

PERCEPTIONS OF CONSUMER PRODUCTS: HAZARDOUSNESS  
AND WARNING EXPECTATIONS

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ABSTRACT

This research examines several characteristics of consumer products that influence warning communication. Seventy-two generically-named products were rated according to perceived hazardousness, familiarity, and several other measures: 1) willingness to read warnings, 2) need for warnings, 3) location of warnings, and 4) appearance of products with warnings. The results indicate that reported willingness to read warnings is strongly and positively related to the perceived hazardousness of the product. Though product familiarity is significantly related to willingness to read warnings, it provides little predictive value beyond hazardousness. Additional analyses showed, the more hazardous the product: 1) the greater the need for warnings, 2) the closer to the product one expects to find a warning, and 3) the less warnings detract from the appearance of such products. Implications of these results are discussed with regard to applications for warning design.

INTRODUCTION

In recent years human factors specialists have become increasingly concerned with the efficacy of consumer product warnings. Despite efforts to present warnings on products, it is apparent that in many instances warning information fails to reach the consumer. Thus, it is of interest to explore factors which contribute to failures in the warning communication process.

Why would product warnings fail to reach the consumer? There are several possible reasons. First, the consumer may not see the warnings. For example, Wogalter, Fontenelle, & Laughery (1985) have shown that warnings located following a set of instructions may not be seen. A second possible reason is that consumers may not comprehend warnings. For example, warning communication may be compromised when the reading level required by a warning is too high for the target audience (e.g., Pyrczak & Roth, 1976; Morris, Meyers, and Thilman, 1980). A third reason warnings fail to be communicated is that the consumer does not read a warning even when it is visible and comprehensible. Why might a consumer not read a product warning? Two fairly intuitive reasons come to mind. Either the consumer perceives the product to be

nonhazardous, or believes he or she is already familiar with the product. There is some evidence to support these ideas. For example, Godfrey, Allender, Laughery, and Smith (1983) found that perceptions of product hazardousness are positively related, while familiarity is negatively related, to likelihood of looking for a warning. If people look for warnings, they probably have intentions of reading them.

In related research, Wright, Creighton, and Threfall (1982) examined factors determining when instructions for consumer products would be read. They report that simplicity of operation is the major determinant of this variable. However, they also report the unexpected finding that familiarity and safety do not relate to claims of reading instructions. In a practical sense, it is difficult to distinguish between consumer product instructions and warnings. Indeed, warnings are a special type of instructions describing what to do for purposes of personal safety and product reliability.

It thus appears that there are discrepant conclusions in the warnings literature: Godfrey et al.(1983) found that familiarity and hazardousness relate to the tendency to look for warnings. However, Wright et al.(1982) found that familiarity and safety do not relate to

claims about reading consumer product instructions. It should be noted that there are numerous methodological differences between these studies. Godfrey et al. asked subjects whether they would look for warnings, whereas, Wright et al. asked whether they would read instructions. These studies also differed in terms of the number of products used (8 in the former vs. 60 in the latter study). It is not clear what effects these differences had.

The present research examines whether the perceptions of hazardousness and familiarity relate to willingness to read warnings. In addition we were interested in exploring several other kinds of warning expectations. These include: 1) need to warn, 2) expected location of warnings, and 3) whether warnings detract from the appearance of products. Such perceptions and expectations will likely influence warning communication and thus have implications for warning design.

METHOD

*Materials and Design.* A large sample of consumer products was selected from several major department store catalogs (e.g., Montgomery Ward, J C Penny, Best Products). These were combined with additional samples of common food and over-the-counter pharmacy items. Inspection of this sample revealed that most of these products could be placed into one of three general categories: 1) Electrical, 2) Chemical, and 3) Non-electrical Tools. A subset of 72 products was selected from our large sample. Several selection criteria were used: 1) products must conform to one of the above three categories, 2) products must represent a wide range of hazardousness under each category, and 3) products must be representative of common household items. Only the generic names of products were used. Table 1 lists the 72 products according to the three product-type categories.

