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Images of a Place and Vacation Preferences:
Implications of the 1989 Surveys
for Assessing the Economic Impacts
of a Nuclear Waste Repository in Nevada

12-19-90

by

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The Nevada Agency for Nuclear Projects/Nuclear Waste Project Office was created by the Nevada Legislature to oversee federal high-level waste activities in the State. Since 1985, it has dealt largely with the U.S. Department of Energy's siting of a high-level nuclear waste repository at Yucca Mountain in southern Nevada. As part of its oversight role, NWPO has contracted for studies designed to assess the socioeconomic implications of a repository and of repository-related activities.

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Nevada, U.S.S.R.

By PETER ZHEUTLIN



A new Soviet antinuclear group called Nevada—a name chosen to attract the attention of U.S. antinuclear activists—has had an impressive first year. . . .

1.0 Introduction

1.1 Background

In July, 1989 we produced a report titled "Perceived Risk, Stigma, and Potential Economic Impacts of a High-Level Nuclear-Waste Repository in Nevada" (Slovic et al., 1989). That report described a program of research designed to assess the potential impacts of a high-level nuclear waste repository at Yucca Mountain, Nevada upon tourism, retirement and job-related migration, and business development in Las Vegas and the state. We concluded that adverse economic impacts potentially may result from two related social processes. One process has to do with perceptions of risk and socially amplified reactions to "unfortunate events" associated with the repository (major and minor accidents, discoveries of radiation releases, evidence of mismanagement, attempts to sabotage or disrupt the facility, etc.). The second process that may trigger significant adverse impacts is that of stigmatization resulting from the city of Las Vegas and the State of Nevada becoming linked with the negative images associated with nuclear waste. The conceptual underpinnings of risk perception, social amplification, and stigmatization were discussed in that paper and empirical data were presented, based upon telephone surveys conducted in Phoenix, Arizona during the Spring of 1988, in order to demonstrate how nuclear images might trigger adverse effects on tourism, migration, and business development in Nevada.

Specifically, the study by Slovic et al. employed analyses of imagery in order to overcome concerns about the validity of direct questions regarding the influence of a nuclear-waste repository at Yucca Mountain upon a person's future behaviors. The results supported the four assumptions that the imagery research aimed to test: Images of cities

and states, derived from a word-association technique (Szalay & Deese, 1978), were consistent across people (Assumption 1). These images had diverse positive and negative affective meanings which were highly predictive of preferences for vacation sites, job and retirement locations, and business sites (Assumption 2). The concept of a nuclear-waste storage facility evoked consistent, extreme, negative imagery (Assumption 3).

The nuclear test site, which has been around far longer than the Yucca Mountain project, was found to have led to a modest amount of nuclear imagery being associated with the state of Nevada. This provided indirect evidence for Assumption 4, which asserted that nuclear-waste related images will also become associated with Nevada and Las Vegas. In addition, people who associated nuclear imagery with Nevada also expressed lower preference for Nevada as a place to vacation. The verification of these four assumptions implies that the repository has the potential to increase Nevada's nuclear imagery which, in turn, will produce adverse impacts on tourism and other economically important activities within the state.

1.2 Objectives of this Study

During the latter months of 1989, data were collected in three major telephone surveys, designed to achieve the following objectives:

1. To replicate the results from the Phoenix surveys using samples from other populations that contribute to tourism, migration, and development in Nevada.
2. To retest the original Phoenix respondents to determine the stability of their images across an 18-month time period and to determine whether their vacation choices

subsequent to the first survey were predictable from the images they produced in that original survey.

3. To elicit additional word-association images for the stimulus "underground nuclear waste repository" in order to determine whether the extreme negative images generated by the Phoenix respondents would occur with other samples of respondents.

4. To develop and test a new method for imagery elicitation, based upon a rating technique rather than on word associations.

Objective 4 requires elaboration. The word-association technique used in the 1988 surveys of Phoenix residents worked well in many respects. However, it has been difficult to get more than 2-5 images from a person over the telephone. Therefore, we may only be getting rather shallow and stereotypic images by using this technique.

The fact that respondents in the Phoenix surveys produced almost no nuclear imagery in response to the stimulus "Las Vegas" raises an important question. Is this because such imagery of the test site or the proposed repository is not associated with Las Vegas or because our technique does not get past the very dominant images (gambling, entertainment) to reveal it? Similar questions could be raised by the lack of nuclear images elicited by the stimulus words "New Mexico" (site of the first A-bomb explosion; site of WIPP).

Our hypothesis is that the word-association method lacks sensitivity. We propose in this study to test an alternative method of assessing imagery that we expect to be more sensitive than the word-association method used in the 1988 Phoenix survey. If this method appears valid, it may be valuable for use in future monitoring studies.

2.0 Method

2.1 The Image-Rating Method

The alternative approach, which we shall call the "image-rating method," starts by selecting a set of images typical of those that have been associated with the various cities and states used in our previous studies. The image concepts that we selected are shown in Table 1. Note that the term "nuclear" is included in the image set to test for negative imagery that may be related to the weapons test site, the proposed nuclear-waste repository, or other nuclear facilities. Respondents are asked to rate the strength of association between each of the image words and the target stimuli (in this case the states Nevada, Arizona, and Colorado).¹ The rating scale ranges from 1 (extremely weak association) to 10 (extremely strong association).

2.2 Survey Plans

During the last three months of 1989, data were collected in three major telephone surveys:

1. The Phoenix Retest Survey
Cities Version
States Version
2. The National Survey
Cities Version
States Version
3. The Southern California Survey
Cities Version
States Version

¹ In every survey the target stimuli consisted of either four states or four cities. Due to space limitation, Table 1 only shows three states.

Table 1

Image Rating Method

33-52. Now, I would like you to rate the strength of association in your mind between each of the following words and the state of NEVADA. On a scale of 1 to 10 where one means you have an extremely WEAK association between that word and NEVADA and 10 means you have an extremely STRONG association between that word and NEVADA.

	EXTREMELY WEAK ASSOCIATION			MODERATELY STRONG ASSOCIATION				EXTREMELY STRONG ASSOCIATION			DK
33-34. ENTERTAINMENT	01	02	03	04	05	06	07	08	09	10	00
35-36. GOOD RESTAURANTS	01	02	03	04	05	06	07	08	09	10	00
37-38. GOOD WEATHER	01	02	03	04	05	06	07	08	09	10	00
39-40. CRIME	01	02	03	04	05	06	07	08	09	10	00
41-42. OUTDOOR RECREATION	01	02	03	04	05	06	07	08	09	10	00
43-44. POLLUTION	01	02	03	04	05	06	07	08	09	10	00
45-46. INTERESTING	01	02	03	04	05	06	07	08	09	10	00
47-48. NUCLEAR	01	02	03	04	05	06	07	08	09	10	00
49-50. CROWDED	01	02	03	04	05	06	07	08	09	10	00
51-52. FRIENDLY	01	02	03	04	05	06	07	08	09	10	00

53-72. Now, I would like you to rate the strength of association in your mind between each of the following words and the state of ARIZONA. On a scale of 1 to 10 where one means you have an extremely WEAK association between that word and ARIZONA and 10 means you have an extremely STRONG association between that word and ARIZONA.

	EXTREMELY WEAK ASSOCIATION			MODERATELY STRONG ASSOCIATION				EXTREMELY STRONG ASSOCIATION			DK
53-54.ENTERTAINMENT	01	02	03	04	05	06	07	08	09	10	00
55-56.GOOD RESTAURANTS	01	02	03	04	05	06	07	08	09	10	00
57-58.GOOD WEATHER	01	02	03	04	05	06	07	08	09	10	00
59-60.CRIME	01	02	03	04	05	06	07	08	09	10	00
61-62.OUTDOOR RECREATION	01	02	03	04	05	06	07	08	09	10	00
63-64.POLLUTION	01	02	03	04	05	06	07	08	09	10	00
65-66.INTERESTING	01	02	03	04	05	06	07	08	09	10	00
67-68.NUCLEAR	01	02	03	04	05	06	07	08	09	10	00
69-70.CROWDED	01	02	03	04	05	06	07	08	09	10	00
71-72.FRIENDLY	01	02	03	04	05	06	07	08	09	10	00

73-92. Now, I would like you to rate the strength of association in your mind between each of the following words and the state of COLORADO. On a scale of 1 to 10 where one means you have an extremely WEAK association between that word and COLORADO and 10 means you have an extremely STRONG association between that word and COLORADO.

	EXTREMELY WEAK ASSOCIATION			MODERATELY STRONG ASSOCIATION				EXTREMELY STRONG ASSOCIATION			DK
73-74. ENTERTAINMENT	01	02	03	04	05	06	07	08	09	10	00
75-76. GOOD RESTAURANTS	01	02	03	04	05	06	07	08	09	10	00
77-78. GOOD WEATHER	01	02	03	04	05	06	07	08	09	10	00
79-80. CRIME	01	02	03	04	05	06	07	08	09	10	00
81-82. OUTDOOR RECREATION	01	02	03	04	05	06	07	08	09	10	00
83-84. POLLUTION	01	02	03	04	05	06	07	08	09	10	00
85-86. INTERESTING	01	02	03	04	05	06	07	08	09	10	00
87-88. NUCLEAR	01	02	03	04	05	06	07	08	09	10	00
89-90. CROWDED	01	02	03	04	05	06	07	08	09	10	00
91-92. FRIENDLY	01	02	03	04	05	06	07	08	09	10	00

Details of these surveys and the original Phoenix surveys are provided in Table 2. Note that extensive efforts to contact the original Phoenix respondents enabled us to locate and interview about 130 persons from each of the two samples studied 17-18 months earlier.² Two surveys were conducted within each population category (Phoenix, National, Southern California). The *cities survey* elicited word associations (and image ratings) to four cities, one of which was always Las Vegas. The *states survey* elicited associations (and ratings) to four states, one of which was always Nevada. Respondents in the National and Southern California surveys also provided word associations to the stimulus phrase "underground nuclear waste repository." Repository associations were not elicited in the Phoenix Retest Survey. About 800 people were surveyed in 1988 and almost 1900 were surveyed in 1989 (including the Retest Study). Response rates were high, ranging from 71% - 80% in the various surveys (excluding the Retest).

Images of cities, states, and an "underground nuclear waste repository" were elicited using a version of the "method of continued associations" (Szalay & Deese, 1978), adapted for use in a telephone interview. Image elicitation was always the first task in the survey. In the cities survey, the elicitation interview proceeded as follows:

"My first question involves word association. For example, when I mention the word baseball, you might think of the World Series, Reggie Jackson, summer time, or even hot dogs. Today, I am interested in the first SIX thoughts or images that come to mind when you hear the name of a PLACE.

² Across the two retest surveys, about 60% of the original respondents simply could not be reached because no one answered the phone (despite repeated callbacks), the number was no longer valid, or the answering person said that the target individual no longer lived there. Of the original respondents who were contacted, 83.3% completed the retest survey.

Table 2
Image Surveys

Survey and Location	Survey Type	Dates	Sample Size	Response Rate	Types of Images	
					Word Associations	Ratings
Phoenix	Cities	4/13 - 5/4/88	402	73	X	
Phoenix	States	5/16 - 6/8/88	400	71	X	
Phoenix Retest	Cities	10/3 - 12/2/89	129	--	X	X
Phoenix Retest	States	10/3 - 12/2/89	131	--	X	X
National	Cities	10/21 - 12/7/89	416	80	X	X
National	States	10/21 - 12/7/89	409	74	X	X
Southern California	Cities	12/6 - 12/15/89	400	78	X	X
Southern California	States	12/16 - 1/1/90	401	76	X	X

Think about _____ for a minute. When you think about
[CITY]
_____, what is the first thought or image that comes to mind?
[CITY]

What is the next thought or image you have when I say _____?
[CITY]

_____. Your next thought or image?
[CITY]

What is another thought or image you have about _____?
[CITY]

This continued until six associations were produced or the respondent drew a blank.
Then the procedure was repeated for the next city. Then the procedure was repeated for

the next city. The order of the cities was rotated across respondents. The procedure was identical for the states surveys.

Following the elicitation of images, respondents were asked to rate each image they gave on a scale ranging from very positive (+2), somewhat positive (+1), neutral (0), somewhat negative (-1), or very negative (-2).

