
PERCEPTION OF ENVIRONMENTAL RISK IN THREE EL PASO COMMUNITIES

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ABSTRACT Perceptions of environmental risk were explored in three communities of El Paso, Texas, through a series of focus groups and a door-to-door survey of 147 residents. Included in the survey were questions about a) knowledge of environmental risks and the perceived level of risk, b) sources of information and source credibility, and c) general attitudes about risk, locus of control, and the government's ability to protect the population. The three communities, each of different SES, were compared for differences in risk perceptions, knowledge, and attitudes. In general, perceived risk to self and family was consistently lower than perceived risk to the community as a whole, especially for risks that might be considered behavioral in nature. Surprisingly, only a small proportion of respondents were even aware of local and national environmental agencies. The media was by far the most common source of environmental risk information. These results demonstrate a clear need for improved environmental risk communication along the U.S.-Mexico border.

KEYWORDS: risk perception, risk communication, U.S./Mexico border

INTRODUCTION

Effectively communicating environmental risk is of utmost importance if communities are to be involved in the discussion of environmental issues. In order to effectively communicate risk, it is necessary to understand how communities perceive the risks in their environment. Communicating about environmental risks is becoming particularly important along the U.S.-Mexico border due to the increase in industrial activity as a result of NAFTA, and an increase in the public's awareness of the risks to health associated with environmental contamination, and issues concerning the migration of contaminants from one country into the other.

Many factors can affect a community's perception of risk. Sandman [1] refers to "outrage factors" when describing how communities evaluate riskiness. In

particular, risks that are perceived to be involuntary, industrial, unfair, exotic, memorable, and dreaded are considered more risky than those that are voluntary, natural, fair, familiar, not memorable, and not dreaded. Studies have also shown that gender, race, and culture can greatly affect perceptions of risk [2-4]. Given the unique cultural mix of the area, it is likely that perceptions of risk by the population will be very different from those of agencies wishing to serve the area. Since virtually no information was available about risk perceptions in this area, we felt that it was important to conduct a pilot study to explore the environmental and other health risk perceptions of three culturally distinct communities in El Paso, Texas.

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METHODS

Study population and sample

El Paso, Texas, is a city of approximately 600,000 people, 70% of whom are of Hispanic origin. To assure that our sample represented a diverse cross-section of the community, we selected three geographically distinct areas in El Paso with varying levels of per capita income: 1) the lower valley of El Paso represented a more rural, low-income community; 2) central El Paso represented an urban, low-income community; and, 3) west El Paso represented an urban, higher income area.

The lower valley is comprised mostly of *colonias*, sections of El Paso County where residents are not served by municipal water and sewerage. The *colonias* include a wide range of types of dwellings; however residents of this area must often obtain water from outside sources and use septic tanks or pit latrines. Central and west El Paso are both within city limits and receive all the usual municipal services. The community in central El Paso is surrounded by an industrial area (e.g., chemical and garment manufacturing plants, oil refineries). West El Paso is primarily residential. According to the 1990 Census, 89.6% of Lower valley

residents, 96% of central El Paso residents and 39.6% of west El Paso residents reported their ethnicity as Hispanic.

Using convenience sampling, adults from 147 households representing three zip code areas were interviewed for this study. Face-to-face interviews were conducted by bilingual (English and Spanish) interviewers. One adult from each of the participating households was interviewed. Demographic characteristics of the study sample are described in Table 1.

Study design and instrument

The questionnaire was an adaptation of an existing instrument which was developed by Slovic, *et al.* [5], for use in the Canadian population. To refine the study instrument and ensure its appropriateness for the target population, we conducted focus groups of persons representing the three study geographic areas. Four community focus groups were conducted, two in central El Paso, one in the lower valley of El Paso, and one on the west side of El Paso. A moderator's guide was developed for use in the groups to facilitate and structure the discussion. Discussion centered on how participants defined risk and risk perception, their familiarity with various environmental

TABLE 1. CHARACTERISTICS OF THE SAMPLE.

