The Relationship between Desire to Reduce Risks and Factor Scores for Environmental Risks

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Health risks stemming from particular activities or products generate a great deal of concern in U.S. society. One reason that such concern may arise is the great complexity and the many types of uncertainty associated with these risks. Health risks are part of a "package" that includes the type of activity or product that is the source of the risk; the probability distribution that undertaking the activity or consuming the product will lead to a particular level of exposure; the probability distribution that exposure will yield adverse effects; the range of possible adverse effects that might occur; the costs of reducing exposure, reducing the probability that an adverse effect will occur given a level of exposure, and reducing the severity of an adverse effect as it occurs; and the costs associated with learning about each of these aspects. Knowing how members of the public feel about these various aspects of health risks helps regulatory agencies communicate risks more effectively, and helps them design regulations that are both more efficient and more acceptable.

The purpose of this research is to learn about preferences and attitudes toward health risks. Although it is unreasonable to expect to understand preferences over each aspect or combination of aspects, this research hopes at least to understand which aspects or characteristics of the risky activities are most important in determining risk attitudes, behavior, or willingness-to-pay for risk reductions.

Researchers have studied the multivariate nature of risk through surveys and discussions with focus groups. Their analytical work has used the following two-stage approach:

1. The survey respondents numerically evaluate the characteristics of the health risks associated with a particular activity or product. Factor analysis is used to uncover the underlying factors. Respondents also rate or rank activities or products on the basis of a variable such as the acceptability of the risks associated with the activity, the desire to have the risks regulated, willingness to pay for risk reductions, perceived riskiness, perceived benefit, or risk of dying. This is the dependent variable.

2. The relationship between the dependent variable and the characteristics or the factor scores is estimated.

In most previous studies of health risks, these steps have been conducted separately. The factor analysis is conducted first, then the factors are regressed on the dependent variable. The results provided by this method are largely unreliable because the factors are not chosen for their ability to explain the dependent variable; they are selected only for their ability to aggregate characteristics. Instead, the two steps should be performed simultaneously; factors should be chosen on the basis of how well they explain the dependent variable. One way of conducting such an analysis is to use projection pursuit (Friedman and Stuetzle), a nonparametric procedure which chooses (possibly nonlinear) factors on the basis of how well they explain the dependent variable. Projection pursuit appears to be especially suitable for this type of research because the dependent variable need be measured only on an ordinal scale. This property allows the researcher to determine the role of risk characteristics without measuring willingness-to-pay.

In the next section, previous studies of the characterization of risks are reviewed. Section 2 then presents results from two new surveys. Discussions of the results and of further research are Sections 3 and 4.

1. Literature Review

Most research on the characterization of risk is based on work by Slovic, Fischhoff, and Lichtenstein (hereafter, SFL). In these studies, a risk is characterized by asking a sample of individuals to rate, on a scale of 1 to 7 (for example), the extent to which the risks associated with a particular activity or product have particular characteristics. For example, if nuclear power were being characterized, a survey participant would answer the question "Do people face this risk voluntarily?" by assigning a rating between 1 ("risk assumed voluntarily") and 7 ("risk assumed involuntarily"). He would answer the same sort of question about each of the characteristics, and would answer the set of characteristics questions for a set of risky activities and products.

The set of characteristics used is often chosen from listening to focus groups talk about risk issues. In one of their most detailed investigations (SFL, 1985), SFL asked survey participants to characterize risks on the basis of the following 18 characteristics (see their Table 8, p. 106; see also SFL, 1980):

Severity not controllable
Globally catastrophic
Dread
Certainly fatal
Little preventive control
Inequitable
Catastrophic
Threatens future generations
Not easily reduced
Risk increasing
Involuntary
Much personal exposure
Not observable
Not known to exposed
Effect delayed
New/unfamiliar
Not known to science
Many people exposed

Most of the other risk attitude research has used a similar set of characteristics. Kraus (1985) summarized these studies and drew up a "master list" of 20 characteristics, drawn especially from SFL (1985) and Vlek and Stallen (1981). Her list combines Catastrophic and Globally Catastrophic into a single characteristic labeled Catastrophic Potential; combines Not Known to Science and Not Known to Those Exposed into a single characteristic Knowledge, and adds the characteristics Human suffering, Nonhuman effects, Necessity, and Reversibility. Her list is reprinted below in Table 1 (Kraus, 1985).

Factor analysis is used to aggregate and summarize the individual characterizations. It does this by exploiting the multicollinearity of risk characteristics. For example, if a risk that is considered high in dread is in general also considered high in catastrophic potential, then only one characteristic ("dread/catastrophic potential") need be defined, which is then called a factor. The factor score measures whether the dread/catastrophic potential of a given risk is high or low.

Previous factor analyses of risks are summarized in Table 2. Table 2 lists: (1) the types of risks that were characterized in the study; (2) the set of characteristics used; and (3) the interpretation of the factors (if factor analysis was used).

In addition to characterizing the risk, the survey participants may be asked to rank or rate the activity or product that is the source of the risk on the basis of its perceived "riskiness", whether (or to what extent) it should be regulated, or what its perceived benefits are. The rank or rating forms the dependent variable for subsequent analysis. While it is possible to consider these aspects simply as other characteristics of the risk (which is what projection pursuit does implicitly), they have typically been considered

separately from the other characteristics.

The relationships between the factor scores (or the characteristics) and the dependent variables from previous studies are summarized in Table 3. This relationship is often a minor part of the studies, so detailed econometric work or explanations of the results are rarely conducted. An exception is Starr (1969), who explores the relationship between the level of acceptable risk and the perceived benefits. Other researchers have looked at "importance" of risk reduction and the number of people affected by a single accident (Wilson, 1975). Despite the lack of detailed statistical analysis in most of these studies, the general conclusion has been that factor scores do predict risk attitudes. More work needs to be done, however, to identify the specific factors or characteristics that are the most important components of risk attitudes. A rigorous statistical analysis of the characteristics and dependent variables using projection pursuit is the ultimate aim of this project.

Results

Our preliminary analysis centers around further investigation of the relationship between the desire to reduce risk and factor scores for environmental risks. Particular questions that are addressed are the stability of risk rankings as the questionnaire changes, and whether environmental risks can be treated the same as nonenvironmental risks.

We used two types of survey questions.

Study 1 (UCSD) Dependent variable is rank or mean rank for 50 risks for "Desire to have the risks reduced". No benefit information given; explicit cost information provided.

Study 2 (UM) Dependent variable is rank or mean rank for 20 risks for "Desire to have the risks reduced". Explicit benefit and cost information specified.

A reprint of the survey instruments and descriptions of the participants are given in the Appendix.

Study 1

Data

The first part of Study 1 was a typical factor analysis along the lines of SFL (1980, 1985). The characteristics questionnaire is given in the Appendix. Sixty-nine students filled it out. The list of risky activities and products included on the survey is given in Table 4. Mean scores on the characteristics are given in Table 5. The correlations between the characteristics are given in Table 6.

Varimax rotation uncovered six factors with eigenvalues greater than one, accounting for 55.2% of the variance. The first three factors accounted for 30.8% of the variance. For ease of interpretation, these factors will be labeled:

Factor 1 "Dread Risk" -- Catastrophic potential, dread
Factor 2 "Unknown Risk" -- Unobservability, latency, newness
Factor 3 "Involuntary Risk" -- Involuntary, inequitable, more of a threat to the natural environment than to humans.

Factor scores for the hazards are plotted in Figures 1, 2, and 3. Almost all of the hazards that might be regulated by the U.S. Environmental Protection Agency (EPA) fall within one sigma of the dread risk and one sigma of the unknown risk (though slightly positive). The greatest exceptions occur with nuclear power and high level nuclear waste. Carbon Monoxide Pollution from Automobiles, Spills from Offshore Wells, and Sewage Spills into Bays and Oceans were the only EPA hazards that were "known", but none of the EPA hazards had a high score on Factor 2. EPA hazards do appear to have been considered relatively involuntary.

Acid Rain, Dumping of Medical Waste at Sea, Spills from Offshore Wells, and Sewage Spills into Bays and Oceans were especially involuntary. EPA hazards also tended to be ranked among the risks that were least known to those exposed.

The risky activities were also ranked on the risk of dying (as a result of undertaking the activity or consuming the product) and on the desire to apply funds to reduce the risks. A rank of 1 was assigned to the activity or product with the highest risk of dying (or which was the object of the greatest desire to have the risks reduced) and 50 to the activity or product with the least risk of dying (or which was the object of the least desire to have the risks reduced). Mean ranks from the 69 individual responses are reported in Tables 7 and 8. Previous studies have explored in depth the relationship between the risk of dying as perceived by members of the public and by scientists or other experts (SFL), so this will not be discussed in this report.

The desire to have the risks reduced cannot be interpreted solely as a desire to have use of the activity or product curtailed. AIDS has a low mean rank, which probably indicates a strong desire to reduce the risks that arise after exposure has occurred. The low score for nuclear power or handguns, on the other hand, most likely reflects a desire to reduce the risks of exposure.

Risks related to nuclear fission typically are outliers in studies of risk attitudes, and that trend is also strong in the data from Study 1. Both the risk of dying from "high level nuclear waste" and the desire to have these risks reduced are ranked very high. The risk of dying from nuclear power, however, is ranked much lower than the risk of dying from high level nuclear waste, a result which is difficult to interpret.

Table 9 compares the desire to have the risks reduced (here labeled "Importance of Regulating") and the perceived risk of dying. Those hazards whose

Risk of Dying was ranked higher than Importance of Regulating tended to have high ratings on the characteristics Voluntary and Threat to the Natural Environment. This group includes Alcohol, Caffeine, Cigarettes, and Marijuana. The hazards that had a higher rank on Importance of Regulating than Risk of Dying were most of the EPA hazards except Lead in Gasoline and some of the food-related hazards. The remaining hazards had approximately equal mean rankings.

Regression Results

Ordinary least squares regression on the data from Study 1 was used to estimate a relationship between the mean rank on the desire to have the risks reduced (DRR1) and the independent variables: factor scores on Factors 1, 2, and 3 (F1, F2, F3), and the mean rank of the risk of dying (RDYING). Regression results are reported in (1).

$$(1)\quad \underset{}{DRR1} = \underset{(33.4)}{13.8} - \underset{(12.5)}{2.56*F1} - \underset{(18.3)}{3.66*F3} + \underset{(32.0)}{0.46*RDYING}, \quad R^2 = 0.34, \; F=600$$

The numbers in parentheses are *t*-statistics. Sixty-nine participants ranked fifty risks, yielding 3450 data points.

To illustrate (1), predicted values for mean DRR1 will be calculated for two risks, Radon and Pesticides used on Wheat, using mean factor scores. Radon has a Factor 1 score of 0.145, suggesting that its risks are dreaded, and a Factor 3 score of -0.337, suggesting that the risks are considered either involuntary or inequitable. Risk of Dying is 23.1, which is in the middle. Predicted rank on the desire to reduce the risks is 25.13. The actual mean rank is 23.34.

Pesticides on Wheat have a Factor 1 score of -0.048, suggesting the associated risks are not especially dreaded, a Factor 3 score of 0.19, suggesting they are considered inequitable or involuntary, and a mean rank on risk of dying of 23.8. The risk of dying is ranked similar to radon, while the factor scores are quite different. The predicted DRR1 for pesticides used on wheat is 24.03, while the actual mean rank is 22.5.

Pesticides and radon can be contrasted with nuclear power, which is a hazard over which individuals typically express much stronger feelings. The factor scores for high level nuclear wastes are 1.38 (Factor 1) and 0.42 (Factor 3); risk of dying is 11.7. (By contrast, "Nuclear Power" has less outlying factor scores, and the risk of dying is 20.82.) The predicted DRR1 is 14.11, while the actual mean rank on desire to reduce risks is 6.03.

The difference between environmental and nonenvironmental risks can be highlighted by running the same regression using only the 16 risks that also appear in Study 2. This yields (2).

$$\underset{\text{(2)}}{\text{DRR1}} = \underset{(2.4)}{10.4} \; \underset{(3.7)}{- 6.52*F1} \; \underset{(3.7)}{- 4.89*F3} \; \underset{(2.5)}{+ 0.48*RDYING}, \quad F = 25.2$$

This regression uses only the means of the variables, so there are only 16 data points, although each of these represents a mean response from a sample of size 69.

Predicted ranks for radon and pesticides are 22.19 and 21.2 using (2). This suggests that environmental risks are ranked approximately three steps lower than other risks. This effect represents the combined effects of changes in the intercept, the factor scores associated with environmental risks, the

importance of factors in risk attitudes for environmental risks (this is essentially an interaction term), the risk of dying associated with environmental risks, and the importance of risk of dying in risk attitudes for environmental risks. These separate effects of elements are not analyzed. The error between predicted rank and actual rank is reduced from (1) to (2), but this would occur whenever a smaller sample size was analyzed.

Study 2

The participants in Study 2 filled out a similar questionnaire about their desire to have the risks reduced from particular activities or products. A copy of the questionnaire is given in the Appendix. Twenty activities and products (all of them "environmental") were included; 16 of these are comparable to ones included in Study 1, although some of these were slightly different. See Table 10. No characterization of the risks or factor analysis was conducted. Mean ranks for desire to have the risks reduced (DRR2) and risk of dying (from the comparable activity or product in Study 1) are listed in Table 11.

The correlation between DRR1 and DRR2 is 0.77. This high value demonstrates the similarity between the results of the two studies: the ranking of risks is relatively unchanged, even though the ranks are on different scales, are based on slightly different risks, and are based on responses from different sets of participants.

Regression of DRR2 on DRR1 and on (mean) factor scores (collected from Study 1) are reported in (3) and (4). The factor scores are good predictors of both DRR1 in (1) and (2) and DRR2 in (4). Because R^2 is roughly the same in (3) and (4), it appears that the factor scores capture most of the relevant information in DRR1 for DRR2.

(3) $DRR2 = \underset{(2.4)}{3.77} + \underset{(4.57)}{0.38}*DRR1, \quad R^2 = 0.60, F = 20.9$

(4) $DRR2 = \underset{(19.8)}{12.63} - \underset{(2.87)}{2.91}*F1 - \underset{(3.46)}{3.58}*F3, \quad R^2 = 0.63, F = 10.9$

These regressions are based on 16 data points, with DRR2 representing the mean rank from 49 responses; DRR1, F1, and F3 are means from 69 responses.

Discussion

The coefficients on the factors scores are significantly different from zero in every regression in which they appear. This result implies that risk rankings can be at least partially explained on the basis of a few combinations of characteristics. We expect this result to be strengthened as better statistical techniques are applied.

The effects of the factors are relatively small in absolute terms. The combined effect of the factors in (1) is 0.33 for radon and 0.31 for pesticides used on wheat. The combined effect is higher for an outlying risk like high level nuclear wastes (combined effect of factors: 5.07). There are three closely related reasons why this effect might be so small in general. First, risk characteristics may not be especially important in determining risk attitudes. If risk attitudes were determined primarily by "objective" features of the activity or product such as the size and timing of the risks and the costs of risk reduction, then the ranks assigned by the survey participants would be essentially random. The factors might have small effects, for example, if individuals treated all environmental risks as roughly the same and randomized the ranks they assigned to them. This reliance on objective features could also explain why Risk of Dying does have a strong effect in (1); it is a proxy for

what the respondents believed was at stake with the activities or products.

Second, there may be other factors not uncovered by the data, or characteristics not included in the analysis that are important components in attitudes toward risk. Third, the statistical techniques (including the rudimentary way in which the factors are chosen) may not have been strong enough to capture all of the effects. All of these problems can be addressed with an improved survey design and better statistical techniques.

A comparison of the results from Studies 1 and 2, as demonstrated by the ability of DRR1 to explain DRR2 in (3) and by the similar effects of the factor scores in (1), (2), and (4), provides fascinating evidence about risk attitudes. The ranking of the desire to have risks reduced proved remarkably stable over two separate studies, even though the surveys used different numbers of risk (and therefore different scales); activities and products that were not always directly comparable; and different subject groups. SFL (1985) reported similar rankings given by different subject groups, but the questionnaire was the same. The similarity of rankings suggests that preferences over risks may indeed be stable and thus could be uncovered through psychological and economic research.