In addition to the word associations, the surveys elicited strength of association ratings for the same four cities or states, using the approach shown in Table 1, followed by questions about preferred vacation sites and previous vacations in the four cities or states. There were also a variety of other questions comparing perceptions of radioactive waste with other hazards and eliciting judgments of the perceived impacts that a nearby repository might have on your local communities.

A complete version of the National States questionnaire is provided in the Appendix. The National Cities questionnaire was identical to the States version except that word associations and association ratings were obtained for four cities rather than for four states. The Southern California surveys were identical to the National surveys except in the choice of cities and states for which images were elicited (California, Los Angeles, and San Diego were replaced by New Mexico, Denver, and Albuquerque for California respondents). The Phoenix Retest survey only examined word associations, image ratings, and vacation preferences and choices.

The data analyses reported below examine the relationships between the word associations, image ratings, vacation preferences, and actual vacation choices for these surveys. Relationships between these variables and the remaining items in the questionnaire

have not yet been analyzed. Extensive analyses of the imagery associated with a nuclear-waste repository will be presented in a separate paper.

3.0 Results

3.1 The Phoenix Retest

3.1.1 Stability of Images

A brief qualitative glimpse of image stability over time is provided in Table 3, which presents the associations made by five respondents in the State survey to the stimulus word "Colorado." In every case, one or more associations were identical in the two image sets separated in time by about 1½ years.³ Image scores are also shown in the table.

A more comprehensive, quantitative picture of image stability is shown in Figures 1 and 2 and in Table 4. The figures present scatterplots of the test-retest image scores for each of 125 persons (times four image sets per person) in the Cities (Figure 1) and States (Figure 2) surveys. The correlations represented by these scatterplots are statistically significant and moderate in size (.52 for cities and .42 for states). Table 4 presents the absolute difference between 1988 and 1989 image scores for paired sets of images (same city or state and same respondent) in the Cities survey. Note that the two image scores were identical in 11.4% of the cases. Almost 70% of the paired scores were within a range of ± 4 points.

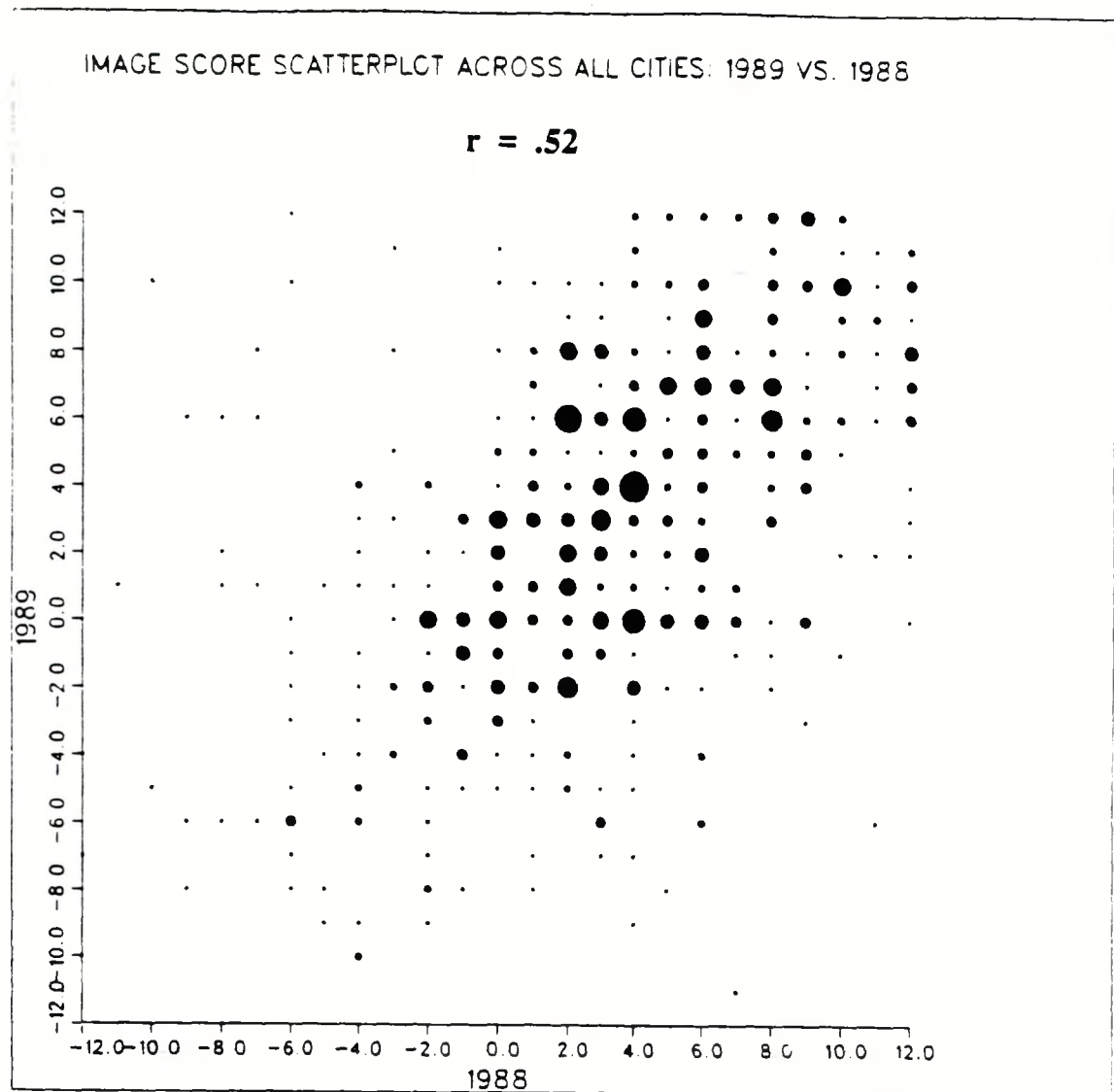
³ Across the 125 persons who provided the image sets for the stimulus word "Colorado," 78% had at least one identical association in both sets.

Table 3

Associations Produced by Five Individuals in the Phoenix Retest
in Response to the Stimulus Word "Colorado".

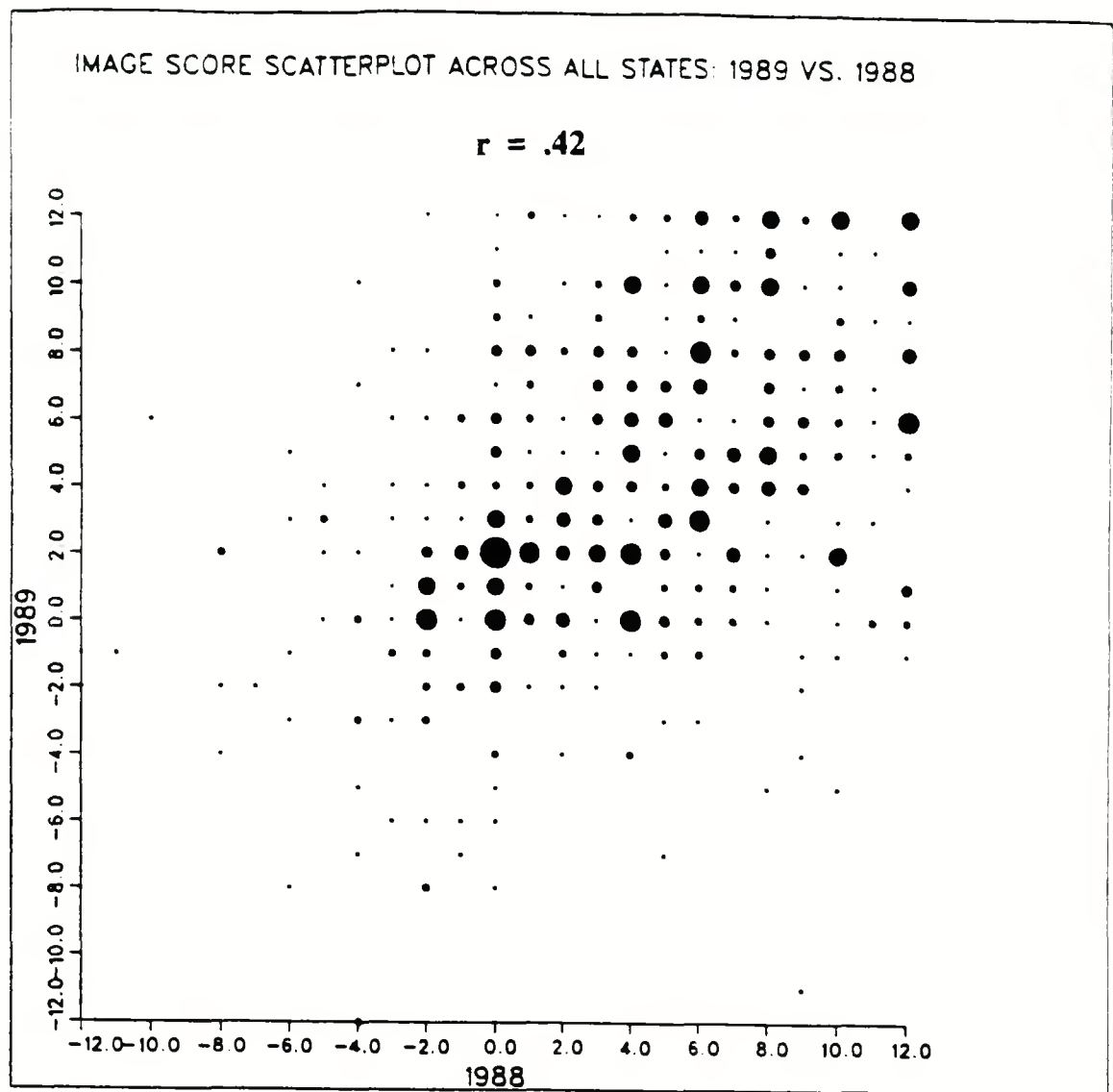
Res- pon- dent	Res- ponse	1988	Eval- uative Rating	1989	Eval- uative Rating
1	1	mountains	2	Rocky Mountains	2
1	2	wilderness	2	Denver	1
1	3	pleasant climate	2	Boulder	2
1	4	polluted air in Denver	-2	Estes Park	2
1	5	nice scenery	2	Golden (city)	1
1	6	friendly people	2	Coors beer	-2
			score = 8		score = 6
2	1	skiing	2	vacation	2
2	2	mountains	2	skiing	2
2	3	vacation	2	mountains	2
2	4	fishing	1	fresh air	2
2	5	relaxation	2		
2	6		2		8
3	1	Denver	2	elk hunting	2
3	2	fishing	2	deer hunting	2
3	3	vacation	2	skiing	2
3	4	skiing	2	fishing	2
3	5	hunting	2	fresh air	2
3	6	mountains	2	mountains	2
			<u>12</u>		<u>12</u>
4	1	Telluride	2	Telluride	2
4	2	ski resort	2	Durango railroad	2
4	3	Denver	0	cool weather	2
4	4			mountains	2
4	5			skiing	1
4	6			snow	1
			4		<u>10</u>
5	1	Denver	1	Denver	1
5	2	Red Rock	0	Mile High stadium	1
5	3	Air Force academy	2	Broncos	1
5	4	weird weather	-2	mining	0
5	5	cold	-2		
5	6	skiing	0		
			<u>-1</u>		<u>3</u>

Figure 1



Note: Multiple responses with the same coordinates are represented by points for which the diameter of the point is multiplied by the number of responses at that location.

Figure 2



Note: Multiple responses with the same coordinates are represented by points for which the diameter of the point is multiplied by the number of responses at that location.

Table 4

Image Stability Analysis
Image Score Differences Between the 1988 and 1989 Phoenix Surveys

Absolute Difference 1988 - 1989	Cell Percentage	Cumulative Percentage
0	11.4	11.4
1	16.6	28.0
2	15.2	43.2
3	13.0	56.2
4	13.2	69.4
5	7.4	76.8
6	7.8	84.6
7	3.6	88.2
8	3.4	91.6
9	2.6	94.2
10	1.4	95.6
11-14	2.8	98.4
15-20	1.6	100.0

The stability of these image scores across a 16-18 month time span is impressive, considering the brief and unstructured nature of the word-association task. At the same time, the stability is not so high as to preclude the possibility of systematic changes in imagery over time. In this regard, it is interesting to compare the mean image scores for each city and each state in the two surveys. Table 5 shows that, in the States survey, New Mexico and Colorado had more favorable imagery in 1989; California's image was somewhat

less favorable; Nevada showed little change. In the Cities survey, San Diego's image became more favorable, Los Angeles' image declined substantially, and Las Vegas' image remained about the same. The differences for New Mexico and Los Angeles were statistically significant. Determining the reasons for these shifts is beyond the scope of this report. The fact that systematic changes do take place over time demonstrates the potential for change in what appears to be a moderately stable cognitive system.

