for dangerously high glucose: “He felt he was too busy. . . . He was always out with his friends, and he’s had a lot of problems with alcohol and drugs. So taking this set shot of insulin was very low on his list of priorities to do for the day.” Because the patient’s glucose was very high as a result of not taking the second injection, the doctor changed his regimen so that he was taking only one injection of long-acting insulin during a day; while far inferior to the regimen using two injections of regular insulin, this concessionary approach resulted in better glucose levels given what the patient was actually doing. Consequently, to whatever extent increased risk of behaviors like substance abuse are consequences of SES and contribute to low evinced motivation, these would comprise additional mechanisms preserving the fundamental relationship.

We observed a wide range of SES-related reasons for patients behaving in ways that were perceived as low motivation and as warrants for concessionary regimens. As expected, motivation was more commonly cited as a problem with patients at County Clinic, an observation seemingly consistent with findings in the medical literature linking low SES and nonadherence in ways that conceive the problem at least in part as a failure of patient motivation (see Conrad [1987]; Svarstad [1986]; Roter et al. [1998]; and DiMatteo [2004] for reviews on nonadherence generally; see Brown et al. [1998]; Smith et al. [1997]; and Senécal, Nouwen, and White [2000] on diabetes). In the survey data we collected, doctors assessed the patients at Park Clinic as adhering more closely to different aspects of their regimen than patients at County Clinic, and we certainly observed more instances of what were interpreted as serious or life-threatening “adherence problems” at County Clinic.

There are many potential reasons high-SES patients may evince higher motivation than low-SES patients. There are the organizational features outlined above, such as continuity of care and diabetes education, which facilitate Park practitioners’ motivating patients while simultaneously impeding such work at County. However, while Park Clinic provides a superior environment for motivating adherence, we also have good reasons to suspect that Park Clinic patients would evince higher levels of motivation than County Clinic patients anyway, by virtue of SES differences in health behaviors (Helmert et al. 1989; Shea et al. 1991; Midanik, Klatsky, and Armstrong 1990; Mirowsky and Ross 1998; Cockerham 2000; Swallen and Haas 2000). Even so, our observations indicate that these factors still comprise *only a portion* of SES differences in apparent motivation to adhere to more aggressive regimens, and for more, one must look at some of the specific criteria that doctors use in assessing the motivation of their patients.

More specifically, our data suggest that practitioner assessments of patient motivation are often based on phenomena that also have a strong socioeconomic character. For patients with low SES, we observed that *the relative costs of complying* with particular features of treatment regimens are often greater than for high-SES patients—leading us to expect SES differences in the probability of adherence among otherwise similar patients—yet these differences are often attributed by providers to psychological differences in patient motivation. The greater costs may thus both inhibit actual adherence and contribute to the physician's impression of the patient as willfully noncompliant. We will next provide some examples that illustrate how SES differences in costs of adherence were implicated in thinking about patient motivation, and how this may be implicated in regimen design. After this, we consider briefly how SES-linked differences in patients' lifestyles before they are diagnosed with diabetes might affect the lifestyle adjustments that patients with equal motivation achieve after being diagnosed.

Differences in the Costs of Adherence

Showing up for one's appointment might seem the simplest expectation of all. Practitioners regarded missed visits as strong indicators that patients were likely not following their treatment regimens well (see also Karter et al. 2004). For poorer patients, however, the personal costs of making a clinic visit may be often higher than they are for middle-class patients. In terms of time, County patients usually had to wait between 60–90 minutes for their appointments (and as long as three hours in one instance we observed), while Park patients usually waited less than 10 minutes. Because County Clinic patients were always seen by either a resident or fellow before the attending physician, their actual appointments were also longer than those from Park Clinic (even though, as noted, County patients spent less time consulting with attending physicians). In all, while the total length of an appointment at Park Clinic was approximately one hour, appointments at County Clinic tended to be twice as long and involved considerably more empty time of patients waiting to be seen. Not to discount that people of all social classes face demands on their time, but the conditions at County Clinic should be considered alongside potential differences among patients in flexibility for taking time off work for appointments, whether such time off is paid (and the personal need for such pay), and finding and being able to pay for child care, all of which are problems patients voiced at County (see also Eakin 1997). Furthermore, more patients at County Clinic than Park Clinic told us that they did not own cars or did not drive, and we heard more frequent

reports from County patients of transportation problems that made it difficult for them to make their scheduled appointments.

Second, patients were also often viewed as unmotivated if they allowed their prescriptions to lapse. The social program subsidizing medications for many County patients required them to fill their prescriptions at the hospital pharmacy; meanwhile, patients with private insurance could not only use their regular local pharmacies but also had the luxury of being able to call in refills beforehand and have them waiting for immediate pickup. As one County physician complained:

What a travesty. If you gave a businessman a prescription that had to be refilled every month, and he had to stop what he was doing and go to the store and stand there in front of a pharmacist for 30 minutes, 40 minutes he'd say, "Either you give me something that's appropriate, or I'm firing you as my physician." And here [at County] we give patients their prescription and say, "Come back every month and stand here. Come back on the bus and get your prescriptions filled." Gimme a break. If that doesn't interfere with compliance, I don't know what does.

Third, patients' apparent motivation to comply with medical instructions may also be affected by the immediacy and transparency of *benefits* associated with producing compliant behavior. For example, patients' logs of their glucometer readings allowed doctors to observe glucose fluctuations, but they were also used as an indicator of how closely patients followed their regimens. As one doctor said, "If they're writing down their sugars, they're probably taking their insulin."²² The more discretion a patient has over her or his insulin dosage (as in sophisticated regimens), the more incentive there is to maintain a log, because that information is critical for determining insulin dosages (in fact, instead of just handing their logs to physicians, patients with insulin pumps often sat side by side with Park physicians in order to make observations about patterns they had observed since their last visit and to make suggestions about potential changes). In contrast, patients with basic regimens were directed to check their glucose levels but do nothing with them other than write them down for the doctor (unless the reading indicated that they were hypoglycemic, in which case they were to eat something). Consequently, with the cost

²² Patients who kept meticulous logs and showed evidence of understanding their utility were seen as candidates for more sophisticated regimens, while patients were more likely to be kept on basic regimens if they said they had "forgotten" their logs or if they had only a few values written in them. One Park Clinic patient, who was characterized by his longtime physician as doing a great job of managing his diabetes, later confessed to us that he had simply fabricated the numbers in his log book for his most recent visit, knowing that a completed log was important for having the doctor continue to perceive him as a diligent patient.

of glucose testing approaching \$2–3 a day, the point of keeping a log may be obscured for patients with simple regimens, especially since—unlike missing a shot of insulin—it has no immediately observable effect on their actual health and little effect on how they are to conduct other parts of their regimen (see also Campbell et al. 2003).

