

# Individual and Cultural Differences in Adaptation to Environmental Risks

Elaine Vaughan

*Constructing environmental and health policies appropriate across diverse communities is challenging. Group differences in the circumstances of exposure and in responses to environmental risk are common. Consequences of this variability may become more apparent given recent calls for more deregulation and an increased use of participatory strategies to manage environmental risks. Approaches requiring active public participation will be successful only if diverse groups can be engaged. Psychological studies of individual differences in risk behaviors can provide policymakers with insights about why responses vary in risk situations and how effective certain participatory strategies may be across a multicultural society. Responses of Mexican immigrant farmworkers to pesticide risk illustrate how the broader context of exposure can contribute to variability among communities in risk adaptation and affect the implementation of innovative policies.*

Few areas of social policy have created more sustained divisiveness and political conflict in society than decisions about environmental risks. Many policy decisions are constructed and implemented in an adversarial and strongly polarized atmosphere (Bingham & Meader, 1990; Jasanoff, 1987; Panem, 1983). Although national legislation, congressional hearings, and activities of regulatory agencies and judicial bodies all tend to be driven directly or indirectly by public perceptions (Dwyer, 1990; Environmental Protection Agency [EPA], 1990; O'Leary, 1991), the public has come increasingly to believe that regulatory agencies are neither sufficiently responsive nor adequately protective of public health (Fiorino, 1990; Stenzel, 1991). Adding to the complexity of decisions in this domain is the need for the policy process to evolve to keep pace with changing circumstances in society. Over time, demands of and expectations for policy are modified so that solutions and approaches to risk management that were previously acceptable may not be so later. In the past, environmental policy primarily had the difficult and accepted goals of maintaining the integrity of the ambient environment, preserving natural resources, and minimizing risk to human health from various agents. Now, many communities and legislators demand that these policies also achieve an array of other social goals, including psychological, economic, and political outcomes (e.g., Brickman & Jasanoff, 1981; Bryant, 1989; Ruckelshaus, 1985). Psychological perspectives on environ-

mental risk management are particularly useful at this time when the prospects for achieving these new objectives will be linked to behavioral dimensions of environmental policy (Montgomery, 1990).

Changing expectations for policy along with the perceived limitations of a regulatory approach have led to calls by many for increasing the use of alternative and nonregulatory strategies to manage environmental risks—for example, community-based management, environmental dispute settlement, right-to-know initiatives, and other participatory processes (e.g., Crowfoot & Wondolleck, 1990; Paehlke, 1990; Ruckelshaus, 1985). Beginning in 1980, the Reagan and Bush administrations strongly endorsed and promoted deregulation and pushed for a more limited role of government and regulatory strategies in environmental risk management (Kraft & Kraut, 1988; Miller & Mink, 1992; Paehlke, 1990; Panem, 1983; Terris, 1990; Young, 1990). Many of the alternative approaches being discussed and attempted reflect more indirect and participatory perspectives that expect industries, communities, and relevant government officials to participate in a process in which policies are codetermined through collaboration, market processes, or choices of individuals (Crowfoot & Wondolleck, 1990; Fiorino, 1990; Stenzel, 1991). Coping with risk at the local or community level is envisioned as the most democratic, efficient, and desirable policy strategy (Ruckelshaus, 1985).

Several of these new perspectives have significant implications for the well-being of certain communities in particular and raise questions of social justice and equity—societal values becoming more prominent in discussions about the acceptability of risk decisions (e.g., Bryant, 1989; Hadden, 1991; Parisi & Ricci, 1991). Are the implicit assumptions of these approaches regarding how citizens respond to risk information or choice situations valid across diverse communities? If not, will certain communities be systematically disadvantaged by policy approaches that shift more of the burden of safety to individuals and communities who

Preparation of this article was supported by a grant from the National Science Foundation, Decision, Risk, & Management Science Division (SES-8911044). The author gratefully acknowledges the thoughtful comments of Irwin Altman, Barbara Brown, and three anonymous reviewers on an earlier draft.

Correspondence concerning this article should be addressed to Elaine Vaughan, Department of Psychology and Social Behavior, School of Social Ecology, University of California, Irvine, CA 92717.

Resource ID#: 3661

are expected to actively negotiate or respond in prescribed ways to a risk situation? Managing environmental and public health risks in a pluralistic society is a formidable task. The American population includes individuals who differ in their beliefs about cancer and other possible consequences of exposure to toxic agents (e.g., Berman & Wandersman, 1990; Michielutte & Diseker, 1982; Vaughan & Nordenstam, 1991), who disagree about the trustworthiness of scientific risk data and regulatory agencies (e.g., Fowlkes & Miller, 1987; Hawkes & Stiles, 1986; Steger & Witt, 1989), and who differ in the importance they assign to economic versus health considerations that are weighted in acceptable risk decisions (e.g., C. Brody, 1984; Cazenave & Shannon, 1986; Office of Technology Assessment, 1987). Attitudes regarding and behavioral responses to many environmental risks (e.g., pesticide residues in food or water or the transport and storage of toxic waste) have been shown to vary significantly among different sociodemographic groups (e.g., Allen, 1987; Blocker & Eckberg, 1989; Diclemente, Brown, & Morales, 1988; EPA, 1990; Gallup Organization, 1989; Hamilton, 1985; Pilisuk & Acredolo, 1988). Psychological studies on response to environmental risks conducted in diverse social, cultural, and economic contexts can be an information resource for policymakers and elected officials regarding the heterogeneous communities that they serve, which may differentially benefit from many of the newly emerging nonregulatory strategies.

