

Institutional Trust and Confidence:
A Journey into a Conceptual Quagmire

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What are we to make of the recent explosion of academic research focusing on trust relationships? At the very least, these studies signal that trust plays a number of central roles in the civic culture. For example, trust seems to influence how individuals perceive technological risks (Flynn et al., 1992); it appears to catalyze regional economic development (Putnam, 1993); it likely provides a “lubricant” for interactions within organizations (Meyerson et al., 1996); and it probably is linked to the level of political legitimacy enjoyed by democratic regimes (Inglehart, 1990). But, at the same time, the notion of trust comes in so many flavors, packages, and subspecies that it seems to have been swallowed up in a conceptual quagmire. Scholars have presented us with “calculus-based trust,” “knowledge-based trust,” and “identification-based trust” (Lewicki and Bunker, 1996). They have argued about “characteristic-based trust,” “process-based trust,” and “institutional-based trust” (Zucker, 1986).

For researchers, these conceptual puzzles and mysteries are challenging and stimulating, offering as they do an almost endless supply of grist for contemplation, speculation, and conjecture. But for me, an academic turned practitioner, this intellectual quagmire makes it hard, if not impossible, to respond persuasively to policymakers’ simple, yet quite pragmatic, requests for help: “What can I do to increase the public’s trust and confidence in my agency? What changes in organizational behavior must I institutionalize to make a difference over the long-term? Given limited resources, which of those changes ought I try hardest to secure?”

Elsewhere I have tried to provide some answers to those questions for the particular case of the Department of Energy (DOE) and its management of radioactive wastes generated by commercial reactors and by the production of nuclear weapons (SEAB, 1993). In this chapter, I would like to take a very modest first step in exploring a much larger question – whether those prescriptions might be generalized and applied to other situations and circumstances. To do so, I shall address the following issue: what meaning can be attached to an individual’s assertion that she has trust and confidence in a particular institution? I conclude that trust is not a complex and multifaceted concept. Rather it is quite simple, depending on two distinctly different components or dimensions: (1) a tightly interconnected and intertwined set of affective beliefs

about institutional behavior and (2) how competent the institution appears to be. I then investigate the implications of this finding for two recent analyses of trust. This chapter ends with some thoughts on the challenges policymakers face in restoring public trust and confidence.

GIVING MEANING TO TRUST AND CONFIDENCE

In the corpus of research just alluded to as well as many other works, it is striking just how often “trust” is either an undefined term or a term defined using concepts that circle the reader back to the notion of trust. Indeed attempting to attach meaning to trust conjures up former Justice Potter Stewart’s oft-quoted reference to pornography – it is something that cannot be defined precisely but one knows it when one sees it. Settling on a common definition may, of course, be premature, given the notion’s richness and reach. But the fuzziness that unfortunately surrounds the concept does impede efforts to make claims either about its antecedents or its consequences.¹ Nevertheless, despite the poorly delineated ground where terminological assertions become blurred with empirical propositions, a set of proto-hypotheses have been advanced that attempt to imbue with meaning the notion of institutional trust and confidence. I will attempt to summarize them briefly.

- *Trust and confidence is related to whether an institution is seen as being open and forthcoming.* Ouchi (1981) details the prominent role that trust plays in the functioning of Theory Z organizations, especially with respect to maintaining openness. Based on the discussions held in a focus group that was evaluating the DOE’s proposed radioactive waste repository in Nevada, Mushkatel and his colleagues (1992) report a close connection between trust and openness.
- *Trust and confidence is related to whether an institution is seen as being reliable and consistent in its actions.* Trust carries an element of risk; those who trust have to be willing to be vulnerable to other individuals’ (or institutions’) actions.² The more those actions are seen as predictable, the less the risk and the greater the willingness to trust. McGregor (1967:164) puts it most directly, “Inconsistencies between words and actions decrease trust.”
- *Trust and confidence is related to whether an institution is seen as having integrity and being honest.* Slovic (1993) identifies events that are quite likely to decrease trust in those running a hypothetical large nuclear power plant. Of the six

events most destructive of trust, three involved a lack of integrity and dishonesty: officials lying to government, covering up problems, and falsifying records.

- *Trust and confidence is related to whether an institution is seen as being credible.* Although Renn and Levine (1991) believes that credibility followed from trust, other students of the subject suggest that the causal arrow is reversed. For example, economic studies that are not subjected to rigorous peer review may be viewed as self-serving rather than credible. An institution that appears to have a history of such behavior is less likely to be trusted. Fromer and colleagues (1995), for example, use credibility to understand public reactions to the transportation of nuclear waste.
- *Trust and confidence is related to whether an institution is seen as being fair.* One party will be more likely to trust another if it believes that it will not be unfairly taken advantage of (Bromiley and Cummings, 1993).
- *Trust and confidence is related to whether an institution is seen as being caring and concerned.* The assessment of political institutions, which depends on the trust of the electorate, is, in part, based on their concern for the broad “public” interest (March and Olsen, 1989).
- *Trust and confidence is related to whether an institution is seen as being competent.* Gabarro (1987) and Kirkpatrick and Locke (1991) observe how the trust relationship between managers and subordinates depends on perceptions of competence. Sako (1992) relates how buyer organizations will often forego quality inspections once they become convinced of suppliers’ competence.