We would expect such differential incentives to be compounded further among those with little education about diabetes—again, disproportionately low-SES patients—as we certainly observed patients at County Clinic who did not appear to understand what the values produced by their glucometers meant or why the doctor needed the logs. For that matter, the task of assiduous record keeping may be more familiar to patients with middle-class occupations and lifestyles. Glucose readings can be uploaded into a patient's home computer and graphed with available software, which might make the task of regular monitoring more informative, interesting, and enjoyable, and thus more likely to be done among the disproportionately high-SES population of skilled computer owners and users.

Finally, financial resources may allow one to make purchases that make it easier to become and remain motivated to follow parts of one's regimen. Adherence to exercise recommendations provides an example. Many of the middle-class patients observed at Park Clinic either belonged to some gym or health club or had purchased new exercise equipment for their homes. Meanwhile, some of the poorer patients in our study were more resourceful: one reported purchasing a battered stationary bicycle at a garage sale for \$5, while another's regular regimen consisted of walking briskly back and forth through the rooms of his residence for a half hour. Conscientious patients who cannot afford expensive equipment or gym memberships can still follow their exercise regimens, and there are of course patients who buy costly exercise equipment but then do not use it. Even so, our observations suggested that being able to afford such amenities made adhering to the prescribed exercise regimen easier and more enjoyable for middle-class patients than for poorer patients. If such resources do contribute to greater aggregate adherence to exercise recommendations—and such adherence does contribute to better aggregate outcomes—then this would stand as yet another mechanism contributing to the fundamental cause relationship.

Differences in the Relative Magnitude of Recommended Lifestyle Adjustments

In the United States, people from middle-class backgrounds are more likely to engage in lifestyles of healthy eating, not smoking, exercising, and avoiding problem drinking, as well as belonging to a social network

that supports such as lifestyle (see Cockerham 1997, 2000; Mirowsky et al. 2000). Among patients with equal motivation to make lifestyle changes once they are diagnosed with diabetes, higher-SES patients may have a “head start” in terms of their behaviors at the outset. If this implies SES differences in ultimate behaviors, then it can also imply differential success in postponing the long-term consequences of patients with diabetes.

For example, in one case we observed, the attending physician was critical of a patient for chronically avoiding his blood-pressure medications. The patient complained that he disliked taking the blood-pressure medication because, as a side effect, it caused him to be impotent. The doctor reasserted the role of the blood-pressure medication as a lifesaving measure, telling the patient, “You’re not going to be wanting to have sex if you’re on dialysis.” After the doctor left, the patient frustratedly told us that he had already given up smoking and drinking, and yet he was still having these problems and was now being asked to give up *more*. Then the patient told us that he would rather resume drinking heavily—even if it killed him—than live with kidney dialysis. In short, the social costs of “clean living” for this patient outweighed the costs of dialysis and potential kidney failure, a dilemma high-SES patients would be less likely to face. Because the doctor was not informed about relative changes the patient had made, his avoidance of medications was perceived as a lack of motivation. Indeed, he *was* evincing insufficient motivation to do more to take better control of his diabetes; however, if his “starting point” had been a healthier lifestyle, the motivation he did exhibit might have resulted in the change that the doctor was seeking.

(APPARENT?) COGNITIVE ABILITY

In addition to motivation, practitioners also frequently alluded to the importance of differences in patients’ cognitive ability for understanding variation in the regimens they designed. As two physicians told us: “Diabetes is a disease that only smart people, well-educated people, should have,” and “In the case of diabetes, it takes a fair amount of understanding, which means that it takes an IQ of more than 85 to be able to cope with [what can be done] physical activity or dietwise that’s going to keep them from having markedly elevated or low blood sugar.” There is a significant cognitive challenge in juggling multiple, contingent issues on a daily basis, and the skills required to be a successful insulin-pump user are greater than those required to sustain more basic regimens. The social factors that contribute to cognitive ability differences (variously measured) have been well covered by others (National Research Council 2000; Fischer et al. 1996; Devlin et al. 1997). Doctor’s interest in patient’s cognitive ability,

however, is thoroughly practical, centering on assessments of their capacity to acquire and implement the specific set of skills required to manage a regimen. We often observed that the practical manifestations of cognitive ability affected the complexity of successfully executed regimens, and to the extent that regimen complexity contributes probabilistically to better health outcomes, then all consequences of SES that produce differences in achieved cognition can be added to the list of mechanisms producing the fundamental relationship between SES and health.²³

At County Clinic, we observed several sobering instances of both profound patient ignorance about diabetes and the ultimate consequences of such ignorance. To give just one example, a patient reported that on a day when he knew he was not feeling well, he not only failed to check his blood sugar or eat anything, but also instead decided to get in his car and drive home. He ended up making a wrong turn and then flipping his van. Afterward, he checked his glucose, and it was 31 mg/dl. The low end of a normal glucose range is 80 mg/dl, and practitioners are legally prohibited from allowing patients to leave clinics with glucose levels below 60. In relating this story to the physician, the patient made brutally clear his poor judgment and poor understanding of the gravity of his condition, which was interpreted by his physician as indicating low cognitive ability and as necessitating a regimen focused on avoiding hypoglycemia, with less attention to postponing long-term consequences.

More generally, we must recognize that cognitive ability as it pertains to something like regimen implementation should not be thought as simply something “in the head” but as a practical *achievement* of actors *in concert* with the compensating social, technological, and other resources of their environments. Following our earlier consideration of social support, many wives took an active role in managing their husband’s diet (not just by cooking for them but also monitoring consumption), medication, and log books, as well as taking a lead role in communicating with practitioners.²⁴ As another example, a mildly developmentally disabled patient at County Clinic had excellent dietary adherence because her conscientious mother prepared her meals for her, and a nurse at the school where she is a

²³ In our formulation, causal pathways running *from* cognitive ability *to* SES are not mechanisms of a fundamental relationship between SES and health. For more on cognitive ability and diabetes self-management, see Goldman and Smith (2002); for more on the potential role of cognitive ability as underlying some of the apparent relationship between SES and health outcomes more generally, see debate between Gottfredson (2004) and Link et al. (2003).

²⁴ We use “wives” instead of “spouses” because we did not observe any instances of husbands providing this kind of comprehensive assistance. Indeed, some women complained during clinic visits that their husbands were not just unhelpful but were actually *impediments* to better management of the disease.

custodian also helps by mixing her insulin injections and monitoring the values stored in her meter. In this case, someone of low SES and a cognitive deficit had a solid compensatory environment. While such cases are laudatory, the literature on social networks would lead one to hypothesize a tendency for many features of network quality (as in, e.g., educational level of one's closest ties) to vary directly with SES. The man at County Clinic who had the van accident described above had actually told his brother he was feeling ill, and the brother apparently watched him get into his van and drive away. In relating this story to the physician, then, the man revealed that his own network contained patently unreliable monitors of possible problems, making a concessionary regimen all the more necessary. Understanding seemingly intrinsic capacities as practical achievements allows one to see how the effects of SES on one's social and technological environments can, in turn, affect the likelihood of successfully performing aspects of regimens whose performance is typically regarded as a matter of individual "cognitive ability."