Many participatory and indirect regulatory processes being considered by policymakers and others implicitly rely on particular individual or community responses to reduce risk (Crowfoot & Wondolleck, 1990; Stenzel, 1991). The underlying assumption of right-to-know initiatives, for example, is that risk information will precipitate actions by individuals to improve health or lower exposure whenever risk levels are "unacceptable" (Ashford & Caldart, 1985; Bingham & Meader, 1990; Hadden, 1991; Stenzel, 1991). Because environmental policy is and will continue to be affected significantly by political considerations (e.g., Dwyer, 1990; Rees, 1991), the effectiveness and validity of these approaches in communities consisting largely of the politically disenfranchised or less active may not initially receive full consideration by Congress or regulatory officials. Often, congressional and environmental policymakers concentrate on issues achieving political salience (Merkhofer, 1987; Rees, 1991), or those brought to prominence in a vivid way, through the media, for example (Vincent, 1990). Psychological factors that affect responses to risk situations operate within broader socioeconomic and cultural contexts that may increase or decrease the likelihood that certain participatory strategies will succeed. Greater social efforts may be required to engage certain populations in risk management. A comprehensive evaluation of various strategies can occur from a perspective achieved only by examining risk responses across a broad spectrum of the American population.

## Immigrant Farm Workers and Pesticide Exposure

Concern about the possible differential effect of nonregulatory versus regulatory policies on particular communities is raised through the work of psychologists examining environmental risk judgments and behaviors in diverse communities. Risk responses increasingly are conceptualized as being embedded in social and cultural contexts (e.g., Bradbury, 1989; Covello & Johnson, 1987; Dietz, Stern, & Rycroft, 1989), and it is likely that in many cases variability in social, economic, and cultural experiences will be associated with some differences in the evaluation of and adaptation to environmental risks. Several social scientists have provided the foundation for this perspective (e.g., Bradbury, 1989; Cvetkovich & Earle, 1985; Dietz et al., 1989; Wapner, 1987) and have begun to study the underlying correlates of individual and group differences in response to risk. As one example of this type of research, I have been examining the risk perceptions and self-protective behavior of Mexican immigrant farm laborers in response to chronic pesticide exposure. These individuals represent only one of many diverse cultural and socioeconomic groups in the United States. For many of these immigrant workers, particularly those who move from county to county during an agricultural season, social conditions have been described as reflecting a culture of poverty and an environment of "social and physical isolation" from the larger community (Meister, 1991, p. 504). I have chosen to study this particular group for two reasons: generally greater exposure levels to environmental hazards, and the salience of the pesticide issue in society.

Exposures to toxic agents are not uniformly distributed throughout the United States. Generally, members of ethnic minority and low-income groups tend to be exposed more than others to increased levels of chemical and other environmental hazards, whether in the workplace (e.g., Davis, 1982; Robinson, 1984) or in residential settings (e.g., Bullard & Wright, 1987; Freudenberg, 1984; U.S. Department of Health & Human Services, 1982). If policy is to be responsive to and address the needs of those members of society at greatest risk from the negative consequences of technological development or environmental hazards, then these are precisely the individuals whose responses must be clearly understood. The farm workers in my investigations represent an ethnic and socioeconomic group whose risk behaviors have not been thoroughly examined.

A second reason to focus on the immigrant farm labor population was to study risk beliefs and behaviors relevant to a highly significant and salient environmental risk issue. Concern about the long-term effects of pesticide exposure have been increasing among the general public, and concerns specifically about the health of farm workers have led to greater prominence of health issues in discussions about labor contracts, employment conditions, and unionizing the agricultural labor force (Goldsmith, 1989). Recently in California, the general public and

workers have gained access to more information about exposures to potential cancer-causing pesticides; health warnings about several common pesticides are now required as a result of a 1986 right-to-know initiative approved by California voters (Kizer, Warriner, & Book, 1988). A science advisory board recently assembled to set priorities for the EPA ranked chemical exposures for agricultural workers as one of the most significant environmental hazards affecting human health in this country (EPA, 1990). The American Medical Association has encouraged responsible state and federal agencies to make reasonable efforts to safeguard the health of agricultural workers who may be exposed to pesticides (Council on Scientific Affairs, 1988).

The general American public believes that pesticide residue in produce is the most significant food safety problem (Food & Drug Administration, 1984), but the lifetime exposure levels experienced by the average consumer may equal only the amounts that a typical farm worker receives in half a season (Goldsmith, 1989). Although several substances have been banned by the EPA, managing occupational risk of pesticides also has relied heavily on active participation of the exposed population—that is, the adoption of self-protective behavior, such as the use of gloves or protective clothing (University of Texas, 1984). This approach to managing the risks of those synthetic pesticides not banned by regulatory agencies depends not only on some prescribed response by the immigrant workers but also on the mutual cooperation of growers in providing access to risk information and protective gear and in limiting the amounts of certain substances applied to crops. New participatory strategies especially require a commitment to risk management from all relevant parties, as suggested by the fact that only 2% of eligible workplaces in the United States were inspected annually before recent cuts in enforcement capacity (Paehlke, 1990). Agricultural sites are exempt even from many of the labor and occupational health laws enforced in other settings (Meister, 1991).