These propositions clearly specify what at least some researchers believe to be the *core elements* of trust and confidence. Unfortunately none of those investigators have subjected their claims to an especially rigorous empirical test. We are therefore at a loss to know whether the elements are linked *in fact* to some relatively valid measure of trust and confidence.

Furthermore we do not know how or even if the elements are related structurally to each other. The next section of this paper will address both of those issues.

DATA AND METHODOLOGY

In 1990, Secretary of Energy James D Watkins established a task force³ to provide him with advice on steps the Department of Energy might take to increase public trust and confidence in its programs for managing radioactive waste generated by commercial reactors and

by efforts to produce nuclear weapons (SEAB, 1993).⁴ Among the activities undertaken by the task force was the development of a survey to measure attitudes relevant to trust held by those who had a demonstrated interest in or who were affected by those programs. The survey was first administered in 1992 to a group of 351 respondents. Succeeding Watkins in 1993, Secretary of Energy Hazel R O’Leary decided to use the survey to measure the Department’s progress in establishing public trust and confidence. The survey was therefore readministered in 1994 to 452 respondents.⁵ (Details about the design and administration of the survey appear in the appendix to this chapter.)

What distinguishes this survey from many, if not most, other studies of institutional trust is that all respondents had to pass a threshold test of *actual involvement* with the DOE; they had to interact in some fashion with the Department or its contractors at least an average of one hour per week over the course of a year.⁶ Thus, when they were asked questions having to do with trust and confidence in the DOE, individuals’ answers were less likely to be labile, spur-of-the-moment responses and more likely to reflect relatively well-established attitudes. Moreover, for a sizable fraction of those interviewed, their relationship with the DOE was a significant element of their professional lives; consequently their answers were grounded in substantial and direct experience and in a relatively high degree of knowledge about the complex work taking place at the agency.

Whenever possible, questions (items) that had been well validated were incorporated into the survey. For example, the key dependent variable, trust and confidence, was measured using a question that had been included in various Gallup polls for nearly a quarter of a century:⁷

“I am going to read you a list of institutions in American society. Would you tell me how much confidence you, yourself, have in each one — a great deal, quite a lot, some, or little...?”

- *US military*
- *Nuclear Regulatory Commission*
- *Organized religion*
- *Department of Energy field offices*

- *Banks*
- *National Academy of Sciences*
- *Department of Energy headquarters*
- *Environmental Protection Agency*
- *Nuclear power industry*
- *Congress*
- *Department of Energy contractors*
- *News media*
- *National environmental groups*
- *Electric utilities.*”

One important issue had to be addressed when first analyzing data from these items: do those interviewed evaluate the three organizational units of the Department of Energy – headquarters, field offices, and private-sector contractors – in a common fashion? The answer, it turns out, was clearly yes. The level of trust accorded one unit correlated very highly with the level of trust accorded another unit.⁸ Moreover, although a factor analysis of responses to all 14 institutions sorted them into three distinct groups,⁹ each of the units of the Department of Energy fell into only *one* of them.¹⁰ Supported by these findings, a Likert scale was constructed using the respondents’ perceptions of trust for all three units. This scale, which I shall call DOEPTC, represents public trust and confidence in the Department of Energy as a whole.

Developing items to measure the core elements of trust and confidence was not nearly as straightforward. None of the relevant studies furnished specific wording for items that could be used. Thus an effort had to be undertaken from scratch to construct questions that had at least *face validity*. Discussions were held with many of the researchers in this field.¹¹ Then different wordings were reviewed by small focus groups composed of individuals similar to those who might be asked to participate in the survey. Nineteen items were finally adopted and included in a much larger questionnaire. They are grouped by the element of trust and confidence they attempt to measure and are presented below.¹²

“Do you strongly agree, somewhat agree, somewhat disagree, strongly disagree that the Department of Energy...?”