Table 5
Mean Image Scores, 1988 and 1989

	1988	1989	Difference
California	5.50	5.09	-.41
Nevada	2.77	2.62	-.15
Colorado	5.16	5.90	+.74
New Mexico	1.81	2.84	+1.03*
San Diego	5.95	6.59	+.64
Las Vegas	1.90	1.97	+.07
Denver	4.23	3.67	-.56
Los Angeles	0.42	-1.06	-1.48*

* $p < .01$

3.1.2 Imagery and Past Vacations

How does the image of a place relate to the probability that a person will vacation there? We attempted to answer this question by using a logistic regression analysis to estimate the probability that a respondent in the Retest survey had vacationed in a particular state (Colorado, California, Nevada, or New Mexico) since May, 1988 as a function of that person's 1989 image score for that state. The results, shown in Figure 3, demonstrate a strong relationship between imagery and previous vacations, much as was demonstrated in the original Phoenix survey. According to the logistic function, the predicted probability of having vacationed in a particular state during the past 16 months ranged between .08 if the image score for that state was -12 and .61 if the image score for that state was $+12$.

As was shown in the previous section, image scores were only moderately reliable over time. The instability shown in Table 4 and Figures 1 and 2 likely reflects both systematic changes over time and unreliability. The unreliability can be reduced by averaging a person's 1988 and 1989 image scores for each city or each state. When this is done for the state images, the relationship between imagery and vacations taken between May, 1988 and Autumn, 1989 becomes even stronger than that shown in Figure 3. Table 6 presents the estimated probabilities for each mean image score. These probabilities now range from about .03 for the lowest score to about .70 for the highest (these two points are superimposed on Figure 3 for comparison with the function based only on 1989 images).

Figure 3

Probability of having vacationed in a particular state since May, 1988 as a function of the image score for that state (Phoenix Retest survey). Upper row of numbers indicates the number of people with that image score who vacationed in the state; lower row is the number who did not vacation in the state; X is the proportion who vacationed. The curve is the best fit logistic function to these proportions. The solid circle points at -12 and +12 are based upon a similar analysis using the mean image scores from 1988 and 1989.

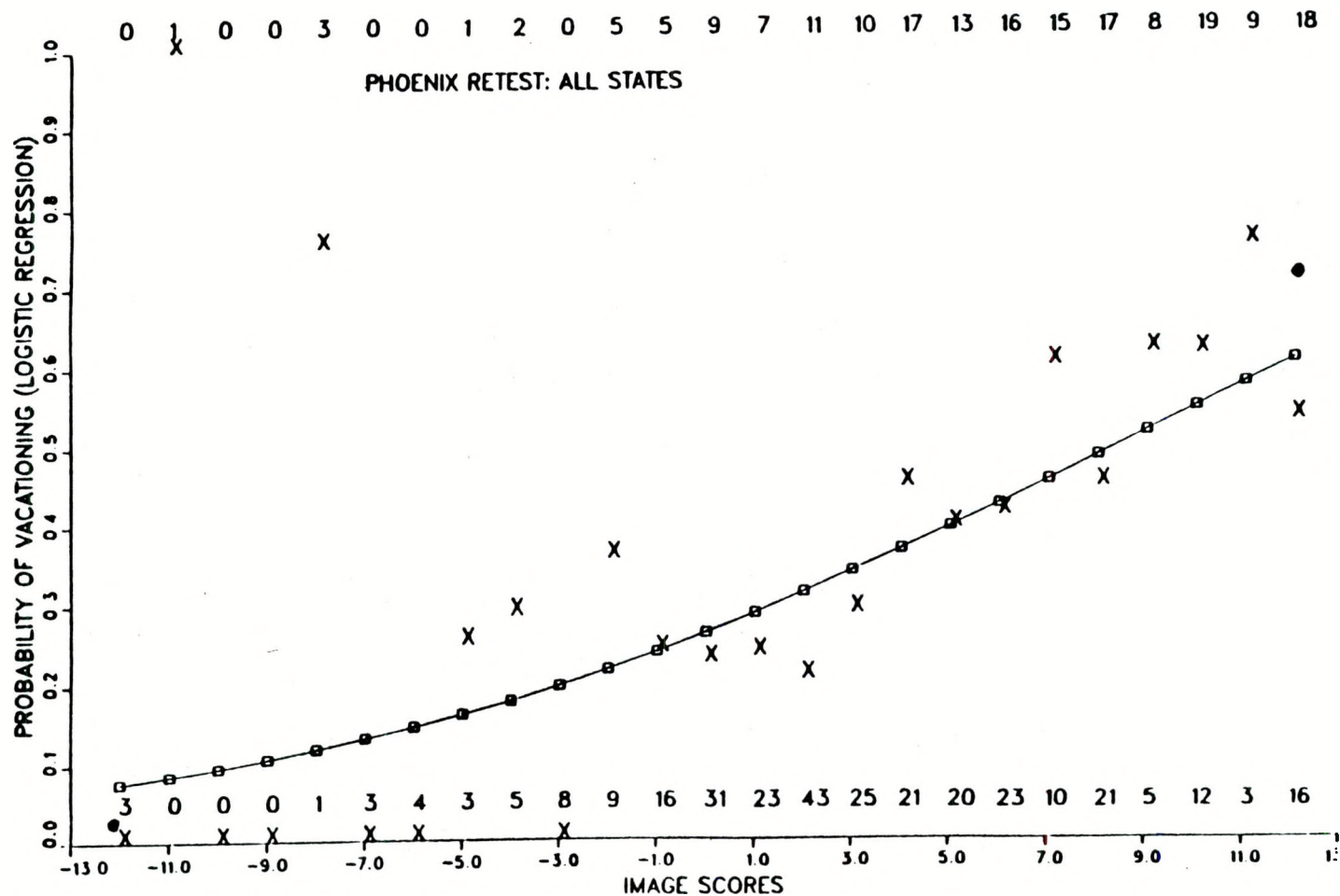


Table 6

Estimated Probability of Previous Vacations as a Function of
the Average of 1988 and 1989 Image Scores

Mean Image Score	Estimated Probability
-12	.03
-11	.04
-10	.04
-9	.05
-8	.06
-7	.07
-6	.08
-5	.10
-4	.11
-3	.13
-2	.16
-1	.18
0	.21
1	.24
2	.28
3	.31
4	.35
5	.39
6	.44
7	.48
8	.53
9	.57
10	.62
11	.66
12	.70

3.1.3 Imagery and Future Vacations

The most important objective of the Retest survey was to test the *predictive* capability of the word-association image scores. This was done by means of logistic regression analysis using a person's 1988 image score for a state or city to estimate the probability that that person would vacation in that place during the subsequent 16-18 months (until the Retest survey). The estimated probabilities for both cities and states are presented in Figures 4 and 5 and in Table 7. These data show that the affective qualities of a person's images of a place are clearly related to the probability that the person will subsequently vacation there, with the relationship being stronger for states than for cities. Comparisons of Figures 3 and 5 shows that image scores appear about as accurate in predicting future vacations (Figure 5) as past vacations (Figure 3).

Additional analyses were conducted, using a person's prior history of living in or vacationing in a place and the presence of friends and relatives in a place, along with the image score, to predict future vacations. A multiple logistic regression analysis showed that the image score for a state remained a strong predictor of future vacationing in that state, even when previous vacations, previous residences, and presence of friends and family were statistically held constant. In addition, the relationship between image scores and future vacationing in a state was strong in the subset of respondents who had not previously vacationed in the state, who had never lived there personally, and who had no friends or relatives in the state. However, the relationship between image scores and future vacations in cities was no longer statistically significant when these other variables were included in the regression equation.

Figure 4

Probability of vacationing in a particular city since May, 1988 as a function of image scores elicited prior to that date (Phoenix surveys).

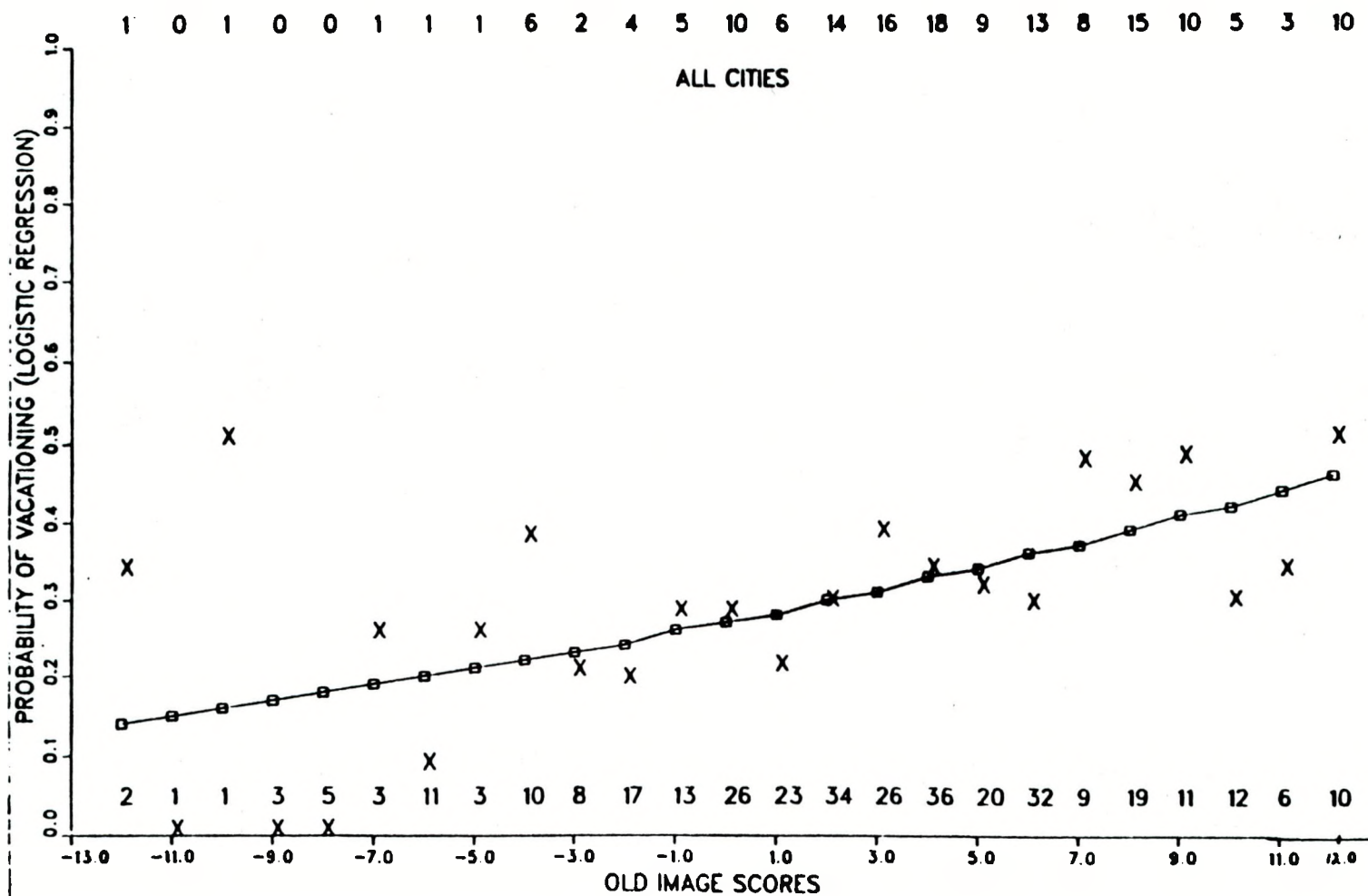


Figure 5

Probability of vacationing in a particular state since May, 1988 as a function of image scores elicited prior to that date (Phoenix survey).

