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Risk and recreancy: Weber, the division of labor, and the rationality of risk perceptions. *William R. Freudenburg.*

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To date, most analyses of risk perceptions have focused on the characteristics of individual perceivers, but given the societal changes that have occurred since the early days of the industrial revolution, there is need for greater attention to the institutions that are responsible for risk management. Risks of death have been dropping significantly for more than a century, but during that time, there has been a dramatic growth of societal interdependence and hence of the potential for recreancy -- the failure of institutional actors to carry out their responsibilities with the degree of vigor necessary to merit the societal trust they enjoy. In the case of facilities for handling nuclear waste, analyses of survey data find that the recreancy perspective explains roughly three times as much variance in levels of concern as do sociodemographic and ideological variables combined. The recreancy concept may also have significant applicability in other contexts involving the potentially problematic performance of specialized responsibilities.

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As James F. Short noted in his Presidential address to the American Sociological Association (1984), risks and their management may have the potential to put the social fabric itself at risk. In growing numbers, sociologists are responding to the importance of this issue, but, in general, sociological attention has tended to be considerably narrower in focus than Short's address. Some sociologists have begun to analyze the probabilities and consequences of risks themselves (e.g., Clarke 1990; Freudenburg 1988, 1992; Perrow 1984), but the majority of sociological work to date has dealt with public perceptions of risks, generally by focusing on the characteristics of individual perceivers. Sociological work on risk perceptions has been growing in sophistication as well as in scope, but this article will argue that there are strong reasons, both theoretically and empirically, to broaden the focus further -- asking not just about the individual perceivers, nor about the risks they perceive, but also about the larger institutional context within which the risks are managed.

This article includes a review of existing social science work on risk and risk perception. The review notes that the accumulating findings are paradoxical in terms of the predominantly psychological and/or economic perspectives employed in much of the literature to date, but that they can be explained readily

in terms of a more sociological insight that Weber offered nearly three-quarters of a century ago. In the interest of demonstrating the robustness of the more sociological perspective, the Weberian insight will be subjected to a set of independent tests -- a pair of quantitative tests employing state-wide surveys from two different states facing proposals that they become host locations for nuclear waste facilities, and a more qualitative test against the accumulated findings of case studies involving incidents of toxic waste contamination and other anthropogenic hazards.

PREVIOUS LITERATURE

This article's perspective will differ substantially from those that have dominated the discourse to date. The earliest social science discussions of risk perceptions were framed almost exclusively in terms chosen by engineers, in part because of the influence of an article by Starr (1969), an engineer who was puzzled that societies tend to spend far less money on certain high-risk activities, such as cigarette smoking, than on others that he considered "objectively safer," such as nuclear power. Using what he called the "revealed preference" method, which relies on the simplistic assumption that societal expenditures can be said to "reveal" the true policy preferences of citizens, Starr calculated that many of the disproportions between expenditures and "true risks" (the latter represented roughly by expected death rates) could be predicted in terms of specifiable risk characteristics, such as the degree to which a risk can be controlled by the individual involved. Starr also helped to fuel a debate about the "irrationality" of risk decisions, especially in the context of nuclear power development, where extremely low estimates of the probabilities of reactor malfunctions were published both by federal agencies (U.S. Nuclear Regulatory Commission 1975) and by individual scientists (see especially Inhaber 1982).

Even today, when the issue of risk perception comes up in the technical community, which it does with increasing frequency, two explanations are commonly voiced. The first, which is probably stated most frequently and is certainly stated most emphatically, is that public reactions commonly reflect a mixture of ignorance and irrationality. One example is provided by Cohen (1985), who argues that, given the low estimated probabilities of nuclear power plant accidents and the high levels of political controversy over the same technology, scientists with moral convictions should be "kicking and screaming ... [about] the needless killing of innocent people" that would result from having too few nuclear power plants. Rejecting nuclear power because of the potential for severe accidents, he continued, "is morally wrong.... If we choose another technology" over nuclear power, "we are killing extra people" (2, emphasis in original).

The second view, associated more with economists than with engineers and other so-called "hard scientists," is that public reactions to controversial installations represent an economically rational, if

understandably selfish, response to facilities and technologies that may constitute locally undesirable land uses, or LULUs (cf. Popper 1981), whatever their level of "objective risk." The focus of this second body of work is not so much on the rationality as on the level of utility, to affected individuals, represented by potentially risky facilities or technologies. One example of this perspective is provided by a recent article, the senior author of which is the former head of the risk program at the National Science Foundation. The article expands on economists' traditional interest "in determining the amount of compensation required to leave individuals indifferent between the status quo and a new situation where less of a commodity can be consumed," examining the "role that providing benefits to a host community (possibly in the form of compensation) can play in improving the chances of siting a facility that is perceived to be potentially dangerous" (Kunreuther & Easterling 1990:252).