[Openness]

- Provides all relevant unclassified information to the public*
- Does not explain the reasons for the decisions it makes*
- Tells the whole truth about important activities*

[Reliability]

- Does not take its commitments seriously enough*
- Changes policies without good reason*
- Tries hard to keep its promises*

[Integrity]

- Takes actions that are consistent with its words*
- Rarely acknowledges the mistakes it has made*
- Pursues relevant studies even if the research may call into question some aspects of a program*
- Is too influenced by politics*

[Credibility]

- Ignores the views of scientists who disagree with them*
- Has difficulty explaining its studies before independent peer review panels*
- Distorts the facts to make its case*

[Fairness]

- Is committed to impartial process for making decisions*
- Makes a good faith effort to treat everyone even-handedly*

[Caring]

- Can be counted on to do the right thing*
- Does not listen to concerns raised by people like you*

[Competence]

- Has the necessary skills to carry out its job*
- Is generally staffed by first class scientists and engineers.”*

An exploratory factor analysis on these items was performed on the data from the 1992 survey. Three factors or components, which accounted for nearly 62% of the total variance, were extracted employing the principal components technique followed by a varimax rotation.¹³ But only one item, “too influenced by politics,” loaded at a level of greater than 0.600 on one of

the factors. Its correlation with DOEPTC, moreover, was the lowest of any of the 19 items, just 0.252 in 1992 and 0.170 in 1994. For these two reasons, the item was eliminated from any further analysis.

A second exploratory factor analysis was carried out with the remaining 18 items using the 1992 data set once again.¹⁴ This time just two components, which accounted for over 59% of the total variance, emerged.¹⁵ To demonstrate that this simpler factor structure was more than a statistical artifact, a confirmatory factor analysis was performed on the 1994 data set. As before, just two components, which accounted for 54% of the total variance, emerged. The items' loadings on each component and their correlations with DOEPTC are presented in Table 1.

THE STRUCTURE OF INSTITUTIONAL TRUST AND CONFIDENCE

The interpretation of the results of the 1992 data analysis is unambiguous. The 16 items that tapped what might be called the *affective elements* – openness, reliability, integrity, credibility, fairness, and caring – only fell along the first component. The two items that spoke to *institutional competence* fell along the second.¹⁶

The findings using the 1994 data set are not quite as clear cut. Compared to the earlier data, the loadings of the items that fell along the first, affective, component were somewhat lower overall, while the corresponding loadings on the second, competence, component were somewhat higher. One item that fell along the affective component in the 1992 data set – “pursues relevant studies” – clearly fell on the competence component in 1994. These structural shifts however are not unexpected. Investigators who routinely deal with this kind of data, such as survey researchers and psychological test designers, are very familiar with the truism that drawing meaning from factor analyses is more often an art than a science.

Yet in this instance, one does not have to be a Picasso or even a Wyeth: a very strong case can be made that the *underlying structure of attitudes and beliefs* about trust and confidence is virtually the same in 1994 as it was in 1992. Out of the 16 items that clearly fell along the

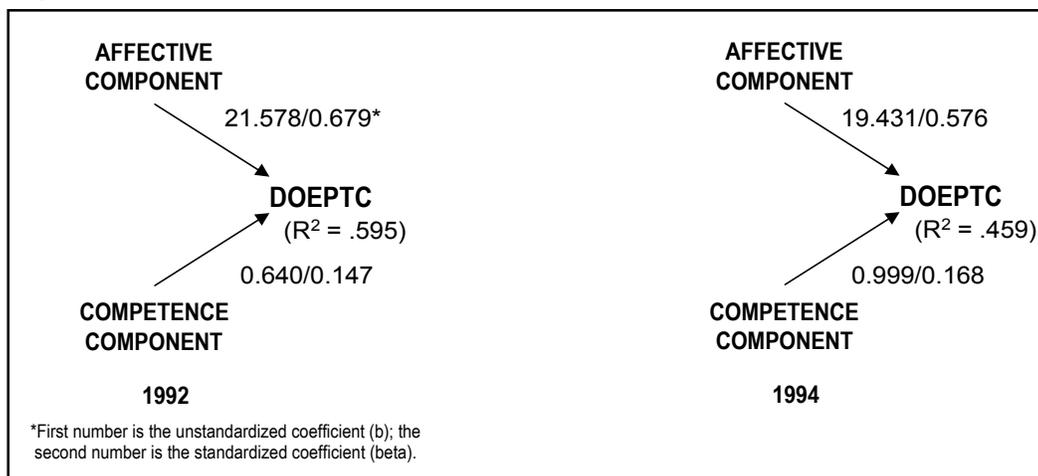
Table 1: The components of trust and confidence