The similarity between Studies 1 and 2 also introduces a note of caution to this research. In Study 1, only cost information (no benefit information) is specified by the question. In Study 2, both the costs and benefits of risk reduction measures are made explicit. The relative desires to have risks reduced, however, appear to have been unchanged by the addition of information about benefits. Because the purpose of these studies is to gather information about preferences over risk reduction, the size of the proposed risk reduction should be crucial information to the survey participant filling out his or her survey. But Study 1's results reflect respondents' desires to have risks

regulated when the size of reduction may vary (in the subjects' minds) from risk to risk, while Study 2's results reflect these desires when the size of the reduction is made explicit and is the same for all risks.

The similarity of results suggests either that the benefit information given in Study 2 was ignored, or that benefits are not important components of risk preferences. Only the first of these explanations is tenable, and it demonstrates the need to design future surveys that elicit economically useful information. On the other hand, this issue is not as significant in studies about risk communication.

Suggestions for Further Research

This Cooperative Agreement entails further survey work. The following issues need to be addressed in that work. These issues or recommendations were drawn both from the analysis of Studies 1 and 2 and from audience suggestions at a seminar given at the EPA in September 1989.

1. The research should be oriented toward risk communication. For example, a valuable finding would be a unique or special combination of characteristics that describes well what consumers especially "dislike", "fear", or "feel" about environmental risks.

2. As much as possible, characteristics should be selected that are readily identifiable or interpretable. For example, the meaning of "dread" is not especially apparent, but the perceived length of time between exposure and adverse health effects is.

3. The question of how various environmental risks should be communicated, modeled, or measured should be pursued rather than the question of how attitudes differ between environmental and nonenvironmental risks.

4. Questions about the desirability of reducing or regulating each particular risk should focus on *which* risks should be reduced, and should avoid emphasizing or drawing into question *who* should reduce the risk or *how* risk reduction should be accomplished.

5. The activities and products that are of most interest for this research are: food safety; auto emissions, small water systems, superfund sites, stratospheric ozone depletion, and global warming.

6. Risk of dying should not be included in the final analysis. One of the reasons behind this suggestion is the large discrepancy between the public's and the scientific community's estimates. If necessary, the questionnaire should include information on the risks of dying.

7. It is important that more information be provided to the respondents about the activities or products and the proposed size and method of risk reduction. It may be necessary to have different respondents rank different subsets of the risks or to use a smaller set of risks.

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Table 1. The "top twenty risk" characteristics
(from Kraus (1985), Fig. 13)

Ability to control severity
Catastrophic potential
Dreadedness
Severity of consequences
Ability to prevent occurrence ("Preventive control")
Equity
Future generations
Ease of reduction
Changes in risk (Are the risks from this activity increasing?)
Voluntariness
Personal exposure
Observability
Knowledge ("How much do we as a society know about this risk?)
Immediacy of effect
Newness
Number of people exposed in U.S.
Human suffering
Nonhuman effects
Necessity
Reversibility

Table 2. Summary of studies that characterize risk

	Number and type of risks characterized	Characteristics used	Factors
SL, Read, and ombs *ow Safe is Safe nough?*	30 risks of various types; larger proportion of "old", non-technological risks.	Voluntariness Immediacy Known to exposed Known to science Controllability Newness Chronic-Catastrophic Common-Dread Severity of consequences	• Technological Risk New Involuntary Technological Latent • Severity Certain to be fatal Dread Catastrophic
FL *acts and Fears* Fig. 5, p. 201)	90 risks	See p. 4	• Dread Uncontrollable Global catastrophic Consequences fatal • Familiarity Not observable Unknown to those exposed Effect delayed • Number of people exposed
FL *acts and Fears* Signal study) Table 10, p. 205)	10 risks; no sports	Informativeness (signal about size of risk) Suffering Need for awareness Effort warranted to prevent recurrence Worry	No factor analysis conducted
raus	49 railroad hazards	Voluntariness Knowledge Control Dreadedness Equity Catastrophic Potential Newness Overall level of risk Signal potential Effort warranted to prevent recurrence	◦ Voluntariness Control Knowledge ◦ Catastrophic potential Newness Equity

raus	4 railroad hazards and 6 other risks	Dreadedness Knowledge Overall level of risk	No factor analysis conducted
lek and Stallen 1981)	26 risks from 4 groups: Personal Traffic and transportation Labor and industry Profession	Personal influence Imaginability of dangers Information about risks and dangers Avoidability of accident	Not reported

Table 3. Relationships of Risk Characteristics to a Dependent Variable

	Dependent variable	Independent variables	Results
Starr	Acceptable risk	Perceived benefit	Acceptable risk is proportional to third power of benefits.
FSLRC	Acceptable risk	Perceived benefit & factor scores	Coefficients not reported. $R^2 = 0.76$ (All coefficients significant?)
	Perceived risk	Perceived benefit & factor scores	Factor 2 (severity of consequences, which includes dread) is the only significant predictor. $R^2 = 0.67$
SFL *Facts&Fears* 30 risks (p.194)	Risk of dying	Risk characteristics, subj. fatality estimates, Disaster potential	"[T]he risk judgments of the LOWV and student groups could be almost perfectly pre- from ratings of dread and severity, the subjective fatality estimates, and the disaster multipliers." (p.194)
90 risks (p.202)	Perceived risk of death; Risk adjustment	Factor scores, perceived benefits, individual characteristics	Factor 1 (dread) correlated highly. Perceived risk was inversely related to perceived benefit. Regression coefficients (using characteristics) were not reported, but R^2 was about 0.90.
Kraus (Table 4, p.63)	Overall level of risk	Hazard profiles artificially constructed	All 8 characteristics are significant; R^2 is above 0.9. Degrees of freedom range from 6 to 11.
(p.101 & Fig. 24)	Overall level risk	Factor scores	The factor that contained catastrophic of of potential was important. Methods and coefficients were not discussed.
Carson & Horowitz	Desire to have risk reduced	Factor scores and risk of dying	See (1) through (4).

TABLE 4. HAZARD LIST, Study 1

1. AIDS
2. Acid Rain
3. Airborne Asbestos in Old Buildings
4. Airborne Particulates Emitted by Businesses and Utilities
5. Noise from Aircraft
6. Alcohol
7. Bridges Collapsing
8. Depletion of Stratospheric Ozone by Chlorofluorocarbons
9. Caffeine
10. Carbon Monoxide Pollution from Automobiles
11. Chemical Warfare Plants
12. Cigarettes
13. Commercial Aviation
14. Working Several Hours a Day in Front of a Computer Terminal
15. Dams Breaking
16. Earthquakes
17. Antibiotics in Farm Animals
18. Food Colorings such As Red Dye No.2
19. Food Preservatives Such as Sodium Nitrates in Hot Dogs
20. Build Up of Carbon Dioxide (Greenhouse Effect) From Burning Fossil Fuels
21. Contamination of Underground Drinking Water Aquifiers by Agricultural Pesticides
22. Biological Contaminants of Drinking Water Such As Giardia (an intestinal parasite)
23. Contamination of Underground Drinking Water Aquifiers by Leaking Fuel Storage Tanks
24. Handguns
25. High Level Nuclear Waste
26. Chemical Disinfectants Used in Hospitals
27. Intramural Sports
28. Lead from Gasoline
29. Lead Paint
30. Lightning
31. Low Level Nuclear Waste
32. Marijuana
33. Dumping of Medical Waste at Sea
34. Medical X-Rays
35. Radiation from Microwave Ovens
36. Mountain Climbing
37. Liquified Natural Gas Facilities
38. Nuclear Power Plants
39. Spills from Off Shore Wells
40. Ozone from Automobiles
41. PCB's in Fish
42. Pesticides Commonly Used on Cotton
43. Pesticides in Milk
44. Pesticides Commonly Used on Tomatos
45. Pesticides Commonly Used on Wheat
46. Radon Emitted by Building Materials
47. Recombinant DNA
48. Sewage Spills into Bays and Oceans
49. Sunbathing
50. Drinking Water Contaminants Produced During the Chlorination Process

Table 5. Risk Characteristics from Study 1

VOLUNTARINESS OF RISK

OBS	HAZARD	MEAN
1	Cigarettes	1.50667
2	Mountain_Climb	1.52000
3	Intramural_Sport	1.68000
4	Alcohol	1.72000
5	Marijuana	1.74667
6	Sunbathing	2.04000
7	Caffeine	2.12000
8	Computer_Screen	2.78378
9	Comm_Aviation	3.08000
10	AIDS	3.90667
11	Medical_X_Rays	3.96000
12	Microwave_Ovens	4.02667
13	Food_Preserve	4.22667
14	Food_Colorings	4.62667
15	Handguns	5.01333
16	Aircraft_Noise	5.65333
17	Pesticide_Tomato	5.77333
18	Pesticide_Milk	6.09333
19	Pesticide_Wheat	6.18667
20	PCB's_in_Fish	6.33333
21	Ozone_Automobile	6.40000
22	Lead_Paint	6.46667
23	Lead_Gasoline	6.53333
24	Hosp_Disinfect	6.62667
25	Farm_Animals	6.64000
26	Carbon_Monoxide	6.66667
27	Pesticide_Cotton	6.93333
28	CFC	6.97333
29	Air_Asbestos	7.04000
30	Natural_Gas	7.06667
31	Greenhous_Effect	7.14667
32	Nuclear_Power	7.18667
33	Water_Chlorine	7.20000
34	Sewage_Spills	7.21333
35	H2O_Biological	7.22667
36	H2O_Ag_Pesticide	7.33333
37	Recombinant_DNA	7.47297
38	Medical_Seawaste	7.52000
39	Chemical_Warfare	7.58667
40	Air_Particulate	7.61333
41	Low_Nuclear	7.65333
42	Off_Shore_Wells	7.73333
43	Acid_Rain	7.78667
44	Radon_Emitted	7.88000
45	H2O_Leaking_Fuel	7.92000
46	High_Nuclear	7.94667
47	Bridges_Collapse	8.49333
48	Dams_Breaking	8.56000
49	Earthquakes	9.09333
50	Lightning	9.24000

IMMEDIACY OF EFFECT

OBS	HAZARD	MEAN
1	Handguns	1.72000
2	Lightning	1.76000
3	Bridges_Collapse	2.04000
4	Dams_Breaking	2.04000
5	Earthquakes	2.08000
6	Mountain_Climb	2.09333
7	Comm_Aviation	2.41333
8	Intramural_Sport	3.15068
9	High_Nuclear	4.60000
10	AIDS	5.18667
11	Chemical_Warfare	5.33333
12	Alcohol	5.58108
13	H2O_Biological	5.74324
14	Nuclear_Power	5.83784
15	Natural_Gas	5.87838
16	Off_Shore_Wells	6.08108
17	Recombinant_DNA	6.08333
18	Marijuana	6.18919
19	PCB's_in_Fish	6.20270
20	Sewage_Spills	6.28378
21	Pesticide_Milk	6.51351
22	Medical_Seawaste	6.68919
23	Water_Chlorine	6.75676
24	Pesticide_Tomato	6.77027
25	H2O_Leaking_Fuel	6.86486
26	Lead_Gasoline	6.86486
27	Carbon_Monoxide	6.90541
28	H2O_Ag_Pesticide	6.91892
29	Lead_Paint	7.00000
30	Low_Nuclear	7.01351
31	Pesticide_Wheat	7.08108
32	Caffeine	7.09459
33	Farm_Animals	7.09459
34	Air_Particulate	7.12162
35	Acid_Rain	7.18919
36	Cigarettes	7.18919
37	Hosp_Disinfect	7.27027
38	Air_Asbestos	7.32432
39	Sunbathing	7.33784
40	Pesticide_Cotton	7.35135
41	Food_Colorings	7.44595
42	Food_Preserve	7.56757
43	Medical_X_Rays	7.63514
44	Aircraft_Noise	7.69444
45	Radon_Emitted	7.74324
46	Microwave_Ovens	8.00000
47	Ozone_Automobile	8.02703
48	Greenhous_Effect	8.18919
49	CFC	8.21918
50	Computer_Screen	8.67568

RISK KNOWN TO PEOPLE EXPOSED

OBS	HAZARD	MEAN
1	Cigarettes	2.20000
2	Mountain_Climb	2.33333
3	Alcohol	3.09333
4	Handguns	3.28000
5	Comm_Aviation	3.42667
6	Marijuana	3.52000
7	AIDS	3.58108
8	Sunbathing	3.60000
9	Intramural_Sport	4.00000
10	Earthquakes	4.28378
11	Lightning	4.50000
12	Dams_Breaking	4.52703
13	High_Nuclear	4.66216
14	Caffeine	4.70667
15	Nuclear_Power	4.97333
16	Carbon_Monoxide	5.25676
17	Medical_X_Rays	5.36000
18	Bridges_Collapse	5.44595
19	Low_Nuclear	5.89189
20	Computer_Screen	5.97297
21	Ozone_Automobile	5.98649
22	Lead_Gasoline	6.12162
23	Off_Shore_Wells	6.20270
24	Aircraft_Noise	6.21622
25	Chemical_Warfare	6.32432
26	Acid_Rain	6.36486
27	Microwave_Ovens	6.50667
28	Sewage_Spills	6.54054
29	Greenhous_Effect	6.55405
30	Lead_Paint	6.63514
31	Food_Colorings	6.67568
32	Food_Preserve	6.68000
33	Air_Asbestos	6.75676
34	CFC	6.75676
35	Medical_Seawaste	6.75676
36	H2O_Biological	7.01351
37	Recombinant_DNA	7.01370
38	Natural_Gas	7.10811
39	Air_Particulate	7.14865
40	Water_Chlorine	7.31081
41	Pesticide_Wheat	7.36486
42	H2O_Ag_Pesticide	7.40541
43	Pesticide_Tomato	7.48649
44	PCB's_in_Fish	7.51351
45	Pesticide_Milk	7.54054
46	Radon_Emitted	7.59459
47	Hosp_Disinfect	7.70270
48	H2O_Leaking_Fuel	7.74324
49	Pesticide_Cotton	7.79730
50	Farm_Animals	7.86486

RISK KNOWN TO SCIENTISTS

OBS	HAZARD	MEAN
1	Cigarettes	1.94667
2	Alcohol	2.25333
3	Sunbathing	2.68000
4	Marijuana	3.00000
5	Handguns	3.08000
6	High_Nuclear	3.09333
7	Medical_X_Rays	3.20000
8	AIDS	3.26667
9	Carbon_Monoxide	3.33333
10	Low_Nuclear	3.37333
11	Mountain_Climb	3.46667
12	Nuclear_Power	3.46667
13	Caffeine	3.49333
14	Lead_Gasoline	3.53333
15	Food_Colorings	3.61333
16	Air_Asbestos	3.64000
17	Lightning	3.65333
18	Comm_Aviation	3.72000
19	Chemical_Warfare	3.76000
20	H2O_Biological	3.76000
21	PCB's_in_Fish	3.77333
22	Acid_Rain	3.85333
23	Radon_Emitted	3.85333
24	Lead_Paint	3.86667
25	Water_Chlorine	3.88000
26	Pesticide_Tomato	3.90667
27	Pesticide_Milk	3.93333
28	CFC	3.94667
29	H2O_Ag_Pesticide	3.96000
30	Earthquakes	4.01333
31	Microwave_Ovens	4.01333
32	Greenhous_Effect	4.04000
33	Recombinant_DNA	4.05405
34	Bridges_Collapse	4.06667
35	Farm_Animals	4.06667
36	H2O_Leaking_Fuel	4.09333
37	Dams_Breaking	4.13333
38	Sewage_Spills	4.13333
39	Hosp_Disinfect	4.16000
40	Food_Preserve	4.17333
41	Ozone_Automobile	4.17333
42	Pesticide_Wheat	4.25333
43	Pesticide_Cotton	4.26667
44	Intramural_Sport	4.31081
45	Medical_Seawaste	4.36000
46	Off_Shore_Wells	4.37333
47	Natural_Gas	4.44000
48	Air_Particulate	4.48000
49	Aircraft_Noise	4.97333
50	Computer_Screen	5.12162