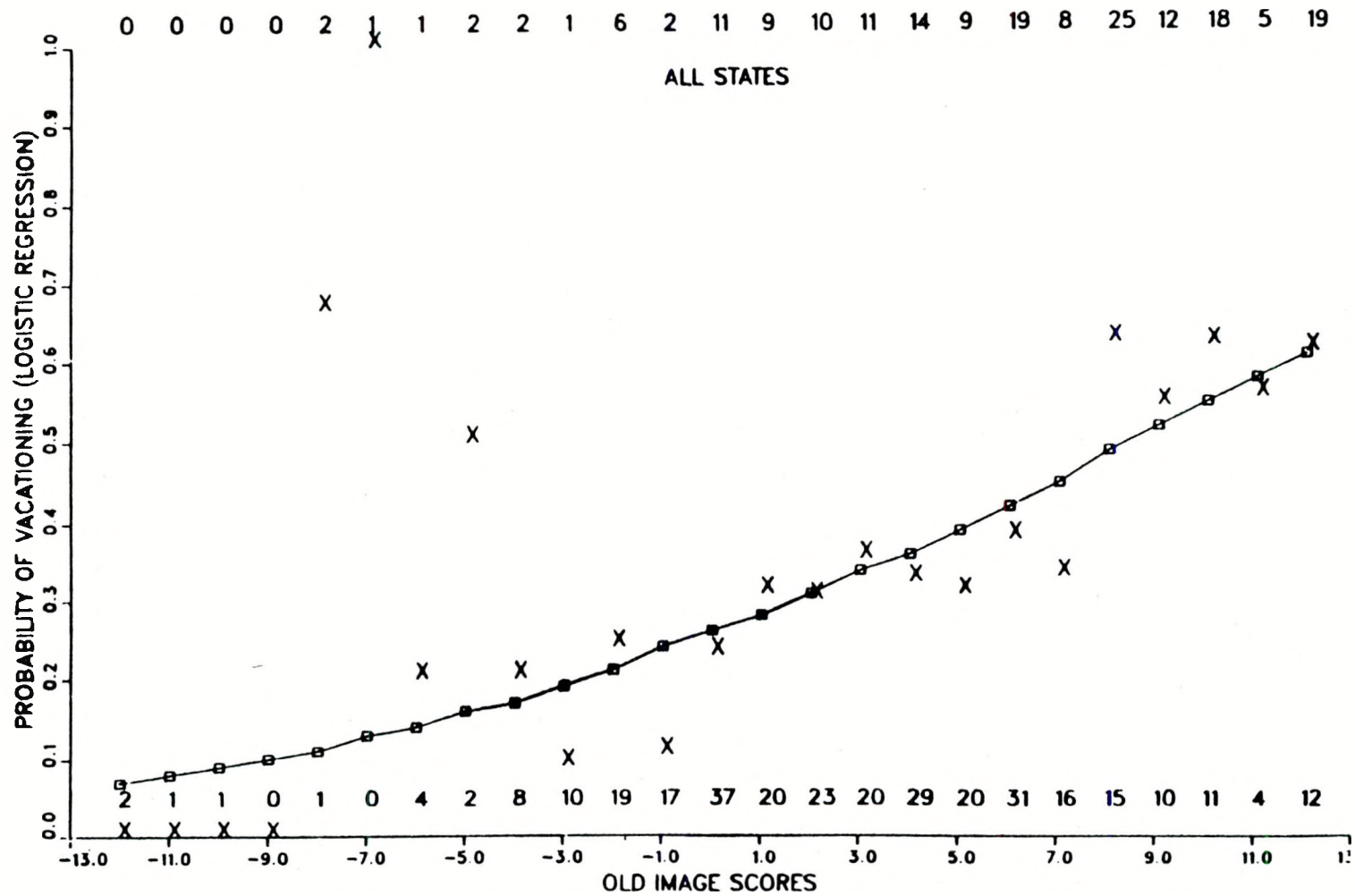


Table 7

Estimated Probability of Future Vacations
As a Function of 1988 Image Scores

Image Score	Estimated Probability	
	Cities Survey	States Survey
-12	0.14	.07
-11	0.15	.08
-10	0.16	.09
-9	0.17	.10
-8	0.18	.11
-7	0.19	.13
-6	0.20	.14
-5	0.21	.16
-4	0.22	.17
-3	0.23	.19
-2	0.24	.21
-1	0.26	.24
0	0.27	.26
1	0.28	.28
2	0.30	.31
3	0.31	.34
4	0.33	.36
5	0.34	.39
6	0.36	.42
7	0.37	.45
8	0.39	.49
9	0.41	.52
10	0.42	.55
11	0.44	.58
12	0.46	.61

3.2 Imagery and Vacation Preferences: Multiple Methods and Multiple Surveys

In this section, we shall present and compare the results from both methods of eliciting images (word association and ratings) for the Phoenix Retest, National, and Southern California surveys.

3.2.1 Imagery and Past Vacations: National Survey

Figures 6 and 7 present the functional relationship between word-association image scores in the National surveys and the probability of having vacationed during the previous 16-18 months in the city or state that elicited those images. Respondents in the National Sample were less likely to have vacationed in any of the four target cities or states, all of which were located in the Western United States. As a result, the relationship between imagery and vacationing was less strong than in the Phoenix sample but was statistically significant nonetheless. As in the Phoenix surveys (both original and retest), imagery was more strongly associated with vacations in states than with vacations in cities.

3.2.2 Nuclear Associations to Nevada and to Las Vegas

Respondents in each of the three surveys were asked to freely associate to the stimulus word Nevada or the stimulus word Las Vegas. In the 1988 Phoenix survey, 39 out of 400 persons produced a nuclear image in response to "Nevada" and 2 persons out of 402 produced a nuclear image in response to "Las Vegas." In the 1989 surveys, nuclear images were rarer. Only 22 persons out of 941 produced an image containing the word "nuclear" in response to "Nevada," and 13 of these had something to do with bombs or bomb testing. Only three persons out of 945 produced a nuclear image in response to the stimulus "Las Vegas."

Figure 6

Probability of having vacationed in a particular city since May, 1988 as a function of the image score for that city (National survey).

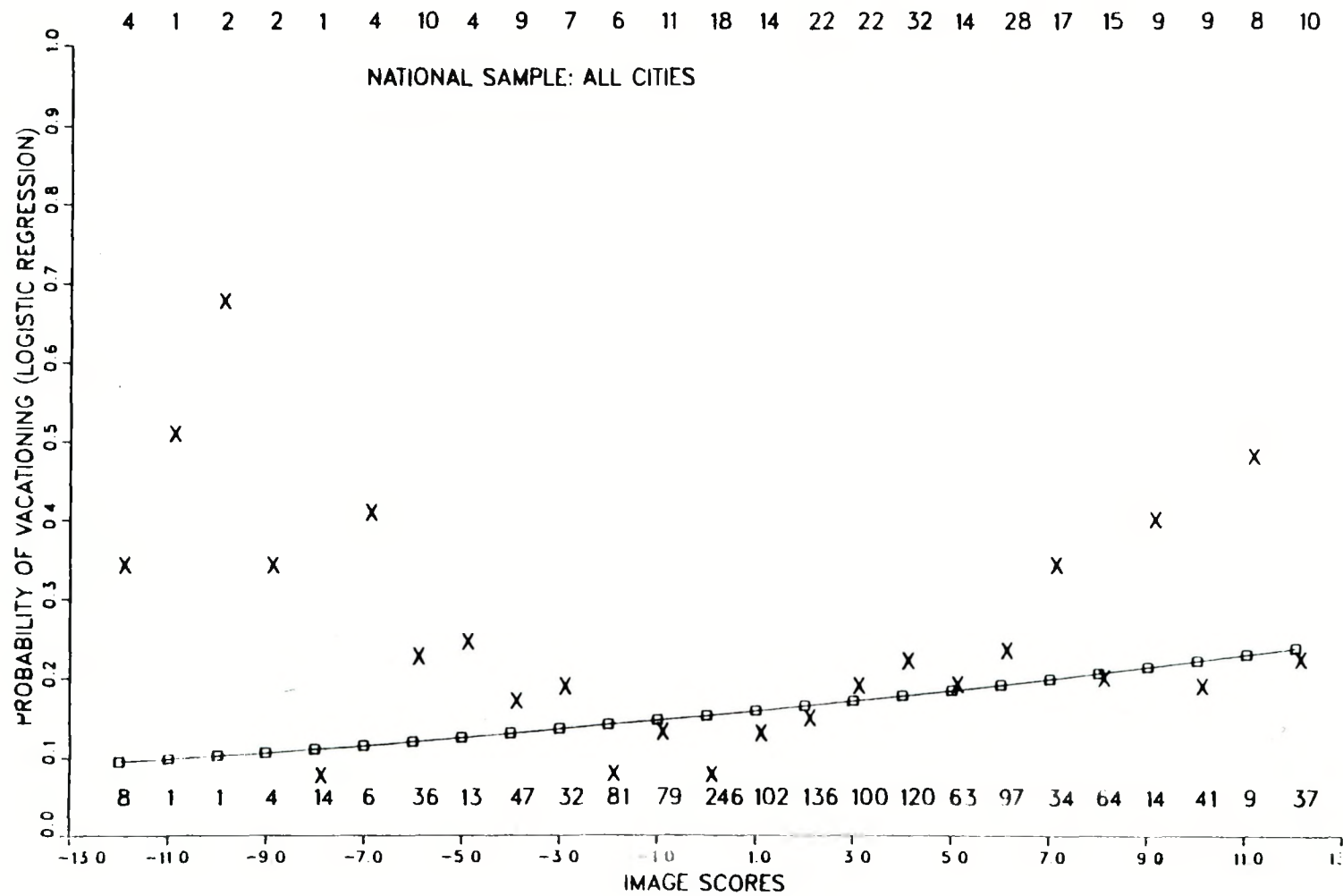
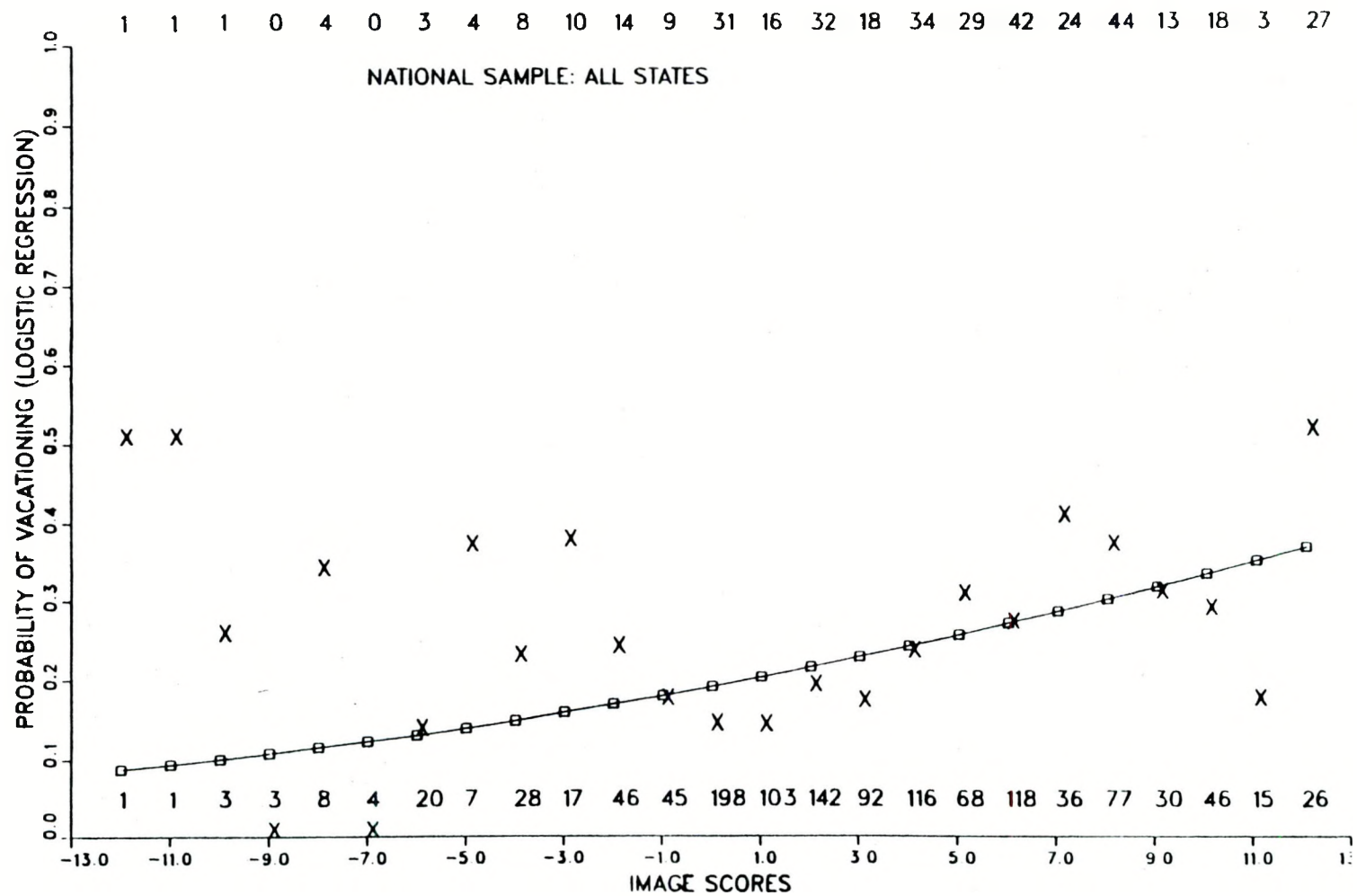


Figure 7

Probability of having vacationed in a particular state since May, 1988 as a function of the image score for that state (National survey).