ELEMENTS OF TRUST AND CONFIDENCE	COMPONENTS 1992		COMPONENTS 1994		CORRELATION WITH DOEPTC	
	1	2	1	2	1992	1994
<i>Openness</i>						
Provides all relevant unclassified information	.687	.284	.671	.194	.598	.482
Does not explain reasons for the decisions it makes	-.738	-.019	-.702	-.204	-.502	-.404
Tells the whole truth about important activities	.751	.311	.742	.218	.680	.543
<i>Reliability</i>						
Does not takes its commitments seriously enough	-.632	-.342	-.627	-.246	-.526	-.423
Changes policy without good reason	-.709	-.208	-.588	-.282	-.549	-.448
Tries hard to keep its promises	.719	.363	.574	.485	.629	.467
<i>Integrity</i>						
Takes actions that are consistent with its words	.708	.383	.658	.460	.614	.597
Rarely acknowledges mistakes it has made	-.575	-.312	-.630	-.071	-.533	-.396
Pursues relevant studies even though the research may call into question some programs	.588	.308	.347	.507	.531	.384
<i>Credibility</i>						
Ignores the views of scientists who disagree with them	-.723	-.279	-.670	-.226	-.579	-.487
Has difficulty explaining its studies before independent peer review panels	-.596	-.110	-.640	-.124	-.385	-.473
Distorts the facts to make its case	-.777	-.268	-.726	-.281	-.636	-.539
<i>Fairness</i>						
Is committed to an impartial process of decision making	.736	.249	.593	.448	.676	.475
Makes a good faith effort to treat everyone even-handedly	.710	.384	.630	.390	.653	.543
<i>Caring</i>						
Can be counted on to do the right thing	.714	.395	.639	.453	.735	.613
Does not listen to concerns raised by people like you	-.718	-.225	-.714	-.339	-.524	-.545
<i>Competence</i>						
Has necessary skills to carry out the job	.214	.847	.197	.780	.471	.479
Is generally staffed by first class scientists and engineers	.231	.816	.083	.823	.468	.334

affective component based on the analysis of the first data set, all but four clearly fell along it based on the analysis of the second data set. And three out of those four were just barely lower than the 0.600 conventional cut-off level for inclusion in a particular component.

The strong congruence between the 1992 and 1994 results is further reinforced when the relationship between the two components and the constructed variable DOEPTC is examined. Using factor scores to weigh the contribution of each item to the underlying component, scales measuring affect and competence were built. The results of regressing the component scales against DOEPTC are presented in Figure 1. In each year, the affective component had roughly four times the impact of the competence component in predicting DOEPTC.

Figure 1: Relationship between the two components and DOEPTC



COMPARISON WITH OTHER RECENT ANALYSES

These findings suggest that some central claims about institutional trust and confidence may have to be reconsidered. In particular, they present the strongest evidence for revising the conventional wisdom about the number and meaning of the components or *dimensions* that constitute trust. These findings also speak, albeit less definitively, to the role values play in engendering trust.

The Dimensionality of Trust

Over the past two decades, scholars have speculated on and tried to discover the number and the meaning of the components or dimensions embedded within the notion of trust. Barber (1983) was the first to posit a two-dimensional concept: the expectation of technical competence and the expectation that fiduciary responsibilities will be fulfilled. Many of those cited above supplemented Barber's concept with new shades of meaning. Mushkatel and his colleagues (1992), for instance, contend that trust may have as many as seven distinct dimensions. Still others sought to investigate the question empirically. Butler (1991) summarizes a number of such studies, some of which claim that trust has as many as four dimensions. Butler's own research leads him to conclude that there are ten dimensions. Mishra (1996) argues that there are four dimensions.¹⁷

A study by Peters and his colleagues (1997) most directly challenges the findings of this chapter. Based on surveys examining public knowledge and perceptions of chemical risk in six communities, they hypothesize and claim to demonstrate that "perceptions of trust and credibility" in a number of institutions are dependent on three factors: perceptions of knowledge and expertise, perceptions of openness and honesty, and perceptions of concern and caring. This work, however, suffers from significant conceptual and methodological flaws.

Some of the conceptual problems are evident in the way the hypothesis is framed. Notions that are at least arguably distinct – trust and credibility, openness and honesty, and concern and care – are merged. This conceptual fuzziness extends to the construction of the single item used to measure each of the key dependent and independent variables.¹⁸ In particular, the respondents are asked to evaluate trust but not credibility, openness but not honesty, and concern but not caring.

The methodological problems however are more troubling. Rather than using a statistical approach that is designed to reveal dimensionality, such as factor analysis, Peters and his colleagues opt for linear regression. They justify the choice of this technique by asserting that the intercorrelation among the independent variables is too small to introduce biases caused by

multicollinearity.¹⁹ Although it is true that, under conditions of perfect multicollinearity, the relevant independent variables almost certainly will fall along the same dimension, the contrapositive does not necessarily hold true.²⁰ Put more simply, Peters and his colleagues used the wrong tool to substantiate their claims.

In contrast, the analysis reported here seems quite robust even though it would be reckless to propose that these findings hold for all populations that might be surveyed or for all other institutions. Nevertheless the analysis does suggest that, rather than being a richly complex and multidimensional notion, trust may be actually quite simple and two-dimensional. The competence component is identical with Barber's first element of trust. But the affective component is different than and not as straightforward as fiduciary responsibility. In fact, wrapped up in the affective component are a wide variety of highly correlated attitudes and beliefs. They resist separation statistically. The more one thinks about these affective elements, the clearer it becomes that they are also conceptually difficult to separate as they are constantly rubbing up against each other across vague and diffuse boundaries. At the end of this essay, I discuss the implications for policymakers of this circumstance.