In the remainder of this article, I focus on several factors explaining why immigrant farm workers of comparable ethnic and sociocultural backgrounds adapt differently to the threat of chronic pesticide exposure, and consider how these factors may reveal ways for policymakers to maximize participation of diverse individuals in risk management.

### **Context of Pesticide Risk for Immigrant Farm Workers**

Currently, more than 80% of the hired farm labor in California and many other western agricultural states consists of individuals who have recently immigrated, primarily from Mexico (Gonzales, 1985; Mines & Martin, 1986). As many as three million seasonal or migrant workers and their dependents currently reside in the United States (Rust, 1990). These agricultural workers face a variety of health hazards, including the risks from chronic low-level or acute high-dose exposures to synthetic pesticides—exposures associated with chronic respiratory illnesses,

neurological disorders, miscarriages, chronic dermatitis, and, for several agents, a possible increased risk of cancer (Rust, 1990; Sakala, 1987). During a typical year, more than 300,000 farm workers may experience pesticide-related illness (Coye, 1985), and the relatively poor health status of this population is exacerbated by conditions of extreme poverty (Meister, 1991; Sakala, 1987). Management of occupational pesticide risk has relied on setting maximum allowable levels of pesticides to be used on crops and controlling the time between application and field reentry by workers. An additional component of the policy strategy has been the assumption that workers adopt self-protective methods in response to risk or health information (Sakala, 1987; University of Texas, 1984).

### **The Farm Workers Study**

In 1988, I began a study of the risk responses of immigrant farm workers in several agricultural counties in California. Participants were contacted and interviewed in residential settings (e.g., farm labor camps, tent cities, temporary housing facilities) identified as primary locations for workers during the peak of an agricultural season (for more details about the methods used in this quasi-experimental study, see Vaughan, 1993). The 282 male participants in this sample shared many demographic characteristics with the larger farm worker population in California: The vast majority had an educational level less than grade school, more than 90% were born in Mexico, and most had worked in the fields for more than 10 years. Among these individuals, knowledge of pesticide exposure and accompanying risks was high, but actual responses to exposure varied.

Despite the high level of knowledge about personal exposures and potential health effects of pesticides, substantial numbers in this sample did not report heightened fear or worry about environmental exposures (43%) and did not consistently use any self-protective methods to minimize the risk (60%). This was true even though many believed that some damage to health likely had already occurred. In contrast, there was a second subgroup of laborers who had frequent thoughts about the negative consequences of pesticides (57%) and who used self-protective measures on a regular basis to minimize possible negative health outcomes (40%). Three factors were useful in accounting for this variability and have particularly important implications for the management of risk in diverse populations: beliefs about the broader economic context of exposure, perceptions of control over health outcomes, and beliefs about the personal relevance of risk. Many of these variables have been identified by other researchers as being important predictors of public risk responses on an aggregate level (e.g., Commission for Racial Justice, 1987; Covello, 1983; Sage & White, 1980; Slovic, Fischhoff, & Lichtenstein, 1980; Vlek & Stallen, 1980).

**Economic context of exposure and response differences.** For many immigrant agricultural workers, knowledge of other employment opportunities is limited, and the health consequences of chronic pesticide exposure

are evaluated and responded to in a context of great economic need, relative uncertainty in employment opportunities from season to season, and limited options for alternative employment outside of agriculture. Although the annual salary for agricultural workers averages far below the federal poverty level (Sakala, 1987), this seasonal work provides the primary, if not sole, source of income for their families (Rust, 1990). In many instances, nonexpert evaluation of environmental risk occurs in situations in which various options to manage a toxic agent may have direct and significant personal economic consequences (Fowlkes & Miller, 1987; Heimer, 1988). Some have suggested that the economic context of exposure may lead to a minimization of environmental risk in many cases (Commission for Racial Justice, 1987). Individuals in impoverished economic circumstances may perceive more than others that the sources of occupational risk are involuntary (e.g., Peterson & Stunkard, 1989), and they may adapt to risk with less active strategies (e.g., Brody, 1988) or focus more on economic instead of health dimensions of risk issues (e.g., Bullard, 1990).

Within the immigrant sample, economic situations were not uniform, and stability in employment and perceptions of economic circumstances were associated with a distinct pattern of adaptation to pesticide risk. On the average, migrants—those workers who moved from county to county during an agricultural season—had a less stable financial situation than workers who resided and worked in one area for an entire season. The social and broader ecological conditions of migrants are among the worst of any agricultural workers (Meister, 1991). In this study, workers who migrated throughout the state were far less likely to use self-protective methods to minimize pesticide exposure than those who had a more stable occupational situation (effect size,  $\phi = .20$ ). Multivariate analyses revealed that, except for perceptions of control, migration status was a stronger predictor of self-protective behavior than other psychological variables often correlated with risk responses. This association was highly significant, despite no reported differences between the migrants and others in the amount of information received about the risks of pesticides or in beliefs about the potential of these chemicals to cause serious physical illnesses.