Furthermore, as already noted, the interviewers who are likely the least skilled at eliciting pertinent information from diabetes patients (i.e., residents) conduct most of the interviews with the patients who tend to be the least articulate at answering them (i.e., those with low SES). More than this, if low-SES patients have received less education and have less knowledge about diabetes, then they are also likely to be the least equipped to compensate for any interviewer deficiencies by knowing what information about their lives and condition is most relevant to the doctor's work. To be sure, interviews at County Clinic seemed less effective than those at Park Clinic, a conclusion from our own observations that was supported by interviews with practitioners who had worked in both clinics. In explaining why, dispositional attributions of low patient cognitive ability may be easily placed in the foreground by practitioners, as opposed to the organizational features of the clinics.

DISPOSITIONAL ATTRIBUTIONS AND PRACTITIONERS' BIASES

As hindrances to regimen design, we observed attributions of low motivation and low cognitive ability to be more pervasive in routine clinic visits at County Clinic than at Park. We have noted ways that the social circumstances of County patients may contribute to their tendency to appear less motivated and able than Park patients. Even so, an obvious question is whether clinician bias might also contribute systematically to negative psychological assessments of low-SES patients, in ways that independently cause some to receive less-sophisticated regimen recommendations than what they actually could manage. The best means of de-

tecting such biases may be audit- or vignette-type studies in which key conditions of mock patients are as identical as possible while only the focal characteristic varies (McKinlay et al. 2002). Such studies have provided evidence of race, gender, and class biases in both diagnosis and treatment recommendations (e.g., Brown 1995; McKinlay and Marceau 2001; Loring and Powell 1988; see also observational studies such as van Ryn and Burke [2000]). Consequently, one would seem naïve not to grant the possibility that such biases could provide still another mechanism mediating the link between SES and health outcomes in the process of regimen design.

Our ethnographic data are inadequate to evaluate this possibility.²⁵ One kind of evidence for such a bias in our ethnographic materials would be an explicit “smoking gun” statement by a physician linking SES to a dispositional attribution and subsequent treatment decision. Not only was such an instance not observed, but, unless recurrent, it would be hard to sustain the claim that it alone exemplifies a systematic influence on the patient care as opposed to being something more idiosyncratic. Another kind of evidence would be blatant differences in the manner with which otherwise similar low- and high-SES patients were treated by the same physician; this was also not observed. While we certainly observed cases in which residents and physicians did not handle low-SES patients entirely as we would have liked, we were on the whole impressed with the compassion and dignity with which these professionals treated their poorest clients. That said, admiration for their overt behavior far from eliminates the possibility of conscious or unconscious biases operating in consequential ways without our recognizing them.

But what should be plain is that if such biases do influence clinician practice, they comprise only part of a much larger causal story. Moreover, even while doctors may often make attributions to client dispositions that would be more accurately attributed to their situations, this does not necessarily mean that the treatment decisions made as a result of the attributions are less appropriate. A propensity to miss appointments may be sometimes wrongly taken as indicating low motivation instead of

²⁵ A different approach we explored was to compare practitioner assessments of cognitive ability with the assessment provided by a short test of cognitive functioning. The patient telephone survey included items from the Wechsler Adult Intelligence Scale (WAIS) similarities subtest (also used in several large-scale social surveys). For these same patients, physicians were asked to rate how cognitively capable they thought patients were of understanding and following a complex treatment regimen. As expected, Park Clinic patients did better than County patients on both the similarities test (7.9 vs. 5 on a 0–16 scale, $P < .001$) and physician ratings (7.5 vs. 6.5 on a 0–10 scale, $P < .05$). Across a variety of model specifications, we did not find any significant effects of either race or income on physician assessments once WAIS similarities score was controlled, although the low sample size means that these tests had low power.

greater difficulties in getting to the clinic, but doctors must ultimately be more cautious with the treatment regimens they give to patients if they cannot count on that patient's receiving care and checkups regularly in the future. Likewise, even if doctors are sometimes wrong in taking inattention to log books as implying low overall motivation, they still are constrained in the regimens they can recommend if they feel they cannot receive this information reliably. Improving physician awareness of the situational character of resistances may help by allowing better development of workable accommodations, but, beyond this, we would not expect improving attributional accuracy to have much further effect on the fundamental relationship.

DISCUSSION

This article attempts to articulate some of the mechanisms by which the inverse relationship between SES and health outcomes might be produced among persons with diabetes. Specifically, it describes potential mechanisms as they become visible in the process of regimen design in routine clinic visits for diabetes patients. Comparing patients across two clinics that serve very different clienteles, our data identify numerous ways in which SES influences the design or successful implementation of a regimen, operating within the broad terms of the organizational features of clinics, external constraints on patients, and influences on (apparent) patient motivation and cognitive ability. Enacted regimens are known to influence long-term glucose levels, and long-term glucose levels are known to importantly affect the risk of long-term complications from diabetes. That we can specify such a large number of candidate mechanisms is consistent with the animating idea of fundamental causality: that durable relationships between encompassing variables like SES and health may represent an accumulation of many small, pervasive advantages that can be expected to be renewed as the particulars of disease treatment change over time.

As such, the foregoing represents an effort toward developing an approach through which ethnographic investigation might contribute to elaborating our understanding of fundamental cause relationships. Such an approach attempts to combine quantitative knowledge about the proximate risk factors that contribute to differential outcomes with qualitative observations and interviews that make the *realization of differentials in risk factors visible in real contexts*. The project is highly consonant with calls from various other quarters of sociology for more fine-grained attention to explanatory detail, whether in the microlevel study of social interaction or in the macrolevel study of comparative history. We propose

a similar attention to particularity in explicating the potentially massively multiple pathways of causation responsible for an association between an independent variable with multiple realizations and a dependent variable that is multiply realizable.

The compendium of potential mechanisms that our study presents comprises findings and hypotheses that we regard as contributions to the social epidemiology of diabetes in their own right, as well as providing a useful riposte to what we see as a regular tendency to underappreciate the multiple and intricate paths by which durable associations between encompassing concepts like SES and health can be produced. Link and Phelan (1995, 2005) suggest that such an underappreciation may be ubiquitous within the prevailing epidemiological approach of studying single risk factors with respect to single diseases, even while, to be sure, the accomplishments of epidemiology demonstrate the immense usefulness of such studies. What an ethnographic approach to a fundamental cause relationship proposes is that there is also value to inquiries that try to describe concrete causal pathways with a depth of observational detail. Apart from possibly generating proposals about specific causal pathways that might be tested using quantitative methods, ethnographic investigations like ours may also expand social epidemiology's understanding of the multiplicity of mechanisms that can underlie the causal potency of single variables like "continuity of care."