What about Values?

In a major research effort, Earle and Cvetkovich (1995;1997) explicate what is essentially a normative theory of social relations. They look to supplant pluralist society with a cosmopolitan one, thereby attenuating the cleavages that now divide groups. This transition is facilitated by social trust. In the course of explicating their ideas, they advance very different claims about the underpinnings of trust and confidence.²¹ In their view, basing trust and confidence either on some perceived level of institutional competence or on affective reactions to specific institutional behaviors is cognitively too demanding. Instead they contend that what counts is whether there are *shared values* between the "truster" and the "trustee." They consider as especially powerful the cultural values associated with Douglas and Wildavsky's (1982) ideal types, the hierarchist, individualist, and egalitarian.

How does the perspective Earle and Cvetkovich bring to bear fit with earlier research on institutional trust? Their empirical investigations provide some indirect, but not full, support for their claims. And because their book was published several years after the SEAB survey was developed, data unfortunately could not be collected that might inform this issue with a high degree of methodological and theoretical precision and rigor. But fortuitously two questions were included in both the 1992 and 1994 surveys:

*“Based on your experience in dealing with the Department of Energy on issues related to the management of radioactive wastes, please tell me whether you strongly agree, somewhat agree, somewhat disagree, or strongly disagree with the statement that the DOE has **lately become more sensitive** to the environmental consequences of its actions?” [no emphasis in questionnaire]*

*“Would you say that, **over the last four years**, your level of trust and confidence in the way the Department of Energy deals with the management of radioactive wastes has greatly increased, somewhat increased, stayed about the same, somewhat decreased, or greatly decreased?” [no emphasis in questionnaire]*

Because of a natural experiment that took place at the DOE, these items may provide a vehicle for at least roughly evaluating claims by Earle and Cvetkovich.

In January 1993, six months after the first round of interviews, President Clinton was inaugurated. Watkins left office, and O’Leary took his place as Secretary of Energy. Joining her were a number of very senior-level appointees drawn from public interest and national environmental groups. Many of those individuals had been prominent critics of the DOE’s radioactive waste management programs. Among the changes that O’Leary promised was renewed attention to compliance with a broad range of environmental laws. When the second round of interviews was conducted in September 1994, O’Leary had been in office for more than 18 months, probably enough time for any mark she might have made to have been felt.

Approximately 20% of the survey respondents were members of public interest and environmental groups. For these individuals, who Douglas and Wildavsky assert are archetypal egalitarians, the item tapping the perception of increased environmental sensitivity

may be a reasonable (unbiased) surrogate or proxy for measuring the degree to which the DOE shares the respondent's commitment to environmental protection. (The logic here is that, because *all* of these respondents are likely to have a strong commitment to environmental protection, the more they see the DOE pursuing such a course, the more they believe that they share important core values with the agency.) In contrast, the rest of the respondents, presumably, are not as *uniformly committed* to the egalitarian value of environmental protection, and therefore the impact of shared values will be attenuated for them. Our faith that the sensitivity item is, in fact, a reasonable surrogate or proxy for shared values will be bolstered if it can be shown that *changes in the level of trust and confidence are more strongly associated with the perception of increased environmental sensitivity for egalitarians than for the rest of the sample.*²²

Using the 1994 data set, Pearsons' correlation between the perception of increased environmental sensitivity and the change in the level of trust and confidence was calculated. For the egalitarians, the association was 0.415; for the rest of the sample, it was 0.216. The difference between the two measures of association appears to be substantively as well as statistically significant.

If one is prepared to accept that, for members of public interest and environmental groups, the sensitivity item can be used as a reasonable surrogate or proxy for shared values, then the Earle and Cvetkovich conjecture can be explored. In particular, their claim will be supported if it can be shown that *the perception of increased environmental sensitivity on the part of the DOE plays a more central role in predicting the absolute level of trust and confidence for egalitarians than for rest of the respondents.*

Using the 1994 data set once again, separate regressions were run for members of public interest and environmental groups and for the rest of the respondents. In each instance, DOEPTC was the dependent variable. The independent variables were shared values (increased environmental sensitivity), the affective component, and the competence component. The results are presented in Table 2.

Table 2: The impact of values in predicting DOEPTC

DEPENDENT VARIABLES	EGALITARIANS		REST OF THE SAMPLE	
	b	β	b	β
Shared values	0.468 [†]	0.201 [†]	0.186 [†]	0.072 [†]
Affective component	9.963	0.377	21.510	0.604
Competence component	1.056	0.209	0.743	0.124
Sample size	77		304	
Multiple R ²	.401		.502	

[†]Not significant at $p < 0.05$

On the surface, it would appear that the regression analyses generally support Earle and Cvetkovich: the unstandardized coefficients (b's) for shared values behave exactly as the two researchers would predict. But the interpretation of these findings is seriously complicated by the fact that the regression coefficient for “shared values” is not statistically significant for egalitarians. I can posit at least three reasons why this result might arise.