CONTROL OVER RISK

OBS	HAZARD	MEAN
1	Chemical_Warfare	3.82432
2	High_Nuclear	3.82667
3	Earthquakes	3.87838
4	Ozone_Automobile	4.01333
5	Recombinant_DNA	4.08219
6	Low_Nuclear	4.12000
7	Lightning	4.16216
8	Greenhous_Effect	4.17333
9	Acid_Rain	4.18919
10	Nuclear_Power	4.28000
11	Handguns	4.32000
12	CFC	4.33333
13	Air_Particulate	4.39189
14	Bridges_Collapse	4.41892
15	Carbon_Monoxide	4.58667
16	Air_Asbestos	4.61333
17	Dams_Breaking	4.64865
18	Hosp_Disinfect	4.64865
19	Lead_Gasoline	4.66216
20	Medical_Seawaste	4.68919
21	H2O_Ag_Pesticide	4.85135
22	H2O_Biological	4.85135
23	H2O_Leaking_Fuel	4.85135
24	Radon_Emitted	4.85135
25	Off_Shore_Wells	4.86486
26	Pesticide_Cotton	4.95890
27	Natural_Gas	4.98649
28	Comm_Aviation	5.00000
29	Pesticide_Wheat	5.02740
30	Water_Chlorine	5.21333
31	Farm_Animals	5.45946
32	Pesticide_Milk	5.47297
33	AIDS	5.52000
34	PCB's_in_Fish	5.54054
35	Pesticide_Tomato	5.60811
36	Sewage_Spills	5.62667
37	Lead_Paint	5.63514
38	Medical_X_Rays	5.81081
39	Microwave_Ovens	5.87838
40	Food_Preserve	6.09333
41	Food_Colorings	6.21333
42	Aircraft_Noise	6.33784
43	Computer_Screen	6.73611
44	Alcohol	6.96000
45	Sunbathing	6.98649
46	Caffeine	7.01351
47	Intramural_Sport	7.10959
48	Marijuana	7.34667
49	Mountain_Climb	7.41892
50	Cigarettes	7.53333

NEWNESS

OBS	HAZARD	MEAN
1	AIDS	2.32000
2	Computer_Screen	2.68493
3	Medical_Seawaste	3.48649
4	Low_Nuclear	3.58667
5	Greenhous_Effect	3.62667
6	Microwave_Ovens	3.64865
7	High_Nuclear	3.74667
8	Radon_Emitted	3.86486
9	Chemical_Warfare	3.91892
10	Nuclear_Power	3.97333
11	CFC	4.00000
12	PCB's_in_Fish	4.04054
13	H2O_Ag_Pesticide	4.05405
14	Recombinant_DNA	4.05479
15	Acid_Rain	4.14865
16	Farm_Animals	4.20270
17	Water_Chlorine	4.24000
18	H2O_Leaking_Fuel	4.28378
19	Pesticide_Tomato	4.33784
20	Pesticide_Wheat	4.33784
21	Hosp_Disinfect	4.44595
22	Pesticide_Milk	4.44595
23	Off_Shore_Wells	4.64865
24	Ozone_Automobile	4.68000
25	Pesticide_Cotton	4.68919
26	Natural_Gas	4.70270
27	Food_Preserve	4.74667
28	Air_Asbestos	4.82667
29	Air_Particulate	4.83784
30	Food_Colorings	4.92000
31	Carbon_Monoxide	4.94667
32	Sewage_Spills	5.22667
33	Aircraft_Noise	5.31081
34	Lead_Gasoline	5.55405
35	H2O_Biological	5.56757
36	Medical_X_Rays	5.58108
37	Comm_Aviation	5.70270
38	Caffeine	5.81081
39	Lead_Paint	5.91892
40	Sunbathing	5.91892
41	Intramural_Sport	5.95890
42	Marijuana	6.26667
43	Bridges_Collapse	7.22973
44	Dams_Breaking	7.24324
45	Mountain_Climb	7.31081
46	Handguns	7.80000
47	Cigarettes	8.00000
48	Alcohol	8.53333
49	Earthquakes	8.59459
50	Lightning	8.63514

CHRONIC-CATASTROPHIC

OBS	HAZARD	MEAN
1	Mountain_Climb	1.94595
2	Intramural_Sport	2.15278
3	Medical_X_Rays	2.20270
4	Cigarettes	2.25333
5	Marijuana	2.26667
6	Caffeine	2.33784
7	Computer_Screen	2.38356
8	Lightning	2.43243
9	Microwave_Ovens	2.50000
10	Alcohol	2.52000
11	Aircraft_Noise	2.71622
12	Sunbathing	2.85135
13	Recombinant_DNA	3.05479
14	Food_Colorings	3.20270
15	Handguns	3.21333
16	Lead_Paint	3.21622
17	AIDS	3.30667
18	Food_Preserve	3.36000
19	Hosp_Disinfect	3.41892
20	PCB's_in_Fish	3.89189
21	Farm_Animals	3.95946
22	Pesticide_Wheat	4.02703
23	Pesticide_Cotton	4.12162
24	Air_Asbestos	4.14667
25	Medical_Seawaste	4.16216
26	Pesticide_Tomato	4.17568
27	Radon_Emitted	4.21622
28	Pesticide_Milk	4.24324
29	Lead_Gasoline	4.32432
30	H2O_Biological	4.35135
31	Sewage_Spills	4.49333
32	Water_Chlorine	4.73333
33	Off_Shore_Wells	4.82432
34	Air_Particulate	4.97297
35	H2O_Ag_Pesticide	5.10811
36	Natural_Gas	5.22973
37	Carbon_Monoxide	5.37333
38	H2O_Leaking_Fuel	5.43243
39	Ozone_Automobile	5.53333
40	Low_Nuclear	5.84000
41	Acid_Rain	5.97297
42	Bridges_Collapse	6.31081
43	Greenhous_Effect	6.85333
44	High_Nuclear	6.97297
45	Dams_Breaking	7.12162
46	CFC	7.22667
47	Nuclear_Power	7.22667
48	Chemical_Warfare	7.29730
49	Comm_Aviation	7.51351
50	Earthquakes	8.28378

COMMON-DREAD

OBS	HAZARD	MEAN
1	Caffeine	2.17808
2	Cigarettes	2.50000
3	Alcohol	2.50667
4	Intramural_Sport	2.50704
5	Aircraft_Noise	2.54795
6	Microwave_Ovens	2.58904
7	Computer_Screen	2.93056
8	Marijuana	2.93243
9	Food_Preserve	3.04054
10	Medical_X_Rays	3.05479
11	Food_Colorings	3.10811
12	Sunbathing	3.14865
13	Hosp_Disinfect	3.28767
14	Mountain_Climb	3.28767
15	Lead_Gasoline	3.36986
16	Pesticide_Cotton	3.44595
17	Pesticide_Tomato	3.50000
18	Lead_Paint	3.68919
19	Pesticide_Milk	3.73973
20	Carbon_Monoxide	3.76000
21	Farm_Animals	3.76712
22	Pesticide_Wheat	3.76712
23	PCB's_in_Fish	4.08219
24	Air_Particulate	4.09459
25	Ozone_Automobile	4.22667
26	Water_Chlorine	4.24000
27	H2O_Biological	4.32432
28	Natural_Gas	4.44595
29	H2O_Ag_Pesticide	4.45946
30	H2O_Leaking_Fuel	4.45946
31	Radon_Emitted	4.49315
32	Lightning	4.57534
33	Off_Shore_Wells	4.63014
34	Air_Asbestos	4.76000
35	Bridges_Collapse	4.82432
36	Sewage_Spills	4.90667
37	Recombinant_DNA	5.18310
38	Medical_Seawaste	5.33784
39	Greenhous_Effect	5.41333
40	Dams_Breaking	5.53425
41	Handguns	5.73333
42	Acid_Rain	5.82192
43	Comm_Aviation	5.89041
44	CFC	5.94667
45	Low_Nuclear	6.45333
46	Earthquakes	6.60811
47	Nuclear_Power	6.78667
48	Chemical_Warfare	7.01351
49	High_Nuclear	7.30667
50	AIDS	7.60000

SEVERITY OF CONSEQUENCES

OBS	HAZARD	MEAN
1	Aircraft_Noise	2.60274
2	Intramural_Sport	3.08451
3	Computer_Screen	3.20833
4	Caffeine	3.24658
5	Hosp_Disinfect	3.47945
6	Food_Preserve	3.59459
7	Microwave_Ovens	3.80822
8	Medical_X_Rays	3.84932
9	Pesticide_Cotton	3.86486
10	Off_Shore_Wells	4.01370
11	Food_Colorings	4.14865
12	Pesticide_Tomato	4.22973
13	Water_Chlorine	4.22973
14	Farm_Animals	4.26027
15	Pesticide_Wheat	4.32877
16	Sunbathing	4.35616
17	Sewage_Spills	4.37838
18	Medical_Seawaste	4.41096
19	Pesticide_Milk	4.45205
20	Marijuana	4.61644
21	Air_Particulate	4.63014
22	Lead_Gasoline	4.68493
23	Acid_Rain	4.71233
24	H2O_Biological	4.74324
25	PCB's_in_Fish	4.81944
26	H2O_Ag_Pesticide	4.89041
27	Lead_Paint	4.95946
28	H2O_Leaking_Fuel	5.00000
29	Radon_Emitted	5.08219
30	Ozone_Automobile	5.10667
31	Carbon_Monoxide	5.12162
32	Greenhous_Effect	5.16216
33	Alcohol	5.25676
34	Air_Asbestos	5.35135
35	Recombinant_DNA	5.44444
36	Natural_Gas	5.48649
37	Low_Nuclear	5.52000
38	CFC	5.78667
39	Earthquakes	5.94595
40	Mountain_Climb	6.06849
41	Cigarettes	6.55405
42	Chemical_Warfare	6.69444
43	Dams_Breaking	6.72603
44	Nuclear_Power	6.73333
45	Handguns	6.75676
46	Bridges_Collapse	6.77027
47	Comm_Aviation	6.97260
48	Lightning	7.19178
49	High_Nuclear	7.43243
50	AIDS	8.20000

SEVERITY CONTROLLABLE

OBS	HAZARD	MEAN
1	Lightning	3.00000
2	AIDS	3.53333
3	Earthquakes	3.71622
4	High_Nuclear	4.13514
5	Recombinant_DNA	4.37500
6	Chemical_Warfare	4.61111
7	Dams_Breaking	4.63014
8	Comm_Aviation	4.67123
9	Bridges_Collapse	4.75676
10	Nuclear_Power	4.80000
11	Low_Nuclear	4.86667
12	CFC	4.90667
13	Greenhous_Effect	5.00000
14	Natural_Gas	5.10811
15	Ozone_Automobile	5.13333
16	Radon_Emitted	5.24658
17	Acid_Rain	5.27397
18	Medical_X_Rays	5.30137
19	PCB's_in_Fish	5.36111
20	Handguns	5.40541
21	H2O_Leaking_Fuel	5.49315
22	H2O_Ag_Pesticide	5.52055
23	Off_Shore_Wells	5.52055
24	Air_Particulate	5.54795
25	Pesticide_Cotton	5.55405
26	Carbon_Monoxide	5.67123
27	H2O_Biological	5.68919
28	Water_Chlorine	5.68919
29	Mountain_Climb	5.73973
30	Pesticide_Wheat	5.73973
31	Sewage_Spills	5.74324
32	Lead_Paint	5.75342
33	Air_Asbestos	5.78378
34	Lead_Gasoline	5.89041
35	Cigarettes	5.91892
36	Microwave_Ovens	5.98630
37	Farm_Animals	6.01370
38	Pesticide_Milk	6.01370
39	Medical_Seawaste	6.09589
40	Pesticide_Tomato	6.13699
41	Food_Colorings	6.21622
42	Hosp_Disinfect	6.21918
43	Aircraft_Noise	6.23288
44	Food_Preserve	6.41892
45	Marijuana	6.54795
46	Computer_Screen	6.69014
47	Sunbathing	6.78082
48	Intramural_Sport	6.78873
49	Alcohol	6.89189
50	Caffeine	6.95890

PREVENTABLE

OBS	HAZARD	MEAN
1	Cigarettes	2.44595
2	Sunbathing	2.60274
3	Alcohol	2.66216
4	Marijuana	2.70270
5	Caffeine	2.86301
6	Intramural_Sport	3.19718
7	Mountain_Climb	3.28767
8	Food_Colorings	3.52703
9	AIDS	3.58667
10	Computer_Screen	3.87500
11	Microwave_Ovens	3.89041
12	Food_Preserve	3.94595
13	Farm_Animals	3.95890
14	Pesticide_Tomato	3.98630
15	Lead_Paint	4.02740
16	Handguns	4.08108
17	Off_Shore_Wells	4.09589
18	Sewage_Spills	4.13514
19	Pesticide_Cotton	4.16216
20	Medical_Seawaste	4.19178
21	Lead_Gasoline	4.31507
22	PCB's_in_Fish	4.32877
23	H2O_Ag_Pesticide	4.35616
24	Aircraft_Noise	4.41096
25	Hosp_Disinfect	4.47945
26	Pesticide_Wheat	4.49315
27	Pesticide_Milk	4.52055
28	Medical_X_Rays	4.56164
29	H2O_Biological	4.56757
30	High_Nuclear	4.59459
31	Water_Chlorine	4.64865
32	H2O_Leaking_Fuel	4.69863
33	CFC	4.74667
34	Comm_Aviation	4.78082
35	Radon_Emitted	4.82192
36	Air_Asbestos	4.85135
37	Acid_Rain	4.93151
38	Ozone_Automobile	4.94667
39	Low_Nuclear	4.96000
40	Natural_Gas	5.04054
41	Air_Particulate	5.05479
42	Carbon_Monoxide	5.08108
43	Greenhous_Effect	5.09459
44	Chemical_Warfare	5.13699
45	Nuclear_Power	5.48000
46	Dams_Breaking	5.65753
47	Recombinant_DNA	5.78873
48	Bridges_Collapse	5.87838
49	Earthquakes	7.55405
50	Lightning	7.95890

EXPOSURE

OBS	HAZARD	MEAN
1	Mountain_Climb	2.43836
2	Recombinant_DNA	3.64286
3	Dams_Breaking	3.80822
4	Lightning	3.83562
5	Intramural_Sport	4.18310
6	Bridges_Collapse	4.20270
7	Off_Shore_Wells	4.41096
8	Marijuana	4.47297
9	Hosp_Disinfect	4.52055
10	Medical_Seawaste	4.52055
11	Natural_Gas	4.60811
12	Computer_Screen	4.81944
13	Chemical_Warfare	4.84932
14	Lead_Paint	4.93151
15	Food_Colorings	4.93243
16	High_Nuclear	5.08108
17	Aircraft_Noise	5.15068
18	Air_Asbestos	5.17568
19	Sewage_Spills	5.17568
20	H2O_Biological	5.21622
21	Low_Nuclear	5.33333
22	PCB's_in_Fish	5.36986
23	Radon_Emitted	5.36986
24	AIDS	5.48000
25	Earthquakes	5.62162
26	Medical_X_Rays	5.80822
27	Nuclear_Power	5.84000
28	H2O_Leaking_Fuel	5.86301
29	Acid_Rain	5.95890
30	Farm_Animals	5.97260
31	H2O_Ag_Pesticide	6.01370
32	Handguns	6.02703
33	Comm_Aviation	6.05479
34	Pesticide_Tomato	6.05479
35	Pesticide_Cotton	6.20270
36	Food_Preserve	6.29730
37	Sunbathing	6.30137
38	Pesticide_Milk	6.34247
39	Water_Chlorine	6.47297
40	Lead_Gasoline	6.50685
41	Microwave_Ovens	6.52055
42	Pesticide_Wheat	6.65753
43	Air_Particulate	6.75342
44	Alcohol	6.89189
45	Cigarettes	6.90541
46	Caffeine	7.20548
47	Carbon_Monoxide	7.75676
48	Ozone_Automobile	7.96000
49	Greenhous_Effect	8.05405
50	CFC	8.29333