We have purposely limited the scope of our inquiry in order to capitalize on the analytic strengths of our data and ethnographic methods more generally—namely, to articulate the concrete experiences of people as they occur in the health care system, and to illuminate such processes in ways that elude large-scale statistical analyses. Obviously, as is common in ethnography, we reap these benefits of depth at the expense of generalizability. We should underscore some of the more important limitations to the generalizability of our work. To begin with, as noted, by restricting our study to patients whose regimens include insulin and who are treated in subspecialty clinics, the average case we observed is more serious than the average case among the general population of diabetes patients. For that matter, we say nothing about mechanisms that may be implicated in the onset of diabetes or in how specific diabetes complications are managed once they develop. A fuller treatment of diabetes would require much more variegated observations and a much larger exposition than a single journal article, and obviously, diabetes is only one kind of chronic disease, and chronic diseases are not the only health outcomes for which an inverse relationship between SES and health outcomes is observed. An eventual goal might be a comprehensive schematic that draws connections and contrasts across many conditions, but such a schematic is

far off and will require many additional studies of specific conditions by other investigators.

Even so, our study may provide a template for other efforts to use ethnographic observation to explore particular fundamental relationships or to better understand fundamental causality more generally. Sociological ethnography has increasingly emphasized its potential of particularistic investigations for reconstructing and strengthening existing and general theoretical ideas (e.g., Burawoy 1991, 1998). In this spirit, we further elaborate three aspects of the fundamental cause concept in the light of our ethnographic analyses.

Compensatory Inversions

When distal factors cause one group to be disadvantaged relative to another with respect to *Y*, compensatory elements may exist that have the potential to yield greater benefits for the disadvantaged group (who have more to gain) than the advantaged group. However, in fundamental cause relationships, these compensatory elements may be distributed precisely *opposite* of what would have the greatest expected effect: the best compensatory resources are instead commonly made most available to those with the least need for them. Lower-SES patients may be the least skilled at articulating their problems to physicians and so would seem to gain the most from experienced medical interviewers, but instead, the bulk of the interviewing of low-SES patients was conducted by inexperienced residents; although the Park Clinic patients have vastly better in-clinic resources, County patients still might ultimately benefit more because their room for improvement is greater and their propensity for self-education outside the clinic is lower. We suspect that such compensatory inversions may exist regularly within fundamental relationships, and they may make the quantitative decomposition of the effects of mechanisms more difficult.

Furthermore, the fundamental cause concept proposes that as the pertinent mechanisms change over time, they will still tend to preserve the direction of the fundamental cause relationship, which raises questions of how particular compensatory inversions develop over time. One such set of mechanisms at work in the case of diabetes is scientific and technological advances, like the insulin pump we describe above, which often improve the potential for avoiding diseases or their adverse consequences. One could be content with simply formulating the expectation that those with resources will have the best access to such innovations as they are introduced, but we think that the serious study of the fundamental cause relationship can perhaps be theoretically elaborated much further, at least with regard to some diseases and innovations.

Specifically, we wonder if such investigations might benefit from the

development of a concept similar to that of *maximally maintained inequality* in the sociology of education (Raftery and Hout 1993). This notion suggests that the highest social strata have sufficient leverage in status-mediating mechanisms—like the educational system—that the odds of a child from a lower stratum achieving a given level of educational attainment relative to the odds of a higher-status child doing so will increase *only* once the higher stratum has effectively achieved saturation at that level. As a result, maximal levels of relative inequality are sustained even as the absolute level of education for the high-SES population also increases. Medical scientific advances are often depicted in public media as a savior that will ultimately minimize inequalities; in the case of diabetes, we can imagine that pharmaceutical developments in oral medications, which are simpler to manage than insulin, could eventually reduce some aspects of the SES gradient we observe. By contrast, a maximally maintained inequality-like thesis would suggest instead that continuing medical advances can provide a regular course of overall social benefit while simultaneously resulting in sustained inequality for a given disease unless or until the highest available level of therapeutic attainment saturates to the entire population (such as when a disease is eradicated).

Distribution and Role of “Knowledge”

Link et al. (1998, p. 379) posit that “the fundamental cause idea suggests that gradients favoring individuals of higher SES will emerge only when knowledge becomes available that allows persons of higher status to avoid disease and its consequences.” Using the examples of Pap smears and mammography, they treat the fundamental relationship as contingent upon the *existence* of knowledge about the disease and the potential for mastery it implies. We have considered many locations in which the existence of relevant knowledge might be consequential for SES differences in outcomes: knowledge is materially manifested in the development of treatment technologies, knowledge is possessed by practitioners capable of expertly assisting patients, patients may already possess or seek to further develop their specific knowledge about the disease, and knowledge relevant to treatment effectiveness may be possessed by members of patient social networks. Building on Link and Phelan, however, our ethnography also considers specific ways in which resources allow for the superior marshaling of knowledge. For example, as a consequence of greater continuity of care, better organization and practices of medical interviewing at Park Hospital, and better understanding of what comprises relevant information for physicians, physicians tended to have more available information when making regimen decisions for higher-SES patients. In thinking about the fundamental cause relationship, then, we

think it is important to recognize that resources can affect not only *access* to people with knowledge of how to fight the disease, but also the marshaling of this knowledge by facilitating the propagation of information about oneself to these people.

Countervailing Mechanisms

Fundamental relationships do not require that all of the pathways between X and Y support the relationship. *Countervailing mechanisms* may work in the other direction; indeed, the only requirement is that the effects of such mechanisms are cumulatively smaller than the mechanisms producing the fundamental relationship. As the intentional search for deviant cases is a staple of ethnographic work (Becker 1998; Strauss and Corbin 1990), special attention to countervailing mechanisms should be part of an ethnography of a fundamental relationship. Instead of dismissing countervailing mechanisms as idiosyncratic or transient, one should look for ways in which at least some of these can be collected as systematically explicable. In our data, one such collection may be consequences of *status pursuit*. As in the case of one biochemist patient at Park Hospital whose adherence was undermined by his desire to spend all his time in his lab, professional occupations with extensive travel or entertainment obligations may reward behaviors that are costly in terms of diabetes care. Similarly, several practitioners became frustrated with white and middle-class teenage girls (and sometimes women), who capitalized on the side effect of weight loss by deliberately allowing their glucose levels to run high in order to stay thin. What these potential countervailing mechanisms share is the prospect that *some of the same behaviors that maintain or enhance social status may also undermine diabetes regimens*. When maintaining status conflicts with the optimal behaviors for the prevention and control of a disease, this might create some pathways that work against the fundamental relationship, even though the overall balance of mechanisms strongly sustains it.