3.2.3 Rated Strength of Association

Recall that the rating method asked respondents to rate the strength of association between a city (or state) and each of 10 image concepts (entertainment, crime, nuclear, etc.), using a 10-point scale ranging from an extremely weak (1) to an extremely strong (10) association. Table 8 presents the summed percentages of ratings in categories 8, 9, and 10 for the term nuclear as it was paired with various cities or states in the Phoenix Retest, National, and Southern California surveys. Thus we see that, in the Nevada survey, 30% of all the ratings regarding the association between Nevada and the term nuclear were assigned to Categories 8, 9, and 10 (high strength of association). The table shows that, in each of the three surveys, the nuclear image was rated as more strongly associated with Nevada than with any other state with which the word nuclear was paired. California also had a relatively high percentage of strong-association ratings with the term nuclear. Turning to the cities data, the table indicates that Las Vegas was more highly associated with the term nuclear than were any of the other cities (Los Angeles was also high in this regard). Note that New Mexico was not rated particularly highly on the nuclear association despite its significant role in A-bomb testing or its role as the location of the WIPP site. Nor were Denver and Colorado highly associated with things nuclear despite the widely-publicized problems at the Rocky Flats facility, just outside of Denver.

The rating data also indicate that Las Vegas was less closely associated with nuclear than was Nevada, a result that is consistent with the greater number of free associations of nuclear to Nevada found in the original Phoenix surveys and in the 1989 surveys (see Section 3.2.2 above). This consistency with the results of the free association technique and

Table 8
Percentage of 8, 9, and 10 Ratings with "Nuclear"

	Sample Size	Nevada	Cali- fornia	New Mexico	Colo- rado	Arizona	
Phoenix Retest	(131)	30	17	14	17		
National	(409)	20	19	—	9	7	
Southern California	(401)	23	—	9	9	8	
Average ^a	(941)	24.3	18.0	11.5	11.7	7.5	

	Sample Size	Las Vegas	Los Angeles	San Diego	Denver	Phoenix	Albu- querque
Phoenix Retest	(129)	22	16	6	9		
National	(416)	15	15	10	—	9	
Southern California	(400)	17	—	—	5	7	10
Average ^a	(945)	18.0	15.5	8.0	7.0	8.0	10.0

^a This average does not take sample size into account. It gives equal weight to each survey by simply dividing the sum of the percentages by the number of surveys.

Note: Cell entries represent the percentage of ratings for "Nevada-nuclear", "California-nuclear", etc. that were assigned to categories 8, 9, and 10, representing the highest strength of association.

the finding that Las Vegas and Nevada are the most highly rated associates with the term nuclear speak to the sensitivity and validity of the rating method. In particular, although nuclear images were almost never freely produced in response to the stimulus "Las Vegas", the rating data clearly show that Las Vegas is currently linked, albeit weakly, to things nuclear.

Analysis of the relationships between personal characteristics (age, income, political affiliation, etc.) and the rated strength of the Nevada-nuclear association did not reveal any strong effects. The data from the Southern California State survey, shown in Table 9, are typical in this regard. Even sex, which is usually a significant variable in nuclear attitudes, showed no consistent effect across surveys on this associative link.

Further insight into the validity of the rating technique is obtained by comparing the percent of ratings in categories 8, 9, and 10 for associations that one would a priori expect to be quite high or quite low. The proportions of high ratings for all four states and all ten concepts are shown in Table 10 and they are consistent with expectation. For example California was rated as the highest of the four states on entertainment, good restaurants, good weather, crime, outdoor recreation, pollution, interesting, and crowded. Its surprisingly high rating on "nuclear" may be due to respondents being influenced by its other extremely high ratings (i.e., an anchoring effect). Other ratings in the matrix also seem reasonable (e.g. Colorado high on outdoor recreation and low on crime, pollution, and crowded).

Table 9

Rated Association Between Nuclear and Nevada

TABULATED COLUMN= 47-48		EXTREM	RATE	RATE	RATE	MODERT	RATE	RATE	RATE	RATE	EXTREM	DOM'T
(N)	KEY GROUPS	WEAK	2	3	4	STRONG	6	7	8	9	STRONG	KNOW

(401)	ENTIRE SAMPLE	18%	5%	6%	5%	16%	7%	7%	9%	4%	10%	12%
(199)	Married Respondent	20	4	7	6	16	7	9	7	4	8	13
(6)	Living as Married	33	0	17	0	0	17	0	0	33	0	0
(117)	Never Been Married	17	5	5	5	20	7	8	11	3	10	9
(38)	Divorced Respondnt	16	5	8	8	16	5	0	13	5	16	8
(7)	Separated Respndnt	29	0	0	0	14	14	0	14	0	29	0
(26)	Widowed Respondent	8	12	0	4	15	0	8	4	8	15	27
(0)	Had No Schooling	0	0	0	0	0	0	0	0	0	0	0
(3)	Compltd Grades 1-8	0	0	0	33	0	0	0	0	0	0	67
(28)	Compltd Grades 9-11	11	7	0	11	14	0	14	7	4	11	21
(79)	High School Grad	19	5	4	5	11	8	6	9	8	10	15
(151)	Some College Educ	15	5	7	6	17	8	6	12	5	9	11
(82)	College Graduate	24	2	9	4	16	7	9	7	2	15	5
(51)	Postgraduate Degr	22	8	6	4	24	4	6	4	2	8	14
(292)	White Respondent	20	4	5	4	18	7	7	9	6	10	10
(40)	Black Respondent	10	10	8	8	15	5	10	10	0	10	15
(17)	Asian Respondent	12	6	6	18	12	12	12	12	0	0	12
(7)	American Indian	14	0	0	29	0	0	0	0	0	14	43
(37)	Hispanic Respndnt	24	3	11	5	11	3	5	11	0	11	16
(69)	18 to 24 Years Old	17	7	9	9	14	7	6	10	1	10	9
(103)	25 to 34 Years Old	19	4	4	6	19	8	8	10	5	10	8
(97)	35 to 44 Years Old	20	3	10	4	18	6	9	5	5	9	10
(49)	45 to 54 Years Old	18	6	4	4	16	6	4	12	4	14	10
(28)	55 to 64 Years Old	14	4	7	4	18	11	7	11	7	7	11
(48)	65 Years or Older	17	4	0	6	10	2	6	6	6	10	31
(9)	Less than \$5 000	0	0	0	11	33	0	11	11	0	33	0
(35)	\$ 5 000 to \$14 999	29	0	3	0	14	0	3	9	6	11	26
(55)	\$15 000 to \$24 999	13	5	2	9	16	2	11	7	9	16	9
(72)	\$25 000 to \$34 999	18	4	7	6	24	8	7	8	0	8	10
(75)	\$35 000 to \$49 999	17	5	7	4	19	11	9	8	4	11	5
(53)	\$50 000 to \$64 999	19	9	11	11	8	6	8	17	0	4	8
(33)	\$65 000 to \$84 999	21	9	3	3	18	9	3	12	3	9	9
(39)	\$85 000 and Over	21	0	10	3	8	8	8	5	10	13	15
(180)	Male Respondent	16	7	7	6	16	3	9	9	6	12	9
(221)	Female Respondent	21	3	5	5	16	10	5	9	4	8	14
(169)	Republican Respndt	18	5	7	5	15	6	8	12	3	9	12
(141)	Democratic Respndt	20	6	5	6	17	9	5	8	5	11	9
(25)	Independent Respnt	16	0	12	4	20	4	8	4	8	12	12
(27)	Very Liberal Stand	22	7	7	11	7	11	7	4	0	19	4
(90)	Somewhat Liberal	22	3	4	7	17	9	8	7	6	9	9
(141)	Middle of the Road	16	5	6	6	18	5	6	11	4	11	13
(104)	Swhat Conservative	20	6	8	2	16	6	10	8	5	9	12
(24)	Very Conaervative	4	4	8	13	17	4	4	17	0	13	17

Row percentages sum across to 100%.

Table 10
 Percentage of 8, 9, and 10 Ratings
 (National Survey)

<u>Associative Concept</u> <u>Arizona</u>	<u>California</u>		<u>Nevada</u>	<u>Colorado</u>
Entertainment	79	57	41	16
Good Restaurants	72	41	33	18
Good Weather	69	38	32	46
Crime	61	22	12	9
Outdoor Recreation	82	32	68	42
Pollution	64	17	17	14
Interesting	70	41	60	39
Crowded	74	23	17	12
Friendly	30	29	39	36
Nuclear	19	20	9	7

Slovic et al. (1989) found that free associations of things nuclear with the stimulus word "Nevada" were more frequent among persons who knew that the nuclear weapons test site was located in Nevada. Knowledge of the location of the proposed repository had only a slight effect on the Nevada-nuclear association rate. An analogous data analysis was performed on the rated strength of association as shown in Table 11. As with the free-association data collected in 1988, persons who knew the location of the test site rated Nevada-nuclear much more highly than persons without that knowledge. The effect of

Table 11

Mean Strength of Association Rating for
Nevada-nuclear (National and California State Surveys Combined)

		Know Test Site Location		
		No	Yes	
Know Repository Location	No	3.51	4.81	4.12
	Yes	3.28	5.40	4.61
		3.49	4.92	4.19

		373	325	
		42	70	

Note: Inner-cell entries indicate the number of respondents on which the means are based.

knowledge of the proposed repository site was much smaller. Persons who knew the location of both facilities had the highest mean ratings for the Nevada-nuclear association.

