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**RISK-TAKING TENDENCIES AND RADON MESSAGES: A FIELD EXPERIMENT**

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**ABSTRACT**

This field experiment examines differences in sending for brochures about how to test for and reduce indoor radon levels, and self-reported testing for indoor radon following messages about radon. The effects of different presentation strategies on the behavior of low and high risk takers is reported. Randomly selected homeowners responded to messages varying: the source of the message (newspaper or government agency brochure), the target of the health hazard (children or a general "self"), the specificity of information about actions to take to reduce the health risk (a detailed step-by-step plan or simply an address to write to for further information) and the complexity of the risks of comparison (X-rays and smoking or nuclear power). Risk-taking tendency interacts with the study variables in both behaviors measured.

## INTRODUCTION

The Environmental Protection Agency's warning in September, 1988 that all homes should be tested for indoor radon levels is an example of the kind of risk information people receive and are expected to judge. Radon gas, a naturally occurring by-product of uranium, has been linked to lung cancer. According to the Centers for Disease Control and the U.S. Environmental Protection Agency, people are dying from radon-caused lung cancer at a rate of 5,000 to 20,000 or more each year.

That some individuals are high risk takers and others low risk takers is apparent to most observers. (See Lamm, et al., 1969; Pruitt, 1971a, 1971b; and Vlek & Stallen, 1980, for reviews and summaries of risk-taking behavior.) By risk taking we mean the tendency to engage in activities in which the individual involved perceives some likelihood of negative consequences. (See Zuckerman, 1988; Tversky & Kahneman, 1974; Slovic, 1987 & Slovic et al., 1982; Streufert, 1986; Isen et al. 1982; Sorrentino et al. 1988; and Stallen & Coppock, 1987 for studies on risk perception, uncertainty and sensation seeking.) In our definition, all people are risk takers to some degree, but some have learned that risk taking will lead to negative consequences while others have learned to expect benefits from risk taking.

For this study, in addition to risk taking, we are interested in four other factors that we expect to interact with risk taking: the target of the threat, message source, specificity and risk schema. (See Brewer & Nakamura, 1984; Fiske & Linville (1980); Janis, 1982; Petty & Cacioppo, 1986; and Rogers, 1983 for reviews of factors in cognitive and affective response to messages.)

## METHOD

A field study was conducted to study the effects of four message factors in interaction with risk-taking tendencies on behaviors to learn about and reduce radon. The research design is a 2 X 2 X 2 X 2 factorial field experiment.

Subjects are a random sample of homeowners in three Florida counties (Alachua, Hillsborough and Polk) with the highest levels of radon.<sup>1</sup>

A phone survey pretested 837 subjects.<sup>2</sup> The 706 (89.1%) homeowners who agreed to become members of the panel were randomly assigned to one of the 16 versions of the message. About two weeks after the pretest, these subjects were mailed a 9-page booklet varying the four message factors.

The first factor varied the message source. Under one condition the message was typeset to resemble a photocopy from a newspaper; it was set in four columns, had a dateline and a newspaper (confederate) name, and a headline. In the second condition, typeset to look like a brochure, the source was identified as a state brochure with a tagline: "Source: The State of Florida Program for Radon Information."

The second factor varies whether or not the message discusses the effects of radon on children or on adults. In the first condition the copy is subheaded with "CHILDREN AT RISK" and explains that according to experts children are more at risk than adults. In the second condition the copy does not mention children, has a subheading that says, "RISK INCREASES OVER TIME" and explains that exposure over time increases risk.

The first level of the third factor presents the risk of lung cancer from radon in comparison with risk from smoking and from X-rays: "Exposure to 4 picocuries is the equivalent of smoking about eight cigarettes a day. Indoor radon at a level of 4 picocuries presents a greater health risk than getting 200 chest X-rays in one year." In addition, the copy has a breakout quote that says, "People worry about the dangers of smoking or having too many X-rays, but we didn't think about radon gas inside our own home." The second condition, in the copy and in a breakout quote, mentions nuclear power as a

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1 The experiment includes only homeowners because they are more likely to be longer-term residents (therefore experiencing greater risk) and to have the resources to test and remediate if necessary. For our sampling frame, the Florida State Department of Revenue provided a computer tape of all taxed and tax-exempt parcels in each county with the name of the owner and the owner's mailing address; only residential dwellings with an assessed value greater than \$25,000 were included. A random sampling program (SPSSX) selected residences that met the above requirements.