FUTURE DIRECTIONS

What value might there be in tying other inquiries in different specific domains to a general conceptualization of fundamental causality? We find the concept stimulating for thinking about robust relationships between basic social conditions and life outcomes, and we think there is likely much room for further elaboration and development through specific inquiries. In this paper, we sought to contribute to this development by first specifying the constituent claims that we take a hypothesis of fundamental

causality to imply, and then by presenting additional insights we believe we have gained from our own empirical inquiry. The generality of the fundamental cause concept may allow distinct empirical investigations to fruitfully inform one another (Williams 1997; Williams and Collins 2001; LaVeist 1996; Link and Phelan 2001; Krieger et al. 1993). Our observations about “compensatory inversions” or “countervailing mechanisms,” for example, might raise useful considerations for inquiries in other domains, just as thinking in the more abstract terms of fundamental relationships led us to consider whether an imported concept like “maximally maintained inequality” might be useful for understanding the preservation of the SES-health gradient as technological mastery over disease treatment increases.

How widely might the concept of fundamental causality be useful? The key issue here is how much it can add to inquiries that pursue the mechanisms underlying relationships in which the distal variable is not “SES” and the outcome is not some aspect of “health.” Toward this end, we can conclude this paper the same way it began, by calling attention to one of the most wide-ranging and inherently probabilistic ideas in sociology—Weber’s “life chances.” Other meanings of life chances and the distal variables observed to serve as durable predictors of them might provide ideal candidates for attempted applications or extensions of the ideas presented here. As perhaps the most obvious example, there already exist many efforts to recount the massively multiple ways that variables like gender or race might probabilistically affect attainments of various kinds (e.g., Oliver and Shapiro 1995; Benokraitis and Feagin 1995; McCall 2001). Do such relationships share the basic constituent properties of fundamental causality, especially the idea of metamechanisms that preserve the observed relationships both holographically and as the outcome’s structure of realizability changes? For those that do, the concept might provide a productive orienting resource for thinking about the analogies and disanalogies among different fundamental cause relationships, and it could serve as a locus for valuable new dialogues between medical sociology and other areas of the discipline that have yet to fully realize the potential benefits of talking more with one another.

REFERENCES

- American Diabetes Association. 1998. “Economic Consequences of Diabetes Mellitus in the U.S. in 1997.” *Diabetes Care* 21:96–309.
- Becker, Howard S. 1998. *Tricks of the Trade: How to Think about Your Research While You’re Doing It*. Chicago: University of Chicago Press.
- Benokraitis, Nijole V., and Joe R. Feagin. 1995. *Modern Sexism: Blatant, Subtle, and Covert Discrimination*. Englewood Cliffs, N.J.: Prentice Hall.
- Bissell, Paul, Carl R. May, and Peter R. Noyce. 2004. “From Compliance to

Fundamental Causality

- Concordance: Barriers to Accomplishing a Re-framed Model of Health Care Interactions." *Social Science and Medicine* 58:851–62.
- Blackwell, D. L., J. G. Collins, and R. Coles. 1997. "Summary Health Statistics for U.S. Adults: National Health Interview Survey, 1997." In *Vital and Health Statistics Series*, series 10, no. 205. Hyattsville, Md.: National Center for Health Statistics.
- Booth, Gillian L., and Janet E. Hux. 2003. "Relationship between Avoidable Hospitalizations for Diabetes Mellitus and Income Level." *Archives of Internal Medicine* 163:101–6.
- Brown, Phil. 1995. "Naming and Framing: The Social Construction of Diagnosis and Illness." *Journal of Health and Social Behavior* extra issue: 34–52.
- Brown, S. L., J. F. Pope, A. E. Hunt, and N. M. Tolman. 1998. "Motivational Strategies Used by Dietitians to Counsel Individuals with Diabetes." *The Diabetes Educator* 24 (3): 313–18.
- Burawoy, Michael. 1991. "The Extended Case Method." Pp. 271–300 in *Ethnography Unbound: Power and Resistance in the Modern Metropolis*, edited by Michael Burawoy et al. Berkeley and Los Angeles: University of California Press.
- . 1998. "The Extended Case Method." *Sociological Theory* 16:4–33.
- Byrne, Donn, and Don Nelson. 1965. "Attraction as a Linear Function of Proportion of Positive Reinforcements." *Journal of Personality and Social Psychology* 1:659–63.
- Campbell, Rona, Pandora Pound, Catherine Pope, Nicky Britten, Roisin Pill, Myfanwy Morgan, and Jenny Donovan. 2003. "Evaluating Meta-ethnography: A Synthesis of Qualitative Research on Lay Experiences of Diabetes and Diabetes Care." *Social Science and Medicine* 56:671–84.
- Centers for Disease Control and Prevention. 2004. "National Diabetes Fact Sheet: General Information and National Estimates on Diabetes in the United States, 2003." Rev. ed. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention.
- Chapin, Charles V. 1924. "Deaths among Taxpayers and Non-taxpayers Income Tax, Providence, 1865." *American Journal of Public Health* 4:647–51.
- Cockerham, William C. 1997. "Lifestyles, Social Class, Demographic Characteristics, and Health Behavior." Pp. 253–65 in *Handbook of Health Behavior Research I: Personal and Social Determinants*, edited by D. S. Gochman. New York: Plenum.
- . 2000. "The Sociology of Health Behavior and Health Lifestyles." Pp. 159–72 in *Handbook of Medical Sociology*, 5th ed., edited by C. E. Bird, P. Conrad, and A. M. Fremont. Upper Saddle River, N.J.: Prentice-Hall.
- Cockerham, William C., Gerhard Kunz, Guenther Lueschen, and Joe L. Spaeth. 1986. "Symptoms, Social Stratification and Self-Responsibility for Health in the United States and West Germany." *Social Science and Medicine* 22 (11): 1263–71.
- Conley, Dalton, and Neil Bennett. 2000. "Is Biology Destiny? Birth Weight and Life Chances." *American Sociological Review* 65:458–67.
- . 2001. "Birth Weight and Income: Interactions across Generations." *Journal of Health and Social Behavior* 42:450–65.
- Conrad, Peter. 1985. "The Meaning of Medication: Another Look at Compliance." *Social Science and Medicine* 20:29–37.
- . 1987. "The Experience of Illness: Recent and New Directions." *Research in the Sociology of Health Care* 6:1–31.
- Coombs, L. C. 1941. "Economic Differentials in Causes of Death." *Medical Care* 1: 246–55.
- Cowie, Catherine C., and Mark S. Eberhardt. 1995. "Sociodemographic Characteristics of Persons with Diabetes." In *Diabetes in America*, edited by M. I. Harris, C. C. Cowie, M. P. Stern, E. J. Boyko, G. E. Reiber, and P. H. Bennett. Washington, D.C.: U.S. Department of Health and Human Services, National Institutes of Health.
- Devlin, Bernie, Stephen E. Fienberg, Daniel P. Resnick, and Kathryn Roeder, eds.