Aside from economists, most of the social scientists who have been prominent in studies of risk perception have been psychologists. One of the most influential of the early works on risk perceptions, that of Tversky and Kahneman (1974), appears to have contributed significantly to assumptions about public irrationality (see especially the discussion in Lopes 1989). According to this perspective, members of the general public have a tendency to judge probabilities in terms of heuristics, or judgmental rules of thumb. While such heuristics may be the product of thousands of years of evolutionary selection, they may also be inadequate for dealing with the probabilistic subtleties of a world where it is literally possible to measure some chemicals at concentrations of parts per trillion, or millionths of a part per million. A particularly important example is the "availability heuristic," by which the probability of a phenomenon is judged according to its cognitive availability, or the ease with which examples can be recalled. Such an approach can provide a handy computational short-cut, but it can lead to a significant overemphasis on events that are particularly memorable or dramatic, such as the nuclear explosion at Hiroshima or an especially gruesome murder, while leading to underestimated probabilities for incidents that are less vivid, such as the premature death of a coal miner from black-lung disease or even the less dramatic forms of death by suicide. In general, however, more recent work by psychologists (see, e.g., Fischhoff et al., 1981; Slovic, et al., 1984; Slovic 1987; see also Lopes 1989) tends to challenge the legitimacy of the real-versus-perceived dichotomy implied by some of the early psychological work and still embraced by large numbers of engineers and other technical persons even today.

PARADOXICAL PERCEPTIONS

This last point deserves additional attention. Increasingly, the findings from empirical studies are providing paradoxical with respect to the individualistic theoretical perspectives that have predominated in the past. In particular, a growing number of sociologists and others who have studied general-

population samples have concluded that differences in risk perceptions cannot be explained in terms of differential information levels. Risk perceptions tend to correlate only modestly with sociodemographic attributes (e.g., age, race, gender) but are more strongly related to other personal characteristics, most notably differences in personal values (see, e.g., Dunlap & Olsen 1984; Gould et al., 1988; Mitchell 1984; Rosa & Freudenburg 1984; for a thoughtful review, see Dietz et al., 1989; see also Johnson & Covello 1987; Kraft & Clary 1991; Kasperson 1986; Fiorino 1989).

In addition, a number of sociologists have begun to work directly with groups that have organized resistance to proposed developments. These groups are often described (and dismissed) by facility proponents as "just a bunch of NIMBYs" (short for "not-in-my-back-yarders," or people who are "just" opposed to a facility because it happens to have been slated for their neighborhood). Empirical studies of such groups, however, have tended to describe the groups' members far more favorably (see, e.g., Brown & Mikkelsen 1990; Jasper 1988; Kraus 1989; Kroll-Smith & Couch 1990; Levine 1982). In their study of residents in the infamous Love Canal neighborhood, for example, Fowlkes and Miller (1987) found that homeowners who were concerned about the chemical contamination were actually characterized not by ignorance but by a very active search for information, while homeowners who supported the chemical industry were the ones who, "by their own accounts, were noticeably and -- in many cases --intentionally uninformed" (Fowlkes & Miller 1987:64). In the words of one of the chemical company supporters, "I'd have just moved ... I wouldn't make any noise about it. I'd just sell the house and move ... no, I wouldn't have worried about having somebody else live there ... that's their business" (Fowlkes & Miller 1987:63). One industry supporter provided this explanation for not wishing to see additional information:

I don't feel Hooker has any responsibility for it at all ... I mean, Hooker does do its share as far as industrial waste, but my god, you've got to have it if you want the plant there. You've got to pay the consequences ... if it ever came out that Love Canal was severely polluted and really destroyed the area in which these people were residing, and these physical problems were caused by the chemicals, I mean, there's no saying where this could ever end ... it would probably be best if they never got [the information] out I think the financial consequences could be just devastating. (Fowlkes & Miller 1987:63)

While it would be premature to describe such differential information seeking as universal, it has been encountered repeatedly (see Edelstein 1988; Freudenberg 1984; Krauss 1989; Levine 1982). Brown (1987) has even reported that in a community he studied, a group of citizens became amateur but reasonably skilled epidemiologists in the search for the kinds of answers that relevant health authorities were unable or unwilling to provide. Particularly in studies of technological disasters, in fact, members of citizen groups often report great frustrations in obtaining the credible scientific information they actively

seek (Couch & Kroll-Smith 1985; Kroll-Smith et al., n.d.; Finsterbusch 1989; Levine 1982; see also Freudenburg & Gramling 1992).

RISK PERCEPTION AND THE DIVISION OF LABOR

Because sociological studies to date, in short, have demonstrated repeatedly that ignorance and irrationality are not the significant issues, it may be time to ask why the irrationality question would continue to receive so much attention. One of the reasons, presumably, is that the question continues to be salient to the technical agencies and personnel who control real-world risk management decisions as well as much of the funding for risk perception work (see also Dietz et al., 1989; Freudenburg & Pastor 1992). Another, however, may be that studies have continued to focus on "irrationality" because researchers are only beginning to recognize the existence and the significance, both theoretically and empirically, of theoretical perspectives that are much more sociological. Two topics, in particular, need to be considered more carefully: the nature of "rationality" and the risk-related implications of the societal division of labor.

Rationality

In his lecture on "Science as a Vocation," Weber ([1919] 1946) discussed a question that was evidently a source of confusion for many of his students, as well as for many who were to follow. What does it mean, Weber was asked, to say that we live in a world of "intellectualized rationalization"? Does it mean that we, today ... have a greater knowledge of the conditions of life under which we exist than has an American Indian or a Hottentot? Hardly. Unless he is a physicist, one who rides on the streetcar has no idea how the car happened to get into motion. And he does not need to know. He is satisfied that he may "count" on the behavior of the streetcar, and he orients his conducts according to this expectation; but he knows nothing about what it takes to produce such a car so that it can move. The savage knows incomparably more about his tools. (138-39)

Instead, Weber continues, intellectualization and rationalization mean "the world is disenchanted. One need no longer have recourse to magical means," because "one can, in principle, master all things by calculation."