2 More extensive details are available in Ferguson and Valenti, 1988 and Valenti and Ferguson, 1987.

shared fear, "People worry about radiation coming from nuclear power plants, but we didn't think about radon gas in our own home."

The fourth factor varies the ease with which readers can obtain additional information about radon. The high specificity condition presents a check-off list of things to do to test for radon along with a list of other sources, while the low specificity condition subjects receive only the mailing address of the state organization charged with educating the public about radon.

Some 317 (44.9%) of the subjects returned the booklets. Approximately six months later, these 317 homeowners were again contacted by mail with a follow-up questionnaire to measure attitudes, information seeking and radon testing behavior. Of those who had originally returned the test booklets, 42.9% (136) responded to the follow-up mailing.

At this stage a control group was contacted using the same mailing list. Posttest measures were mailed to 100 randomly selected homeowners in June, 1988. Some 26 percent of those in the control returned it.

Risk-taking tendencies are measured by asking questions (adapted from the Farley Fisc-Risk Scale) designed to tap different aspects of risk taking. Eight questions measured personal freedom, independence, sense of control, sensation seeking, activity, time perspective and general risk. These items are summed into a simple index to represent risk taking.

There are two separate measures of behavior. The first is a self-report of the activities the subjects engaged in to test for and reduce radon in their homes. Respondents were asked: (1) "Have you contacted anyone to get information about radon?" (2) "Have you contacted anyone to have your home tested for radon?" and (3) "Have you done anything to reduce the amount of radon entering your home?" Responses to these three questions were scaled so that a yes answer to the first question received a "1", the second a "2" and the third a "3". These weighted responses were then summed.

In addition, subjects were invited to contact the American Lung Association of Florida by using a coupon we provided. The coupon listed the titles of four radon publications: "A Citizen's Guide to Radon: What It Is and What To Do About It;" "Radon Reduction Methods: A Homeowner's Guide (2nd ed.);" a list of laboratories offering radon detection and measurement services in Florida as of March 3, 1988; and a list of companies offering radon mitigation (reduction) techniques in Florida as of March 21, 1988. By prearrangement we coded the actual number requested.

of those in the nuclear power condition guessed correctly. Of those in the smoking/X-ray condition, 73.8% correctly answered 200 chest X-rays, while only 1.6% of those in the nuclear power condition guessed correctly.

To test whether the specificity of the message was related to estimates of how easy or difficult it might be to get information, we asked, "How difficult will it be to get more information about radon?" Of those in the high specificity condition, 94.9% said it would be somewhat easy or very easy, while in the low specificity condition 90.7% said it would be somewhat easy or very easy. Radon is a topic for which finding information is believed not to be difficult and the specificity of the message did not appear to affect this perception.

Some 39.5% requested brochures using the coupon mailed to the American Lung Association of Florida in Jacksonville; 3.7% asked for only one item, 11.1% requested two titles, 3.1% asked for three, and 21.6% requested all four handouts.

The statistical procedure used to examine the effects of the message manipulations and risk-taking tendencies on the dependent variables is ANOVA.

#### EFFECTS ON ACTUAL INFORMATION SOUGHT AND BEHAVIORS

There are no significant simple main effects for the message variables or for the risk-taking variable, however, there is a near significant ( $F(1,125) = 3.21, p < .076$ ) main effect for the message target on the number of brochures requested. Those who received the message targeted to adults requested a mean of 1.5 brochures while those who received the message targeting children requested a mean of 1.0 brochures.

There are several significant interactions among the message variables and for the message variables with the risk-taking variable. Source and target interact for the amount of information requested ( $F(1,125) = 4.24, p < .042$ , Figure 1). The greatest number of brochures was requested when the source was a brochure and the target an adult ( $M = 1.7$ ) compared to when the message was in a brochure and targeted a child ( $M = 0.58$ ).