1997. *Intelligence, Genes, and Success: Scientists Respond to the Bell Curve*. New York: Copernicus.
- Diabetes Control and Complications Trial Research Group. 1993. "The Effect of Intensive Treatment of Diabetes on the Development and Progression of Long-Term Complications in Insulin-Dependent Diabetes Mellitus." *New England Journal of Medicine* 329:977–86.
- Diamant, Allison L., Susan H. Babey, E. Richard Brown, and Neetu Chawla. 2003. "Diabetes in California: Findings from the 2001 California Health Interview Survey." Los Angeles: University of California, Los Angeles, Center for Health Policy Research.
- DiMatteo, M. Robin. 2004. "Variation in Patients' Adherence to Medical Recommendations: A Quantitative Review of 50 Years of Research." *Medical Care* 42 (3): 200–209.
- Eakin, Joan M. 1997. "Work-Related Determinants of Health Behavior." Pp. 337–57 in *Handbook of Health Behavior Research I: Personal and Social Determinants*, edited by D. S. Gochman. New York: Plenum.
- Ellison, George. 2002. "Letting the Gini Out of the Bottle?: Challenges Facing the Relative Income Hypothesis." *Social Science and Medicine* 54:561–76.
- Evans, Gary W., and Elyse Kantrowitz. 2002. "Socioeconomic Status and Health: The Potential Role of Environmental Risk Exposure." *Annual Review of Public Health* 23:303–31.
- Feinstein, Jonathan S. 1993. "The Relationship between Socioeconomic Status and Health: A Review of the Literature." *The Milbank Quarterly* 71:279–322.
- Fischer, Claude S., Michael Hout, Martin Sanchez Jankowski, Samuel R. Lucas, Ann Swidler, and Kim Voss. 1996. *Inequality by Design: Cracking the Bell Curve Myth*. Princeton, N.J.: Princeton University Press.
- Forssas, Erja, Ilmo Keskimäki, Antti Reunanen, and Seppo Koskinen. 2003. "Widening Socioeconomic Mortality Disparity among Diabetic People in Finland." *European Journal of Public Health* 13:38–43.
- Freidson, Eliot. 1988. *Profession of Medicine*. Chicago: University of Chicago Press.
- Glasgow, Russell E., and Elizabeth G. Eakin. 1998. "Issues in Diabetes Self-Management." Pp. 435–61 in *The Handbook of Health Behavior Change*, 2d ed., edited by Sally A. Shumaker, Eleanor B. Shron, Judith K. Ockene, and Wendy L. McBee. New York: Springer.
- Goldman, Dana P., and James P. Smith. 2002. "Can Patient Self-Management Help Explain the SES Health Gradient?" *Proceedings of the National Academy of Sciences* 99:10929–34.
- Goldthorpe, John H. 2000. *On Sociology: Numbers, Narratives, and the Integration of Research and Theory*. Oxford: Oxford University Press.
- Gottfredson, Linda S. 2004. "Intelligence: Is It the Epidemiologists' Elusive 'Fundamental Cause' of Social Class Inequalities in Health?" *Journal of Personality and Social Psychology* 86:174–99.
- Harris, Maureen I., Richard C. Eastman, Catherine C. Cowie, Katherine M. Flegal, and Mark S. Eberhardt. 1999. "Racial and Ethnic Differences in Glycemic Control of Adults with Type 2 Diabetes." *Diabetes Care* 22:403–8.
- Harris, Maureen I., Katherine M. Flegal, Catherine C. Cowie, Mark S. Eberhardt, David E. Goldstein, Randie R. Little, Hsiao-Mei Wiedmeyer, and Danita D. Byrd-Holt. 1998. "Prevalence of Diabetes, Impaired Fasting Glucose, and Impaired Glucose Tolerance in U.S. Adults. The Third National Health and Nutrition Examination Survey, 1988–1994." *Diabetes Care* 21:518–24.
- Hedström, Peter, and Richard Swedberg. 1998. "Social Mechanisms." Pp. 1–30 in *Social Mechanisms*, edited by P. Hedström and R. Swedberg. Cambridge: Cambridge University Press.
- Helmert, U., B. Herman, K.-H. Joeckel, E. Greiser, and J. Madans. 1989. "Social Class

- and Risk Factors for Coronary Heart Disease in the Federal Republic of Germany: Results of the Baseline Survey of the German Cardiovascular Prevention Study." *Journal of Epidemiology and Community Health* 43:37–42.
- Hosler, Akiko S., Jennifer L. Metivier, and Kathryn Godley. 1997. *Behavioral Risk Factor Surveillance System Summary Report: Diabetes Prevalence and Care in New York State*. New York: New York State Department of Health.
- House, James S. 2001. "Relating Social Inequalities in Health and Income." *Journal of Health Politics, Policy, and Law* 26:523–32.
- House, James, Ronald C. Kessler, A. Regula Herzog, Richard P. Mero, Ann M. Kinney, and Martha J. Breslow. 1990. "Age, Socioeconomic Status, and Health." *The Milbank Quarterly* 68 (3): 383–411.
- Illsley, Raymond, and Ken Mullen. 1985. "The Health Needs of Disadvantaged Client Groups." Pp. 389–402 in *Oxford Textbook of Public Health*, edited by W. W. Holland, R. Detels, and G. Knox. Oxford: Oxford University Press.
- Jacobson, Alan M., Stuart T. Hauser, John Willett, Joseph I. Wolfsdorf, and Leanna Herman. 1997. "Consequences of Irregular versus Continuous Medical Follow-up in Children and Adolescents with Insulin-Dependent Diabetes Mellitus." *The Journal of Pediatrics* 131:727–33.
- Karter, Andrew J., Melissa M. Parker, Howard H. Moffet, Ameena T. Ahmed, Assiamira Ferrara, Jennifer Y. Liu, and Joe V. Selby. 2004. "Missed Appointments and Poor Glycemic Control: An Opportunity to Identify High-Risk Diabetic Patients." *Medical Care* 42 (2): 110–15.
- Kenny, Susan J., Ronald E. Aubert, and Linda S. Geiss. 1995. "Prevalence and Incidence of Non-Insulin Dependent Diabetes." Pp. 47–68 in *Diabetes in America*, edited by M. I. Harris, C. C. Cowie, M. P. Stern, E. J. Boyko, G. E. Reiber, and P. H. Bennett. Washington, D.C.: U.S. Department of Health and Human Services, National Institutes of Health and Human Services.
- King, H., and M. Rewers. 1993. "Global Estimates for Prevalence of Diabetes Mellitus and Impaired Glucose Tolerance in Adults." *Diabetes Care* 16:157–77.
- Knowler, William C., Elizabeth Barrett-Connor, Sarah E. Fowler, Richard F. Hamman, John M. Lachin, Elizabeth A. Walker, and David M. Nathan. 2002. "Reduction in the Incidence of Type 2 Diabetes with Lifestyle Intervention or Metformin." *New England Journal of Medicine* 346:393–403.
- Koenigsberg, Marlon Russell, Donald Bartlett, and Steven Cramer. 2004. "Facilitating Treatment Adherence with Lifestyle Changes in Diabetes." *American Family Physician* 69 (2): 309–16.
- Krieger, Nancy, Diane L. Rowley, Allen A. Herman, Byllye Avery, and Mona T. Phillips. 1993. "Racism, Sexism, and Social Class: Implications for Studies of Health, Disease, and Well Being." *American Journal of Preventive Medicine* 9 (6): 82–122.
- LaVeist, Thomas A. 1996. "Why We Should Continue to Study Race . . . But Do a Better Job: An Essay on Race, Racism, and Health." *Ethnicity and Disease* 6 (1–2): 21–29.
- Lieberson, Stanley. 1985. *Making It Count: The Improvement of Social Research and Theory*. Berkeley and Los Angeles: University of California Press.
- . 1991. "Small N's and Big Conclusions: An Examination of the Reasoning in Comparative Studies Based on a Small Number of Cases." *Social Forces* 70:307–20.
- Light, Donald W. 1988. "Toward a New Sociology of Medical Education." *Journal of Health and Social Behavior* 29 (December): 307–22.
- Link, Bruce G., Mary E. Northridge, Jo C. Phelan, and Michale L. Ganz. 1998. "Social Epidemiology and the Fundamental Cause Concept: On the Structuring of Effective Cancer Screens by Socioeconomic Status." *Milbank Quarterly* 76 (3): 375–402.
- Link, Bruce G., and Jo C. Phelan. 1995. "Social Conditions as Fundamental Causes of Disease." *Journal of Health and Social Behavior* extra issue: 80–94.