EQUITY

OBS	HAZARD	MEAN
1	Intramural_Sport	2.45070
2	Mountain_Climb	2.57534
3	Caffeine	2.93151
4	Sunbathing	3.09589
5	Marijuana	3.24324
6	Medical_X_Rays	3.46575
7	Computer_Screen	3.52778
8	Comm_Aviation	3.76712
9	Microwave_Ovens	4.02740
10	Alcohol	4.04054
11	Cigarettes	4.06757
12	Hosp_Disinfect	4.09589
13	Food_Preserve	4.41892
14	Bridges_Collapse	4.51351
15	Carbon_Monoxide	4.81081
16	Food_Colorings	4.97297
17	AIDS	4.97333
18	Farm_Animals	5.00000
19	Ozone_Automobile	5.01333
20	Dams_Breaking	5.09589
21	Water_Chlorine	5.13514
22	Lead_Gasoline	5.20548
23	Pesticide_Milk	5.20548
24	Pesticide_Cotton	5.24324
25	H2O_Biological	5.28767
26	Pesticide_Tomato	5.30137
27	Pesticide_Wheat	5.30137
28	Recombinant_DNA	5.31429
29	Greenhous_Effect	5.44595
30	Natural_Gas	5.52703
31	Lead_Paint	5.61644
32	Nuclear_Power	5.69333
33	Radon_Emitted	5.69863
34	PCB's_in_Fish	5.91667
35	Aircraft_Noise	5.93151
36	H2O_Ag_Pesticide	6.00000
37	Air_Particulate	6.16438
38	CFC	6.18667
39	Low_Nuclear	6.20000
40	Earthquakes	6.22222
41	Air_Asbestos	6.22973
42	Handguns	6.25676
43	Chemical_Warfare	6.35616
44	H2O_Leaking_Fuel	6.35616
45	Acid_Rain	6.54167
46	Lightning	6.54286
47	High_Nuclear	6.60811
48	Off_Shore_Wells	6.88889
49	Sewage_Spills	6.94595
50	Medical_Seawaste	7.52055

FUTURE GENERATIONS

OBS	HAZARD	MEAN
1	Mountain_Climb	1.93151
2	Intramural_Sport	2.36620
3	Aircraft_Noise	3.08219
4	Dams_Breaking	3.26027
5	Lightning	3.50685
6	Sunbathing	3.68493
7	Medical_X_Rays	3.73973
8	Bridges_Collapse	3.74324
9	Caffeine	3.79452
10	Hosp_Disinfect	3.87671
11	Food_Colorings	3.95946
12	Comm_Aviation	4.02740
13	Marijuana	4.10811
14	Microwave_Ovens	4.21918
15	Computer_Screen	4.26389
16	Food_Preserve	4.35135
17	Farm_Animals	4.35616
18	Lead_Paint	4.36986
19	Pesticide_Cotton	4.48649
20	Alcohol	4.54054
21	Cigarettes	4.56757
22	Pesticide_Tomato	4.78082
23	Pesticide_Wheat	5.00000
24	H2O_Biological	5.02703
25	Pesticide_Milk	5.02740
26	Earthquakes	5.05405
27	Water_Chlorine	5.28378
28	Air_Asbestos	5.31081
29	Natural_Gas	5.44595
30	Handguns	5.45946
31	PCB's_in_Fish	5.49315
32	Recombinant_DNA	5.59155
33	Lead_Gasoline	5.75342
34	Radon_Emitted	5.79452
35	Off_Shore_Wells	6.12329
36	H2O_Leaking_Fuel	6.15068
37	Medical_Seawaste	6.16438
38	Air_Particulate	6.41096
39	H2O_Ag_Pesticide	6.43836
40	Sewage_Spills	6.67568
41	AIDS	7.10667
42	Carbon_Monoxide	7.18919
43	Low_Nuclear	7.34667
44	Nuclear_Power	7.48000
45	Chemical_Warfare	7.54795
46	Ozone_Automobile	7.70667
47	High_Nuclear	7.87838
48	Acid_Rain	7.97260
49	Greenhous_Effect	8.39189
50	CFC	8.84000

EXPOSURE AT WORK

OBS	HAZARD	MEAN
1	Mountain_Climb	1.91781
2	Intramural_Sport	2.18310
3	Dams_Breaking	2.54795
4	Medical_Seawaste	2.58904
5	Marijuana	2.60811
6	PCB's_in_Fish	2.65753
7	Lightning	2.67123
8	Sunbathing	2.68493
9	Recombinant_DNA	2.69014
10	Bridges_Collapse	2.74324
11	Pesticide_Tomato	2.83562
12	Off_Shore_Wells	2.88889
13	Medical_X_Rays	2.95890
14	Pesticide_Wheat	2.97260
15	AIDS	3.01333
16	Sewage_Spills	3.01351
17	Handguns	3.06757
18	Farm_Animals	3.15068
19	Alcohol	3.17568
20	Pesticide_Milk	3.19178
21	Food_Colorings	3.20270
22	Pesticide_Cotton	3.43243
23	Comm_Aviation	3.49315
24	Food_Preserve	3.52703
25	Chemical_Warfare	3.58904
26	Hosp_Disinfect	3.60274
27	Aircraft_Noise	3.82192
28	Natural_Gas	3.85135
29	Microwave_Ovens	3.87671
30	Acid_Rain	3.94521
31	High_Nuclear	3.94595
32	Nuclear_Power	3.96000
33	Low_Nuclear	4.09333
34	H2O_Biological	4.12162
35	Lead_Gasoline	4.15068
36	H2O_Leaking_Fuel	4.27397
37	H2O_Ag_Pesticide	4.30137
38	Lead_Paint	4.31507
39	Carbon_Monoxide	4.58904
40	Water_Chlorine	4.62162
41	Ozone_Automobile	5.08108
42	Greenhous_Effect	5.10811
43	CFC	5.20000
44	Earthquakes	5.33784
45	Cigarettes	5.60811
46	Caffeine	5.80822
47	Air_Particulate	5.87671
48	Air_Asbestos	6.01351
49	Radon_Emitted	6.23288
50	Computer_Screen	7.47222

GLOBAL CATASTROPHE

OBS	HAZARD	MEAN
1	Intramural_Sport	2.01408
2	Mountain_Climb	2.02740
3	Aircraft_Noise	2.06849
4	Lightning	2.09589
5	Computer_Screen	2.12500
6	Caffeine	2.23288
7	Marijuana	2.29730
8	Bridges_Collapse	2.31081
9	Sunbathing	2.43836
10	Hosp_Disinfect	2.46575
11	Dams_Breaking	2.49315
12	Medical_X_Rays	2.51389
13	Food_Preserve	2.55405
14	Alcohol	2.72973
15	Microwave_Ovens	2.73973
16	Food_Colorings	2.75676
17	Lead_Paint	2.80822
18	Comm_Aviation	2.83562
19	Pesticide_Cotton	2.85135
20	Air_Asbestos	2.93243
21	Pesticide_Tomato	2.95890
22	Cigarettes	2.97297
23	Pesticide_Milk	3.09589
24	Pesticide_Wheat	3.13699
25	Farm_Animals	3.27397
26	H2O_Biological	3.51351
27	H2O_Leaking_Fuel	3.56164
28	Radon_Emitted	3.57534
29	Recombinant_DNA	3.67606
30	PCB's_in_Fish	3.68493
31	Handguns	3.68919
32	Water_Chlorine	3.70270
33	H2O_Ag_Pesticide	3.84932
34	Natural_Gas	3.90541
35	Lead_Gasoline	4.20548
36	Medical_Seawaste	4.26027
37	Off_Shore_Wells	4.30137
38	Air_Particulate	4.75342
39	Sewage_Spills	4.83784
40	Carbon_Monoxide	5.62162
41	Low_Nuclear	5.76000
42	Earthquakes	5.77027
43	AIDS	5.94667
44	Ozone_Automobile	6.14667
45	Acid_Rain	6.53425
46	Nuclear_Power	6.80000
47	Chemical_Warfare	6.98630
48	High_Nuclear	7.32432
49	Greenhous_Effect	7.58108
50	CFC	7.82667

OBSERVABILITY

OBS	HAZARD	MEAN
1	Earthquakes	2.48649
2	Dams_Breaking	2.58904
3	Lightning	2.84932
4	Bridges_Collapse	2.86486
5	Comm_Aviation	2.91781
6	Handguns	2.94595
7	Intramural_Sport	2.98592
8	Mountain_Climb	3.57534
9	Alcohol	3.77027
10	Sewage_Spills	3.81081
11	Off_Shore_Wells	3.89041
12	AIDS	4.17333
13	Cigarettes	4.33784
14	Acid_Rain	4.41096
15	Sunbathing	4.45205
16	Aircraft_Noise	4.46575
17	Medical_Seawaste	4.69863
18	Marijuana	4.79730
19	High_Nuclear	4.86301
20	Chemical_Warfare	4.89041
21	Nuclear_Power	4.92000
22	Natural_Gas	5.08108
23	Carbon_Monoxide	5.33784
24	CFC	5.37333
25	Caffeine	5.39726
26	Recombinant_DNA	5.40845
27	Ozone_Automobile	5.62667
28	Greenhous_Effect	5.78378
29	H2O_Biological	5.87838
30	Low_Nuclear	5.90667
31	Air_Particulate	6.06849
32	H2O_Leaking_Fuel	6.10959
33	Computer_Screen	6.23611
34	Lead_Gasoline	6.24658
35	Lead_Paint	6.26027
36	PCB's_in_Fish	6.26027
37	Pesticide_Wheat	6.26027
38	Food_Preserve	6.31081
39	Hosp_Disinfect	6.34247
40	Food_Colorings	6.36486
41	Farm_Animals	6.38356
42	H2O_Ag_Pesticide	6.38356
43	Medical_X_Rays	6.43056
44	Pesticide_Milk	6.45205
45	Pesticide_Tomato	6.46575
46	Air_Asbestos	6.54054
47	Pesticide_Cotton	6.55405
48	Water_Chlorine	6.62162
49	Microwave_Ovens	7.06849
50	Radon_Emitted	7.17808

CHANGES IN RISK

OBS	HAZARD	MEAN
1	Greenhous_Effect	3.27027
2	Acid_Rain	3.31507
3	AIDS	3.33333
4	CFC	3.41333
5	Handguns	3.52703
6	Ozone_Automobile	3.61333
7	Carbon_Monoxide	3.68919
8	High_Nuclear	3.87838
9	Sewage_Spills	3.90541
10	H2O_Ag_Pesticide	3.93151
11	Low_Nuclear	3.96000
12	Medical_Seawaste	4.02740
13	Chemical_Warfare	4.04110
14	Sunbathing	4.21918
15	Computer_Screen	4.22222
16	Off_Shore_Wells	4.27397
17	H2O_Leaking_Fuel	4.28767
18	PCB's_in_Fish	4.28767
19	Air_Particulate	4.34247
20	Water_Chlorine	4.37838
21	Nuclear_Power	4.38667
22	Recombinant_DNA	4.43662
23	Pesticide_Tomato	4.56164
24	Farm_Animals	4.58904
25	Comm_Aviation	4.68493
26	Pesticide_Wheat	4.79452
27	Pesticide_Cotton	4.86486
28	Caffeine	4.87671
29	Microwave_Ovens	4.87671
30	Pesticide_Milk	4.89041
31	H2O_Biological	4.89189
32	Alcohol	4.94595
33	Natural_Gas	4.94595
34	Lead_Gasoline	4.97260
35	Marijuana	4.97297
36	Earthquakes	5.12162
37	Food_Preserve	5.12162
38	Radon_Emitted	5.12329
39	Aircraft_Noise	5.15068
40	Cigarettes	5.21622
41	Hosp_Disinfect	5.23288
42	Lightning	5.27397
43	Intramural_Sport	5.40000
44	Medical_X_Rays	5.44444
45	Bridges_Collapse	5.56757
46	Air_Asbestos	5.67568
47	Dams_Breaking	5.76712
48	Mountain_Climb	5.79452
49	Food_Colorings	5.86486
50	Lead_Paint	5.95890

EASE OF REDUCTION

OBS	HAZARD	MEAN
1	Sunbathing	2.91667
2	Food_Colorings	3.17808
3	Caffeine	3.20548
4	Intramural_Sport	3.54286
5	Marijuana	3.54795
6	Medical_Seawaste	3.55556
7	Food_Preserve	3.72603
8	Cigarettes	3.86486
9	Mountain_Climb	3.87500
10	Pesticide_Wheat	3.91667
11	Pesticide_Tomato	3.93056
12	Pesticide_Cotton	3.94521
13	Lead_Paint	4.04167
14	Water_Chlorine	4.15068
15	Farm_Animals	4.16667
16	Alcohol	4.20548
17	Pesticide_Milk	4.20833
18	Microwave_Ovens	4.27778
19	Hosp_Disinfect	4.29167
20	Air_Asbestos	4.32432
21	Computer_Screen	4.35211
22	Lead_Gasoline	4.44444
23	PCB's_in_Fish	4.47222
24	Radon_Emitted	4.63889
25	Sewage_Spills	4.67568
26	Off_Shore_Wells	4.70833
27	H2O_Biological	4.71233
28	H2O_Leaking_Fuel	4.76389
29	Bridges_Collapse	4.76712
30	AIDS	4.80000
31	Natural_Gas	4.91781
32	Aircraft_Noise	4.95833
33	H2O_Ag_Pesticide	5.06849
34	Handguns	5.08108
35	Comm_Aviation	5.09722
36	Dams_Breaking	5.12500
37	Medical_X_Rays	5.14085
38	Air_Particulate	5.31507
39	Carbon_Monoxide	5.39189
40	Chemical_Warfare	5.41667
41	Acid_Rain	5.47222
42	Low_Nuclear	5.49333
43	Nuclear_Power	5.78378
44	Ozone_Automobile	5.78378
45	CFC	5.80000
46	High_Nuclear	5.84932
47	Greenhous_Effect	6.10959
48	Recombinant_DNA	6.12676
49	Lightning	7.49296
50	Earthquakes	7.60274

THREAT TO NATURAL ENVIRONMENT

OBS	HAZARD	MEAN
1	Off_Shore_Wells	3.18056
2	Acid_Rain	3.27778
3	Sewage_Spills	3.68919
4	Medical_Seawaste	4.11111
5	PCB's_in_Fish	4.75000
6	Greenhous_Effect	4.75342
7	CFC	4.97333
8	Ozone_Automobile	5.39189
9	Low_Nuclear	5.41333
10	Lightning	5.43056
11	High_Nuclear	5.54795
12	Carbon_Monoxide	5.68919
13	Nuclear_Power	5.70270
14	H2O_Ag_Pesticide	5.73973
15	Chemical_Warfare	5.81690
16	Dams_Breaking	5.90278
17	Natural_Gas	6.05479
18	Air_Particulate	6.08219
19	Lead_Gasoline	6.11111
20	Pesticide_Wheat	6.13889
21	H2O_Leaking_Fuel	6.25000
22	Pesticide_Cotton	6.26027
23	Farm_Animals	6.34722
24	Pesticide_Tomato	6.40278
25	Aircraft_Noise	6.41667
26	Earthquakes	6.57534
27	H2O_Biological	6.79452
28	Recombinant_DNA	6.94366
29	Water_Chlorine	6.98630
30	Lead_Paint	7.31944
31	Radon_Emitted	7.36111
32	Pesticide_Milk	7.69444
33	Hosp_Disinfect	8.11111
34	Air_Asbestos	8.22973
35	Bridges_Collapse	8.27397
36	Microwave_Ovens	8.51389
37	Comm_Aviation	8.52778
38	Food_Colorings	8.53425
39	Handguns	8.71622
40	Medical_X_Rays	8.77465
41	Food_Preserve	8.86301
42	Cigarettes	9.06757
43	Sunbathing	9.11111
44	Caffeine	9.16438
45	AIDS	9.17333
46	Marijuana	9.19178
47	Mountain_Climb	9.23611
48	Computer_Screen	9.33803
49	Alcohol	9.39726
50	Intramural_Sport	9.40000