Division of Labor

Yet the availability of this option "in principle" clearly does not mean that the average individual -- or, indeed, any individual -- will be able to "master all things by calculation." Instead, the expectation is that someone will be performing the necessary calculations, and doing so in a way that others can "count

on." But it may be precisely this expectation that becomes increasingly problematic as the societal division of labor grows more complex.

When Durkheim first called attention to the division of labor, he referred approvingly to what he called "organic solidarity." With increased specialization, he argued, different kinds of people come to need each other just as much as do the different organs of the body; the heart cannot live without the brain or stomach, and neither is the stomach viable on its own. Unlike stomachs, however, humans have the capacity to discern specialized interests that differ from the needs or interests of the collectivity. Durkheim ([1893] 1933) does not directly address the problematic implications of this capacity, arguing instead that "the different parts of the aggregate, because they fill different functions, cannot easily be separated" (149), and asserting that "the division of labor ... more and more, fills the role that was formerly filled by the common conscience" (173).

Yet the filling of functions may not always be so automatic. The very interdependencies of increasingly complex social systems may increase the probability that some key portions of the system -- some "vital organs," to use the Durkheimian metaphor -- cannot be safely counted on. Paradoxically, the very division of labor that permits many of the achievements of advanced industrial societies may also have the potential to become one of the most serious sources of risk and vulnerability.

Figure 1 uses a pair of straightforward indicators to illustrate this point. The past century and a half have seen dramatic decreases in the form of risk that has been the traditional focus of scientific attention, namely the risk of death. According to the data sources having the highest reliability, namely those for whites, the implied annual risk of death in the U.S. has declined from nearly 3% in the early 1800s to less than 1.5% today.

This decline in the traditional form of risk, however, is only part of the story. Aside from the fact that the average life span in any given era is

likely to be seen as what is due to us -- as implied by the very term of life "expectancy" -- the declining risk of death has been accompanied by increasing vulnerability to interdependence. A comparably simple index of interdependence is provided by the second line in Figure 1, which reflects the proportion of the population involved directly in the growing of food. In the early 1800s, over 80% of all U.S. workers were farmers. Though their relative independence and self-sufficiency may have been more a matter of necessity than of romance, a society with more than three-fourths of its citizens involved in farming can safely be seen as one with a relatively low level of interdependence (cf. Gillette 1936:53). Today, by contrast, the proportion of the workforce involved in farming had dropped to less than one-thirtieth of its former level, or to roughly 2%.

RECREANCY

In terms of the traditional ways of thinking about risk within the technical community, Figure 1 does little more than demonstrate that the division of labor is effective -- that technical specialization has helped to permit an increase in life expectancy that is little short of dramatic. The success is part of what has led some observers to ask, with obvious frustration, "What are Americans afraid of? Nothing much, really, except the food they eat, the water they drink, air they breathe, the land they live on, and the energy they use" (Douglas & Wildavsky 1982:10).

As noted above, however, while the reactions may appear paradoxical in terms of past approaches to risk, proponents of those approaches have overlooked some of the key implications of the Weberian insight. Though the increased division of labor has indeed helped to permit a substantial decrease in the risk of death, it has done so at a cost -- a cost of substantially increased vulnerability to the very interdependencies that also make the system work. From a sociological perspective, moreover, those interdependencies may be more problematic than past risk debates suggest.

As Hewitt (1983) notes, even natural disasters can be extremely unsettling; in addition to the physical destruction they cause, they reveal some of the fallibilities in our scientific and technological systems, which otherwise enjoy public support in part because they permit the impression and sometimes the fact of control. Natural forces that overwhelm society's system of technological defenses, as do hurricanes or volcanic eruptions, can be disquieting because they remind us that our immunity from natural disaster is incomplete. According to the Weberian- institutional perspective being suggested here, however, even the most violent of "natural" disasters should not be so disturbing as incidents that suggest to us that our defense system itself is what can no longer "be counted on" (see also Catton 1985; Erikson 1992; Freudenburg & Jones 1991; Molotch 1970; Shapiro 1987, 1990; Slovic 1987).

What is provided by science and the broader intellectualized rationalization of society is not so much infallibility as something far more paradoxical. Our current division of labor permits a level of prosperity, prowess, and even physical health and safety, that is altogether unprecedented. The same division of labor, however, may increase societal vulnerability to cases where duties are not being carried out properly -- whether the "fault" is one of individual actors or of a broader system in which important responsibilities may fall through the institutional cracks.

What are we to call this problem? At first glance, the question appears to be relatively straightforward; the problem essentially has to do with actors or systems failing to carry out responsibilities as expected, and the English language is full of phrases that are more or less interchangeable with "not doing one's job." Upon reflection, however, it becomes evident that our language is short on appropriate terms to denote the set of phenomena being discussed here -- perhaps in part because the need for such words may have been a relatively recent development. Credibility refers to

believability, not to the broader range of behaviors (and failures to "behave") that constitute a failure to perform specialized duties in an appropriate manner. Trust is usually exercised or withheld by those who assess the performance of institutional actors, not by the institutional actors themselves. Trustworthiness would come as close as any common word to the meaning that needs to be conveyed, particularly if we think in terms of the two primary considerations in Barber's discussion of trust relationships (1983) -- technical competence and fiduciary responsibility. For the interests of the society at large to be properly protected, after all, the relevant specialists and institutions need to be both competent and properly reflective of their responsibilities to the broader collectivity. The risks of interdependence include the potential for failings along either dimension, or both. To refer to failings of "trustworthiness," however, is to make such an emotionally laden charge as to divert attention away from the substantive content that needs to be conveyed.