With regard to self-reported behavior the source, target and schema triggered interacted ( $F(1,125) = 6.64, p < .011$ , Figure 2). Those who received the newspaper message, targeted at children with the smoking/X-ray condition ( $M = 1.86$ ) and those who received the brochure message, targeted to adults with the smoking/X-ray comparison ( $M = 1.71$ ) engaged in more behaviors than did those who received the newspaper message

targeted to children with the nuclear power comparison ( $M = .24$ ) and the newspaper message targeted to adults with the smoking/X-ray comparison ( $M = .47$ ). Also, those in these two conditions ( $M = 1.86$  &  $M = 1.71$ ) engaged in significantly more behaviors than did those in the control group ( $M = .73$ ,  $T(17.02) = 1.86$ ,  $p < .04$  and  $T(17.39) = 1.69$ ,  $p < .055$ , respectively).

The source, target and specificity also interacted to affect self-reported behaviors ( $F(1,125) = 4.10$ ,  $p < .045$ , Figure 3). When the child was the threat target, most behaviors occurred in the newspaper-high specificity condition ( $M = 1.54$ ), while when the adult was targeted most behaviors occurred in the brochure source-high specificity condition ( $M = 1.5$ ).

Finally, there is a significant three-way interaction ( $F(1,125) = 4.04$ ,  $p < .047$ ) for risk taking, source and specificity on the amount of information requested (Figure 4). Those who are low risk takers who received the message in the newspaper format with low specificity requested more information ( $M = 1.93$ ) than did low risk takers who received a brochure message with high specificity ( $M = .67$ ).

## DISCUSSION

In summary, those aspects of the message and risk taking that lead to information seeking are not necessarily the same as those that lead to behavior. First, when newspapers are perceived to be the source, the target does not appear to affect information seeking, but when a government brochure is perceived to be the source, information seeking is much greater with the adult as the target. In a brochure, a message that targets children seems to suppress information seeking.

For behavior the source and the target interact with both the schema triggered and the specificity of action provided. The smoking/X-ray comparison is most effective with the child as the target in a newspaper message or with the adult as the target in a brochure message. Again, we believe that targeting the child is acceptable in a medium such as a newspaper, but is discounted or suspect in a government brochure.

Under the brochure, low specificity condition it does not appear to matter who the target is; equally high levels of behavior occurred. With the newspaper, high specificity

condition, behavior did not occur unless the target was the child; for the brochure, high specificity condition, behavior did not occur unless the adult was the target. Again, the source--newspaper article or government brochure--appears to impact behavior only when the target is perceived as appropriate to the medium.

Risk communication usually does not take into account individual differences in risk-taking tendencies. Attempts at such general guidelines about how to communicate risk have understandably lead to complaints about conflicting directives and contradictory perspectives. The findings presented here are inconclusive and need further validation, but they suggest that a better understanding of individual risk-taking traits can affect how risk messages are received.

The limitations to consider include the operationalizations of the concepts. The risk-taking measures are from a newly developed scale that is currently being further validated. Other questions are important. For example, with the schema variables, we are sure whether or not we triggered a complex schema or a risk which is believable, or both.

The nature of the experimental design appears to rule out most threats to the internal validity of the study, and the fact that the study is a field experiment greatly enhances the external validity. Finally, we believe there are different dimensions of risk taking, and when those differences are understood this research will be even more valuable to those who are developing messages about environmental and health risks such as radon.