- *There is, in fact, no relationship between shared values and DOEPTC.* This explanation would imply that claims by Earle and Cvetkovich are not correct.
- *The sample size is too small to yield a statistically significant estimate.* This explanation would suggest that shared values is not the dominant direct influence in producing DOEPTC. Based on the standardized coefficients (β 's), shared values has about the same impact as the competence component but only about one-half as much as the affective component.
- *The surrogate or proxy for shared values contains too much measurement error.* This explanation leads one to defer making any judgment whatsoever about the arguments advanced by Earle and Cvetkovich.

Although the data do not favor any particular explanation, *none* are especially supportive of the Earle and Cvetkovich thesis.

IMPLICATIONS FOR POLICY AND THEORY

Leaders of major public and private institutions increasingly appear to recognize that trust and confidence is a valuable commodity that can improve internal operations as well as facilitate interactions with actors outside of the organization. Energy Secretary O’Leary, for example, termed it a “critical success factor” in the DOE’s strategic plan (DOE, 1994). For good reason. Trust and confidence legitimates institutions’ activities. The more the DOE was trusted, for example, the more an individual believed that the agency should retain its radioactive waste management functions. (The Pearsons’ correlations were 0.572 in 1993 and 0.457 in 1994.)

But trust is not a panacea that can cure all ills. In particular, it seems to “lubricate” relationships, but it does not lead individuals to accept “good” processes in place of acceptable performance. Two survey items provide some insight into this claim:

“Do you strongly agree, somewhat agree, somewhat disagree, or strongly disagree that...

- *The substance of a decision is more important than the process used to make it.*
- *You would be more likely to accept a decision you did not agree with if you were involved in the process that made it.”*

Pearsons’ correlation between DOEPTC and the first item was just 0.150 in 1992 and 0.115 in 1994. For the second item, the correlations were 0.228 and 0.013 respectively.

Notwithstanding the limits to what trust can accomplish, most governmental policy-makers still ask the question that launched this chapter: what can be done to increase public trust and confidence? O’Leary certainly undertook a number of initiatives designed to achieve that end.²³ But as Slovic (1993) continues to remind us, it is extremely difficult to restore lost trust and confidence.

The survey data seem to confirm this view. With the exception of the item “has difficulty with peer reviews,” the mean value of *every element* belonging to the affective component shows a positive and statistically significant change between 1992 and 1994. The amount of

improvement ranges from a low of about 7% to a high of about 17%. Items such as “provides relevant unclassified data” and “distorts the facts” scored some of the largest gains. In contrast, the mean value of *none of the elements* belonging to the competence component changes over the two year period. Given the rather strong impact – shown in Figure 1 above – that the affective component has on public trust and confidence, one might reasonably expect that there would be more or less a commensurate increase in DOEPTC. Yet the mean value of that measure is virtually the same in 1992 as it was in 1994.

Perhaps one ought not be surprised at this finding since roughly half of the variance in DOEPTC is not accounted for by either the affective or competence components. Nonetheless it is impossible to avoid asking why O’Leary was not more successful? The survey, unfortunately, does not include items that provide a ready or clear explanation. All I can do is to advance two plausible possibilities.

First, the affective and competence components may interact in ways that are not easy to model statistically. There may, for instance, be some threshold that one or the other component must rise above before the level of trust rises. Alternatively each of the tightly interconnected and intertwined elements of the affective component must show improvement at the *individual level* for trust to be recovered. Indeed, the SEAB Task force seem to understand implicitly the potential for some kind of interactive effect between the affective and competence components when it observes (SEAB, 1993:49):

[Our] recommendations are not simply choices on a **menu** – something from Column A can be picked to go along with something from Column B; rather they represent the panel’s **recipe** for what the Department should do to strength public trust and confidence: put another way, they are threads of roughly comparable importance that make up a fabric.

For policymakers, of course, this prescription suggests just how difficult it will be to recover trust.

Second, there may be an important relationship between trust and power. When power is distributed relatively evenly, trust is not essential, particularly when the exchanges take place over short time horizons and involve clear feedback measures. Each party is in a position to protect its interests either in the absence of trust or if the trust relationship breaks down. Ironically, being able to protect ones' interests does seem to make it easier to trust. In the 1992 survey, the Pearsons' correlation between change in the level of trust and a measure of how satisfied the respondent felt about being able to influence the Department of Energy was 0.374. In 1994, it was 0.345.