- . 1996. "Understanding Sociodemographic Differences in Health—The Role of Fundamental Social Causes." *American Journal of Public Health* 86:471–73.
- . 2000. "Evaluating the Fundamental Cause Explanation for Social Disparities in Health." Pp. 33–46 in *Handbook of Medical Sociology*, edited by Chloe E. Bird, Peter Conrad, and Allen M. Fremont. Upper Saddle River, N.J.: Prentice Hall.
- . 2001. "Conceptualizing Stigma." *Annual Review of Sociology* 27:363–85.
- . 2003. "McKeown and the Idea That Social Conditions Are Fundamental Causes of Disease." *American Journal of Public Health* 93:1032.
- . 2005. "Fundamental Sources of Health Inequalities." In *Policy Challenges in Modern Health Care*, edited by D. Mechanic, L. Rogut, D. Colby, and J. Knickman. New Brunswick, N.J.: Rutgers University Press.
- Link, Bruce G., Jo C. Phelan, Richard Miech, and Emily Leckman. 2003. "The Resources That Matter: Fundamental Social Causes of Health Disparities and the Challenge of Intelligence." Presentation at the annual meetings of the American Sociological Association, Atlanta, August.
- Loring, Marti, and Brian Powell. 1988. "Gender, Race, and DSM-III: A Study of the Objectivity of Psychiatric Diagnostic Behavior." *Journal of Health and Social Behaviour* 29:1–22.
- Maxim, Paul S. 1999. *Quantitative Research Methods in the Social Sciences*. Oxford: Oxford University Press.
- McCall, Leslie. 2001. "Sources of Racial Wage Inequality in Metropolitan Labor Markets: Racial, Ethnic, and Gender Differences." *American Sociological Review* 66 (4): 520–41.
- McKinlay, John B., Ting Lin, Karen Freund, and Mark Moskowitz. 2002. "The Unexpected Influence of Physician Attributes on Clinical Decisions: Results of an Experiment." *Journal of Health and Social Behavior* 43:92–106.
- McKinlay, John B., and Lisa D. Marceau. 2001. "Third Generation Studies of the Doctor-Patient Relationship: Macro Determinants of Micro Processes." Paper presented at the annual meetings of the American Sociological Association, Anaheim, Calif., August.
- Mechanic, David. 2000. "Rediscovering the Social Determinants of Health." *Health Affairs* 19:269–76.
- Mellor, Jennifer M., and Jeffrey Milyo. 2001. "Reexamining the Evidence of an Ecological Association between Income Inequality and Health." *Journal of Health Politics, Policy, and Law* 26:487–522.
- Midanik, Lorraine T., Arthur L. Klatsky, and Mary Anne Armstrong. 1990. "Changes in Drinking Behavior: Demographic, Psychosocial, and Biomedical Factors." *International Journal of the Addictions* 25:599–619.
- Middlekoop, Barend J. C., Hein W. A. Struben, Irene Burger, and Johanna M. Vroom-Jongerden. 2001. "Urban Cause-Specific Socioeconomic Mortality Differences: Which Causes of Death Contribute Most?" *International Journal of Epidemiology* 30:240–47.
- Mirowsky, John, and Catherine E. Ross. 1998. "Education, Personal Control, Lifestyle, and Health: A Human Capital Hypothesis." *Research on Aging* 20:415–19.
- Mirowsky, John, Catherine E. Ross, and John Reynolds. 2000. "Links between Social Status and Health Status." Pp. 47–67 in *Handbook of Medical Sociology*, 5th ed., edited by C. E. Bird, P. Conrad, and A. M. Fremont. Upper Saddle River, N.J.: Prentice-Hall.
- Mokdad, Ali H., Earl S. Ford, Barbara A. Bowman, David E. Nelson, Michael M. Engelgau, Frank Vinicor, and James S. Marks. 2000. "Diabetes Trends in the U.S.: 1990–1998." *Diabetes Care* 23:1278–83.
- Muhlhauser, I., H. Overmann, R. Bender, V. Jorgens, and M. Berger. 2000. "Predictors of Mortality and End-Stage Diabetic Complications in Patients with Type I Diabetes Mellitus on Intensified Insulin Therapy." *Diabetic Medicine* 17:727–34.