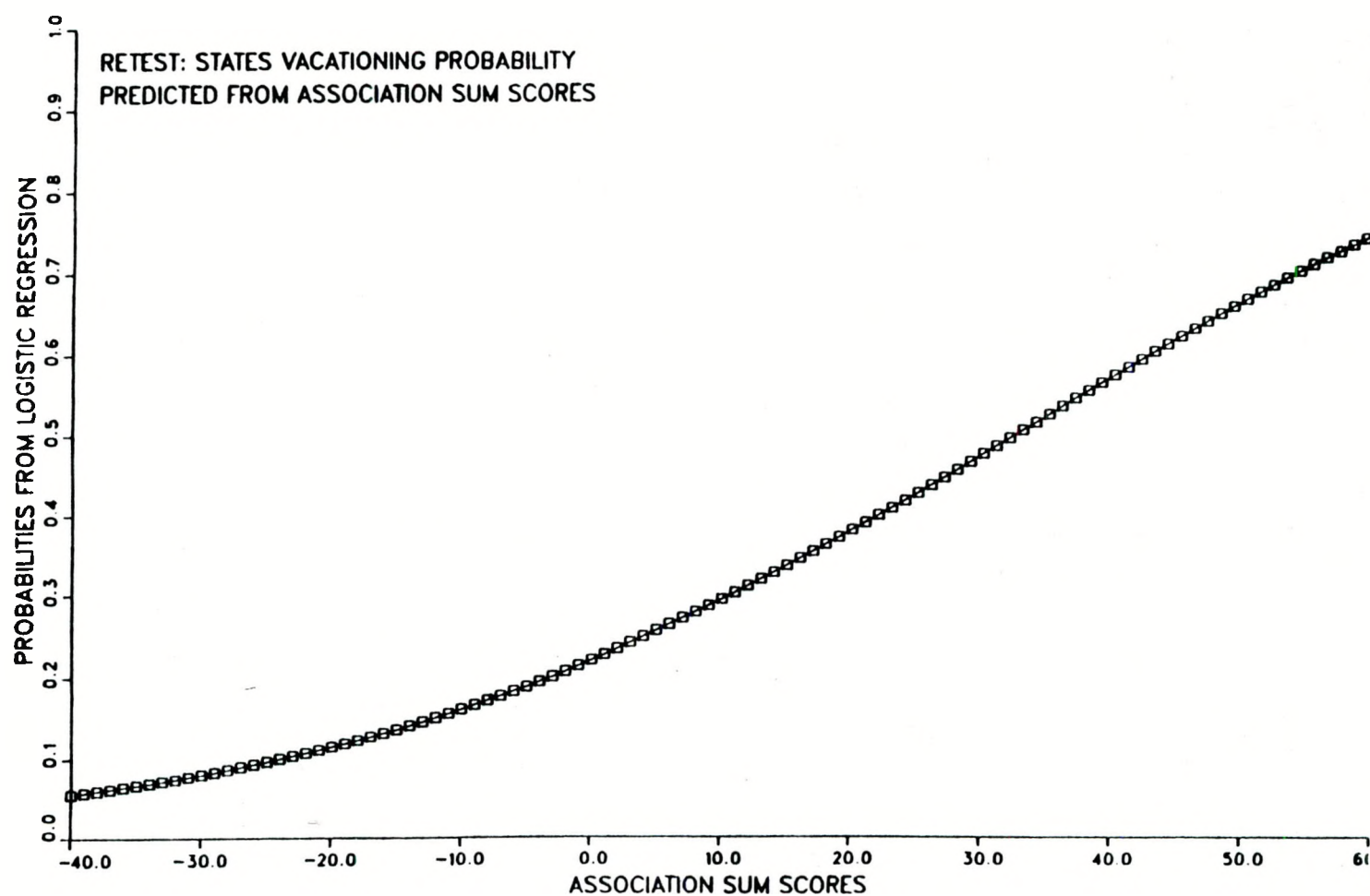
The 1988 and 1989 surveys have demonstrated that image scores for cities and states, based on word associations, are predictive of preference rankings for vacation sites and actual selection of vacation sites. Would the same hold true for image scores based on the association-rating technique? To answer this question we computed, for each respondent and each city or state, an image rating sum score designed to be analogous to the word association image score. Of the 10 images rated for each location, six were assumed to be positive (entertainment, good restaurants, good weather, outdoor recreation, interesting, friendly) and four were assumed to be negative (crime, pollution, nuclear, crowded). Ratings on the 1-10 scale for the six positive terms were simply added. The ratings for the four negative terms were subtracted from the sum of the positive ratings to produce the rating association sum score. This score has a theoretical maximum of 56 and minimum of -36.

A logistic regression analysis was conducted to estimate the probability that a respondent in the Phoenix Retest sample had vacationed in a particular state during the previous 16-18 months, based on the rating association sum score for that person and that state. The best fitting logistic equation, plotted in Figure 8, shows a strong relationship between the association rating score and vacation probability, much as was found with the original word association image scores (see Figure 5).

A second analysis with the State Retest Survey data simply intercorrelated (across respondents) the Image score for Nevada based on word associations, the image score based

Figure 8

Probability of having vacationed in a particular state since May, 1988 as a function of the association rating score for that state (Phoenix Retest survey).



on association ratings, vacation experience in Nevada during the previous 16-18 months (coded 0 or 1; no or yes), the vacation preference ranking for Nevada, and the rated strength of association between Nevada and the term "nuclear". The results, shown in Table 12, indicate that the rating measure of imagery correlates moderately well ($r = .46$) with the word association measure. Both of these measures show significant correlations with the vacation preference ranking and the past vacation experience, with the word association image score showing slightly higher correlations with these measures of preference than the rating measure. We also see that the Nevada-nuclear rating was not significantly correlated with the vacation preference ranking or the past vacation history in Nevada (a similar absence of relationship was observed in the combined data from the Southern California and National Surveys). The Nevada-nuclear rating did correlate $-.33$ with the overall rating score for Nevada, showing that it contributed to the overall score to about the same degree as did the rating of Nevada with crime ($r = -.31$ between the crime rating and the total association rating score for Nevada).

Although the rating of Nevada-nuclear did not predict a person's preference ranking for vacationing in Nevada, other image ratings were highly predictive. For example, the rated association of a city with the term "interesting" showed a strong relationship to preference rank (see Table 13). The table shows that, if the strength of the association with "interesting" was rated low (1 – 4), only 9.9% of those cities were in the most preferred rank (rank 1), whereas 33.1% of those cities rated 8 – 10 on "interesting" were assigned the highest preference rank.

Table 12

Correlations Between Two Forms of Image Scores for Nevada, Two Measures of Vacation Preference, and the Nevada-Nuclear Rating in the Phoenix Retest Survey

	Image Score	Image Rating Score	Past Vacation	Vacation Preference Rank	Nevada -- Nuclear Rating
Image Score (Word Associations)	---				
Image Rating Score	.46 ^a	---			
Past Vacation in Nevada	.24 ^b	.20 ^b	---		
Vacation Preference Rank for Nevada	-.40 ^b	-.33 ^b	-.36	---	
Nevada -- Nuclear Rating	-.01	-.33	.05 ^c	.03 ^c	---

N = approximately 125 for each correlation

^aWord association and rating measure of imagery correlate moderately well.

^bWord-association score (column 1) slightly outpredicts the rating measure (column 2).

^cNevada -- Nuclear rating does not correlate with vacation preferences or behavior.

Table 13

Relationship Between Rated Associations Between a City and the Term "Interesting" and Expressed Preference for Vacationing in that City (Data from All Cities; National Sample)

Rated Strength of Association	Preference Rank			
	1	2	3	4
1-4	9.9	20.3	21.4	48.4
5-7	20.2	23.1	28.5	28.1
8-10	33.1	26.3	23.1	17.5

Cell entries are percentages of ratings. They sum to 100% in each row.

Rank 1 is most preferred; rank 4 is least preferred.

4.0 Discussion

4.1 Major Findings

We have not yet conducted all of the necessary analyses in these three large surveys. Nevertheless, we have done enough analysis to get a fairly clear set of answers to the questions that have motivated these surveys. We have focused on images of various cities and states and the links between the affective quality of these images and both stated rankings of these places as vacation sites and actual vacationing in these places.

In the analyses completed thus far, we have replicated and extended all of the findings from the original Phoenix survey reported in Slovic et al. (1989). Image scores derived from word associations were found to predict the probability that a person had vacationed in a place during the previous 16-18 months. This predictive relationship held

in a national sample of respondents as well as in a sample from Phoenix. Image scores were also predictive of a person's preference rankings of places to vacation. Most important, data from the Retest Survey demonstrated that images predicted future vacation choices as well as past vacations, although the degree of predictability was much stronger for states than for cities. Thus the image-behavior link is strengthened and extended by the 1989 surveys.

We also investigated a method of assessing imagery based on rating the strength of association between image concepts and places. These ratings had face validity (i.e. they were consistent with expectations about associative strength) and they predicted previous vacations and vacation preference rankings almost as well as did images derived from word associations. Whereas respondents rarely volunteered a "nuclear image" in response to the stimulus "Las Vegas", the ratings of associative strength for the "Las Vegas-Nuclear" connection was higher than any other rated association between cities and the nuclear image. This shows that a) the rating technique is more sensitive for detecting weak images than is the word-association technique and b) Las Vegas is more closely linked to things nuclear than any of the other cities studied here. The rating technique also showed that Nevada was more strongly associated with things nuclear than were any of the other states included in the surveys. Nevada was also more strongly associated with nuclear imagery than was Las Vegas, thus replicating the pattern of results obtained with word associations. Although Las Vegas and Nevada are clearly marked as "nuclear places", most of this imagery seems due to the test site rather than to the repository (which does not exist) and the level of nuclear imagery is still quite low compared to more established images (e.g. "entertainment").

The Phoenix Retest Survey provided a unique opportunity to test the consistency between two brief flurries of word associations elicited 16-18 months apart. There was definite similarity between a person's two sets of images of a city or state, both with regard to content and to affective quality (image score). Nevertheless, pairs of image scores correlated only .46 across persons, making the ability of a single set of scores to predict vacation behavior even more impressive in light of the moderate instability (random fluctuation) in the image sets. When reliability was increased by averaging the two image scores, predictability of past vacations became markedly better.

4.2 Future Directions

In addition to completing the present analyses, several research directions seem important to pursue.

First, rated strength of association appears to be valid enough and sensitive enough to use in monitoring studies, designed to track changes in nuclear stigmatization and other imagery over time. However, the finding that rated strength of the nuclear association did not correlate with expressed or actual vacation preferences is puzzling, in light of our earlier finding that persons who freely associated a nuclear image to the state of Nevada expressed less preference for Nevada as a vacation site, compared with persons whose expressed images of Nevada were non-nuclear. Why are freely expressed nuclear images more predictive than ratings? Is this a reliable difference, analogous in some way to the difference between the physical expression of dominant and recessive genes? Or will the behavioral impact of "Nevada-nuclear" and "Las Vegas-nuclear" ratings become apparent if the link becomes strong enough that 70% or more of the public rate it at 8, 9, or 10 (as they

do with images such as "California-interesting")? Research on this topic of dominant vs. recessive or latent imagery would seem worth pursuing.

Another possibility is that the word nuclear is too bland and non-specific to capture the kinds of associations that might be created by a nuclear waste repository. Our study of repository imagery suggests that the term "radioactive" might be a more precise and more powerful indicator of stigmatization than the term "nuclear" and it may be more predictive of behavioral impacts. This needs to be tested in future surveys.

Second, research needs to be done to determine how images develop and change over time, in response to external stimuli. Laboratory studies, in which information is controlled and presented to subjects systematically, could provide valuable information on this topic. We can presume that the media play a key role in creating our associative links, as does the publicity generated by special interest groups (see the figure on the inside cover of this report). However, much more needs to be known about the evolutionary course of nuclear and other imagery.

5.0 References

- Slovic, P., Layman, M., Kraus, N., Chalmers, J., Gesell, G., & Flynn, J. (1989). *Perceived risk, stigma, and potential economic impacts of a high-level nuclear waste repository in Nevada*. Carson City, NV: State of Nevada, Nuclear Waste Project Office.
- Szalay, L. B., & Deese, J. (1978). *Subjective meaning and culture: An assessment through word associations*. Hillsdale, NJ: Erlbaum.

APPENDIX

National States Survey

INTRODUCTION:

Hello, I'm _____ from O'Neil Research. We are conducting a nation-wide survey for what people think about certain STATES and about some of the problems that make them more or less desirable for vacations or as places to live.

First of all, we are trying to get a random sample of household members, and we would like to speak with the person in your household who is 18 years of age or older with the most recent birthday. Are you the person 18 or older who has had the most recent birthday in your household?

1. YES 2. NO

|

|

|

V

|

Could I please speak to the person 18 or older who has had the most recent birthday in your household?

|

1. NO [IF UNAVAILABLE OR NOT HOME, RESCHEDULE CALL BACK]

|

|

2. YES--Hello, I'm _____ from O'Neil Research. We are conducting a nation-wide survey for what people think about certain STATES and about some of the problems that make them more or less desirable for vacations or as places to live.

|

V

|

V

START THESE QUESTIONS WITH THE STATE THAT HAS BEEN CHECKED ON THE INTERVIEW FORM.

FOR EACH STATE, SAY My first question involves word association. For example, when I mention the word baseball, you might think of the World Series, Reggie Jackson, summertime, or even hotdogs. Today, I am interested in the first SIX thoughts or images that come to mind when you hear the name of a PLACE.

Think about _____ for a minute. When you think about _____, what is the first
(STATE) (STATE)
thought or image that comes to mind?

What is the next thought or image you have when I say _____?
(STATE)

_____. Your next thought or image?
(STATE)

What is another thought or image you have about _____?
(STATE)

Tell me another thought or image you have when I say _____.
(STATE)

What additional thought or image comes to mind when you think about _____?
(STATE)

FILL IN BLANKS FOR ALL FOUR STATES BEFORE ASKING QUESTIONS 9-32.