Most of the available phraseology that is less emotion-laden refers to the behaviors of lower-status persons who fail to carry forward their duties with sufficient vigor -- as with insubordination, disobedience, noncompliance, and so forth. When it comes to relatively high-status persons -- and institutions -- the question becomes more challenging. Even if we seek synonyms for trust or, more accurately, trustworthiness, the available terms raise severe problems because of their emotional connotations: There are a number of reasonably dispassionate terms that describe suitable behaviors by individuals (e.g., responsibility, trustworthiness, faithfulness, dependability), but the corresponding terms for the failure to behave suitably carry overtones that are heavily affect-laden or moralistic (e.g., irresponsibility, betrayal of trust, breach of faith, untrustworthiness). The high degree of indignation may indicate the societal significance of the failure to perform specialized duties in a sufficiently trustworthy way. In Webster's New World Thesaurus (Laird 1985), in fact, the primary antonym for reliable is dangerous. Such indignation, however, also makes it difficult to focus on the problems that are created when institutions and systems, as well as individuals, fail to carry out specialized duties in a way that is sufficiently "reliable" or "trustworthy." (Many of the other remaining terms also carry implications that are moralistic or legalistic, as in malpractice and misfeasance.)

In an effort to concentrate on factual rather than emotional implications, while still conveying a meaning that is more specific than "not getting the job done," this article will refer to recreancy, based on the Latin roots re-(back) and credere (to entrust). This usage draws on one of the two dictionary meanings of the term, namely a retrogression or failure to follow through on a duty or trust. It is intended to provide an affectively neutral reference to behaviors of persons and/or of institutions that hold positions of trust, agency, responsibility, or fiduciary or other forms of broadly expected obligations to the collectivity, but that behave in a manner that fails to fulfill the obligations or merit the trust.

As suggested by the above discussion, recreancy can involve failings in either or both of the aspects of trust emphasized by Barber (1983) -- technical competence and fiduciary responsibility -- but the term is also intended to describe cases where the failing is neither a matter of (individual) incompetence nor one of self-interest. Even though the adjectival form, recreant, bears a linguistic family resemblance to the more familiar term miscreant, the intention is to avoid the implication that someone is necessarily an evildoer or villain. For example, as pointed out in Catton's (1985) discussion of an Air New Zealand jet that crashed directly into the side of a mountain because of a series of failures in communication and coordination, or more broadly in Perrow's (1984) discussion of "normal accidents," the complex possibilities of technology and the division of labor make it entirely possible for social activities to lead to disastrous outcomes even when no identifiable human villain can be found. Often, in fact, the most significant failings are not so much those of individuals as of organizations and institutions (see, e.g., Clarke 1990, 1993; Short 1992; Vaughan 1989, 1990), suggesting that for those who object to the term of recreancy, it may be possible to refer instead to institutional failure, although this alternative terminology can convey a meaning that is far less precise. For the purposes of this article, in any case, it is not relevant to know whether or not villainy can be discerned, whether at individual or collective levels; instead, to repeat Weber's words, the key question is simply whether experience shows that the behaviors of specialized individuals and institutions can be counted on.

Empirical Tests

OPERATIONALIZATION

As has been pointed out by the relativist/constructivist school of the sociology of science (see, e.g., Knorr-Cetina 1981; Latour & Woolgar 1986), even what we call "scientific facts" are socially constructed and open to differing interpretations; in operationalizing recreancy, similarly, it is important to recognize the potential for differing or even competing interpretations. Citizens who are affected by a controversial development may or may not be fair judges of recreancy, but comparable concerns could be raised about institutional actors, if only because those actors are likely to have considerable interest in claiming that their own behaviors reflect responsibility and competence. In addition, as noted above, recreancy may pose a sufficient risk for an interdependent society to be a topic of considerable salience. From this perspective, in fact, the repeated complaints about public "irrationality" by scientists and engineers could be seen as efforts to divert attention away from institutional failings, doing so in part by calling into question the legitimacy of citizen concerns about those failings (Freudenburg & Gramling 1992; Freudenburg & Pastor 1992).

Given the potential contentiousness of disagreements over recreant behaviors, in short, the concept is likely to require a variety of approaches to operationalization, rather than a reliance on any one. For purposes of this initial discussion, a pair of complementary approaches will be used; the first incorporates the views of "beholders," namely the broader public, while the second relies on assessments by third-party observers. To lessen the likelihood of strategic misrepresentations, the first approach will draw on two different statewide surveys, each of which has the advantage of representing segments of the public that are "broader" than those that are immediately affected by a given proposal, while not being so broad that a specific, concrete proposal would be largely unknown to the respondents. The second and complementary approach is a response to the claim that it would be preferable to have "objective" measures of institutional performance (if only such measures could be found). In the absence of utopian objectivity, this second approach will be approximated by drawing on existing studies by professional social scientists.

In the interest of comparability, both approaches will focus on the risks involved in the management of nuclear and/or hazardous wastes. To increase the confidence that can be placed in the findings, the data have been drawn from three separate sources: (1) a survey of a midwestern state that has been identified as the potential site for a low-level nuclear waste facility; (2) a survey from a western state that has been identified as a proposed site for a high-level nuclear waste repository; and (3) a set of existing case studies, including the largest known summary of studies of the citizen groups that have emerged in response to hazardous waste contamination, as compiled independently by Finsterbusch (1987, 1988, 1989). Data from the first survey are in my possession, permitting a direct analysis; the second and third data sets are not in my possession, but they include information that is not present in the first survey and that can permit indirect and relatively unobtrusive analyses, based on the results that have been presented in professional articles and technical reports.