Table 6. Characteristics correlations, Study 1

Correlations

	VOLUN	IMMED	EXPOSED	SCIENCE	CONTROL	NEWNESS	CHRONIC
VOLUN	1.00000	0.02816	0.30807	0.11826	-0.26886	-0.09800	0.23358
IMMED	0.02816	1.00000	0.34557	0.09246	0.07234	-0.24069	-0.16755
EXPOSED	0.30807	0.34557	1.00000	0.36958	-0.13231	-0.27900	0.03216
SCIENCE	0.11826	0.09246	0.36958	1.00000	-0.07118	-0.05120	0.03730
CONTROL	-0.26886	0.07234	-0.13231	-0.07118	1.00000	0.09200	-0.18357
NEWNESS	-0.09800	-0.24069	-0.27900	-0.05120	0.09200	1.00000	-0.02883
CHRONIC	0.23358	-0.16755	0.03216	0.03730	-0.18357	-0.02883	1.00000
COMMON	0.20830	-0.19397	-0.05516	-0.01480	-0.21205	-0.10134	0.48397
CONSEQ	0.07414	-0.27782	-0.17054	-0.05032	-0.14025	0.10213	0.32247
SEVERITY	-0.18443	0.12545	-0.00260	-0.07349	0.21576	0.00875	-0.13191
PREVENT	0.27932	-0.11376	0.06610	0.17926	-0.18197	0.09211	0.19522
EXPOSURE	0.00100	0.18880	0.03879	-0.02997	-0.03279	0.00864	0.05694
EQUITY	0.27421	-0.01302	0.13124	0.09224	-0.15956	-0.04997	0.14040
FUTURE	0.16931	0.13324	0.06157	-0.02417	-0.16125	-0.17231	0.32224
ATWORK	0.00330	0.11202	-0.02070	-0.01432	-0.02305	-0.05258	0.10920
GLOBAL	0.16518	0.00263	-0.02539	-0.00655	-0.18678	-0.11778	0.45185
OBSERVE	0.08614	0.36105	0.27139	0.09235	0.01018	-0.19382	-0.06105
CHANGES	-0.07860	-0.07467	-0.03084	0.04302	0.11971	0.14084	-0.07795
EASERED	0.18106	-0.10679	-0.01518	0.12841	-0.18525	0.10267	0.20082
NATENV	-0.34152	-0.03522	-0.13047	-0.09842	0.17720	0.12309	-0.24776

	COMMON	CONSEQ	SEVERITY	PREVENT	EXPOSURE	EQUITY	FUTURE
VOLUN	0.20830	0.07414	-0.18443	0.27932	0.00100	0.27421	0.16931
IMMED	-0.19397	-0.27782	0.12545	-0.11376	0.18880	-0.01302	0.13324
EXPOSED	-0.05516	-0.17054	-0.00260	0.06610	0.03879	0.13124	0.06157
SCIENCE	-0.01480	-0.05032	-0.07349	0.17926	-0.02997	0.09224	-0.02417
CONTROL	-0.21205	-0.14025	0.21576	-0.18197	-0.03279	-0.15956	-0.16125
NEWNESS	-0.10134	0.10213	0.00875	0.09211	0.00864	-0.04997	-0.17231
CHRONIC	0.48397	0.32247	-0.13191	0.19522	0.05694	0.14040	0.32224
COMMON	1.00000	0.40844	-0.18261	0.12780	-0.04355	0.22591	0.28108
CONSEQ	0.40844	1.00000	-0.16391	0.10860	-0.01849	0.10938	0.20875
SEVERITY	-0.18261	-0.16391	1.00000	-0.22115	0.03706	-0.10708	-0.10077
PREVENT	0.12780	0.10860	-0.22115	1.00000	0.04650	0.17991	0.08191
EXPOSURE	-0.04355	-0.01849	0.03706	0.04650	1.00000	0.02362	0.27009
EQUITY	0.22591	0.10938	-0.10708	0.17991	0.02362	1.00000	0.23119
FUTURE	0.28108	0.20875	-0.10077	0.08191	0.27009	0.23119	1.00000
ATWORK	0.06840	0.02721	0.04519	0.03837	0.17844	0.03088	0.20271
GLOBAL	0.40794	0.26631	-0.12351	0.10946	0.17549	0.15131	0.54659
OBSERVE	-0.10263	-0.13741	-0.01159	-0.00124	0.07883	0.01614	0.03106
CHANGES	-0.15925	-0.02496	0.11602	-0.01216	-0.15156	-0.11743	-0.32643
EASERED	0.18974	0.13827	-0.23580	0.35807	0.09149	0.13124	0.19655
NATENV	-0.14763	-0.00324	0.10987	-0.15671	0.04337	-0.23761	-0.24872

Correlations

	ATWORK	GLOBAL	OBSERVE	CHANGES	EASERED	NATENV
VOLUN	0.00330	0.16518	0.08614	-0.07860	0.18106	-0.34152
IMMED	0.11202	0.00263	0.36105	-0.07467	-0.10679	-0.03522
EXPOSED	-0.02070	-0.02539	0.27139	-0.03084	-0.01518	-0.13047
SCIENCE	-0.01432	-0.00655	0.09235	0.04302	0.12841	-0.09842
CONTROL	-0.02305	-0.18678	0.01018	0.11971	-0.18525	0.17720
NEWNESS	-0.05258	-0.11778	-0.19382	0.14084	0.10267	0.12309
CHRONIC	0.10920	0.45185	-0.06105	-0.07795	0.20082	-0.24776
COMMON	0.06840	0.40794	-0.10263	-0.15925	0.18974	-0.14763
CONSEQ	0.02721	0.26631	-0.13741	-0.02496	0.13827	-0.00324
SEVERITY	0.04519	-0.12351	-0.01159	0.11602	-0.23580	0.10987
PREVENT	0.03837	0.10946	-0.00124	-0.01216	0.35807	-0.15671
EXPOSURE	0.17844	0.17549	0.07883	-0.15156	0.09149	0.04337
EQUITY	0.03088	0.15131	0.01614	-0.11743	0.13124	-0.23761
FUTURE	0.20271	0.54659	0.03106	-0.32643	0.19655	-0.24872
ATWORK	1.00000	0.29243	0.12341	-0.01014	0.09852	-0.03821
GLOBAL	0.29243	1.00000	0.02160	-0.21743	0.22695	-0.31206
OBSERVE	0.12341	0.02160	1.00000	0.05112	-0.00915	0.00754
CHANGES	-0.01014	-0.21743	0.05112	1.00000	-0.09116	0.10877
EASERED	0.09852	0.22695	-0.00915	-0.09116	1.00000	-0.16582
NATENV	-0.03821	-0.31206	0.00754	0.10877	-0.16582	1.00000

Table 7. RISK OF DYING, mean ranks, study 1

OBS	HAZARD	MEAN
1	Cigarettes	3.5333
2	AIDS	5.9467
3	Alcohol	6.6400
4	Handguns	6.8333
5	High_Nuclear	11.6667
6	Carbon_Monoxide	14.1200
7	H2O_Ag_Pesticide	17.9467
8	Earthquakes	19.2000
9	H2O_Leaking_Fuel	19.3333
10	CFC	19.5333
11	Air_Asbestos	20.5467
12	Sewage_Spills	20.7733
13	Chemical_Warfare	20.8267
14	Nuclear_Power	21.2800
15	PCB's_in_Fish	21.4667
16	Low_Nuclear	21.6933
17	Ozone_Automobile	21.8533
18	Greenhous_Effect	21.8667
19	Comm_Aviation	22.1467
20	Marijuana	22.4533
21	Radon_Emitted	23.0733
22	Air_Particulate	23.4533
23	Pesticide_Wheat	23.8200
24	Pesticide_Milk	23.9600
25	H2O_Biological	24.0933
26	Lead_Gasoline	24.5200
27	Medical_Seawaste	25.8533
28	Water_Chlorine	26.0667
29	Lead_Paint	26.5933
30	Pesticide_Tomato	27.0267
31	Farm_Animals	27.5733
32	Food_Preserve	28.0667
33	Pesticide_Cotton	28.1067
34	Acid_Rain	28.1467
35	Sunbathing	29.0800
36	Off_Shore_Wells	29.6533
37	Natural_Gas	30.3867
38	Caffeine	33.2000
39	Medical_X_Rays	33.6533
40	Mountain_Climb	34.1467
41	Recombinant_DNA	34.2400
42	Food_Colorings	35.2133
43	Dams_Breaking	35.3067
44	Bridges_Collapse	36.1400
45	Hosp_Disinfect	37.3067
46	Microwave_Ovens	37.4800
47	Lightning	38.3333
48	Computer_Screen	42.3446
49	Intramural_Sport	42.4800
50	Aircraft_Noise	46.1067

Table 8. IMPORTANCE OF REGULATING, mean ranks, Study 1

OBS	HAZARD	MEAN
1	High_Nuclear	6.0270
2	AIDS	7.1164
3	CFC	9.6233
4	Greenhous_Effect	10.5890
5	Nuclear_Power	13.5068
6	Carbon_Monoxide	13.7055
7	Low_Nuclear	14.1575
8	Ozone_Automobile	15.7534
9	Acid_Rain	15.8243
10	H2O_Ag_Pesticide	15.8750
11	H2O_Leaking_Fuel	15.9452
12	Sewage_Spills	16.1528
13	Chemical_Warfare	17.2397
14	Medical_Seawaste	18.6507
15	Off_Shore_Wells	19.2055
16	Handguns	19.4658
17	Air_Particulate	19.5753
18	PCB's_in_Fish	19.9653
19	Water_Chlorine	20.8194
20	H2O_Biological	21.3904
21	Pesticide_Wheat	22.5139
22	Air_Asbestos	22.6736
23	Pesticide_Milk	22.9041
24	Comm_Aviation	23.2917
25	Radon_Emitted	23.3425
26	Lead_Gasoline	24.5822
27	Pesticide_Tomato	24.7083
28	Alcohol	25.6712
29	Farm_Animals	26.3750
30	Pesticide_Cotton	26.6944
31	Natural_Gas	26.7746
32	Cigarettes	27.0890
33	Food_Preserve	29.0694
34	Lead_Paint	29.6438
35	Recombinant_DNA	31.5915
36	Food_Colorings	33.2192
37	Marijuana	33.5616
38	Hosp_Disinfect	33.8542
39	Medical_X_Rays	34.4792
40	Earthquakes	34.5000
41	Microwave_Ovens	34.6781
42	Dams_Breaking	35.9041
43	Bridges_Collapse	37.5753
44	Caffeine	39.0548
45	Sunbathing	40.3356
46	Aircraft_Noise	40.7534
47	Computer_Screen	42.5211
48	Lightning	43.5205
49	Mountain_Climb	44.1507
50	Intramural_Sport	44.3425

TABLE 9. COMPARING RISK OF DYING TO IMPORTANCE OF REGULATING

his table categorizes Risk of Dying and Importance of Regulating by elative mean values. DYING < IMPORT means that DYING had a higher average ank than IMPORT.

YING > IMPORT	DYING < IMPORT	DYING = IMPORT
.cid_Rain	Alcohol	AIDS
.ir_Asbestos	Caffeine	Bridges_Collapse
.ir_Particulate	Cigarettes	Carbon_Monoxide
.ircraft_Noise	Earthquakes	Comm_Aviation
:FC	Handguns	Computer_Screen
:hemical_Warfare	Intramural_Sport	Dams_Breaking
;reenhous_Effect	Lead_Paint	Farm_Animals
!20_Ag_Pesticide	Lightning	Food_Colorings
!20_Biological	Marijuana	Food_Preserve
!20_Leaking_Fuel	Mountain_Climb	Lead_Gasoline
!igh_Nuclear	Sunbathing	Medical_X_Rays
!osp_Disinfect		PCB'S_in_Fish
.ow_Nuclear		Pesticide_Cotton
1edical_Seawaste		Pesticide_Milk
1icrowave_Ovens		Pesticide_Wheat
Natural_Gas		Radon_Emitted
Nuclear_Power		
)ff_Shore_Wells		
)zone_Automobile		
Pesticide_Tomato		
Recombinant_DNA		
Sewage_Spills		
Water_Chlorine		

Table 10. Activities and products included in Study 2

See the Appendix for the descriptions of the activities and products that appeared in the surveys.

	Study 2	Study 1
1.	Radon	Same
2.	H20 contamination from chlorination	Same
3.	H20 contamination from petroleum seepage into groundwater	Same
4.	H20 contamination from leaching of agricultural pesticides	Same
5.	Asbestos removal	Airborne asbestos
6.	Transport of radioactive wastes	Low level nuclear waste
7.	Low level ozone from autos	Same
8.	Pesticides used on corn	Pesticides used on wheat
9.	Pesticides used on apples	Pesticides used on tomatoes
10.	Airborne lead from gasoline	Lead from gasoline
11.	Stratospheric ozone depletion	Same
12.	Toxic waste dumps	No comparable activity
13.	Industrial accidents releasing toxic gas into the air	No comparable activity
14.	PCB contamination of seafood	Same
15.	Acid rain	Same
16.	Emissions from incinerators burning household garbage	No comparable activity
17.	Sewage spills into bay or ocean	Same
18.	Medical wastes dumped at sea	Same
19.	Lead in H20 from lead pipe	No comparable activity
20.	Industrial accidents releasing radioactive gas into air	High level nuclear waste

Table 11. Mean Ranks from Studies 1 and 2

OBS	DRR2	DRR1	DYING	FACTOR1	FACTOR2	FACTOR3
1	12.7551	23.3425	23.0733	0.145	0.880	-0.047
2	10.6531	20.8190	26.0667	-0.100	0.561	0.061
3	8.2449	15.9452	19.3330	0.044	0.513	0.472
4	8.8367	15.8750	17.9467	0.026	0.495	0.434
5	11.3673	22.6736	20.5467	0.164	0.546	-0.165
6	11.0204	14.1575	21.6933	0.653	0.323	0.488
7	11.1429	15.7534	21.8533	0.019	0.202	0.250
8	15.4898	22.5139	23.8200	-0.337	0.500	0.191
9	15.2857	24.7083	27.0267	-0.366	0.459	0.139
10	14.2041	24.5822	24.5200	-0.147	0.129	0.190
11	8.9592	9.6233	19.5333	0.639	0.357	0.580
12	6.1224	.	.	.	.	.
13	7.6939	.	.	.	.	.
14	10.6735	19.9653	21.4667	-0.177	0.363	0.541
15	8.2857	15.8243	28.1467	0.279	0.022	1.250
16	13.9796	.	.	.	.	.
17	7.5102	16.1528	20.7333	-0.151	-0.259	1.267
18	9.0612	18.6507	25.8333	-0.011	0.217	1.198
19	11.0612	.	.	.	.	.
20	7.2245	6.0270	11.6667	1.377	-0.151	0.416

APPENDIX

Characteristics questionnaire, Study 1

VOLUNTARINESS OF RISK (VOLUN)

A. Do people face this risk voluntarily? If some of the risks are voluntarily undertaken and some are not, mark an appropriate spot towards the center of the scale.

risk assumed voluntarily . . . . . risk assumed involuntarily

IMMEDIACY OF EFFECT (IMMED)

B. To what extent is the risk of death immediate -- or is death likely to occur at some later time?

effect immediate . . . . . effect delayed

RISK KNOWN TO PEOPLE EXPOSED (EXPOSED)

C. To what extent are the risks known precisely by the persons who are exposed to those risks?

risk level known precisely . . . . . risk level not known

RISK KNOWN TO SCIENTISTS (SCIENCE)

D. To what extent are the risks known to science?

risk level known precisely . . . . . risk level not known

CONTROL OVER RISK (CONTROL)

E. If you are exposed to the risk, to what extent can you, by personal skill or diligence, avoid death?

personal risk can't be controlled . . . . . personal risk can be controlled

NEWNESS

F. Is this risk new and novel or old and familiar?

new . . . . . old

CHRONIC-CATASTROPHIC (CHRONIC)

G. Is this a risk that kills people one at a time (chronic risk) or a risk that kills large numbers of people at once (catastrophic risk)?

chronic . . . . . catastrophic

COMMON-DREAD (COMMON)

H. Is this a risk that people have learned to live with and can think about reasonably calmly, or is it one that people have great dread for--on the level of a gut reaction?

common . . . . . dread

SEVERITY OF CONSEQUENCES (CONSEQ)

I. When the risk from the activity is realized in the form of a mishap or illness, how likely is it that the consequence will be fatal?