Perhaps as important as actual economic circumstances in affecting response in a chronic risk situation is the *perception* of these circumstances. Agricultural labor provided the primary source of income for more than 80% of this sample, but among individuals who were equally dependent on agriculture for their livelihood, there was considerable variability in perceptions of the voluntariness of agricultural work. These beliefs about personal economic circumstances were associated with differences in the use of self-protective methods to minimize exposure to pesticides. In fact, the relationship between employment stability and risk responses seemed to be mediated by beliefs about the voluntariness of agricultural work. Independent of education, age, or length of time engaged in agricultural work, those who perceived that

it would be difficult to find alternative employment and who had never worked outside of agriculture were the least likely to have used self-protective methods (effect size,  $\phi = .18$ ).

It is crucial, however, to look further at why differences in reported behavioral response to pesticides were associated with economic dimensions. Psychological perspectives provide one approach to explaining differences, but other institutional, societal, and ecological sources of variability should also be considered as plausible reasons for individual differences in apparent behavioral responses to risk. Implications for policy would differ if, for example, dissimilarities between migrants and others in self-protective behavior were due to reduced availability of self-protective equipment for the migrants rather than to psychological adaptation to a less stable economic situation. Work sites and agricultural communities vary in the availability of risk information, self-protective provisions, and emphasis on occupational health issues (Sakala, 1987). In a follow-up study in this population, I am examining the relative strength of psychological and other factors in accounting for variability.

**Perceived control and self-protective behavior.** Differences in self-protective behavior associated with beliefs about the economic context of exposure may be illustrative of a more general relationship between perceptions of control and risk responses. Beliefs about the level of control over health outcomes seem to play a major role in the likelihood of adopting self-protective methods or of engaging in other behavioral responses to an environmental or health risk (e.g., Cvetkovich & Earle, 1985; Peterson & Stunkard, 1989; Siegel & Gibson, 1988). In fact, beliefs about the level of personal or societal control over a hazardous situation may even affect whether significant exposure to a toxic agent results in heightened levels of stress (Baum, Fleming, & Singer, 1983; Collins, Baum, & Singer, 1983). Beliefs about control over health outcomes can vary significantly among diverse groups. For example, whereas 54% of this sample of immigrant laborers believed that cancers mostly were the result of unavoidable exposures (i.e., substances in the air or water), in past surveys, less than one third of the general American public have endorsed this belief (e.g., Cambridge Reports, 1978; Lou Harris & Associates, 1980). Variability along this dimension is important to consider for nonregulatory risk management because the resolution of environmental disputes through participatory processes, such as formal dispute settlements, can be influenced by beliefs about a group's ability to control consequences (e.g., Crowfoot & Wondolleck, 1990). Similar to what researchers have found in a variety of other populations, perceptions of control were associated with the adoption of precautionary behavior in the farm worker sample.

Many, but not all, of the study participants believed that they had little or no control over experiencing negative health effects of pesticides, and these beliefs were associated with a decreased likelihood of using self-protective methods in the occupational setting (effect size,

$n = 23$ ). Workers who believed that they had significant control over the health effects of pesticide exposure were more than five times as likely to engage in self-protective behavior as those who perceived that they had no control over the consequences of this environmental risk. Neither the level of a worker's education nor the reported amount of information received about pesticides affected this relationship. Control beliefs were more predictive of self-protective behavior than perceptions of the effectiveness of methods, fear of pesticide risk, or beliefs about the amount of exposure occurring on a regular basis. Only reporting that one had received information about pesticides was a stronger predictor of precautionary behavior than perceptions of control over health outcomes (effect size,  $\eta = .31$ ).

The strong relationship found between perceived control and risk responses, even when controlling for factors such as information, formal education, and amount of exposure, suggests the importance of this factor in accounting for individual differences in responses to a chronic environmental risk. Increasing participation of this population in efforts to reduce personal risk from pesticides may call for a strategy that not only increases the dissemination of risk information but also specifically targets the substantial number of people who believe that they have little influence over whether they experience pesticide-related illnesses.

**Framing of risk issues: personal versus societal judgments.** The risk information presented to immigrant farm workers or other lay populations usually offers risk estimates at the aggregate level—that is, these communications present data for the population as a whole and cannot estimate the risk for any one particular individual. However, the layperson often reframes an issue as one of personal risk (e.g., Jeffrey, 1989; Sharlin, 1986). If general health information is not judged to be personally relevant, assessments of risk may be minimized and self-protective behavior less likely to occur (e.g., Siegel & Gibson, 1988; Weinstein, 1988). Among these immigrant laborers, individuals who had frequent or constant fears about the health effects of pesticides were those who judged the chances of future personal risk to be relatively high (effect size,  $\eta = .19$ ). Judgments about future risk for farm workers in general were not associated with greater fears or more self-protective behavior. In fact, many of these workers believed themselves to be at less risk than other farm workers exposed to comparable levels of pesticide residues, a finding consistent with the optimistic biases seen in other populations when judging environmental hazards (e.g., Weinstein, Klotz, & Sandman, 1988).