TEST 1: DIRECT EXAMINATION OF ATTITUDINAL ITEMS

The first test involves data that were collected as part of the 1989 Nebraska Annual Social Indicators Survey (NASIS), conducted by the Bureau of Sociological Research at the University of Nebraska-Lincoln. Three counties in Nebraska were being considered as potential sites for a nuclear waste facility at the time of this survey, and several questions focused on the proposed facility. The questionnaire also contained the customary sociodemographic background questions and, importantly, three items relating directly to issues of recreancy and trust. These questions involved 753 of the 1889 respondents of the 1989 NASIS interviews; the 753 will constitute the sample to be used in the analyses below.

The first step of analysis is to examine crosstabular results for the one item having the greatest face validity as a measure of concern about a potential nuclear waste repository: "If a low-level radioactive waste facility were located in your county, how concerned would you be?" (extremely, very, somewhat, or not too concerned). Based in part on previous findings (see, e.g., Hamilton 1985; McStay & Dunlap 1983; Freudenburg 1991; Mitchell 1984; Van Liere & Dunlap 1980), the sociodemographic variables considered included educational attainment, income level, sex, age, marital status, the presence of children, rural/urban residence, and the respondent's employment and home ownership status; the ideological variables available from the survey were political party affiliation and self-identified liberalism-conservatism.

Rather than presenting each crosstabular analysis individually, Table 1 presents a summary, focusing on respondents expressing high levels of concern (i.e., those who were "very" or "extremely" concerned); in the interest of manageability, the table reports data only for the categories of the independent variable having the highest and lowest percentages of high-concern people. The five sociodemographic and ideological variables having the strongest effects are shown in the top two panels of the table. As can be seen, several of the variables have effects that fail to reach statistical significance despite the size of the sample, and even some of the larger percentage differences are nonsignificant. As is common for studies involving toxic materials (cf. Hamilton 1985; McStay & Dunlap 1983), the sociodemographic variables achieving the strongest levels of statistical significance are sex and the presence of children, although both variables lead only to small differences in the percentage of respondents expressing high levels of concern. None of the other sociodemographic variables exerted statistically significant effects; the largest percentage differences for other sociodemographic variables are found for age (with 67.7% of the people aged 31 to 40, versus 54.6% of those older than 65, having high levels of concern) and occupational sector (with self-employed farmers expressing the highest levels of concern, and self-employed business people expressing the lowest levels). The items measuring political party affiliation and self-assessed political ideology exert somewhat stronger effects, although there were so few people from this conservative state identifying themselves as "very liberal" (12 of the 753 respondents) that even the 25% difference in concern levels across reported ideologies is not statistically significant. (Among the 120 "liberal" respondents, 78 of them, or 65%, had very/extremely high concern levels. When the liberal and very-liberal categories are combined, 66.7% express the higher concern levels -- a slightly lower proportion than the 67.4% expressing such concern among those who consider themselves "middle of the road.")

By contrast, the findings on the recreancy variables, listed in the bottom panel of Table 1, are significant both substantively and statistically. Among the people having "very high" levels of trust in "current scientific and technical ability to build safe, efficient nuclear waste disposal sites," only 28.9%

expressed high levels of concern, while among those who had "no trust at all" in such technical capacities, fully 91.9% expressed high levels of concern (64.5% were in the "extremely high" category alone). The item measuring "trust in the ability of private enterprise to develop cost-effective, safe disposal sites in the United States" has the weakest effect of the three recreancy variables, albeit one that is still more than twice as strong as any of the sociodemographic variables and nearly twice as strong as the ideology variable; 79% of the people having no trust at all in business, but 35.4% of those having very high levels of trust, describe themselves as having very or extremely high levels of concern. The item on the trustworthiness of "national government agencies to safely administer a system of nuclear waste sites" elicits a finding that is intermediate in strength with respect to the other two recreancy items; 85.1% of the people having no trust at all, but 34.1% of those having high levels of trust in the government, express very or extremely high levels of concern. In short, while the sociodemographic variables tended to exert an influence of 10% to 15% on the expressed levels of concern, even the weakest of the recreancy items shows a difference of more than 40%; the strongest item shows a 63% difference in concern levels between the groups perceiving high and low levels of recreancy.

A colleague who reviewed an earlier draft of this article suggested that the relationships between the "concern" and recreancy items were so strong that the items might in fact be measuring the same concept; to test this possibility, six key items were next subjected to a principal components factor analysis. Based on face validity, three items were selected as potential indicators of concern. The first is the item summarized in Table 1, asking "how concerned" a respondent would be "if a low-level radioactive waste disposal facility were located in your county." The second was an item asking about a very clear behavioral manifestation of concern: "How likely would you be to move out of the community in which you live if a low-level radioactive waste disposal facility were to be located there?" ("very," "somewhat," or "not too likely to move"). The third was an item focusing on the most commonly voiced concern about the facility's implications for the biophysical environment: "If it were to be located in your county, how concerned would you be about its effect on the water supply?" ("extremely," "very," "somewhat," or "not too concerned"). All three of these items were then entered into a six-item factor analysis with the three recreancy items that were used in Table 1. A two-factor solution was hypothesized, and as can be seen from the top panel of Table 2, a clear two-factor solution emerged. After varimax rotation, the three "concern" items loaded at .875, .728, and .848, respectively, on the first factor, which had an eigenvalue of 2.61; none of the three recreancy variables had a loading of as much as .20 on this same factor. Instead, the three recreancy/trustworthiness variables loaded at .795, .829, and .790, respectively, on the second factor, which had an eigenvalue of 1.45; none of the three concern items loaded as heavily as .15 on this second factor. Thus it appears clear that the two sets of variables are successfully measuring two separate constructs.