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## EFFECTS OF SOURCE & TARGET ON AMOUNT OF INFORMATION REQUESTED

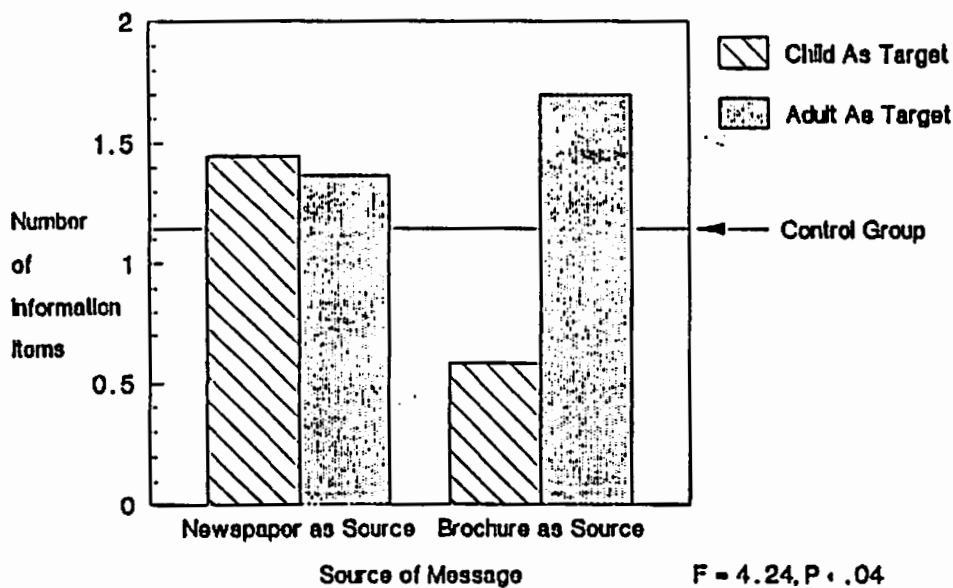


Figure 1

## EFFECTS OF SOURCE, TARGET & SCHEMA TRIGGERED ON BEHAVIOR TO REDUCE RADON

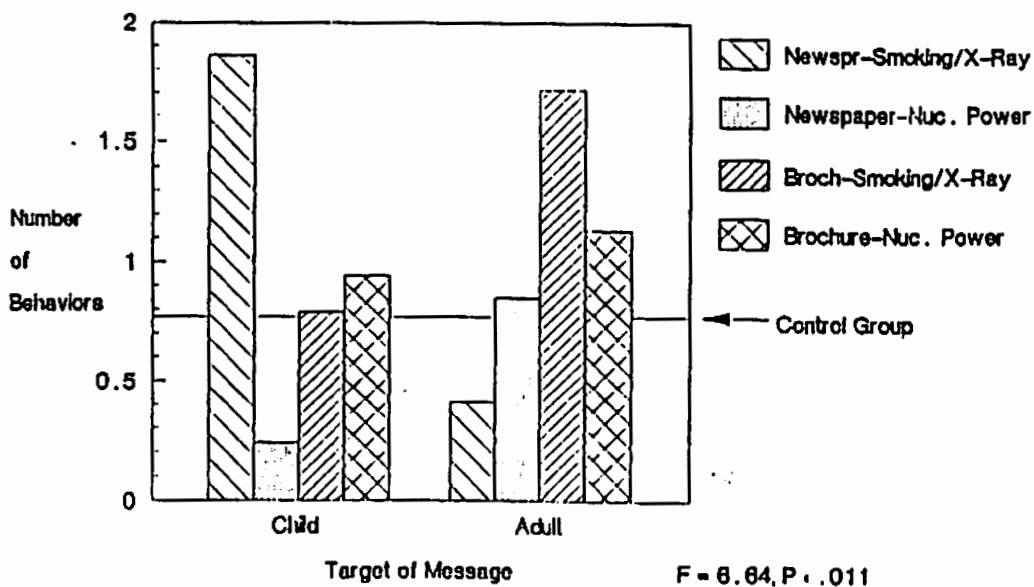


Figure 2

EFFECTS OF SOURCE, TARGET & SPECIFICITY OF ACTION ON BEHAVIOR TO REDUCE RADON

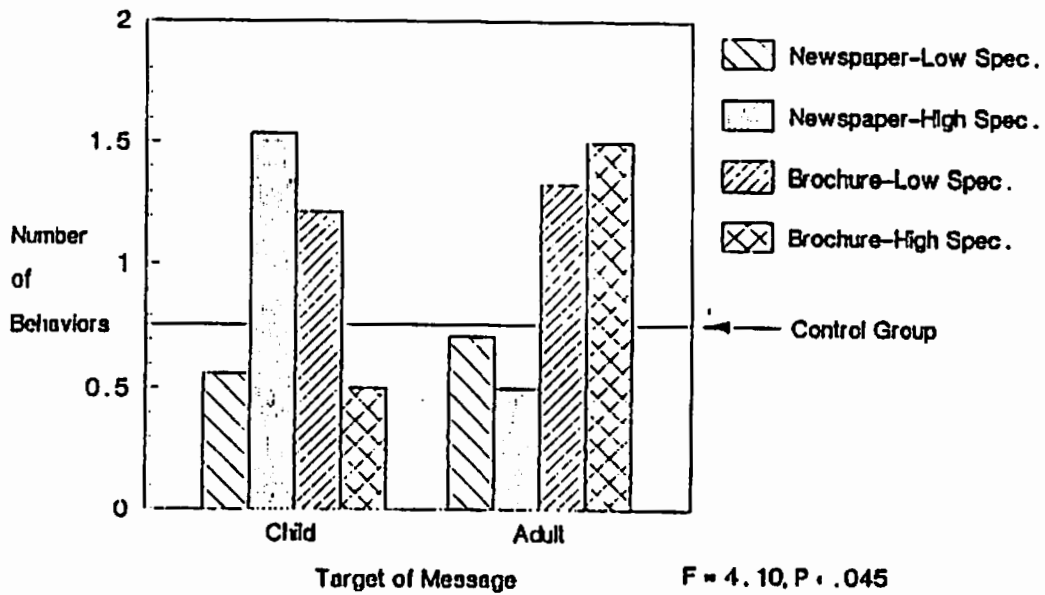


Figure 3

EFFECTS OF RISK TAKING, SOURCE & SPECIFICITY ON AMOUNT OF INFORMATION REQUESTED

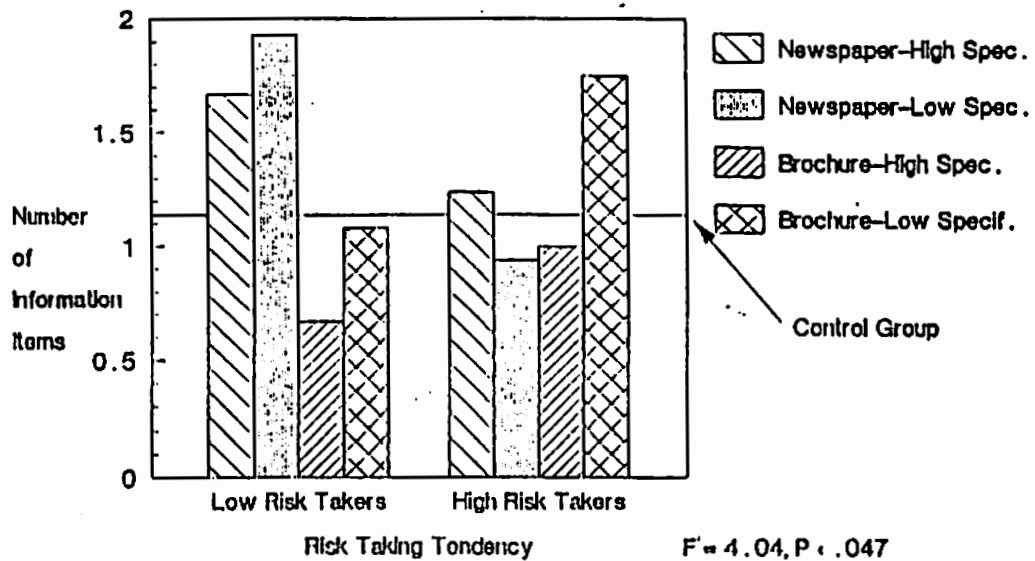


Figure 4

## REFERENCES

- Brewer, W. R. & Nakamura, G. V. (1984). The nature and function of schemas. In R. S. Wyer & T. K. Srull (Eds.) Handbook of social cognition. Hillsdale, N. J. Lawrence Erlbaum Associates.
- Eysenck, S. B., & Eysenck, H. J. (1977). The place of impulsiveness in the dimensional system of personality description. British Journal of Social and Clinical psychology, 16, 57-68.
- Ferguson, M. A. & Valenti, J. M. (1988, July). Risk-taking tendencies and radon messages: A field experiment testing an information processing model for risk communication. Paper presented at Association for Education in Journalism and Mass Communication, Portland, Oregon.
- Fiske, S. T., & Linville, P. W. (1980). What does the concept schema buy us? Personality and Social Psychology Bulletin, 6, 543-557.
- Fiske, S. T., & Taylor, S. E. (1984). Social cognition. Reading, Mass.: Addison-Wesley Publishing Co.