However when power is distributed unevenly, the trust relationship is more essential for the more dependent and less influential party. Yet maintaining trust is more problematic because the more powerful party may believe that its interests will not be adversely affected if trust breaks down. I suspect that we will not make much further progress in understanding how institutions can maintain and restore trust until we can understand better why those who are weak nevertheless may trust.

APPENDIX: SURVEY DEVELOPMENT AND ADMINISTRATION

QUESTIONNAIRE DESIGN

A working group composed of DOE officials initially specified the types of information they hoped the survey would gather. Focus groups were conducted with members of various stakeholder organizations to get their views on: a) what factors influenced public trust and confidence; b) what measures might be adopted by the Department of Energy to increase trustworthiness; c) how public trust and confidence might be conceptualized; and d) the utility of various mechanisms for public involvement. Researchers from the Social and Economic Sciences Research Center (SESRC) at Washington State University then developed several drafts of a questionnaire. To keep the instrument to a manageable length, the working group selected those questions that were of greatest importance. SESRC sought peer reviews on a preliminary questionnaire from stakeholder groups, academic researchers, and private sector polling experts. The final questionnaire contained a total of 96 items, of which eight were completely open-ended, seven were semi-structured, and the rest were close-ended.

SAMPLE

Stakeholder organizations located throughout the United States who were known to have frequent and direct communication with the DOE or its contractors with regard to the Department's environmental restoration and civilian and defense radioactive waste management programs comprise the population from which a sample was drawn to conduct this study. (Only non-federal and non-contractor organizations were included.)

A data base of stakeholders that was created included 949/1282²⁵ organizational contacts derived from the following sources: a) organizational representatives appearing on Department of Energy Field Office community relations mailing lists; b) organizational representatives who had commented on the Environmental Restoration and Waste Management Programmatic

Environmental Impact Statement; c) organizational representatives who commented on the Environmental Restoration and Waste Management Five-Year Plan; d) a national stakeholder list provided by the Office of Civilian Radioactive Waste Management; and e) names provided by organizational representatives who were either replacements for themselves or additional representatives of their organizations. (In cases where an individual was a representative of two organizations, they were called to ask which one they wanted to be associated with and whether they could provide an alternative or replacement contact for the other organization.)

The data base contained many local government representatives. If possible, the city manager was chosen as the city representative rather than the mayor. Mayors were included if the city manager was unavailable. The chairman of the county commission was chosen as the county representative. If the chairman was unavailable, a member of the county commission was included. One representative was selected from each of the tribal or Native American organizations listed.

SURVEY IMPLEMENTATION

PRIOR LETTER: Each person in the data base was sent a letter announcing the study. This letter explained the purpose of the study and indicated why it was important for respondents to participate. The letter also assured respondents that participation was voluntary and that the information provided would be kept confidential.

INTERVIEW PROCEDURES: Interviewers received four hours of interviewer training and four hours of training on the telephone questionnaire. The average length of interview was 34/32 minutes. The longest interview conducted was 57/60 minutes. Up to 8/5 attempts were made on 8/22 separate days. Approximately half of the calls were placed during morning hours and half in the afternoon for all time zones in the United States. The calling period spanned 24/20 business days and 34/28 calendar days. Respondents were provided with an opportunity to reschedule a call if the contact was at an inconvenient time. They could reschedule any time

during the day or evening and on any day of the week. Altogether 4,535/3,446 phone calls were made during the interview period.

The interviews were conducted out of the Public Opinion Laboratory of the SESRC. The interviewers used the micro-computer assisted telephone interviewing (MATI) software to aid in the telephone interview. This system displays each item on a monitor; the interviewer then can read the questions to the respondent and enter the response directly into a networked personal computer.

RESPONSE RATES: Of the 941/1282 representatives in the data base, 340/444 completed interviews and 11/8 partially completed interviews were conducted. The cooperation rate (the ratio of the number of completed interviews to the number of completed plus refused interviews) was 85.0/91.2%. The completion rate (the ratio of completed interviews to the total number of potential respondents) was 56.4/47.2%. The response rates were affected by both the high ineligibility of respondents (insufficient interaction with the DOE) and by interviewers not being able to reach respondents.

END NOTES

¹As the sociologist C. Wright Mills put it: “When we define a word, we are merely inviting others to use it as we would like it to be used; for the purpose of definition is to focus argument upon fact, and the proper result of good definition is to transform argument over terms into disagreements about facts, and thus open arguments to further inquiry.” (Mills, 1959:14)

²When we can count on someone *doing the opposite* of what he says, we remark ironically, “I can really trust him to do that.”

³The author served as director of that task force.

⁴The United States is not the only country where lack of trust created difficulties for siting and developing nuclear waste repositories. A similar tale, for example, unfolded in the spring of 1997 in the United Kingdom. Nirex, the company charged with the responsibility for managing Britain’s waste, was dealt a major blow when the Secretary for the Environment disapproved a plan to construct an underground laboratory near Sellafield in Cumbria.