Characteristic	Lower Valley	Central El Paso	West El Paso
Employed			
yes	35.3%	26.0%	86.7%
no	64.7%	74.0%	13.3%
Highest educational level			
≤ Grade 6	41.2%	31.3%	4.3%
HS graduate	43.1%	43.8%	2.2%
Some college	11.8%	16.7%	32.6%
College grad	2.0%	4.2%	37.0%
Beyond college	2.0%	4.2%	23.9%
Per capita income	\$5,495	\$4,634	\$17,884

and health risks, and their use and familiarity with various information sources in the community. Based on our findings from the focus groups, the original questionnaire was shortened, questions about little known risks were removed and those regarding other risks specific to the border were added, and questions to measure fatalism were developed.

The study questionnaire included questions regarding knowledge and evaluation of environmental and health risks in El Paso, sources of risk information and their credibility, responsibility of sources to give risk information, and how well sources met that responsibility. The questionnaire also measured attitudes toward environmental and other health-related issues, as well as demographics and personal health practices.

Data collection methods

Data were collected from May through September, 1995. Among individuals who were approached, the number of refusals was less than 10%. After verbal consent was obtained, the interview was conducted in participants' homes in either English or Spanish. The interview took approximately 40 minutes to complete.

Data analysis

Survey data were analyzed using SPSS. Frequencies and proportions were used to describe the sample. The Chi-square statistic was used to test the statistical significance of cross-tabulation. Focus group data were analyzed using qualitative methods. Focus group data were used to support and explain survey data.

RESULTS

Characteristics of the sample population

In the Lower Valley and west El Paso, the largest age category was 30 to 44 years (37% of the sample for each). In central El Paso, the sample was older, with 40% in the > 55 age category. The majority of the west El Pasoans interviewed (86.7%) reported that they were employed, while those in the Lower Valley and central El Paso less often reported employment. In west El Paso, 94% of respondents reported having had some college or more education, compared to 16% in the Lower Valley and 24% in central El Paso (Table 1).

Perception of risk from particular hazards

When we look at the data for all three samples areas as a whole, crime is the item most often considered "high risk" for self and family (38.1%), followed by destruction of the ozone layer (37.9%), illegal dumping of hazardous waste (36.7%), nuclear waste (36.4%), and lack of sewerage (35.4%). The ranking of all twenty hazards can be found in Table 2. "Risk to the community as a whole" followed a similar pattern, with every hazard for the community rated as "high risk" by a larger percentage of respondents than the same hazard for self and family (Table 3).

When the three communities are considered separately, the rank order of perceived risk changes (Table 4). Overall, the west El Paso group has a lower percentage of respondents answering "high risk" than the other two groups. The hazards ranked "high risk" by the largest proportion of the sample were lack of sewerage (80.4%) for the Lower Valley group, nuclear waste (48.9%) for the central El Paso group, and ambient air

pollution (28.3%) for the west El Paso group.

Perception of information sources

The majority of respondents reported getting a “fair amount” to “a lot” of information from media sources, with television being the most frequently reported source (64%), followed by newspapers (44%), and radio (27%). Only 12% of respondents reported receiving information from industry, and only 16% from the EPA.

Regarding the amount of confidence they have in information sources, the majority (66%) reported that they have “a fair amount” to “a lot” of confidence in the EPA. Fifty-five percent reported having confidence in television, 57% in newspaper, 46% in radio, and only 20% reported having confidence in industry.

General attitude questions

Regarding general attitudes toward chemicals, only 13% of the respondents *strongly agreed* with the statement “chemicals have improved our health more than they have harmed it.” Thirty-eight percent *strongly agreed* with the statement “most chemicals cause cancer,” and 33% *strongly agreed* that “man-made chemicals are more dangerous than natural chemicals.” However, 47% *agreed* that they “don’t worry about chemicals because there are just too many other things in life they have to deal with.”