Given that a multiple-item index can normally be expected to provide more reliable measurements than do individual items, the factor scores from the three concern items were used to construct an overall concern measure, which was then subjected to additional analysis. Because the sociodemographic variables (particularly age) were more likely than the recreancy variables to exhibit nonlinearity, the analysis was conducted using multiple classification analysis (MCA) instead of regression analysis, although this did limit the number of variables that could be included in any one analysis. Table 2 reports the results for the four sociodemographic and ideological factors exerting the strongest influence in multiple classification analyses and for the same recreancy/trust variables that were employed in Table 1. Two sets of results are reported for each of the independent variables; the first line reports the difference in levels of concern between the categories of a given independent variable where the highest and lowest levels of concern were found. These results, and their associated eta values, are presented in raw or bivariate form. The second line presents results that have been "adjusted" for the other variables in a given equation (i.e., either for the other sociodemographic/ideological variables or for the other recreancy/trust variables), with associated beta, F, and significance-level statistics. As can be seen from Table 2, the four sociodemographic/ideological variables, in combination, explain just 6.6% of the variance, compared to more than 24% for the three recreancy variables. Whether in cross-tabular or multiple-classification analyses, in other words, the recreancy measures in this survey exercise much stronger effects than do the sociodemographic and ideological variables that have been the primary focus of past research.

TEST 2: INDIRECT OR UNOBTRUSIVE MEASURES, USING SURVEY DATA

It is still possible, however, that these strong findings could be artifactual reflections either of the unique characteristics of a single state or of the specific ways in which questions were phrased in the NASIS survey. To test this possibility, it is useful to consider a very different type of test, one that (a) draws on two different types of survey measures and that (b) dichotomizes a sample in terms of its dependent variable, support for a facility.

The Nebraska sample did not include any direct yes-no items (e.g., questions about "voting" on the facility) and neither did it include any explicit measures of potential management alternatives. Such items were included, however, in a state-wide survey conducted in Nevada, which contains the only site currently being considered for a high-level nuclear waste repository. While the author of this article has not yet been able to obtain access to the raw data, he did participate in the design of the Nevada questionnaire, and the specific information that has now been included in publicly available documents (see especially Kunreuther et al., 1989) is sufficient to permit the necessary tests.

The information summarized in Table 3 reflects two steps. First, the entire sample was dichotomized in terms of the following item: "If a vote were held today on building a permanent repository, would you vote for locating a repository at ... Yucca Mountain in Nevada, ... [two alternative sites, or] ... none of the above?" Of the 996 Nevada respondents, 24% reported they would have voted for the in-state site; the remaining respondents are coded as opposing the site. Second, both groups of respondents were asked about a series of management options, all of which are summarized in Table 3.

Most of the options mirror the predominantly individualistic and/or economic assumptions that have received the lion's share of attention to date. The options generally involve economic tradeoffs, such as jobs, tax rebates, and community facilities, that have been advocated by policy activists as being likely to improve the public acceptability of the facility. Due in part to the urging of the present author, however, the survey also included one option that reflects the recreancy perspective, or the expectation that a major reason for opposition is the concern that the relevant officials may not prove to be worthy of trust.

As can be seen, Table 3 also supports the recreancy expectation. Only one of the options elicited a marked difference between supporters and opponents, and it is precisely the option that reflects the lowest level of trust, or the highest level of concern over the potential for recreancy. Opponents were much more likely than supporters to describe as "very important" the option of establishing a local committee that "would have the power to shut down the repository if they decided it was unsafe," (79.7% vs. 41.2%; $[[\text{Chi}].\text{sub}.2] = 146.66, 2 \text{ d.f.}, p [\text{is less than}] .001$). The shut-down authority was the second most important of the seven options for opponents of the site, while being the second least important option for supporters.

[TABULAR DATA OMITTED]

[TABULAR DATA OMITTED]

Only on one item were the supporters of the facility at least 5% more likely than the opponents to describe a step as "very" important; the item was one that essentially ignored the potential for recreancy, focusing instead on a form of economic compensation, namely a proposal that the federal government "would start a large high-tech project that would create many new jobs in communities within 100 miles of the repository" (53.9% vs. 38.2%).

TEST 3: OBSERVER ASSESSMENTS OF RECREANCY

Given that both of the tests involving survey data provide clear support for the recreancy perspective, the analysis moves next to a very different type of data, requiring the judgments of outside observers

rather than of the affected populations. The case studies that are most directly comparable to the nuclear waste surveys are those that focus on the victims of toxic waste exposure incidents.

As noted at the outset, the usual assumption in the technical community is that public concerns over toxic waste facilities, or other locally undesirable land uses, will be a reflection either of ignorance/irrationality or of understandable selfishness. This view, moreover, is also reflected in the mass media, where articles focus on "NIMBY Gridlock" (Glaberson 1988) or a purported epidemic of "chemophobia" (Passell 1989a, 1989b). The view that emerges from the case studies is quite different.