9-32. Next, I want to return to the words you associated with the four STATES to be sure that I understand them. When I say YOUR word, please tell me how it relates to your overall image of the STATE. Is it - VERY POSITIVE, SOMEWHAT POSITIVE, NEUTRAL, SOMEWHAT NEGATIVE, or VERY NEGATIVE? Let's begin (continue) with the words for _____. (STATE)

ID# _____ [1-3] I'VR# _____ [4-6] I'VR _____ CODER _____ VALIDATED _____
 CROTH _____ [7-8] START TIME _____ END TIME _____ DAY _____ DATE _____

_____ COLORADO		VER	SOM		SOM	VER	
		POS	POS	NEU	NEG	MEG	DK
1st	_____	1	2	3	4	5	6
2nd	_____	1	2	3	4	5	6
3rd	_____	1	2	3	4	5	6
4th	_____	1	2	3	4	5	6
5th	_____	1	2	3	4	5	6
6th	_____	1	2	3	4	5	6
		[9-14]					
_____ NEVADA		VER	SOM		SOM	VER	
		POS	POS	NEU	NEG	MEG	DK
1st	_____	1	2	3	4	5	6
2nd	_____	1	2	3	4	5	6
3rd	_____	1	2	3	4	5	6
4th	_____	1	2	3	4	5	6
5th	_____	1	2	3	4	5	6
6th	_____	1	2	3	4	5	6
		[15-20]					
_____ ARIZONA		VER	SOM		SOM	VER	
		POS	POS	NEU	NEG	MEG	DK
1st	_____	1	2	3	4	5	6
2nd	_____	1	2	3	4	5	6
3rd	_____	1	2	3	4	5	6
4th	_____	1	2	3	4	5	6
5th	_____	1	2	3	4	5	6
6th	_____	1	2	3	4	5	6
		[21-26]					
_____ CALIFORNIA		VER	SOM		SOM	VER	
		POS	POS	NEU	NEG	MEG	DK
1st	_____	1	2	3	4	5	6
2nd	_____	1	2	3	4	5	6
3rd	_____	1	2	3	4	5	6
4th	_____	1	2	3	4	5	6
5th	_____	1	2	3	4	5	6
6th	_____	1	2	3	4	5	6
		[27-32]					

33-52. Now, I would like you to rate the strength of association in your mind between each of the following words and the state of NEVADA. On a scale of 1 to 10 where one means you have an extremely WEAK association between that word and NEVADA and 10 means you have an extremely STRONG association between that word and NEVADA.

	EXTREMELY WEAK			MODERATELY STRONG				EXTREMELY STRONG			
	ASSOCIATION			ASSOCIATION				ASSOCIATION			DK
33-34.ENTERTAINMENT	01	02	03	04	05	06	07	08	09	10	00
35-36.GOOD RESTAURANTS	01	02	03	04	05	06	07	08	09	10	00
37-38.GOOD WEATHER	01	02	03	04	05	06	07	08	09	10	00
39-40.CRIME	01	02	03	04	05	06	07	08	09	10	00
41-42.OUTDOOR RECREATION	01	02	03	04	05	06	07	08	09	10	00
43-44.POLLUTION	01	02	03	04	05	06	07	08	09	10	00
45-46.INTERESTING	01	02	03	04	05	06	07	08	09	10	00
47-48.NUCLEAR	01	02	03	04	05	06	07	08	09	10	00
49-50.CROWDED	01	02	03	04	05	06	07	08	09	10	00
51-52.FRIENDLY	01	02	03	04	05	06	07	08	09	10	00

53-72. Now, I would like you to rate the strength of association in your mind between each of the following words and the state of ARIZONA. On a scale of 1 to 10 where one means you have an extremely WEAK association between that word and ARIZONA and 10 means you have an extremely STRONG association between that word and ARIZONA.

	EXTREMELY WEAK ASSOCIATION			MODERATELY STRONG ASSOCIATION				EXTREMELY STRONG ASSOCIATION			DK
53-54.ENTERTAINMENT	01	02	03	04	05	06	07	08	09	10	00
55-56.GOOD RESTAURANTS	01	02	03	04	05	06	07	08	09	10	00
57-58.GOOD WEATHER	01	02	03	04	05	06	07	08	09	10	00
59-60.CRIME	01	02	03	04	05	06	07	08	09	10	00
61-62.OUTDOOR RECREATION	01	02	03	04	05	06	07	08	09	10	00
63-64.POLLUTION	01	02	03	04	05	06	07	08	09	10	00
65-66.INTERESTING	01	02	03	04	05	06	07	08	09	10	00
67-68.NUCLEAR	01	02	03	04	05	06	07	08	09	10	00
69-70.CROWDED	01	02	03	04	05	06	07	08	09	10	00
71-72.FRIENDLY	01	02	03	04	05	06	07	08	09	10	00

73-92. Now, I would like you to rate the strength of association in your mind between each of the following words and the state of COLORADO. On a scale of 1 to 10 where one means you have an extremely WEAK association between that word and COLORADO and 10 means you have an extremely STRONG association between that word and COLORADO.

	EXTREMELY WEAK			MODERATELY STRONG				EXTREMELY STRONG			
	ASSOCIATION			ASSOCIATION				ASSOCIATION			DK
73-74. ENTERTAINMENT	01	02	03	04	05	06	07	08	09	10	00
75-76. GOOD RESTAURANTS	01	02	03	04	05	06	07	08	09	10	00
77-78. GOOD WEATHER	01	02	03	04	05	06	07	08	09	10	00
79-80. CRIME	01	02	03	04	05	06	07	08	09	10	00
81-82. OUTDOOR RECREATION	01	02	03	04	05	06	07	08	09	10	00
83-84. POLLUTION	01	02	03	04	05	06	07	08	09	10	00
85-86. INTERESTING	01	02	03	04	05	06	07	08	09	10	00
87-88. NUCLEAR	01	02	03	04	05	06	07	08	09	10	00
89-90. CROWDED	01	02	03	04	05	06	07	08	09	10	00
91-92. FRIENDLY	01	02	03	04	05	06	07	08	09	10	00

93-112. Now, I would like you to rate the strength of association in your mind between each of the following words and the state of CALIFORNIA. On a scale of 1 to 10 where one means you have an extremely WEAK association between that word and CALIFORNIA and 10 means you have an extremely STRONG association between that word and CALIFORNIA.

	EXTREMELY WEAK			MODERATELY STRONG				EXTREMELY STRONG			
	ASSOCIATION			ASSOCIATION				ASSOCIATION			DK
93-94. ENTERTAINMENT	01	02	03	04	05	06	07	08	09	10	00
95-96. GOOD RESTAURANTS	01	02	03	04	05	06	07	08	09	10	00
97-98. GOOD WEATHER	01	02	03	04	05	06	07	08	09	10	00
99-100. CRIME	01	02	03	04	05	06	07	08	09	10	00
101-102. OUTDOOR RECREATION	01	02	03	04	05	06	07	08	09	10	00
103-104. POLLUTION	01	02	03	04	05	06	07	08	09	10	00
105-106. INTERESTING	01	02	03	04	05	06	07	08	09	10	00
107-108. NUCLEAR	01	02	03	04	05	06	07	08	09	10	00
109-110. CROWDED	01	02	03	04	05	06	07	08	09	10	00
111-112. FRIENDLY	01	02	03	04	05	06	07	08	09	10	00

Now think of these four STATES -- NEVADA, ARIZONA, COLORADO, and CALIFORNIA. Suppose you were going to spend two or more days vacationing sometime over the next year. Assume that transportation costs are no problem. Which one of these STATES would be your:

NV AZ CO CA

113. FIRST CHOICE	1	2	3	4
114. SECOND CHOICE	1	2	3	4
115. THIRD CHOICE	1	2	3	4
116. [INTERVIEWER: CIRCLE REMAINING STATE]	1	2	3	4

117-120. Have you spent two or more days vacationing in _____ during the past two years?

121-124. Have you ever lived in _____?

125-128. Do you have family or close friends living in _____?

	[117-120] VACATION IN 2 YEARS		[121-124] EVER LIVED IN		[125-128] HAVE ANY FAMILY/FRIENDS		
	YES	NO	YES	NO	YES	NO	DK
NEVADA	1	2	1	2	1	2	3
COLORADO	1	2	1	2	1	2	3
CALIFORNIA	1	2	1	2	1	2	3
ARIZONA	1	2	1	2	1	2	3

My next question again involves word association.

Think about an UNDERGROUND NUCLEAR WASTE REPOSITORY for a minute. When you think about this UNDERGROUND NUCLEAR WASTE REPOSITORY, what is the first thought or image that comes to mind?

What is the next thought or image you have when I say UNDERGROUND NUCLEAR WASTE REPOSITORY?

UNDERGROUND NUCLEAR WASTE REPOSITORY. Your next thought or image?

What is another thought or image you have about an UNDERGROUND NUCLEAR WASTE REPOSITORY?

Tell me another thought or image you have when I say UNDERGROUND NUCLEAR WASTE REPOSITORY.

What additional thought or image comes to mind when you think about UNDERGROUND NUCLEAR WASTE REPOSITORY?

=====

FILL IN ALL BLANKS BEFORE ASKING QUESTIONS 129-134.

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129-134. Next, I want to be sure I understand these words and images. When I say YOUR word, please tell me how it relates to your overall image of the REPOSITORY. Is it VERY POSITIVE, SOMEWHAT POSITIVE, NEUTRAL, SOMEWHAT NEGATIVE, OR VERY NEGATIVE?

	VER	SOM		SOM	VER	
	POS	POS	NEU	NEG	NEG	DK
1st	1	2	3	4	5	6
2nd	1	2	3	4	5	6
3rd	1	2	3	4	5	6
4th	1	2	3	4	5	6
5th	1	2	3	4	5	6
th	1	2	3	4	5	6

[129-134]

Now we need to discuss some features of communities that affect people's willingness to visit them or live in them. All regions have exposure to environmental problems and I'd like to read you a list of several sources of pollution. On a scale of 1 to 10, with 1 meaning not at all serious and 10 meaning very serious, please tell me how serious a problem you think each source of pollution is for the UNITED STATES AS A WHOLE. The first source is:

[READ LIST. CIRCLE NUMBER. REPEAT SCALE.]

	NOT SERIOUS				SOMEWHAT SERIOUS				EXTREMELY SERIOUS		DON'T KNOW
135-136. Garbage from city or county landfills	01	02	03	04	05	06	07	08	09	10	00
137-138. Air pollution from cars and factories	01	02	03	04	05	06	07	08	09	10	00
139-140. Radioactive waste from nuclear power plants	01	02	03	04	05	06	07	08	09	10	00
141-142. Water pollution from toxic chemicals	01	02	03	04	05	06	07	08	09	10	00
143-144. Acid rain from power plants	01	02	03	04	05	06	07	08	09	10	00
145-146. Radiation from nuclear weapons testing	01	02	03	04	05	06	07	08	09	10	00
147-148. Transportation accidents during shipments of danger- ous materials	01	02	03	04	05	06	07	08	09	10	00

FINDING places to build new industrial and energy facilities is sometimes difficult these days. I'm going to mention several types of facilities. Assuming that they would be built and operated according to government environmental and safety regulations, you might or might not feel strongly about living close to them. For each type of facility please tell me the closest such a plant could be built from your home before you would want to move to another place or to actively protest, or whether it wouldn't matter to you one way or another how close it was? Please answer in NUMBER OF MILES. [WRITE IN THE NUMBER OF MILES: OR MARK COLUMN IF "DOESN'T MATTER"]

	NO. MILES	DOESN'T MATTER
149-152. A garbage dump (landfill)	— — — —	0000
153-156. A 10-story office building	— — — —	0000
157-160. A nuclear power plant	— — — —	0000
161-164. Plant that manufactures pesticides	— — — —	0000
165-168. An oil refinery	— — — —	0000
169-172. A power plant using coal for fuel	— — — —	0000
173-176. A landfill for chemical waste	— — — —	0000
177-180. An underground nuclear waste repository	— — — —	0000

181. In general, do you favor or oppose building more nuclear power plants in the United States?

1. FAVOR 2. OPPOSE 3. DON'T KNOW/NO ANSWER

182-183. In which state is the nation's nuclear weapons test site located?