When managing risk in diverse settings, it is necessary to identify those factors that can affect the personal framing of the risk issue. These factors may vary from one group to another. In the immigrant farm worker population, for example, there was a much higher level of concern for the potential of pesticides to harm their children than concern even about personal exposures or the exposure levels of their fellow workers. This perspective

may not necessarily be as predominant in other groups, although this has not been empirically established to date. For the farm workers, general judgments about pesticides' potential to cause serious illnesses in the future were not predictive of worry about or fear of long-term chemical exposure. Instead, judgments about personally relevant risk (e.g., whether workers believed that their or their offsprings' health could be affected) were associated with increased fears of chemical risk. Policy strategies intended to engage the public in a meaningful way will need to overcome the consequences of a fundamental difference between the expert's framing of risk as a societal or aggregate issue, and nonexpert populations' framing of risk as a personal level assessment (Jeffrey, 1989).

### Implications of Variability

In the past, the federal government has assumed major responsibility for protecting the health and well-being of the nation (Commission for Racial Justice, 1987). Since the 1960s and 1970s, the use of regulatory tools has been the primary policy approach adopted by the federal government to limit the risks presented by environmental agents (Paehlke, 1990). With the high priority given to deregulation and regulatory relief by recent administrations, indirect, participatory, or other nonregulatory strategies of risk management represent a possible major shift in the way society may attempt to manage selected technological and environmental hazards. If these new approaches have a reasonable likelihood of resulting in unequal levels of protection across diverse communities, then policy officials may want to weigh this factor when deciding which policy strategy indeed represents the superior alternative for a given risk issue. If the commitment to minimize the adverse effects of technological development is to extend to all segments of the population in a meaningful way, then risk management approaches must formally acknowledge and accommodate the diversity of the American population (Office of Technology Assessment, 1987). Many communities recently have become more discontented with and vocal in their opposition to risk policies perceived as inequitable and lacking in social justice (e.g., Bryant, 1989; Bullard, 1990; Rees, 1991). Direct community involvement in the process of managing environmental hazards almost surely will increase over the next decade (Ruckelshaus, 1991), and constructing policies that are effective across a variety of economic, exposure, and sociocultural contexts will be one of the most significant challenges facing elected and regulatory officials.

Psychological research on responses to environmental risk provides indispensable input to policymakers who are considering alternative risk management strategies that either precipitate or require some response from lay populations. Montgomery (1990) argued, in fact, that environmental management is in essence behavioral policy because it is the actions of individuals, communities, and industries that protect or degrade the environment. Although policymakers have tended to ignore or minimize the behavioral and psychological dimensions of environ-

mental policy, decisions in this domain invariably produce some behavioral and broader psychological effects that are not always equivalent across different groups in society (Montgomery, 1990). As Congress monitors the effects of environmental legislation and various social policy strategies as a part of its oversight function (Ruckelshaus, 1985), generating profiles of the ecological conditions, cultural contexts, psychological responses, and social needs of various constituencies is a worthwhile contribution of psychological researchers in this domain and others (e.g., Vincent, 1990). Results from these programs of research suggest several specific policy-related uses for information generated by psychologists.

**Designing participatory risk management programs.** For many hazards, reduction in vulnerability to risk depends on the adoption of some precautionary behavior, such as obtaining a screening test, using self-protective equipment, or monitoring a toxic agent. These efforts, when designed for diverse groups, may need to consider factors, such as perceptions of control, that may increase or decrease the likelihood that certain individuals will adopt a desired behavior or procedure. Many studies in health and social psychology underscore the importance of control beliefs in the initiation and maintenance of precautionary behavior. Among the immigrant laborers, although information was a very significant factor associated with self-protection, believing that one had personal control over health was associated with a significantly greater increased likelihood of self-protective behavior. Efforts to involve individuals from diverse backgrounds in risk management may need to attend to these perceptions in some cases to maximize participation. The predominance of these beliefs may vary in different communities, depending on the broader social and cultural context of exposure.

**Understanding the role of socioeconomic factors in risk response.** On a societal level, risk management often involves a decision that attempts to balance economic outcomes and health risks, but personal economic circumstances provide a proximal context within which adaptation to environmental risks occurs. For many of the major environmental threats to human health, individuals from impoverished socioeconomic circumstances tend to be most at risk. For example, children most at risk from the health-damaging effects of lead poisoning are those living in poverty in urban settings (Bullard & Wright, 1987; Freudenberg, 1984). Future risk management strategies will need to consider the responses of individuals in broader contexts and how economic constraints may act as barriers to participation in efforts to reduce the effects of environmental hazards. As in the immigrant farm worker sample, perceptions of economic factors may be an equally important variable of interest within a community.