Fundamental Causality

- Mulatu, Mesfin Samuel, and Carmi Schooler. 2002. "Causal Connections between Socio-economic Status and Health: Reciprocal Effects and Mediating Mechanisms." *Journal of Health and Social Behavior* 43:22–41.
- National Research Council. 2000. *The Aging Mind: Opportunities in Cognitive Research*. Washington, D.C.: National Academy Press.
- . 2001. *New Horizons in Health: An Integrative Approach*. Washington, D.C.: National Academy Press.
- Nicolucci, Antonio, Fabrizio Carinci, and Antonio Ciampi. 1998. "Stratifying Patients at Risk of Diabetic Complications." *Diabetes Care* 21:1439–44.
- Oliver, Melvin L., and Thomas M. Shapiro. 1995. *Black Wealth/White Wealth*. New York: Routledge.
- Pappas, Gregory, Susan Queen, Wilbur Hadden, and Gail Fisher. 1993. "The Increasing Disparity in Mortality between Socioeconomic Groups in the United States." *New England Journal of Medicine* 329:103–9.
- Parsons, Talcott. 1951. *The Social System*. New York: Free Press of Glencoe.
- Pastor, P. N., D. M. Makuc, C. Reuben, and H. Xia. 2002. "Chartbook on Trends in the Health of Americans." Hyattsville, Md.: National Center for Health Statistics.
- Phelan, Jo C., Bruce G. Link, Ana Diez-Roux, Ichiro Kawachi, and Bruce Levin. 2004. "'Fundamental Causes' of Social Inequalities in Mortality: A Test of the Theory." *Journal of Health and Social Behavior* 45 (3): 265–85.
- Pickering, Andrew. 1993. "The Mangle of Practice: Agency and Emergence in the Sociology of Science." *American Journal of Sociology* 99:559–89.
- . 1995. *The Mangle of Practice: Time, Agency, and Science*. Chicago: University of Chicago Press.
- Raftery, Adrian E., and Michael Hout. 1993. "Maximally Maintained Inequality: Expansion, Reform and Opportunity in Irish Education, 1921–1975." *Sociology of Education* 66:41–62.
- Robert, Stephanie A., and James S. House. 1994. "Socioeconomic Status and Health across the Life Course." Pp. 253–74 in *Aging and Quality of Life*, edited by R. P. Abeles, H. C. Gift, and M. G. Ory. New York: Springer.
- . 2000. "Socioeconomic Inequalities in Health: An Enduring Sociological Problem." Pp. 79–97 in *Handbook of Medical Sociology*, 5th ed., edited by C. E. Bird, P. Conrad, and A. M. Fremont. Upper Saddle River, N.J.: Prentice-Hall.
- Roter, Debra L., Judith A. Hall, Rolande Merisca, Beth Nordstrom, Deborah Certin, and Bonnie Svarstad. 1998. "Effectiveness of Interventions to Improve Patient Compliance: A Meta-Analysis." *Medical Care* 36 (8): 1138–61.
- Rothman, Kenneth. 1986. *Modern Epidemiology*. Boston: Little, Brown, and Company.
- Sampson, Robert J., Jeffrey D. Morenoff, and Thomas Gannon-Rowley. 2002. "Assessing 'Neighborhood Effects': Social Processes and New Directions in Research." *Annual Review of Sociology* 28:443–78.
- Senécal, Caroline, Arie Nouwen, and David White. 2000. "Motivation and Dietary Self-Care in Adults with Diabetes: Are Self-Efficacy and Autonomous Self-Regulation Complementary or Competing Constructs?" *Health Psychology* 19 (5): 452–57.
- Shea, Steven, Aryeh D. Stein, Charles E. Basch, Rafael Lantingue, Christopher Maylahn, David S. Strogatz, and Lloyd Novick. 1991. "Independent Associations of Educational Attainment and Ethnicity with Behavioral Risk Factors for Cardiovascular Disease." *American Journal of Epidemiology* 134:567–82.
- Smith, Delia E., Christine M. Heckenmeyer, Polly P. Kratt, and Dehryl A. Mason. 1997. "Motivational Interviewing to Improve Adherence in a Behavioral Weight-Control Program for Older Obese Patients with NIDDM: A Pilot Study." *Diabetes Care* 20 (1): 52–54.
- Smith, George Davey, James D. Neaton, Deborah Wentworth, Rose Stamier, and Jeremiah Stamier. 1998. "Mortality Differences between Black and White Men in

American Journal of Sociology

- the USA: Contribution of Income and Other Risk Factors among Men Screened for the MRFIT." *The Lancet* 351:934–39.
- Stinchcombe, Arthur L. 1968. *Constructing Social Theories*. Chicago: University of Chicago Press.
- Strauss, Anselm, and Juliet Corbin. 1990. *Basics of Qualitative Research: Grounded Theory Procedures and Techniques*. Newbury Park, Calif.: Sage.
- Svarstad, Bonnie L. 1986. "Patient-Practitioner Relationships and Compliance with Prescribed Medical Regimens." Pp. 438–59 in *Applications of Social Science to Clinical Medicine and Health Policy*, edited by L. Aiken and D. Mechanic. New Brunswick, N.J.: Rutgers University Press.
- Swallen, Karen, and Steve Haas. 2000. "Early Parental Loss, Risk Taking, and Health." Paper presented at the Population Association annual meeting, Los Angeles, March.
- Tang, Mei, Yue Chen, and Daniel Krewski. 2003. "Gender-Related Differences in the Association between Socioeconomic Status and Self-Reported Diabetes." *International Journal of Epidemiology* 32:381–85.
- Thoits, Peggy. 1995. "Stress, Coping, and Social Support Processes: Where Are We? What Next?" *Journal of Health and Social Behavior* extra issue: 53–79.
- Trostle, James A., W. Allen Hauser, and Ida S. Susser. 1983. "The Logic of Noncompliance: Management of Epilepsy from the Patient's Point of View." *Culture, Medicine, and Psychiatry* 7:35–56.
- van Ryn, Michelle, and Jane Burke. 2000. "The Effect of Patient Race and Socioeconomic Status on Physicians' Perceptions of Patients." *Social Science and Medicine* 50:813–28.
- Waitzkin, Howard. 1991. *The Politics of Medical Encounters*. New Haven, Conn.: Yale University Press.
- Weber, Max. (1921) 1968. *Economy and Society*. Translated and edited by Guenther Roth and Claus Wittich. New York: Bedminster Press.
- West, Sheila K., Beatriz Munoz, Ronald Klein, Aimee T. Broman, Rosario Sanchez, Jorge Rodriguez, and Robert Snyder. 2002. "Risk Factors for Type II Diabetes and Diabetic Retinopathy in a Mexican-American Population: Proyecto VER." *American Journal of Ophthalmology* 134:390–98.
- Williams, David R. 1990. "Socioeconomic Differentials in Health: A Review and Redirection." *Social Psychology Quarterly* 53:81–99.
- . 1997. "Race and Health: Basic Questions, Emerging Directions." *Annals of Epidemiology* 7:322–33.
- Williams, David R., and Chiquita Collins. 2001. "Racial Residential Segregation: A Fundamental Cause of Racial Disparities in Health." *Public Health Reports* 116 (5): 404–16.