

## Preface

# Warnings and risk communication

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Warnings are used to communicate hazard and risk information as a means of preventing accidents and injuries. Ideally, a warning should capture attention, provide essential information, and facilitate self-protective behavior. Virtually any type of sensory stimulus can serve an alerting function and much of the early work in this area focused on assessing the relative merits of different types of auditory and visual signals. Since the mid-1980s, however, warnings research has undergone significant growth in defining the factors that determine whether a warning will or will not be effective. Most of this attention has been directed at warning labels accompanying consumer products, warning signs in various environments, warning messages delivered via print and electronic media, and various other speech and pictorial warnings.

Warnings have rapidly become a common feature of everyday life. Literally thousands of consumer products and pieces of industrial equipment now bear warning messages. In addition, tobacco products, alcoholic beverages, prescription drugs, and over-the-counter medications often contain warning information of some type. Failure to warn and instruct has emerged as an important issue in consumer product and other liability litigation, and forensics specialists are frequently called upon to debate the merits of different warning messages and protocols. Warning information is also part of workplace hazard communication and "right-to-know" requirements. In addition, warnings are a community health concern, for example, with respect to the transport and storage and of toxic substances and hazardous wastes. The uniformity and comprehensibility of warnings must be addressed in accessing global markets and negotiating trade agreements.

Much of the recent research and thinking on warnings has been based on a generalized information-processing model. The warnings process is typically portrayed as a sequence of steps or stages beginning with attention/perception, proceeding through comprehension and decision-making, and ending with re-

sponse selection and execution. The basic linear form of the model suggests that the effectiveness of a warning is determined by success at each stage of the model. That is, if a warning is not attended to, it will not be processed any further. Research has tended to evaluate effectiveness by using tests of intermediate stages or processes necessary for behavior change (e.g., tests of attention and comprehension), by using newly developed methodologies (e.g., incidental exposure and behavioral paradigms), or by using assessments of risk and hazards perceptions. Studies measuring actual behavioral compliance have been less frequent and there have been very few field or population-based studies of actual in-use warnings. Although considerable progress has been made in understanding warning effectiveness, there is still a great need for new approaches and research to fill gaps in this important and challenging area.

The purpose of the Special Issue on *Warnings and Risk Communication* is to provide a forum for quality research using current and promising methodological approaches and to provide a synthesis of recent research on warnings. In making acceptance decisions, we assigned primary importance to the overall quality of the submission and the extent to which it adds to or organizes what is known about the topic. However, we were also interested in putting together a compilation of papers that would be, to the extent possible, representative of the full range of topics and methodologies being pursued in this area of inquiry. Regrettably, because of space limitations and the above decision criteria, we were unable to accommodate many excellent papers.

The articles in this issue cover a diverse array of approaches to warnings and risk communication. The first paper provides a comprehensive and up to date review of the warnings literature (Lehto and Papastavrou). We felt that this particular paper would provide a useful orientation for readers who are essentially unfamiliar with contemporary warnings research. A second reason for leading with this paper is that it includes a conceptual model that may prove useful as an organizing framework for the papers that follow.

The next several papers feature laboratory research that, for the most part, focuses on perceptual aspects of warning effectiveness. The paper by Laughery and associates summarizes four experiments designed to assess the effects of warning explicitness on purchase preferences and caution in use. The Silver and Braun paper explores warning readability as a function of several font or print style characteristics. Galluscio and Fjelde describe an experiment that uses saccadic eye movements to assess warning effectiveness. The final paper in the laboratory research section is by Wogalter and colleagues. This paper summarizes three behavioral compliance experiments that examine the use of pictorials, voice warnings, and other enhancement devices.

The next two papers also involve compliance behavior but these studies were conducted in field settings. Dingus and colleagues manipulated the costs associated with using personal protective equipment in two different field settings. Summala and Pihlman studied the effects of a safety tape recording on

the subsequent driving behavior of truckers as they entered a highway work zone. A novel aspect of this particular study is that it targeted potential perpetrators rather than victims.

The final three papers represent other innovative and promising approaches for furthering our understanding of warnings-related behavior. The Greenfield and Kaskutas paper summarizes the results of a large-scale national survey on the early effects of alcoholic beverage warning labels. This study focuses on the drinking and driving message and takes more of a public health approach to warnings. Mallett and colleagues use a qualitative research approach to explore coal miners' reactions to warning message systems in an underground mine fire. Finally, Kreifeldt describes how a theoretical and mathematical approach (fuzzy sets) can be applied to forensic decision making.

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As Guest Editors, we hope that this special issue will help organize what is known about warnings and that it will serve to expand and improve research in this important area of safety. Ideally, the articles contained in this compilation will stimulate new and better ideas and methodologies, broader and more detailed critical discussion of warnings, and greater multidisciplinary participation in the design and use of warnings for communicating hazard and risk information.