**Framing of risk issues across diverse groups.** The fact that nonexperts often frame risk issues in terms of personal rather than societal risk has implications for the effective communication and implementation of environmental policies. In the farm worker sample as in

other populations, the presence of an optimistic bias about personal risk suggests that general health information alone may not increase the likelihood of adopting self-protective methods unless the risk situation is framed in personally relevant terms (Jeffrey, 1989; Weinstein, 1988). Industry and health officials providing risk information to communities may need to frame such information in a way that maximizes the perceived personal relevance of the issue. In a population such as the Mexican immigrant laborers, language and cultural factors present challenges to the reasonable exchange of risk information between employers and workers (Meister, 1991). Mitigating the effects of many environmental hazards may require communication strategies that are modified depending on the sociocultural context in which exposure occurs.

As the demands for environmental policy change and issues of social justice and equity in risk management become more salient, psychological research on variability in perceptions of and behavioral responses to risk can inform policy in a meaningful way. By providing a glimpse of the way in which diverse communities may differentially respond to the opportunity for participatory risk management, psychologists can assist in the evaluation of the overall social desirability of certain innovative policies designed to protect public health.

## REFERENCES

- Allen, F. W. (1987). Towards a holistic appreciation of risk: The challenge for communicators and policymakers. *Science, Technology, & Human Values*, 12(3), 138-143.
- Ashford, N. A., & Caldart, C. C. (1985). The right-to-know: Toxics information transfer in the workplace. *Annual Review of Public Health*, 5, 383-401.
- Baum, A., Fleming, R., & Singer, J. E. (1983). Coping with victimization by technological disaster. *Journal of Social Issues*, 39(2), 117-138.
- Berman, S. H., & Wandersman, A. (1990). Fear of cancer and knowledge of cancer: A review and proposed relevance to hazardous waste sites. *Social Science and Medicine*, 24(2), 35-47.
- Bingham, E., & Meader, W. V. (1990). Governmental regulation of environmental hazards in the 1990's. *Annual Review of Public Health*, 11, 419-434.
- Blocker, T. J., & Eckberg, D. L. (1989). Environmental issues as women's issues: General concerns and local hazards. *Social Science Quarterly*, 70(3), 586-593.
- Bradbury, J. A. (1989). The policy implications of differing concepts of risk. *Science, Technology, & Human Values*, 14(4), 380-399.
- Brickman, R., & Jasanoff, S. (1981). Concepts of risk and safety in toxic-substances regulation: A comparison of France and the United States. In D. E. Mann (Ed.), *Environmental policy formation* (pp. 203-213). Lexington, MA: Lexington Books.
- Brody, C. J. (1984). Differences by sex in support for nuclear power. *Social Forces*, 63(1), 209-228.
- Brody, J. G. (1988). Responses to collective risk: Appraisal and coping among workers exposed to occupational health hazards. *American Journal of Community Psychology*, 16(5), 645-663.
- Bryant, P. (1989). Toxics and racial justice. *Social Policy*, 20(1), 48-52.
- Bullard, R. (1990). *Dumping in Dixie: Race, class and environmental quality*. Boulder, CO: Westview Press.
- Bullard, R. D., & Wright, B. H. (1987). Blacks and the environment. *Humboldt Journal of Social Relations*, 14(1), 165-184.
- Cambridge Reports. (1978). *An analysis of public and workers attitudes toward carcinogens and cancer risk* (Technical Report). New York: Shell Oil Company.