01.AL	06.CO	11.HI	16.KS	21.MA	26.MT	31.NM	36.OK	41.SD	46.VA
02.AK	07.CT	12.ID	17.KY	22.MI	27.NE	32.NY	37.OR	42.TN	47.WA
03.AZ	08.DE	13.IL	18.LA	23.MN	28.NV	33.NC	38.PA	43.TX	48.WV
04.AR	09.FL	14.IN	19.ME	24.MS	29.NH	34.ND	39.RI	44.UT	49.WI
05.CA	10.GA	15.IA	20.MD	25.MO	30.NJ	35.OH	40.SC	45.VT	50.WY
00.DK/NO ANSWER									

184-185. Congress has decided that high-level nuclear waste produced by civilian activities such as nuclear power stations should be stored permanently in underground repositories. The U.S. Department of Energy has been instructed to study one site as a potential place to locate this repository. Can you tell me in which state the site being studied by the Department of Energy is located? (CIRCLE STATE CODE)

01.AL	06.CO	11.HI	16.KS	21.MA	26.MT	31.NM	36.OK	41.SD	46.VA
02.AK	07.CT	12.ID	17.KY	22.MI	27.NE	32.NY	37.OR	42.TN	47.WA
03.AZ	08.DE	13.IL	18.LA	23.MN	28.NV	33.NC	38.PA	43.TX	48.WV
04.AR	09.FL	14.IN	19.ME	24.MS	29.NH	34.ND	39.RI	44.UT	49.WI
05.CA	10.GA	15.IA	20.MD	25.MO	30.NJ	35.OH	40.SC	45.VT	50.WY
00.DK/NO ANSWER									

Management of radioactive waste is a major federal and state responsibility. Efforts to manage existing waste sites and to establish new sites could lead to possible benefits and problems for states and local communities.

I am going to read a list of possible benefits and problems, and I'd like you to tell me whether you think each one is likely or unlikely to be a result of nuclear waste management activities, including the development of new waste sites. On a scale of 1 to 10, with 1 meaning NOT AT ALL LIKELY to occur and 10 meaning VERY LIKELY to occur, please tell me how likely you think each benefit or problem will be.
[READ LIST. CIRCLE NUMBER. REPEAT SCALE FOR EACH ITEM.]

	NOT LIKELY				SOMEWHAT LIKELY					EXTREMELY LIKELY		DON'T KNOW
	01	02	03	04	05	06	07	08	09	10	00	
186-187. Create a significant number of new jobs in near by local communities												
188-189. Cause fear among community residents about nuclear waste activities	01	02	03	04	05	06	07	08	09	10	00	
190-191. Greatly increase revenues to state and local governments	01	02	03	04	05	06	07	08	09	10	00	
192-193. Lead to serious accidents in the transportation of nuclear waste	01	02	03	04	05	06	07	08	09	10	00	
194-195. Result in areas near nuclear waste facilities being labelled "Nuclear Dump" areas	01	02	03	04	05	06	07	08	09	10	00	
196-197. Cause some tourists or other visitors to avoid coming to communities located near nuclear waste facilities	01	02	03	04	05	06	07	08	09	10	00	
198-199. How likely do you think it is that activities at the nation's nuclear facilities have in the PAST caused health problems for people who live near such activities?	01	02	03	04	05	06	07	08	09	10	00	
200-201. How likely do you think it is that activities at the nation's nuclear facilities will in the FUTURE cause health problems for those who live near such facilities?	01	02	03	04	05	06	07	08	09	10	00	

Now I am going to read you a list of statements about nuclear waste facilities and activities. In response to each statement would you please tell me if you STRONGLY DISAGREE, SOMEWHAT DISAGREE, NEITHER AGREE NOR DISAGREE, SOMEWHAT AGREE, or STRONGLY AGREE.

STATEMENT	STRONGLY DISAGREE	SOMEWHAT DISAGREE	NEITHER	SOMEWHAT AGREE	STRONGLY AGREE	DON'T KNOW
202. Highway and rail accidents will occur in transporting the nuclear waste.	1	2	3	4	5	6
203. Nuclear waste repositories can be made safe so that future generations will not accidentally dig into them looking for resources.	1	2	3	4	5	6
204. A future earthquake, volcanic activity or other natural phenomenon may cause release of nuclear waste to the outside environment.	1	2	3	4	5	6
205. The buried waste will be contained in the waste sites so that contamination of underground water supplies will not occur.	1	2	3	4	5	6
206. Accidents will occur in handling the materials during the burial operations and result in contamination of workers or radioactive releases into the air and ground	1	2	3	4	5	6
207. Shipments of nuclear waste can be made safe from sabotage/attack by terrorists	1	2	3	4	5	6
208. The U.S. Department of Energy can be trusted to provide prompt and full disclosure of any accidents or serious problems with their nuclear waste management programs.	1	2	3	4	5	6

209. On balance, thinking about the areas in which nuclear waste facilities are located, do you think that the possible benefits from a nuclear waste program outweigh the possible harmful effects, that the possible harmful effects outweigh the possible benefits, or that they are equal?

1. BENEFITS OUTWEIGH HARM 2. HARM OUTWEIGHS BENEFITS 3. BALANCE 4. DON'T KNOW

210. Many communities and states are opposed to siting nuclear waste facilities in or near their boundaries. Sometimes opponents to proposed sites claim that questions of "fairness" need to be considered. Please give us your answer to the question, "Do you think it is fair for one state to be asked to serve as the site for a repository for nuclear waste generated by the other states?"

1. YES 2. NO 3. DON'T KNOW/NO ANSWER

211. Do you think it is fair for a state that does not produce high-level nuclear waste to be asked to serve as a site for a nuclear waste repository?

1. YES 2. NO 3. DON'T KNOW/NO ANSWER

212. I'm going to read you a list of 5 statements. At the end, I'm going to ask you to tell me which you think is the most fair way to deal with high level nuclear waste, and which way is the least fair. Please listen carefully as I read the statements. [READ LIST]
Which of those options do you think is the MOST FAIR way to deal with high-level nuclear waste? [WRITE IN CODE FOR FIRST ANSWER ONLY]

1. Continued storage of waste at each nuclear plant where the waste are generated.
2. A site for each state to store waste from that state.
3. A number of regional repositories for waste from several states.
4. One site in the western United States, and one in the East.
5. Only one repository to take the waste from the whole country.
6. Don't know/No answer. [DO NOT READ]

213. Which of those options do you think is LEAST FAIR way to deal with high-level nuclear waste? [DO NOT READ UNLESS NECESSARY] [WRITE IN CODE FOR FIRST ANSWER ONLY.]

1. Continued storage of waste at each nuclear plant where the waste are generated.
2. A site for each state to store waste from that state.
3. A number of regional repositories for waste from several states.
4. One site in the western United States, and one in the East.
5. Only one repository to take the waste from the whole country.
6. Don't know/No answer. [DO NOT READ]

214. Do you believe that the federal government will do better in constructing and operating future nuclear waste repositories than they have in running their other nuclear facilities.

1. YES 2. NO 3. DON'T KNOW/NO ANSWER

215. During the past year, have you seen or heard of any problems at the federal government nuclear facilities?

- | | |
|----------------|--------|
| 2. NO | 1. YES |
| 3. DON'T KNOW/ | |
| NO ANSWER | |
| | V |

00 216-217. Would you tell me what problems you recall hearing about?

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218-219. On a scale of 1 to 10 where 1 is NOT AT ALL SERIOUS and 10 is VERY SERIOUS, how would you rate the seriousness of the problem you just described?

00 01 02 03 04 05 06 07 08 09 10 00 - DON'T KNOW

V

GO TO NEXT PAGE

220. Some people are quite active in politics, while others prefer not to take an active part. Think back on the past four years or so. During this time, have YOU written or talked to your Congressional Representative, Senator, or any federal, state, or local official to let them know what you would like them to do on a public issue?

1. YES 2. NO 3. DON'T KNOW

221. In the last four years, have you contributed money to a political party, a candidate for a political office, or to pass or defeat a ballot measure?

1. YES 2. NO 3. DON'T KNOW

222. In the last four years, have you participated in any marches, rallies, or demonstrations?

1. YES 2. NO 3. DON'T KNOW

Finally, we would like to ask some questions about yourself and your family to help us interpret the results of this study. Remember that your responses are completely confidential.

223. What was the highest grade of school or year of college that you completed?

(DO NOT READ LIST)

1. NO SCHOOL 2. GRADE SCHOOL(1-8) 3. SOME HIGH SCHOOL(9-11) 4. HIGH SCHOOL GRADUATE(12)
5. SOME COLLEGE(1-3) 6. COLLEGE GRADUATE 7. POSTGRADUATE(17+) 8. DK 9. REFUSED

224. What is your occupation? --IF UNCLEAR ASK: What is the nature of the work you do?

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V

What's your actual position?/
Does it have a name or title?

IF RETIRED ASK: What did you do before you retired?

225. How would you describe the organization you work for (or most recently worked for (IF RETIRED))? Would you say it is a COMPANY OR BUSINESS, A GOVERNMENT AGENCY, A NOT-FOR-PROFIT ORGANIZATION, or are you SELF-EMPLOYED?

1. COMPANY OR BUSINESS 2. GOVERNMENT AGENCY 3. NOT-FOR-PROFIT ORGANIZATION
4. SELF-EMPLOYED 5. OTHER (SPECIFY) 6. DON'T KNOW

226. In terms of your age, are you ...

1. BETWEEN 18 AND 24 2. BETWEEN 25 AND 34 3. BETWEEN 35 AND 44 4. BETWEEN 45 AND 54
5. BETWEEN 55 AND 64 6. 65 OR OLDER? 7. DON'T KNOW 7. REFUSED

227. What is your current marital status? Are you...(READ LIST)

1. MARRIED 4. DIVORCED 7. REFUSED
2. LIVING AS MARRIED 5. SEPARATED 8. DON'T KNOW
3. SINGLE AND NEVER BEEN MARRIED 6. WIDOWED

228. To which political party do you belong?

1. REPUBLICAN 2. DEMOCRAT 3. INDEPENDENT 4. NONE 5. OTHER

229. Which of the following terms best describes your usual stand on political issues? Are you VERY LIBERAL, SOMEWHAT LIBERAL, MIDDLE OF THE ROAD, SOMEWHAT CONSERVATIVE, OR VERY CONSERVATIVE?

1. VERY LIBERAL 2. SOMEWHAT LIBERAL 3. MIDDLE OF THE ROAD
4. SOMEWHAT CONSERVATIVE 5. VERY CONSERVATIVE 6. REFUSED 7. DON'T KNOW

230. How would you describe your racial or ethnic background?

1. WHITE/ANGLO/CAUCASIAN 4. AMERICAN INDIAN/NATIVE AMERICAN
2. BLACK/NEGRO 5. MEXICAN/MEXICAN AMERICAN/CHICANO/HISPANIC/LATIN
3. ASIAN OR ORIENTAL 6. OTHER (RECODE WHERE POSSIBLE) Specify: _____

231-232. About how many years have you lived in your present community? ____ YEARS

233-237. What is your zip code? _____

238-239. How long did you live in your last community before moving to your present community?
____ YEARS

240. Are you buying or own your own home, or do you rent?

1. OWN OR BUYING HOME 2. RENT

241-242. Including yourself how many people over the age of 18 live in your household? ____

243-244. How many children under the age of 18 live in your household? ____

245-246. I'd like to read some general categories regarding levels of family income. They refer to total family income from all sources, before taxes in 1988. Please tell me to stop when I reach your category.

01. LESS THAN \$5,000 02. \$5,000-\$14,999 03. \$15,000-\$24,999 04. \$25,000-\$34,999
05. \$35,000-\$49,999 06. \$50,000-\$64,999 07. \$65,000-\$84,999 08. \$85,000 AND OVER
09. DON'T KNOW 10. REFUSED

Thank you very much for your help. Could I have your first name in case my supervisor needs to verify that I conducted this interview?

NAME

And your phone number is _____? (NUMBER)

247. (SEX OF RESPONDENT: DON'T ASK UNLESS NECESSARY) 1. MALE 2. FEMALE

248. TIME ZONE [DO NOT ASK] [CODE FROM SAMPLE]

1. EASTERN STANDARD TIME 2. CENTRAL TIME
3. MOUNTAIN TIME 4. PACIFIC STANDARD TIME

I certify that this is an honest interview conducted in accordance with my instructions.

Signature of Interviewer

REVIEW INTERVIEW THEN RECORD END TIME AND TELEPHONE NUMBER ON COVER PAGE.