To limit the extent to which my own viewpoint might color or distort the selection of cases, it is preferable to use the summaries that have been produced by others. The best available summary of existing studies is provided by Finsterbusch (1988, 1989), who has been able to identify and systematize the findings from 25 case studies of community exposures to toxic wastes. While some of the Finsterbusch findings suggest that institutional actors had exercised at least a degree of care, the overall pattern contains clear indications of recreancy problems. It is worth quoting in detail the five phases of the "common pattern" that emerged from the Finsterbusch (1989) review:

- (1) The predisposal phase was typified by inadequate and minimal regulatory systems governing the disposal and storage of toxic wastes. Where regulatory systems existed they were not strongly enforced.
- (2) In the disposal phase, polluters did not use sound disposal practices even though many of them acted legally and used state-of-the-art disposal methods. Even technically and legally acceptable techniques caused off-property contamination and threatened lives and property.
- (3) In the discovery phase, the victims were usually confused and ignorant of the danger they were in.... They complained to authorities and usually received very inadequate responses.
- (4) The reaction phase found victims complaining and demanding actions from the authorities who usually acted slowly, stingily, and inadequately. The victims, therefore, had to organize and escalate their pressure on the authorities to investigate, stop further pollution, decontaminate, and compensate. Their pressure tactics were only partially successful. Meanwhile, polluters continued polluting on average 4.1 years after public discovery of the problem.
- (5) The resolution usually involved the removal of danger (though sometimes with considerable delays) but little removal of the toxins.... Victims usually received little or no compensation. Polluters were never prosecuted, paid few fines, and in the majority of cases paid no compensation to victims. (59-60)

As Finsterbusch takes pains to note, most studies have been done in communities where controversy has emerged, so these findings do not represent all cases of toxic waste management, and they presumably would not include any cases where both administrators and residents expressed satisfaction. Still, in 16 of the 25 cases, the contamination problems were first discovered by citizens, rather than by authorities, and even in the minority of cases where contamination problems were first discovered by relevant authorities,

The most common pattern ... was for the victims to experience a nuisance, ask the government to investigate and solve the problem, receive inadequate and often incompetent government responses, and pressure for a more adequate government action.... A major finding of this study is that citizen activism is generally a response to government inactivity or failure. (Finsterbusch 1989:65, emphasis in original)

To underscore the apparent, "government inactivity or failure" is an important form of recreancy -- and observations similar to those of Finsterbusch are so common throughout the available literature that they could scarcely be said to reflect the biases of any one observer. Levine's study of the citizens at Love Canal, for example, a study which was named for the "Award for Distinguished Contributions" from the American Sociological Association's Section on Environment and Technology, reported that the socially problematic stages of the Love Canal incident began not just with residents suffering from their proximity to the chemicals, but with "the regulations obsolete, and the regulators uninterested" (Levine 1982:11). Other useful illustrations are provided by Clarke (1988); Edelstein (1988); Fowlkes and Miller (1987); Perrow (1984); or Sterling and Arundel (1985).

Discussion

Past studies of risk perceptions have focused almost exclusively on the individual characteristics of the perceivers and on the relatively technical properties of the risks they perceive. This article's findings suggest, however, that past approaches have been inadequate. To understand risks and their management, it is also necessary to consider the societal division of labor and the potential for recreant behavior.

While recreancy involves the performance of actors who occupy positions of societal trust, it is most appropriately measured not in terms of those actors' perceptions, but through the assessments of others who have fewer vested interests in describing the legitimacy of their own actions. This article has presented results that use both of the two obvious approaches, employing assessments both from the broader collectivity and from knowledgeable, outside observers. The findings show that further attention is warranted. At least with respect to the management of nuclear and toxic wastes and their associated risks, both approaches have provided strong support for the significance of recreancy concerns. Whether by using statewide survey data from affected citizens or the publicly available judgments of knowledgeable observers, this article's tests have found the recreancy concept to provide significantly greater explanatory power -- as well as a more sociological approach to explanation -- than do the individualistic approaches that have been common in the past. Perrow's formulation (1984) is that often, "the issue is not risk, but power" (12). The recreancy perspective leads to a slightly different conclusion: The issue may still be risk, but it is at least in part the risk that socially consequential actors will fail to carry out their duties with the full degree of competence and responsibility that their fellow citizens need to expect.

These findings also suggest the need to re-examine the assumption that the only "serious" risks are the ones having immediate implications for physical health. According to this article's Weberian-institutional perspective, we also need to consider the implications for interinstitutional, social health -- for risks to "the social fabric" itself (Short 1984). To build on Weber's own words, future research may need to examine institutional behaviors that provide reason to believe some portion of our increasingly complex and interdependent societal system can no longer be counted on.

FUTURE DIRECTIONS

While the tests in this article can be said to provide a degree of independent verification, there is a need for much more work -- theoretical and methodological as well as empirical. In terms of theoretical development, there is a need for more systematic thought about the kinds of institutional arrangements that are most and least likely to foster recreant behavior, and about the factors that can foster or frustrate

the efforts of recreant officials and organizations to evade the responsibility for their failings. There is also a need to assess the broader implications of recreancy in an increasingly interdependent society.