Critics of the plan were suspicious that the laboratory would become a “Trojan horse”: once it was built, it would be much harder to stop the construction of a repository at the site. In fact, the former chairman of Britain’s Radioactive Waste Management Advisory stated that before Nirex starts looking for another site it would have to learn “to operate in a transparent manner and be responsive to the need to gain public confidence.” (*Nature*, vol 386, April 3 1997, p. 424.)

⁵Obviously some individuals were interviewed both times. The survey also was administered in 1996, but that data are not yet available.

⁶In addition, the individual could not be employed by the federal government or by a contractor of the DOE.

⁷An alternative item is used by in the Harris Poll and by the National Opinion Research Center: “*As far as the people running [various institutions] are concerned, would you say that you have a great deal of confidence, only some confidence, or hardly any confidence at all in them?*” This formulation was rejected because it personalized trust and confidence and because it appeared biased toward lack of trust and confidence.

⁸In 1992, the associations were: Headquarters/field – 0.644; Headquarters/private-sector contractors – 0.628; and Field/private-sector contractors – 0.539.

⁹Factor analysis is a methodology for assessing whether there is an underlying structure in respondents’ answers to a series of items. In the classical factor analysis model, an item is expressed as a linear combination of underlying common factors or hypothetical constructs. The technique estimates the *coefficients or loadings* of each of the factors. See Harmon, (1967).

¹⁰The principal components technique was employed. Only three factors had eigenvalues greater than one. (This is the convention normally used to pare down the number of factors that will be analyzed further.) In the 1992 data set, the three factors account for nearly 55% of the variance. A varimax rotation yielded these loadings: DOE field offices – 0.798; DOE headquarters – 0.783; DOE contractors – 0.701. In the 1994 data set, the three factors account for nearly 52% of the variance. A varimax rotation yielded these loadings: DOE field offices – 0.744; DOE headquarters – 0.693; DOE contractors – 0.722.

¹¹None of those researchers are responsible, of course, for the final wording of any of the items.

¹²These items were *not* asked in this order.

¹³Their eigenvalues were 9.680, 1.129, and 0.965 respectively. The fourth highest eigenvalue was 0.763.

¹⁴A principal components analysis followed by a varimax rotation was used.

¹⁵Their eigenvalues were 9.570 and 1.027 respectively. The third highest eigenvalue was 0.864.

¹⁶The two items that use “studies” as a vehicle for assessing integrity and credibility – “pursues relevant studies” and “has difficulty explaining studies to independent peer reviewers” – have the lowest loadings on the first component. But it is significant to note that those interviewed still did respond strongly to the affective character of these two items.

¹⁷He further contends that they “combine multiplicatively in determining the overall degree of trust that one party has with respect to a given referent.” I tested this claim using the survey data from both 1992 and 1994 and discovered no support for it. I first estimated a multiplicative model of the affective and competence components. It explained less variance than did a linear model. I then added a multiplicative term to the linear regression and found that its coefficient was not statistically significant.

¹⁸Personal communication to the author from Richard G Peters, October 17, 1997.

¹⁹Quote is from p. 47. In the classical normal linear regression model, it is assumed that none of the independent variables are perfectly correlated with any of the others or with any linear combination of the others. When this assumption is violated, the condition of perfect multicollinearity arises. When the all of the independent variables are uncorrelated with each other, there is complete absence of multicollinearity. Thus multicollinearity is a matter of degree, not kind. If it is too high, the estimates of the regression coefficients will be biased. See Kmenta (1971:380).

²⁰I replicated the analysis reported by Peters and his colleagues using the items and data from the two SEAB surveys. For both years, when knowledge, openness and honesty, and concern and caring were regressed against DOEPTC, statistically significant coefficients were

generated. This result occurred notwithstanding the fact that the last two independent variables were shown to fall along a single dimension. For a more generalized statement of this point, see Kmenta (1971:380-391).

²¹For example, they are strongly critical of both the fundamental premises as well as the prescriptions that were adopted in the report of Watkins' task force (SEAB, 1993).

²²A t-test of means on the environmental sensitivity item indicated no difference at all between the two subsamples. Thus, it would appear that whether or not the individual represented a public interest or environmental group made no difference in how she *perceived* (as opposed to evaluated) the behavior of the DOE.

²³O'Leary's major effort was the so-called Openness Initiative, launched in December, 1993. Through it, she released massive amounts of previously classified information about nuclear weapons testing, the stockpile of fissionable materials, and studies of the effects of exposing often unsuspecting human subjects to radiation. These actions placed her on the front page of national publications such as the *Washington Post* and the *New York Times*. They also put her on the covers of *Time* and *Newsweek*. ABC News chose her to be the "Person of the Week."

²⁴Where two numbers appear in the text, the first refers to the 1992 survey administration and the second refers to the 1994 administration.

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