certain not to be fatal . . . . . certain to be fatal

SEVERITY CONTROLLABLE (SEVERITY)

J. Risks can be controlled either by preventing mishaps or by reducing the severity of mishaps after they occur. After a mishap or illness does occur, to what extent can proper action reduce the likelihood or number of fatalities (i.e., the severity)?

severity can't be controlled . . . . . severity can be controlled

PREVENTABLE (PREVENT)

K. Risk can be controlled either by preventing mishaps or by reducing the severity of mishaps after they occur. To what extent can people, by personal skill or diligence, prevent mishaps or illnesses from occuring?

much preventive control . . . . . little preventive control

EXPOSURE

L. How many people are exposed to this risk in the United States?

few . . . . . many

EQUITY

M. To what extent are those who are exposed to the risks the same people as those who receive the benefits?

risks/benefits matched . . . . . risks/benefits mismatched

FUTURE GENERATIONS (FUTURE)

N. To what extent does present pursuit of this activity or technology pose risks to future generations?

very little threat . . . . . very great threat

EXPOSURE AT WORK (ATWORK)

O. To what extent do you believe that people are likely to be exposed to this risk at work? this activity, substance or technology?

unlikely to be exposed at work . . . . . likely to be exposed at work

GLOBAL CATASTROPHE (GLOBAL)

P. To what extent does pursuit of this activity, substance or technology have the potential to cause catastrophic death and destruction across the whole world?

very low catastrophic potential . . . . . very high catastrophic potential

OBSERVABILITY (OBSERVE)

Q. When something bad is in the process of happening because of this activity, substance, or technology, to what extent is the damage observable?

observable . . . . . not observable

CHANGES IN RISK (CHANGES)

R. Are the risks from this activity, substance, or technology changing?

increasing greatly . . . . . decreasing greatly

EASE OF REDUCTION (EASERED)

S. How easily can risks from this activity or technology be reduced?

easily reduced . . . . . not easily reduced

THREAT TO NATURAL ENVIRONMENT (NATENV)

T. Are the risks from this activity more of a threat to plants and wildlife than to humans?

more of a threat to plants/wildlife . . . . . more of a threat to humans

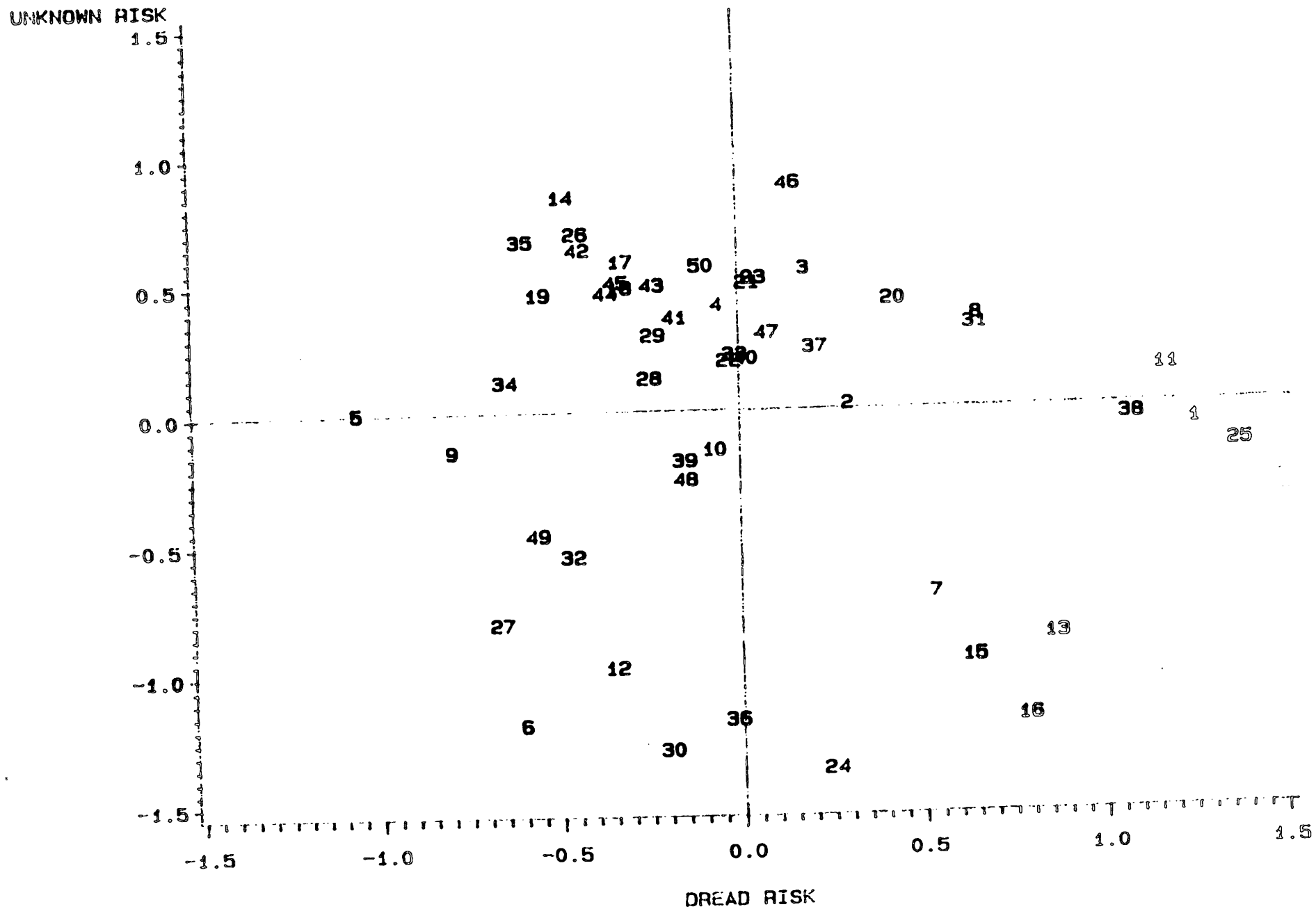

Figure 1. Gra of Dread Risk (Factor1) and Unknown Risk (Factor2), Study 1

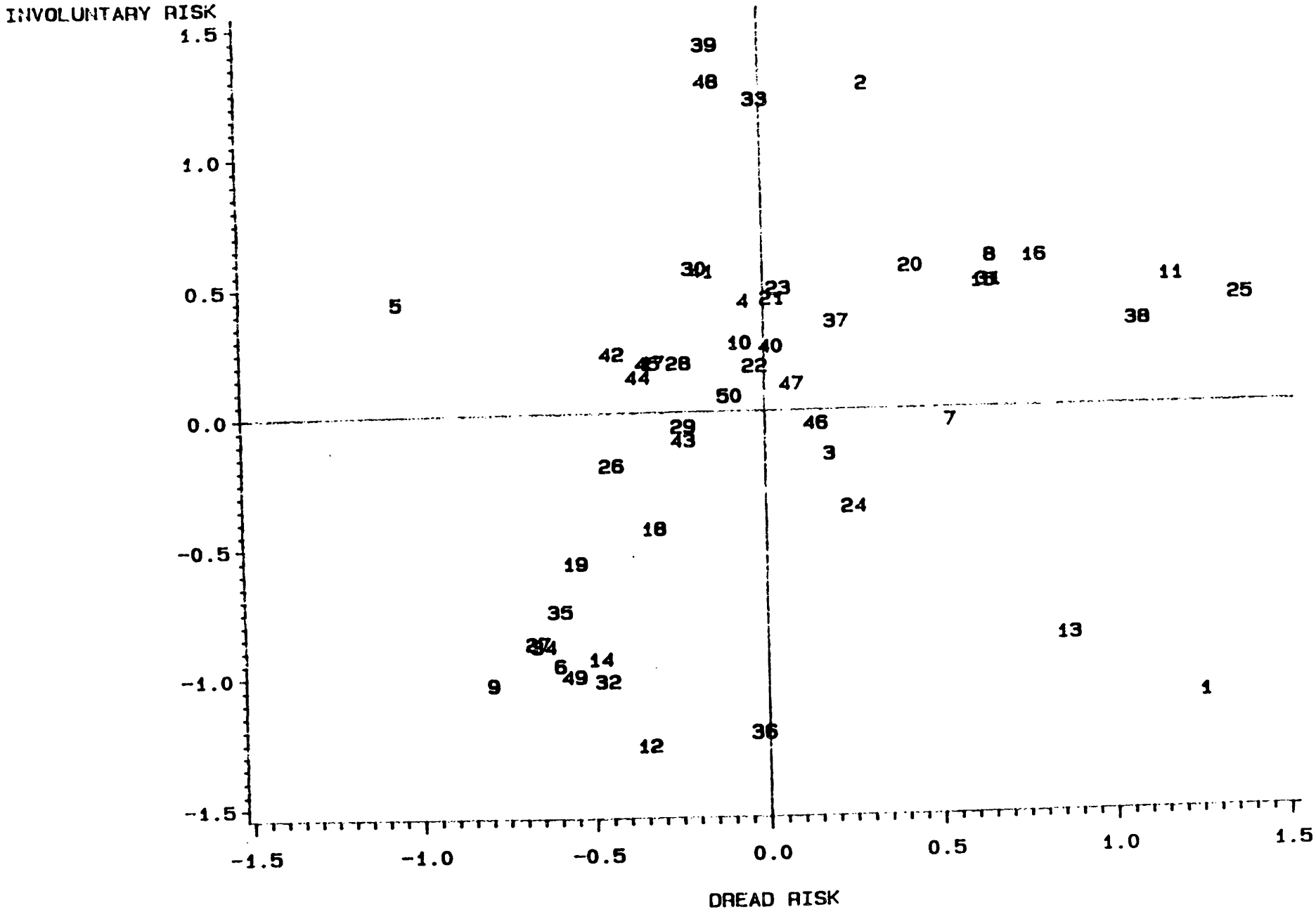

Figure 2. Graph of Dread Risk (Factor1) and Involuntary Risk (Factor3), Study 1

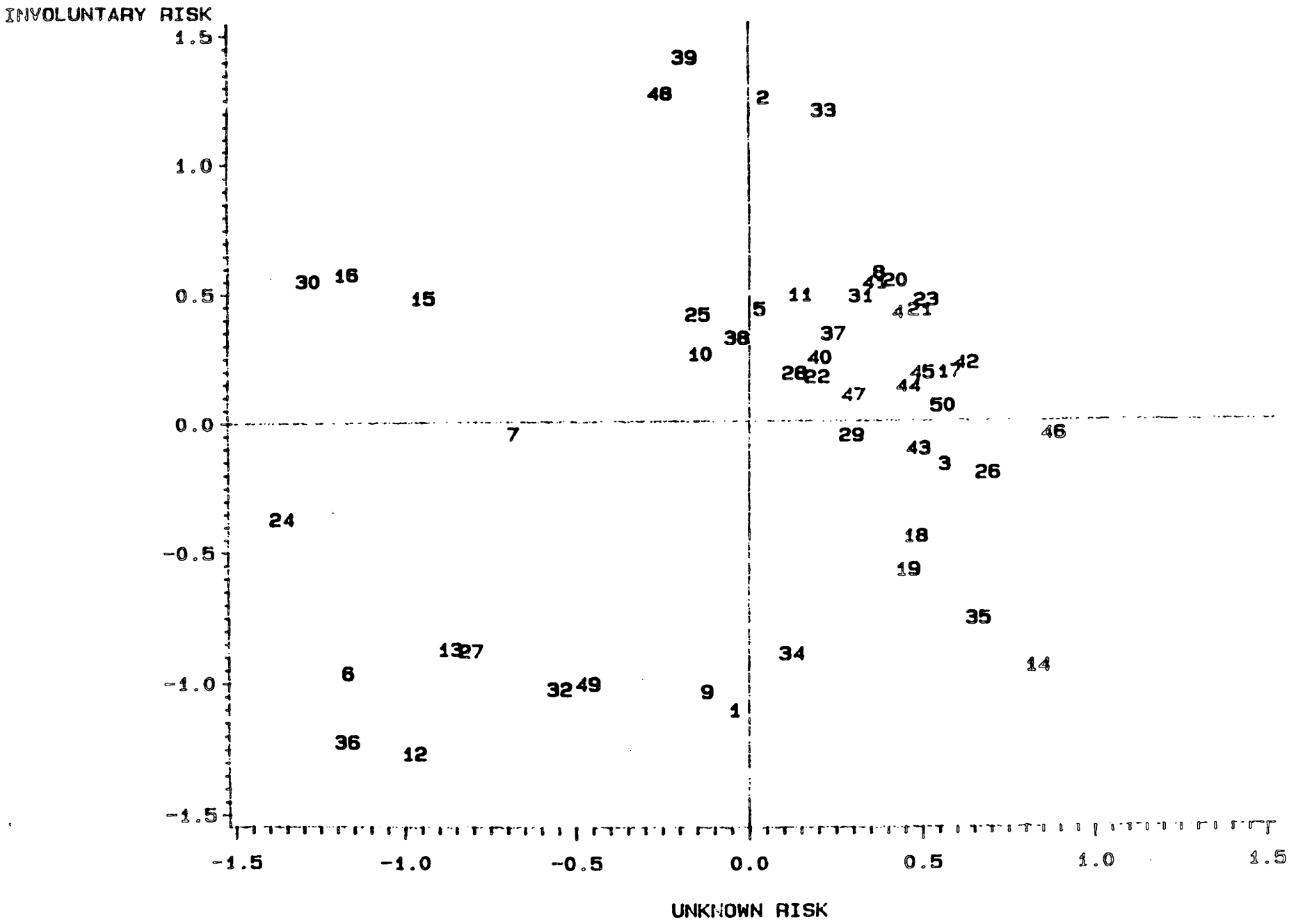

Figure 3. Graph of Unknown Risk (Factor2) and Involuntary Risk (Factor3), Study 1

Factor scores for 50 risks, Study 1.