Methodologically, some of the most obvious areas of need are those that involve reanalyses of a wide range of existing data sets --not just those related to the estimation and management of technological risks -- along with the development of new surveys at the local, regional, national, and cross-national levels. A second and complementary need is for analyses that make use of independent or expert-panel assessments of recreancy, of the associated media coverage, and of the societal impacts that ensue. A third need is for methods to analyze a wider range of social problems and social conflicts, drawing on the recreancy perspective, and attempting to be more nearly comprehensive in considering the perspectives of the relevant social actors, ranging from citizens to corporate and governmental officials. Controversy, by nature, involves at least two sides; in many of the risk-perception debates to date, however, attention has focused predominantly on the images being promulgated by one side -- generally the "official" side (cf. Martin 1989). A more nearly comprehensive approach would need to focus not just on the citizens who are affected, and not just on the organizations that bear official responsibility. It would also need to deal with the ways in which the entire problem or conflict can be shaped by the potential for recreancy; with the fact and/or the perception of recreant behaviors; and with the social reactions that can ensue, both among citizens (ranging from reassurance to outrage) and among officials (ranging from efforts to correct the problem to attempts to cover it up and/or to divert attention away from recreancy and toward other issues, notably the "emotionalism" of the citizen responses -- cf. Freudenburg & Pastor 1992). While such comprehensive approaches hold promise for many areas of analysis, the promise is particularly clear in areas of social life having susceptibility to what Molotch (1970) calls an "accident" -- by his definition, "an occasion in which a miscalculation leads to the breakdown of customary order" (143). This is especially true where an important part of the "customary order" is that responsible parties need to be defined, socially, as acting responsibly. Three such contexts offer ready illustrations.

Protests over Environmental Hazards

The stereotypical image of an antinuclear activist involves someone who is young, well educated, affluent, perhaps being a student with long hair, and probably being someone with decidedly liberal if not radical leanings. As will be recalled from the Nebraska survey results, however, the levels of concern were actually higher among those who saw themselves as "middle-of-the-roaders" than among self-described "liberals." Elsewhere as well, the "antinuclear activists" who are emerging in communities across the U.S. are proving to be almost the polar opposites of traditional stereotype. Many of them are middle-aged, conservative Republicans, or people who vastly prefer bowling to chess; many are "silent

majority" members who have never before spoken up in public, and who may not even have had much to say when they were called on in their high school classes, years ago. Rather than being radicals in any other sense of the word, they are virtual personifications of middle America. When social movement participants look, sound, believe, and act differently from everyone else, it makes a certain degree of sense to ask what it is about these people that causes them to protest against the system. Ultimately, however, when the protestors come to have as few differences from those around them as do these new antinuclear activists, it may be time to begin asking what it is about the system that would cause such normal people to have such high levels of concern.

Social Impacts of Technological Disasters

At least since the time of Erikson's (1976) study of the flood at Buffalo Creek, West Virginia, sociologists have devoted growing attention to the ways in which anthropogenic disasters differ from those having "natural" origins. A set of recent articles (Couch & Kroll-Smith 1985; Kroll-Smith & Couch 1989; Kroll-Smith et al., n.d.; Freudenburg & Jones 1991) have summarized some of the key sociological differences. While preliminary indications have been available for several decades (Bucher 1957; but see Drabek & Quarantelli 1967), recent discussions have more clearly identified the significance of recreancy considerations. Traditional or natural disasters have generally been followed with the emergence of a "therapeutic community" and with official actions that tend to reflect community expectations, helping to restore a sense that the system can be trusted. By contrast, anthropogenic incidents -- particularly incidents involving exposure to hazardous wastes -- have more commonly been associated with the emergence of what Freudenburg and Jones (1991) call "corrosive communities." As Kroll-Smith and Couch (1989) note, the consequences include considerable "estrangement" (2), particularly as residents learn that traditional community organizations are unable to provide effective protection from danger. Yet the problem may also be more long-lasting: Responses to natural disasters are often typified by the actions of both citizens and officials that are selfless and even heartwarming, but in a growing number of cases, the responses to anthropogenic hazards seem to be typified by lawyers, who seek to avoid any expression of responsibility on behalf of their clients, and who are often less-likely to assist the victims than to attack them, accusing them of everything from irrationality to a lack of patriotism (cf. Fowlkes & Miller 1987).

Risk-Related Social Movements

Studies of risk-related social movements more broadly, and particularly of the social movements that arise in response to technological risk and/or the perceived failings of government institutions, also appear to deserve renewed examination. Perhaps the most relevant overview is the summary provided by Freudenberg (1984), who surveyed 110 community groups that were involved in environmental health issues. Roughly half of the representatives who responded to Freudenberg's survey reported that exposures to environmental hazards had caused health problems that they believed to be documented. "Nearly half (46%) [of] the groups were formed because concerned citizens became alarmed or angry about a suspected health hazard.... After identifying the hazard, the next activity of the groups was to investigate it.... Nearly nine out of every ten groups (88%) perceived obstacles to obtaining information. Almost half (45%) claimed that government agencies blocked their learning process" (445). It may prove instructive to inquire into the degree to which such experiences may also typify other kinds of social movements.

In each of these three areas, and in others as well, the Weberian insight can help us to understand the societal division of labor, and rationality, in a new way. Weber's "intellectualized rationalization" has led to an apparent increase of control over many of the unpredictabilities of nature, but the trade-offs have included an increased vulnerability to failings that are human and institutional. Technological progress may have provided the solutions to many of the scourges of the centuries, but it may have done so at the cost of introducing new scourges of its own; if the division of labor has helped us in overcoming many of the oldest risks of society, it may have done so in part at the cost of increasing our vulnerability to newer ones. As we enter the twenty-first century, accordingly, the risks of recreancy are ones we can no longer afford to ignore -- if indeed we ever could.

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