- Isen, A. M., Means, B., Patrick, R. & Nowicki, G. (1982) Some factors influencing decision-making strategy and risk taking. In M. S. Clark & S. T. Fiske (Eds.), Affect and cognition (pp.243-261). Hillsdale, N.J.: Lawrence Erlbaum Associates.
- Janis, I. L. (1982). Stress, attitudes, and decisions. New York: Praeger Prints.
- Lamm, H., Myers, D. C. & Ochsman, R. (1976). On predicting induced shifts toward risk or caution: A second look at some experiments. Psychologische Beitrage, 18, 288-296.
- Petty, R. E. & Cacioppo, J. T. (1986) The elaboration likelihood model of persuasion, in L. Berkowitz (Ed.), Advances in experimental social psychology. (Vol. 19). New York: Academic Press.

- Pruitt, D. G. (1971a). Choice shifts in group discussion : An introductory review. Journal of Personality and Social Psychology, 20, 339-360.
- Pruitt, D. G. (1971b). Conclusions: Toward an understand of choice styles in group discussions. Journal of Personality and Social Psychology, 26, 495-510.
- Rogers, R. W. (1983). Cognitive and physiological processes in fear appeals and attitudes changes: A revised theory of protection motivation. In J. Cacioppo & R. Petty (Eds.). Social psychophysiology. New York: Guilford Press.
- Slovic, P. (1987) Perception of risk. Science, 236, 280-285.
- Slovic, P., Fischhoff, B. & Lichtenstein, S. (1980). Facts and Fears: Understanding Perceived Risk. In R. Schwing & W. Albers, Jrs., Societal Risk Assessment (pp. 181-216). New York: Plenum.