HAZARD=AIDS

N Obs	Variable	N	Minimum	Maximum	Mean	Std Dev
75	FACTOR1	74	-0.8810281	3.1450573	1.2357894	0.8848147
	FACTOR2	74	-2.2830639	2.6452719	-0.0625805	0.8139590
	FACTOR3	74	-2.4833591	2.6719971	-1.1015185	0.8821914
	FACTOR4	74	-3.0084611	1.9924785	-0.1272143	0.9747336
	FACTOR5	74	-2.4320966	2.0807617	-0.3148107	0.9891187
	FACTOR6	74	-3.7138066	3.2252507	-1.1791451	1.2046406

HAZARD=Acid_Rain

N Obs	Variable	N	Minimum	Maximum	Mean	Std Dev
75	FACTOR1	70	-1.7344212	2.4509172	0.2786104	0.9082228
	FACTOR2	70	-1.5120561	2.4728216	0.0217653	0.8149535
	FACTOR3	70	-1.8670504	2.6069383	1.2505905	0.8336809
	FACTOR4	70	-1.9583565	2.2953378	-0.1382388	0.9972557
	FACTOR5	70	-1.7437866	2.4177693	0.3364954	0.8371166
	FACTOR6	70	-2.7656055	3.5177396	-0.6459661	1.0032332

HAZARD=Air_Asbestos

N Obs	Variable	N	Minimum	Maximum	Mean	Std Dev
75	FACTOR1	73	-1.4853240	1.8831294	0.1641980	0.7098491
	FACTOR2	73	-1.4816564	2.2928186	0.5457861	0.7558927
	FACTOR3	73	-1.2209706	1.9374256	-0.1650506	0.6408000
	FACTOR4	73	-1.5073408	2.5190839	0.0442682	0.8070539
	FACTOR5	73	-1.7496390	2.4397887	0.2159413	0.7664842
	FACTOR6	73	-2.4055336	2.4585779	0.5229958	0.9239919

HAZARD=Air_Particulate

N Obs	Variable	N	Minimum	Maximum	Mean	Std Dev
75	FACTOR1	72	-1.4361473	2.2275771	-0.0790658	0.7373347
	FACTOR2	72	-1.6831912	2.2928186	0.4099315	0.7792956
	FACTOR3	72	-1.8395865	2.2299861	0.4248337	0.7368845
	FACTOR4	72	-1.2711576	3.4836100	0.2451699	0.8197638
	FACTOR5	72	-1.1339269	2.5151125	0.6537433	0.7915339
	FACTOR6	72	-1.9363193	1.6478122	0.0303158	0.8876192

HAZARD=Aircraft_Noise

N Obs	Variable	N	Minimum	Maximum	Mean	Std Dev
75	FACTOR1	70	-2.5483810	2.2447203	-1.0781848	1.0231201
	FACTOR2	70	-1.8801780	2.3421431	0.0092082	1.0071931
	FACTOR3	70	-1.4783611	2.0309608	0.4380087	0.7523481
	FACTOR4	70	-1.8524183	2.3689750	-0.0411565	0.8510266
	FACTOR5	70	-1.8241995	2.1197383	-0.1032695	0.8777620
	FACTOR6	70	-1.5156153	2.4631122	0.4334641	0.8421720

HAZARD=Alcohol

N Obs	Variable	N	Minimum	Maximum	Mean	Std Dev
75	FACTOR1	72	-1.9581938	2.4377288	-0.6171779	0.8304633
	FACTOR2	72	-2.6087940	1.4935137	-1.1880312	0.8207124
	FACTOR3	72	-2.8630691	0.5934851	-0.9610544	0.6044687
	FACTOR4	72	-2.0971782	1.6683810	-0.3429327	0.8759106
	FACTOR5	72	-1.1402507	2.0136292	0.4132617	0.8037256
	FACTOR6	72	-1.6673855	3.2151928	-0.0038650	0.9071756

HAZARD=Bridges_Collapse

N Obs	Variable	N	Minimum	Maximum	Mean	Std Dev
75	FACTOR1	72	-1.5928709	2.3506710	0.5149131	0.9182731
	FACTOR2	72	-2.4228706	1.5162870	-0.7041451	0.9384757
	FACTOR3	72	-1.9495482	1.4479122	-0.0446004	0.8740788
	FACTOR4	72	-1.8400982	2.9099283	0.6941762	1.1224211
	FACTOR5	72	-2.5547998	2.5932188	-0.9459733	1.1896286
	FACTOR6	72	-1.2142648	3.9589842	0.7131945	0.9695665

HAZARD=CFC

N Obs	Variable	N	Minimum	Maximum	Mean	Std Dev
75	FACTOR1	73	-1.7344212	2.5806806	0.6394137	0.9205677
	FACTOR2	73	-1.7908399	2.3915806	0.3573410	0.8291409
	FACTOR3	73	-0.7623818	1.8310303	0.5804784	0.5963655
	FACTOR4	73	-2.3824457	2.5595219	0.0313548	1.1189766
	FACTOR5	73	-0.9152397	3.4847367	1.1173775	0.8511532
	FACTOR6	73	-2.4755301	3.0736763	-0.7009134	1.1002204

HAZARD=Caffeine

N Obs	Variable	N	Minimum	Maximum	Mean	Std Dev
75	FACTOR1	72	-2.0299298	2.3295807	-0.8141920	0.8007043
	FACTOR2	72	-1.7536878	2.2262513	-0.1415271	0.8368833
	FACTOR3	72	-2.0623007	0.7968616	-1.0325300	0.6628390
	FACTOR4	72	-2.3381095	3.2873465	-0.5338861	0.8724632
	FACTOR5	72	-1.2311506	2.4627798	0.6807493	0.8758744
	FACTOR6	72	-1.8423680	2.5263922	0.2151148	0.8724820

HAZARD=Carbon_Monoxide

N Obs	Variable	N	Minimum	Maximum	Mean	Std Dev
75	FACTOR1	71	-2.0715526	2.6763207	-0.0700759	0.7777189
	FACTOR2	71	-1.8424663	1.9321243	-0.1445429	0.8362238
	FACTOR3	71	-1.6624593	2.2212925	0.2644129	0.6802642
	FACTOR4	71	-2.0732376	3.0306300	0.1274156	0.9766612
	FACTOR5	71	-1.4850287	2.5681704	0.7983441	0.8826558
	FACTOR6	71	-2.4880699	2.7236408	-0.4835490	0.9510164

HAZARD=Chemical_Warfare

N Obs	Variable	N	Minimum	Maximum	Mean	Std Dev
75	FACTOR1	69	-0.5756138	2.9967131	1.1791828	1.0226006
	FACTOR2	69	-1.8178297	2.1927087	0.1456756	0.8520619
	FACTOR3	69	-1.3996440	2.1276653	0.4939254	0.7710893
	FACTOR4	69	-2.1017880	2.8948821	0.0693518	1.0142365
	FACTOR5	69	-1.9311052	1.5448654	-0.0540553	0.8369937
	FACTOR6	69	-1.9679835	1.4941272	-0.2980630	0.7771033

HAZARD=Cigarettes

N Obs	Variable	N	Minimum	Maximum	Mean	Std Dev
75	FACTOR1	73	-1.8042072	2.4377288	-0.3468568	0.7763012
	FACTOR2	73	-2.4734997	1.7021461	-0.9757872	0.7664183
	FACTOR3	73	-2.8630691	1.4327708	-1.2638328	0.7704785
	FACTOR4	73	-2.1106999	1.7897951	-0.4409694	0.8816485
	FACTOR5	73	-1.4225983	2.8434602	0.8475207	0.9987368
	FACTOR6	73	-1.9660957	2.1803737	0.1354464	0.8784466

HAZARD=Comm_Aviation

N Obs	Variable	N	Minimum	Maximum	Mean	Std Dev
75	FACTOR1	72	-0.8834495	2.3544898	0.8631056	0.7396862
	FACTOR2	72	-2.2553421	1.2952432	-0.8687995	0.8548265
	FACTOR3	72	-2.4059204	1.5153633	-0.8702352	0.9119771
	FACTOR4	72	-1.6169270	2.8863296	0.3242914	0.9035487
	FACTOR5	72	-2.0690023	1.8319502	-0.3311163	0.8638318
	FACTOR6	72	-1.5584801	2.0461634	0.1736535	0.8012773

HAZARD=Computer_Screen

N Obs	Variable	N	Minimum	Maximum	Mean	Std Dev
74	FACTOR1	69	-1.7978201	2.1505627	-0.4834120	0.8036609
	FACTOR2	69	-1.0167500	2.7376628	0.8329358	0.8253273
	FACTOR3	69	-2.4939629	1.8087207	-0.9368491	0.8078118
	FACTOR4	69	-2.5859754	1.9595080	-0.3745132	0.9168269
	FACTOR5	69	-1.3906661	2.4342878	0.5501491	0.8977657
	FACTOR6	69	-1.6138090	3.7220667	0.2753956	0.9645896

HAZARD=Dams_Breaking

N Obs	Variable	N	Minimum	Maximum	Mean	Std Dev
75	FACTOR1	71	-1.2681910	2.9782905	0.6353810	0.9068497
	FACTOR2	71	-2.4788106	1.3965822	-0.9499830	0.8677874
	FACTOR3	71	-1.2152309	2.5076199	0.4835499	0.8687081
	FACTOR4	71	-2.4630167	2.3198786	0.5371133	0.9583681
	FACTOR5	71	-2.8094722	2.3524537	-1.0225360	1.0899390
	FACTOR6	71	-0.9811515	3.5207538	0.8856379	0.9694779

HAZARD=Earthquakes

N Obs	Variable	N	Minimum	Maximum	Mean	Std Dev
75	FACTOR1	70	-1.9010352	2.5860989	0.7859790	0.8571476
	FACTOR2	70	-3.0151789	2.1628419	-1.1733815	0.9473254
	FACTOR3	70	-1.6772233	2.5444089	0.5776254	0.8768566
	FACTOR4	70	-2.2749826	3.5076494	1.3477162	1.1457186
	FACTOR5	70	-2.0457699	2.4172720	0.2430559	0.9401932
	FACTOR6	70	-1.4373323	3.6306026	0.6977714	0.8492263

HAZARD=Farm_Animals

N Obs	Variable	N	Minimum	Maximum	Mean	Std Dev
75	FACTOR1	71	-1.6848574	2.1370695	-0.3226077	0.8058904
	FACTOR2	71	-2.4493789	2.7061612	0.5798608	0.8020520
	FACTOR3	71	-2.0513538	2.3064911	0.1943066	0.8103603
	FACTOR4	71	-1.5657265	2.1768839	-0.1944239	0.7438954
	FACTOR5	71	-2.1793130	2.5515602	-0.1976102	0.9347001
	FACTOR6	71	-2.6565729	2.1722550	0.0143194	0.8892460

HAZARD=Food_Colorings

N Obs	Variable	N	Minimum	Maximum	Mean	Std Dev
75	FACTOR1	71	-1.7911251	2.2044440	-0.3260002	0.8752900
	FACTOR2	71	-1.3748666	2.3512012	0.4793398	0.7398379
	FACTOR3	71	-2.1569097	1.1925069	-0.4407723	0.7204837
	FACTOR4	71	-2.3887788	1.0778263	-0.4440739	0.7858167
	FACTOR5	71	-2.4696481	1.9892620	-0.2369256	0.8957994
	FACTOR6	71	-2.7366302	2.2756350	0.4060910	0.9182061

HAZARD=Food_Preserve

N Obs	Variable	N	Minimum	Maximum	Mean	Std Dev
75	FACTOR1	72	-1.7731474	2.3035136	-0.5523433	0.8486836
	FACTOR2	72	-1.7513083	2.9224731	0.4575751	0.8293107
	FACTOR3	72	-1.9673068	1.0593241	-0.5691162	0.6832290
	FACTOR4	72	-2.2313966	2.2038703	-0.2252834	0.8244006
	FACTOR5	72	-1.8640806	2.4573791	0.0972465	0.8302109
	FACTOR6	72	-2.5200364	1.9667782	0.1671627	0.8747396

HAZARD=Greenhous_Effect

N Obs	Variable	N	Minimum	Maximum	Mean	Std Dev
75	FACTOR1	72	-1.7344212	2.5273056	0.4285666	0.9493488
	FACTOR2	72	-1.1222826	2.3080807	0.4234062	0.7607736
	FACTOR3	72	-1.0791071	2.0897869	0.5497944	0.5931131
	FACTOR4	72	-2.0981939	2.7134527	0.1465201	1.0537237
	FACTOR5	72	-0.5047394	3.1346734	1.0811902	0.8693382
	FACTOR6	72	-2.7363480	2.2675950	-0.6988568	0.9727279

HAZARD=H2O_Ag_Pesticide

N Obs	Variable	N	Minimum	Maximum	Mean	Std Dev
75	FACTOR1	72	-1.7344212	1.7373415	0.0255825	0.7011037
	FACTOR2	72	-0.8871092	2.4576895	0.4948547	0.7029000
	FACTOR3	72	-1.1502667	1.9241607	0.4340324	0.6556438
	FACTOR4	72	-1.5419278	2.0293560	-0.0165092	0.8665303
	FACTOR5	72	-1.5995995	2.6455750	0.1334458	0.8485113
	FACTOR6	72	-2.6115118	1.7400256	-0.2449210	0.8574670

HAZARD=H2O_Biological

N Obs	Variable	N	Minimum	Maximum	Mean	Std Dev
75	FACTOR1	71	-2.2058049	1.8781709	-0.0276104	0.8742817
	FACTOR2	71	-1.7628531	2.0429730	0.1944104	0.7711812
	FACTOR3	71	-1.5309798	1.3873944	0.1762996	0.6643922
	FACTOR4	71	-1.2674539	3.8040338	0.0903430	0.8842469
	FACTOR5	71	-1.6879519	2.1008722	-0.1139677	0.8408320
	FACTOR6	71	-2.1677231	2.7872860	0.2734109	0.9615354

HAZARD=H2O_Leaking_Fuel

N Obs	Variable	N	Minimum	Maximum	Mean	Std Dev
75	FACTOR1	71	-2.3149085	2.1150537	0.0445127	0.8623779
	FACTOR2	71	-1.0033391	2.0457095	0.5130196	0.6781724
	FACTOR3	71	-0.9221086	2.2418277	0.4725386	0.6546403
	FACTOR4	71	-1.7232984	3.9192701	0.0393403	0.9849125
	FACTOR5	71	-1.7739343	2.2608741	0.0336076	0.8493895
	FACTOR6	71	-2.1605070	1.9743295	-0.0388977	0.7819388

HAZARD=Handguns

N Obs	Variable	N	Minimum	Maximum	Mean	Std Dev
75	FACTOR1	74	-1.2602140	2.3828979	0.2504270	0.7485040
	FACTOR2	74	-2.7368580	1.5792086	-1.3645645	0.8636057
	FACTOR3	74	-2.5078141	1.2633241	-0.3673709	0.6902383
	FACTOR4	74	-1.6255184	3.1760004	0.3381714	0.9606966
	FACTOR5	74	-2.5203518	1.8570942	-0.3084677	0.9756283
	FACTOR6	74	-2.2974023	1.4179795	-0.5054927	0.8363460

HAZARD=High_Nuclear

N Obs	Variable	N	Minimum	Maximum	Mean	Std Dev
75	FACTOR1	71	-1.4361473	2.9986845	1.3773578	0.9511818
	FACTOR2	71	-1.9963218	2.2928186	-0.1513227	0.9507843
	FACTOR3	71	-1.1887440	1.9061743	0.4163249	0.5895417
	FACTOR4	71	-2.4277714	1.7752825	0.0553676	0.7811686
	FACTOR5	71	-1.6529866	1.4174861	-0.0084138	0.7027023
	FACTOR6	71	-2.4787188	2.5563165	-0.5236690	1.0075361

HAZARD=Hosp_Disinfect

N Obs	Variable	N	Minimum	Maximum	Mean	Std Dev
75	FACTOR1	71	-1.7621192	2.3072802	-0.4445689	0.8965633
	FACTOR2	71	-0.9371485	2.6341791	0.6901594	0.7512133
	FACTOR3	71	-1.4195376	1.5541330	-0.1974132	0.6032498
	FACTOR4	71	-1.3919223	2.3980159	-0.0049024	0.8517750
	FACTOR5	71	-1.9980236	2.2358013	-0.3809617	0.8608027
	FACTOR6	71	-1.7478653	2.5751123	0.3277685	0.8696537

HAZARD=Intramural_Sport

N Obs	Variable	N	Minimum	Maximum	Mean	Std Dev
75	FACTOR1	69	-2.1088372	3.1500397	-0.6623625	0.9717888
	FACTOR2	69	-2.5429581	1.4980961	-0.8064085	0.9041654
	FACTOR3	69	-1.8869392	1.1375342	-0.8764153	0.5551375
	FACTOR4	69	-2.1191335	2.1454168	-0.4310253	0.9712887
	FACTOR5	69	-2.4575441	1.3494898	-0.6824036	0.8280098
	FACTOR6	69	-1.4142164	3.3439617	0.4224576	0.8282070

HAZARD=Lead_Gasoline

N Obs	Variable	N	Minimum	Maximum	Mean	Std Dev
75	FACTOR1	71	-1.8051523	2.0563402	-0.2472156	0.7745580
	FACTOR2	71	-1.4822111	2.1460374	0.1292023	0.7820373
	FACTOR3	71	-1.2154748	1.8540615	0.1896467	0.6808952
	FACTOR4	71	-2.4791921	2.0293560	-0.0441937	0.8348126
	FACTOR5	71	-1.0560265	2.6686320	0.3533899	0.8074460
	FACTOR6	71	-2.5774438	2.9214474	0.0634888	0.9837470

HAZARD=Lead_Paint

N Obs	Variable	N	Minimum	Maximum	Mean	Std Dev
75	FACTOR1	71	-2.2052208	1.7094880	-0.2364753	0.7862989
	FACTOR2	71	-1.1589505	2.2928186	0.2955186	0.7441664
	FACTOR3	71	-1.5104086	1.3710334	-0.0517082	0.6360633
	FACTOR4	71	-1.8635219	2.7480095	-0.0943065	0.9079448
	FACTOR5	71	-2.1555962	1.9124483	-0.0944253	0.8637670
	FACTOR6	71	-2.0998751	2.6545220	0.6202513	1.0133916