When asked about attitudes toward regulations and experts, 70% *disagreed* that “there should be fewer laws regulating chemicals.” Seventy-five percent *agreed* with the statement “experts can make accurate estimates of the health risks from chemicals in the environment.” Yet, 67%

TABLE 2. PERCENT OF RESPONDENTS ANSWERING “HIGH RISK TO ME AND MY FAMILY” TO EACH OF 20 HAZARDS MENTIONED.

Crime	38.1%
Ozone	37.9%
Dumping hazardous waste	36.7%
Nuclear waste	36.4%
No sewerage	35.4%
Sun exposure	33.6%
Chemicals	32.4%
AIDS	31.7%
Car accidents	31.7%
Waste incinerators	29.7%
Ambient air pollution	28.3%
Global warming	28.2%
Pesticides in food	26.4%
Drugs	25.0%
Contaminated water	24.5%
Smoking	24.5%
Bacteria in food	21.5%
High tension wires	10.8%
Asbestos	09.8%
Indoor air quality	03.5%

disagreed with the following statement: “When there is a really serious health problem, the government will do something about it. Until they tell me about a problem, I don’t really have to worry.”

Several questions related to the impact that people can have on the environment. Ninety percent of respondents *agreed* that “if people work together they can change the environment,” while 97% *agreed* that “changes people make today can effect the environment of the future.” Ninety-four percent *agreed* that “there are things I can do to improve the environment.” Still, 50%

agreed that “I am completely at a loss about what to do about environmental problems.”

General attitudes about environmental risk included questions about “acceptable risk.” Sixty-three percent *strongly agreed* that “if even a tiny amount of a substance that could make me sick were found in my tap water, I wouldn’t drink it.” Thirty-six percent *strongly disagreed* that “El Pasoans should be willing to accept some risks to their health in order to strengthen the economy.” Thirty-two percent *strongly agreed* with the statement “I believe that a risk-free environment is an attainable goal in El

TABLE 3. COMPARISON OF “HIGH RISK TO SELF AND FAMILY” VS. “HIGH RISK TO THE COMMUNITY” FOR THE 20 HAZARDS MENTIONED.

Hazard	Self	Community	Difference
Pesticides in food	26.4%	30.1%	03.7%
Nuclear waste	36.4%	40.9%	04.5%
Indoor air quality	03.5%	06.6%	04.7%
Ozone	37.9%	43.5%	05.6%
Asbestos	09.8%	15.5%	05.7%
Bacteria in food	21.5%	27.3%	05.8%
No sewerage	35.4%	41.3%	05.9%
High tension wires	10.8%	17.9%	07.1%
Waste incinerators	29.7%	36.8%	07.1%
Global warming	28.2%	35.3%	07.1%
Sun exposure	33.6%	43.4%	09.8%
Chemicals	32.4%	45.5%	13.1%
Ambient air pollution	28.3%	43.2%	14.9%
Car accidents	31.7%	48.6%	16.9%
Contaminated water	24.5%	39.7%	15.2%
Dumping hazardous waste	36.7%	57.3%	20.6%
Smoking	24.5%	45.9%	21.4%
Crime	38.1%	64.8%	26.7%
AIDS	31.7%	61.5%	29.8%
Drugs	25.0%	65.9%	40.9%

TABLE 4. RISK TO SELF VS. RISK TO COMMUNITY FOR THE LOWER VALLEY.

Type of Hazard	Risk to self	Risk to community
Pesticides in food	38.3%	35.6%
No sewerage	80.4%	62.0%
Chemicals	46.0%	44.0%
Waste incinerators	56.9%	51.0%

Paso.”

DISCUSSION

Clearly, risks are perceived differently in different areas of the city. This may partly be due to the real differences in risk in different areas. Those in the higher income areas perceived all hazards as less risky and, in fact, they have fewer industries in their area and are adequately served by city utilities.