- Cazenave, N. A., & Shannon, J. H. (1986). Black families' perceptions of nuclear power and nuclear arms issues: A pilot study. *Marriage and Family Review*, 10(2), 85-112.
- Collins, D. L., Baum, A., & Singer, J. E. (1983). Coping with chronic stress at Three Mile Island: Psychological and biochemical evidence. *Health Psychology*, 2, 149-166.
- Commission for Racial Justice. (1987). *Toxic wastes and race in the United States: A national report on the racial and socio-economic characteristics of communities with hazardous waste sites*. New York: Public Data Access.
- Council on Scientific Affairs. (1988). Cancer risk of pesticides in agricultural workers: Council report to the American Medical Association. *Journal of American Medical Association*, 260, 959-966.
- Covello, V. T. (1983). The perception of technological risks: A literature review. *Technological Forecasting and Social Change*, 23, 285-297.
- Covello, V. T., & Johnson, B. B. (1987). The social and cultural construction of risk: Issues, methods, and case studies. In B. B. Johnson & V. T. Covello (Eds.), *The social and cultural construction of risk* (pp. vii-xiii). New York: D. Reidel.
- Coye, M. J. (1985). The health aspects of agricultural production: The health of agricultural workers. *Journal of Public Health Policy*, 6(3), 349-370.
- Crowfoot, J. E., & Wondolleck, J. M. (1990). Citizen organizations and environmental conflict. In J. E. Crowfoot & J. M. Wondolleck (Eds.), *Environmental disputes: Community involvement in conflict resolution* (pp. 1-16). Washington, DC: Island Press.
- Cvetkovich, G., & Earle, T. C. (1985). Classifying hazardous events. *Journal of Environmental Psychology*, 5, 5-35.
- Davis, M. (1982). The impact of workplace health and safety on Black workers: Assessment and prognosis. In F. Goldsmith & L. E. Kerr (Eds.), *Occupational safety and health* (pp. 199-212). New York: Human Sciences.
- Diclemante, R. J., Brown, C. B., & Morales, E. S. (1988). Minorities and AIDS: Knowledge, attitudes, and misconceptions among Black and Latino adolescents. *American Journal of Public Health*, 78(1), 55-57.
- Dietz, T., Stern, P. C., & Rycroft, R. W. (1989). Definitions of conflict and the legitimization of resources: The case of environmental risk. *Sociological Forum*, 4(1), 47-70.
- Dwyer, J. P. (1990). The limits of environmental risk assessment. *Journal of Energy Engineering*, 12, 1-18.
- Environmental Protection Agency. (1990). *Reducing risk: Setting priorities and strategies for environmental protection: Report of the Science Advisory Board*. Washington, DC: U.S. Government Printing Office.
- Fiorino, D. J. (1990). Citizen participation and environmental risk: A survey of institutional mechanisms. *Science, Technology, & Human Values*, 15(2), 226-243.
- Food and Drug Administration. (1984). Pesticides and food: Public worry no. 1. *FDA Consumer*, 18(6), 12-15.
- Fowlkes, M. R., & Miller, P. Y. (1987). Chemicals and community at Love Canal. In B. B. Johnson & Covello, V. T. (Eds.), *The social and cultural construction of risk* (pp. 55-77). New York: D. Reidel.
- Freudenberg, N. (1984). *Not in our backyards*. New York: Monthly Review.
- Gallup Organization. (1989). Attitudes toward AIDS. *Gallup Report*, 285, 26-30.
- Goldsmith, M. F. (1989). As farmworkers help keep America healthy, illness may be their harvest. *Journal of American Medical Association*, 261(22), 3207-3213.
- Gonzales, J. L. (1985). *Mexican and Mexican-American farmworkers*. New York: Praeger.
- Hadden, S. G. (1991). Regulating product risks through consumer information. *Journal of Social Issues*, 47(1), 93-105.
- Hamilton, L. C. (1985). Concern about toxic wastes. *Sociological Perspectives*, 28(4), 463-486.
- Hawkes, G. R., & Stiles, M. C. (1986). Attitudes about pesticide safety. *California Agriculture*, 40(5), 19-22.
- Heimer, C. A. (1988). Social structure, psychology, and the estimation of risk. *Annual Review of Sociology*, 14, 491-519.
- Jasanoff, S. (1987). EPA's regulation of daminozide: Unscrambling the messages of risk. *Science, Technology, & Human Values*, 12(4), 116-124.
- Jeffrey, R. W. (1989). Risk behaviors and health: Contrasting individual and population perspectives. *American Psychologist*, 44, 1194-1202.
- Kizer, K. W., Warriner, T. E., & Book, S. A. (1988). Sound science in the implementation of public policy. *Journal of American Medical Association*, 260, 951-966.
- Kraft, M. E., & Kraut, R. (1988). Citizen participation and hazardous waste policy implementation. In C. E. Davis & J. P. Lester (Eds.), *Dimensions of hazardous waste politics and policy* (pp. 63-80). New York: Plenum Press.
- Lou Harris & Associates. (1980). *Risk in a complex society: A Marsh & McLennan public opinion survey*. New York: Marsh & McLennan.
- Meister, J. S. (1991). The health of migrant farm workers. *Journal of Occupational Medicine*, 6(3), 503-513.
- Merkhofer, M. W. (1987). *Decision science and social risk management*. Boston: D. Reidel.
- Michielutte, R., & Diseker, R. A. (1982). Racial differences in knowledge about cancer: A pilot study. *Social Science and Medicine*, 16, 245-252.
- Miller, J. C., & Mink, P. (1992). An agenda for deregulation. *Policy Review*, 61, 4-12.
- Mines, R., & Martin, P. L. (1986). *A profile of California farmworkers* (Giannini Information Series No. 86-2). Davis: University of California, Division of Agriculture & Natural Resources.
- Montgomery, J. D. (1990). Environmental management as behavioral policy. *Canadian Public Administration*, 33(1), 1-16.
- Office of Technology Assessment. (1987). *New developments in biotechnology: Public perceptions of biotechnology*. Washington, DC: U.S. Government Printing Press.
- O'Leary, R. (1991). Environmental administration, the courts, and public policy: 1980-1989. *International Journal of Public Administration*, 14(3), 303-314.
- Paehlke, R. (1990). Regulatory and non-regulatory approaches to environmental protection. *Canadian Public Administration*, 33(1), 17-36.
- Panem, S. (1983). Public policy, science, and environmental risk: An introduction. In S. Panem (Ed.), *Public policy, science, and environmental risk* (pp. 1-10). Washington, DC: Brookings Institution.
- Parisi, F., & Ricci, P. F. (1991). Environmental policy in the 1990's [Review of *Environmental policy in the 1990's*]. *Ecology Law Quarterly*, 18, 459-484.
- Peterson, C., & Stunkard, A. J. (1989). Personal control and health promotion. *Social Science of Medicine*, 28(8), 819-828.
- Pilisuk, M., & Acredolo. (1988). Fear of technological hazards: One concern or many? *Social Behaviour*, 3, 17-24.
- Rees, J. (1991). Equity and environmental policy. *Geography*, 76(4), 292-303.
- Robinson, J. C. (1984). Racial inequality and the probability of occupation-related injury or illness. *Milbank Memorial Fund Quarterly: Health and Society*, 62, 567-590.
- Ruckelshaus, W. D. (1985). Risk, science, and democracy. *Issues in Science and Technology*, 1(1), 19-38.
- Ruckelshaus, W. D. (1991). Science, risk, and public policy. In T. D. Goldfarb (Ed.), *Taking sides: Clashing views on controversial environmental issues* (pp. 54-59). Guilford, CT: Dushkin.
- Rust, G. S. (1990). Health status of migrant farmworkers: A literature review and commentary. *American Journal of Public Health*, 80(10), 1213-1217.
- Sage, A. P., & White, E. B. (1980). Methodologies for risk and hazard assessments: A survey and status report. *IEEE Transactions on Systems, Man, & Cybernetics*, 10(8), 425-446.
- Sakala, C. (1987). Migrant and seasonal farmworkers in the United States: A review of health hazards, status, and policy. *International Migration Review*, 21(3), 659-687.
- Sharlin, H. I. (1986). EDB: A case study in communicating risk. *Risk Analysis*, 6(1), 61-68.
- Siegel, K., & Gibson, W. C. (1988). Barriers to the modification of sexual behavior among heterosexuals at risk for acquired immune deficiency syndrome. *New York State Journal of Medicine*, 88, 66-70.
- Slovic, P., Fischhoff, B., & Lichtenstein, S. (1980). Facts and fears: Understanding perceived risk. In R. Schwing & W. A. Albers (Eds.), *How safe is safe enough?* (pp. 58-73). New York: Plenum Press.