HAZARD=Lightning

N Obs	Variable	N	Minimum	Maximum	Mean	Std Dev
75	FACTOR1	68	-1.9012307	2.0228390	-0.1967342	0.8682527
	FACTOR2	68	-2.7947667	0.7408371	-1.2845242	0.9024914
	FACTOR3	68	-1.4071788	2.2819800	0.5526867	0.7049675
	FACTOR4	68	-1.2498167	3.5064137	1.6913093	1.2130404
	FACTOR5	68	-3.0395055	1.6233995	-0.9695226	1.0330938
	FACTOR6	68	-1.8547277	2.6890262	0.4505086	0.7834286

HAZARD=Low_Nuclear

N Obs	Variable	N	Minimum	Maximum	Mean	Std Dev
75	FACTOR1	74	-1.4361473	2.3277014	0.6533825	0.8481390
	FACTOR2	74	-1.5285089	2.2928186	0.3229571	0.7497374
	FACTOR3	74	-0.8045398	1.8624439	0.4878572	0.5739460
	FACTOR4	74	-2.1435926	2.7999914	-0.0086914	0.7979716
	FACTOR5	74	-1.7233853	2.0356445	0.1425297	0.6844604
	FACTOR6	74	-2.5025497	2.5187505	-0.4327177	1.0538106

HAZARD=Marijuana

N Obs	Variable	N	Minimum	Maximum	Mean	Std Dev
75	FACTOR1	71	-2.0298432	2.4377288	-0.4630585	0.8386607
	FACTOR2	71	-2.4794356	1.2720497	-0.5495678	0.7769836
	FACTOR3	71	-2.8630691	1.1860329	-1.0218885	0.7046991
	FACTOR4	71	-2.2344609	1.7125519	-0.6119713	0.7828167
	FACTOR5	71	-1.6803206	1.7385485	-0.2058008	0.8930910
	FACTOR6	71	-2.0473850	2.4422449	0.0656098	0.9107972

HAZARD=Medical_Seawaste

N Obs	Variable	N	Minimum	Maximum	Mean	Std Dev
75	FACTOR1	71	-2.2871045	2.0365399	-0.0109263	0.8594975
	FACTOR2	71	-2.2088536	2.4426896	0.2170879	0.7403897
	FACTOR3	71	-0.7547865	3.0386662	1.1979221	0.8668522
	FACTOR4	71	-2.1907025	1.6035387	-0.5915349	0.8978785
	FACTOR5	71	-2.7717657	1.1555994	-0.5461583	0.8507155
	FACTOR6	71	-2.0704487	2.0581863	-0.3550951	0.9464467

HAZARD=Medical_X_Rays

N Obs	Variable	N	Minimum	Maximum	Mean	Std Dev
75	FACTOR1	70	-2.1240223	2.3711583	-0.6468135	0.8674662
	FACTOR2	70	-1.2453481	2.1368851	0.1220624	0.7956107
	FACTOR3	70	-2.5585010	2.1881063	-0.8879289	0.8297701
	FACTOR4	70	-1.7329118	4.0425062	0.2283279	0.9638845
	FACTOR5	70	-1.5172837	2.0930903	0.0179557	0.8093990
	FACTOR6	70	-2.1324354	1.7777255	0.0820754	0.7693334

HAZARD=Microwave_Ovens

N Obs	Variable	N	Minimum	Maximum	Mean	Std Dev
75	FACTOR1	71	-2.2511475	2.7353650	-0.5975197	0.8731974
	FACTOR2	71	-1.2836767	2.3526923	0.6622279	0.7409661
	FACTOR3	71	-2.5090718	1.0084727	-0.7539828	0.7691430
	FACTOR4	71	-2.1197344	2.7124710	-0.1389603	0.8865949
	FACTOR5	71	-1.4536677	2.2973290	0.1728228	0.8460766
	FACTOR6	71	-2.5667356	1.6980613	-0.0527584	0.8988878

HAZARD=Mountain_Climb

N Obs	Variable	N	Minimum	Maximum	Mean	Std Dev
75	FACTOR1	72	-1.5265372	2.7917624	-0.0166002	0.7326027
	FACTOR2	72	-2.5287476	1.5462965	-1.1718837	0.8606644
	FACTOR3	72	-2.7848664	1.3078306	-1.2200881	0.6928172
	FACTOR4	72	-2.2317602	2.4024241	-0.2372335	0.9445938
	FACTOR5	72	-2.1919421	1.1456447	-1.0322311	0.8163695
	FACTOR6	72	-0.9786924	3.0005225	0.7103960	0.7512951

HAZARD=Natural_Gas

N Obs	Variable	N	Minimum	Maximum	Mean	Std Dev
75	FACTOR1	72	-2.0224523	2.7159331	0.2103327	0.8299477
	FACTOR2	72	-1.4535664	2.6427874	0.2423735	0.7695597
	FACTOR3	72	-1.2026487	1.7129630	0.3419336	0.5931050
	FACTOR4	72	-1.8142609	3.0977867	0.1348805	0.8617888
	FACTOR5	72	-2.4045237	1.7575108	-0.2701431	0.8358082
	FACTOR6	72	-1.7937236	2.3116397	0.2776039	0.8993170

HAZARD=Nuclear_Power

N Obs	Variable	N	Minimum	Maximum	Mean	Std Dev
75	FACTOR1	73	-1.4361473	2.8772682	1.0796288	1.0056164
	FACTOR2	73	-1.4424900	2.2928186	-0.0379310	0.7996039
	FACTOR3	73	-1.3996440	1.6800127	0.3261341	0.6849692
	FACTOR4	73	-2.0257806	3.3874989	0.1236244	0.9531618
	FACTOR5	73	-2.4396677	1.9863340	0.2845157	0.8351403
	FACTOR6	73	-2.2525773	3.7051399	-0.2058010	1.0788325

HAZARD=Off_Shore_Wells

N Obs	Variable	N	Minimum	Maximum	Mean	Std Dev
75	FACTOR1	69	-2.3196124	1.6191405	-0.1530157	0.8014808
	FACTOR2	69	-2.0898251	1.4977551	-0.1864572	0.7300678
	FACTOR3	69	-0.8850665	2.9546203	1.4075285	0.7476296
	FACTOR4	69	-1.7517201	3.4528997	-0.3752409	0.8869965
	FACTOR5	69	-1.8378345	1.3638085	-0.3916445	0.7634824
	FACTOR6	69	-2.5315954	1.7597289	-0.1633410	0.8520852

HAZARD=Ozone_Automobile

N Obs	Variable	N	Minimum	Maximum	Mean	Std Dev
75	FACTOR1	72	-1.4361473	1.8644145	0.0194476	0.7271546
	FACTOR2	72	-1.7014549	2.3042495	0.2021560	0.7186149
	FACTOR3	72	-1.9239567	1.4947235	0.2502182	0.5822158
	FACTOR4	72	-2.1435926	2.6295444	0.2646993	0.9600215
	FACTOR5	72	-0.6214040	2.8711213	0.9869159	0.9047912
	FACTOR6	72	-2.6093668	2.9551454	-0.6009656	0.9276114

---------- HAZARD=PCB's_in_Fish ----------

N Obs	Variable	N	Minimum	Maximum	Mean	Std Dev
75	FACTOR1	69	-1.5932913	1.6737183	-0.1769478	0.7196715
	FACTOR2	69	-1.1038493	2.7061612	0.3633860	0.7251584
	FACTOR3	69	-1.9218352	2.4019276	0.5416119	0.8811643
	FACTOR4	69	-2.2891290	2.0502705	-0.1864086	0.7028234
	FACTOR5	69	-2.3442436	2.0681644	-0.3186117	0.7991887
	FACTOR6	69	-2.5662241	2.7981186	-0.2291444	0.8743412

---------- HAZARD=Pesticide_Cotton ----------

N Obs	Variable	N	Minimum	Maximum	Mean	Std Dev
75	FACTOR1	71	-2.7068786	2.4400037	-0.4406095	0.8065218
	FACTOR2	71	-0.7484363	2.3976304	0.6280715	0.6759687
	FACTOR3	71	-1.6643083	2.3463848	0.2289404	0.8409813
	FACTOR4	71	-2.1157462	1.8519828	-0.0267644	0.7225909
	FACTOR5	71	-1.5468318	1.6098665	-0.1720691	0.7311412
	FACTOR6	71	-3.1436354	1.5463936	0.0709954	0.7875535

---------- HAZARD=Pesticide_Milk ----------

N Obs	Variable	N	Minimum	Maximum	Mean	Std Dev
75	FACTOR1	71	-2.0779837	2.0659648	-0.2371426	0.7805264
	FACTOR2	71	-0.9743433	2.7143160	0.4883498	0.7001930
	FACTOR3	71	-1.8545522	2.6925589	-0.1049141	0.7858693
	FACTOR4	71	-2.1779115	2.8874908	-0.0326386	0.8665251
	FACTOR5	71	-1.8230940	1.7918480	-0.0688089	0.7872810
	FACTOR6	71	-2.9611471	2.2805460	0.0667373	0.8780266

---------- HAZARD=Pesticide_Tomato ----------

N Obs	Variable	N	Minimum	Maximum	Mean	Std Dev
75	FACTOR1	71	-2.0057604	2.4400037	-0.3658008	0.8040768
	FACTOR2	71	-1.2755416	2.4693407	0.4588894	0.7133350
	FACTOR3	71	-1.8655822	2.4408763	0.1385194	0.8068683
	FACTOR4	71	-2.1134303	1.5877060	-0.2645708	0.7787676
	FACTOR5	71	-1.8864961	2.0439756	-0.1781605	0.7580917
	FACTOR6	71	-2.2350626	1.4574667	-0.0473410	0.8091847

HAZARD=Pesticide_Wheat

N Obs	Variable	N	Minimum	Maximum	Mean	Std Dev
75	FACTOR1	70	-2.1588856	2.4400037	-0.3374027	0.7951069
	FACTOR2	70	-1.0065611	2.4602059	0.4997221	0.7131453
	FACTOR3	70	-1.6643083	2.4408763	0.1909862	0.8403713
	FACTOR4	70	-2.1134303	1.5441865	-0.0688513	0.7449940
	FACTOR5	70	-1.6307951	2.5331229	-0.1069173	0.7597727
	FACTOR6	70	-3.2354617	2.4302833	-0.0283655	1.0009114

HAZARD=Radon_Emitted

N Obs	Variable	N	Minimum	Maximum	Mean	Std Dev
75	FACTOR1	71	-1.4361473	2.6763207	0.1449609	0.8381309
	FACTOR2	71	-0.7034670	2.2928186	0.8802535	0.6812439
	FACTOR3	71	-1.7986972	1.5137470	-0.0477292	0.7532369
	FACTOR4	71	-2.0642894	3.2588435	0.0852019	0.9762470
	FACTOR5	71	-1.5949446	2.2419039	0.3085359	0.8646087
	FACTOR6	71	-1.6511996	2.2793034	0.3197928	0.8415491

HAZARD=Recombinant_DNA

N Obs	Variable	N	Minimum	Maximum	Mean	Std Dev
75	FACTOR1	67	-1.3079224	2.1571594	0.0773207	0.8289084
	FACTOR2	67	-1.7472945	2.5721922	0.2995951	0.8829657
	FACTOR3	67	-1.6000483	1.4513381	0.1045873	0.7496361
	FACTOR4	67	-1.3310932	3.3568491	0.5995670	1.1123749
	FACTOR5	67	-2.8090903	2.0630703	-0.6616462	1.0435962
	FACTOR6	67	-2.0606134	1.3726744	-0.2444871	0.7677690

HAZARD=Sewage_Spills

N Obs	Variable	N	Minimum	Maximum	Mean	Std Dev
75	FACTOR1	73	-2.2871045	1.7786322	-0.1512256	0.7665382
	FACTOR2	73	-2.2851504	2.2409953	-0.2595414	0.7640878
	FACTOR3	73	-0.3220181	3.1458791	1.2671375	0.8204996
	FACTOR4	73	-2.5588049	2.1006593	-0.3628510	0.8512988
	FACTOR5	73	-1.7666731	1.8952576	-0.1264820	0.8087193
	FACTOR6	73	-1.8931454	1.7021187	-0.3151477	0.7889693

HAZARD=Sunbathing

N Obs	Variable	N	Minimum	Maximum	Mean	Std Dev
75	FACTOR1	71	-2.2982345	2.4377288	-0.5601232	0.9072546
	FACTOR2	71	-1.6493960	2.0196699	-0.4667247	0.7257050
	FACTOR3	71	-2.8630691	1.4662443	-1.0024395	0.7685679
	FACTOR4	71	-2.0678489	1.7821771	-0.7284991	0.7735128
	FACTOR5	71	-1.4949289	1.8580981	0.0322657	0.7931893
	FACTOR6	71	-2.3119618	2.5348185	-0.3083401	1.0454690

HAZARD=Water_Chlorine

N Obs	Variable	N	Minimum	Maximum	Mean	Std Dev
75	FACTOR1	72	-1.4506883	1.7808102	-0.1001553	0.7364383
	FACTOR2	72	-0.7909940	2.2928186	0.5608422	0.7158856
	FACTOR3	72	-1.5916868	1.6675319	0.0616809	0.7021477
	FACTOR4	72	-1.9339032	2.6031522	-0.0403207	0.8387986
	FACTOR5	72	-2.0769711	1.8550752	0.1753321	0.8735775
	FACTOR6	72	-2.2225863	1.8521058	-0.0067316	0.8822891

Sample survey question, study 1

[redacted]

2. Indicate the rank order of each attribute for [redacted] (from 1 to 20), the most voluntary risk a rank of 1 and the least voluntary risk a rank of 20.

A. _____	Voluntariness	_____	[redacted]
B. _____	Immediacy of Effect	_____	[redacted]
C. _____	Known to Exposed	_____	[redacted]
D. _____	Known to Scientists	_____	[redacted]
E. _____	Control Over Risk	_____	[redacted]
F. _____	Newness	_____	[redacted]
G. _____	Chronic-Catastrophic	_____	[redacted]
H. _____	Common-Dread	_____	[redacted]
I. _____	[redacted] Consequences	_____	[redacted]
J. _____	Severity Controllable	_____	[redacted]

3. Suppose the government had an extra $1,000,000.00 raised [redacted] to spend on reducing one of these risks. Please rank order the risks from your first choice (give a rank of 1) to your last choice (give a rank of 50) for applying these funds. Your rank for this risk is _____

[redacted]

Sample survey question, Study 2

Name: _____

Suppose that the government has identified a number of different actions and policies that could reduce risks. Economists have estimated that the total costs of adopting one of these policies are $100 million (total for all people) in terms of taxes or higher prices. Scientists have determined that about 100 deaths and a large number of less serious illnesses would be avoided under each policy. (Some of these avoided deaths and illnesses would have occurred in the future).

Twenty different risks are listed below. A separate policy (costing $100 million and saving about 100 lives) is needed to reduce each risk. Because the government or the economy may not be able to afford all of these policies, it must set priorities for the risks. Which risks is it most important to reduce? Please rank order your choices for the risks you would apply funds to, from first choice (rank =1) to last choice (rank = 20). Note that it's not possible to divide the money and undertake two (smaller) policies.

___ Depletion of stratospheric ozone by chlorofluorocarbons
___ Toxic waste dumps
___ Industrial accidents that result in the release of toxic gas into the air
___ PCB contamination of fish and other seafood
___ Acid rain
___ Emissions by incinerators that burn household garbage
___ Sewage spills into bays and oceans from sewage treatment plants that have inadequate capacity
___ Medical wastes dumped at sea and washing up on beaches
___ Drinking water contamination by lead originating from lead pipes.
___ Industrial accidents that result in the release of radioactive materials into the air
___ Radon emitted by building materials
___ Drinking water contamination caused by the chlorination process
___ Drinking water contamination caused by the seepage of petroleum products into groundwater.
___ Drinking water contamination by agricultural pesticides or fertilizers leaching through the soil into groundwater.
___ Removal of asbestos in old schools and office buildings
___ Storage and transportation of radioactive wastes from nuclear power plants
___ Low-level ozone pollution caused by automobile fumes
___ Pesticides commonly used on corn
___ Pesticides commonly used on apples
___ Airborne lead from use of leaded gasoline by automobiles