- Slovic, P., Fischhoff, B. & Lichtenstein S. (1982). Facts versus fears: Understanding perceived risk. In D. Kahneman, P. Slovic and A. Tversky, Judgment under uncertainty: Heuristics and biases (pp. 463-489). Cambridge: Cambridge University Press.
- Sorrentino, R. M., Bobocel, D. R., Gitta, M. Z., Olson, J. M. & Hewitt, E. C. (1988). Uncertainty orientation and persuasion: Individual differences in the effects of personal relevance on social judgments. Journal of Personality and Social Psychology, 55, 357-371.
- Stallen, P.J. & Coppock, R. (1987). About Risk Communication and Risky Communication. Risk Analysis, 7, 413-414.
- Streifert, S. (1986). Individual differences in risk taking. Journal of Applied Social Psychology, 16, 482-497.
- Tversky, A. & Kahneman, D. (1974). Judgment Under Uncertainty: Heuristics and Biases, Science, 175, 1124-31.
- Valenti, J. M. & Ferguson, M.A. (1987). Radon awareness, concern, responsibility and source confidence: A survey of homeowners in three Florida counties--Alachua, Hillsborough & Polk. Florida Phosphate Council and the College of Journalism & Mass Communications, University of Florida, Gainesville, Florida.

Vlek, C., & Stallen, P. (1980). Rational and personal aspects of risk. Acta Psychologica, 45, 273-300.

Zuckerman, M. (1988). Behavior and biology: Research on sensation seeking and reactions to the media. In L. Donohew, H. E. Sypher & E. T. Higgins (Eds.), Communication, social cognition, and affect (pp. 173-194). Hillsdale, N.J.: Lawrence Erlbaum Associates.