- Steger, M. E., & Witt, S. L. (1989). Gender differences in environmental orientations: A comparison of publics and activists in Canada and the U.S. *The Western Political Quarterly*, 42(4), 627-649.
- Stenzel, P. L. (1991). Right-to-know provisions of California's Proposition 65: The naivete of the Delaney Clause revisited. *Harvard Environmental Law Review*, 15(2), 493-528.
- Terris, M. (1990). Public health policy for the 1990's. *Annual Review of Public Health*, 11, 39-51.
- University of Texas at Austin. (1984). *Regulating pesticides in Texas*. Austin: University of Texas at Austin, Policy Research Project on Pesticide Regulation.
- U.S. Department of Health & Human Services. (1982). *Blood carbon monoxide levels in persons 3-74 years of age: United States, 1976-80* (DHHS Publication No. PHS 82-1250). Washington, DC: U.S. Government Printing Office.
- Vaughan, E. (1993). Chronic exposure to an environmental hazard: Risk perceptions and self-protective behavior. *Health Psychology*, 12, 74-85.
- Vaughan, E., & Nordenstam, B. (1991). The perception of environmental risks among ethnically diverse groups. *Journal of Cross-Cultural Psychology*, 22(1), 29-60.
- Vincent, T. A. (1990). A view from the hill: The human element in policymaking on Capitol Hill. *American Psychologist*, 45, 61-64.
- Vlek, C., & Stallen, P. J. (1980). Rational and personal aspects of risk. *Acta Psychologica*, 45, 273-300.
- Wapner, S. (1987). A holistic, developmental, systems-oriented environmental psychology: Some beginnings. In D. Stokols & I. Altman (Eds.), *Handbook of environmental psychology* (pp. 433-465). New York: Wiley.
- Weinstein, N. D. (1988). The precaution adoption process. *Health Psychology*, 7, 355-386.
- Weinstein, N. D., Klotz, M. L., & Sandman, P. (1988). Optimistic biases in public perception of the risk from radon. *American Journal of Public Health*, 78(7), 796-800.
- Young, A. L. (1990). A White House perspective on risk assessment and risk communication. *The Science of the Total Environment*, 99, 223-229.

## CALL FOR BOOK PROPOSALS FOR TEST INSTRUMENTS

The APA Book Program is seeking proposals for edited or authored volumes in specialty areas summarizing available instruments for assessing specific constructs, dimensions, attributes, and abilities.

The area of tests and measurement has always been central in psychology. Individual differences and the assessments of other personality and behavioral dimensions have also played a critical role in psychology. It has been variously estimated that upwards of 20,000 psychological, behavioral, and cognitive measures are developed each year. Many are not used further after one or two exploratory studies. A few of these instruments get refined and developed (and go through formal reliability and validity procedures). As a means of helping to identify newly emerging measurement instruments for assessing and quantifying specific attributes and abilities, the APA is establishing a book series focused on methods for quantification of specific variables.

Volumes in the series will probably be edited works focusing on specific subareas within psychology. Such volumes might have as few as 12 chapters or as many as 40, depending in part on the specialty area being covered. It is assumed that the individual chapters will focus on a single ability, attribute, or dimension—such that an individual chapter would describe the 2, 3, or 4 measures available for quantifying a given factor, present the reliability and validity data on each instrument, and compare and contrast the instruments with each other to the maximum extent possible.

Please send your proposal (including topic outline and table of contents) and a current CV to APA Books, 750 First Street, NE, Washington, DC 20002-4242.



AMERICAN  
PSYCHOLOGICAL  
ASSOCIATION