In general, people perceive less risk to themselves than to the community as a whole for all hazards. This may be due to an “optimistic bias,” which operates for many kinds of risks. This did not hold true, however, for four hazards in the Lower Valley; pesticides in food, no sewerage, chemicals in the environment, and waste incinerators. It makes sense that Lower Valley residents would see lack of sewerage as a particularly severe risk for themselves, since they are not served by the municipal system. There is not a clear reason why they would see the other hazards as particularly risky for themselves and not for the community as a whole. The Lower Valley is a community that has struggled to bring about changes to improve the quality of life in the area, and many of their efforts have not been fruitful. This may lead to a feeling of helplessness and a tendency to feel that self and family are more at risk because government agencies have not been responsive to the needs of the community. Hance and associates [6] suggest that in addition to explaining risks to the public, agencies need to place a greater priority on understanding the community’s concerns and values and involving them in risk decisions. This has not been a priority in the Lower Valley, and residents may feel that nothing they do will ever change the existing risk conditions.

Knowing from what sources people get health risk information can shed light on why people are concerned about particular risks. Clearly, the goals of mass media are different from the goals of government and health agencies. Television in particular, in order to maintain viewership, seeks the most “visual” stories, and may choose not to air more mundane spots. Television seems to be a major source of information about environmental risk, and although residents expressed confidence in the EPA, the majority had not received information from them, and most did not even know of the agency. This is particularly interesting, since the EPA has recently placed an office in El Paso. In general, people stated they did not receive, and would not have confidence in, information about risk from industry. The way that risk is portrayed by the media, and the methods they use to choose stories, may have an influence on people’s perceptions of risk. For example, depletion of the ozone layer was rated as one of the highest risks for El Paso. It may be that because the news media reports on ambient ozone levels almost daily, that the public confuses this with ozone depletion. The need to educate the media is evident.

In this sample, respondents were clearly concerned about chemical hazards, but felt too overwhelmed with everyday life to think about the risk. They believed that experts could accurately estimate the risk of health problems from environmental hazards, but did not have confidence that the government would respond to their need to know. There was a strong indication that they believed that changes might be made, and that they as individuals and as communities could make changes, but were not clear about what actions should be taken.

CONCLUSIONS

Public perceptions of risk are important because they influence policy. Misperceptions help to create poor policy. Effective risk communication may be useful in changing the public's understanding of environmental risk, and in involving communities in decisions about their environment and their health. To effectively communicate risk, it is necessary for "experts" to understand that the public perceives risks differently, and that their perception of risk is colored by many factors, including issues of control and emotion.

We are currently analyzing this data more carefully to examine the differences in perception between the three communities and to identify the factors most closely related to these perceptions. We also plan on additional studies of the media, in particular the way that the mass media cover environmental issues and how this coverage varies between stations in the U.S. and Mexico. Educating the media about environmental policy and environmental risk may well be the most effective means of improving the public's awareness and understanding of these issues.

The EPA should become more active in communities and should also be trained in methods of risk communication since people express a high level of confidence in the agency. Respondents were very optimistic in their belief that the environment can be improved, but need information about what they as individuals and communities can do.

We would also like to learn more about how people form their ideas about what risks to worry about. A better understanding of the processes involved in the formation of beliefs about one's environment may help to

develop new methods for working with communities to resolve potentially contentious environmental issues before misperceptions are formed.

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REFERENCES

1. P. Sandman, Hazard versus outrage in the public perception of risk, In: V. Covello, D. McCallum, and M. Pavlova (Eds.), *Effective Risk Communication*, Plenum Press, NY, 1989, pp. 45-49.
2. B.B. Johnson, Risk and culture research: Some cautions, *Journal of Cross-Cultural Psychology*, 22 (1991) 141-149.
3. K. Dake, Myths of nature: Culture and the social construction of risk, *Journal of Social Issues*, 48 (1992) 21-37.
4. J. Flynn, P. Slovic, and C.K. Mertz, Gender, race, and perception of environmental health risks, *Risk Analysis*, 14 (1994) 1101-1108.
5. P. Slovic, J. Flynn, C.K. Mertz, and L. Mullican, *Health-Risk Perception in Canada*, Report No. 93-EHD-170, Department of National Health and Welfare, Ottawa, 1993.
6. B.J. Hance, C. Chess, and P.M. Sandman, Setting a context for explaining risk, *Risk Analysis*, 9 (1989) 113-117.