Products were rated along several dimensions. The specific questions and rating scales are described as follows: (1) If you saw a warning on this product would you read it? The response to this question was made on a 6-point scale labeled from 1 to 6 and anchored from the low end to the high end with definitely no, probably no, possibly no, possibly yes, probably yes, and definitely yes, respectively. (2) How hazardous is the product? (3) How familiar is the

Table 1. Products categorized by product type.

<i>ELECTRICAL</i>	
battery alarm clock	microwave oven
curling iron	photoflash unit
desk lamp	pocket calculator
digital watch	quartz/space heater
drip coffee maker	sewing machine
electric blanket	sunlamp
electric carving knife	steam iron
electric food slicer	toaster/oven
electric hedge trimmer	transistor radio
flashlight	oscillating fan
metal detector	vacuum cleaner
<i>CHEMICAL</i>	
antacid	kerosene
apple sauce	lacquer stripper
artificial sweetener	milk
aspirin	nonprescription diet aid
baby powder	oven cleaner
cake mix	roasted peanuts
cough medicine	roll-on deoderant
drain cleaner	shampoo
dried cereal	skin moisturizer
eggs	soap
household bleach	suntan lotion
insecticide/pesticide	whiskey
<i>NON-ELECTRICAL TOOLS</i>	
binoculars	hunting knife
chain saw	inflatable boat
clothesline	ladder
dart game	life vest
football helmet	ping pong table
garden shears	rake
garden sprinkler	screwdriver
gas outdoor grill	scuba gear
gas powered lawn mower	semi-automatic rifle
golf club	three-speed bicycle
hammer	wheel barrow
hiking boot	wood splitter

product? Questions 2 and 3 were worded to fit a 7-point scale labeled from 1 to 7 and anchored respectively with semantic labels of quantity : not at all, a little, some, moderately, fairly, very, and extremely. (4) Do you think there should be a warning on this product? This question used the same response scale as the first question. (5) Where would you most expect to find a warnings on this product? Several alternative choices were provided: on the product, on the package, at the beginning of an instruction booklet, at the end of an instruction booklet, on a piece of paper separate from the instructions, and the last alternative was "I would not expect a warning on this product." These alternatives were assumed to reflect an underlying distance metric indicating expected proximity between product and warning. These alternatives were subsequently coded from 1 to 6 with lower numbers indicating a shorter warning to product distance. (6) Do you

think a warning that is visible when the product is in use would make the product less attractive? Subjects responded on the same 6-point scale used for questions 1 and 4 ranging from definitely no to definitely yes.

All subjects rated the 72 products on all six questions. The product names were listed along the left column of two rating sheets. Four random orders of products were used in order to control for possible order effects. To the right of the product names were six columns of blank spaces where subjects recorded their ratings.

**Procedure.** Initially, the experimenter read instructions to subjects stating that they would be rating a variety of consumer products on several dimensions. Subjects were then given the set of two sheets containing the product listing. They were told to read over these sheets to familiarize themselves with the type and variety of products. Two minutes were provided for subjects to examine the list. They were then given two pages of questions dealing with the products. It was emphasized that they should read each question in turn, and rate *all* 72 products on Question 1 before proceeding to Question 2, and so on. Subjects were told they were to assume that the generically-named products would soon be introduced under a new brand name. In a subsequent phase, an independent group of subjects rated the same set of 72 products on the hazardousness question.

**Subjects.** One hundred twenty-five Rice University undergraduates participated in this study. Subjects were run in groups of 5 to 20. Subjects were given psychology course extra credit. At a later time, an additional set of 20 psychology graduate students participated voluntarily in a replication of the product hazardousness ratings.

## RESULTS

Several analyses were carried out using these data. Individual subject ratings were combined into mean ratings for each of the 72 products, and intercorrelations for all six questions were computed and can be seen in Table 2. Scatter plots of these data indicated linearity.

We initially focused on factors related to willingness to read warnings. Subjects report that they are more likely to read warnings on products

**Table 2. Pearson-product moment intercorrelations for product warning perceptions and expectations.**

	Read	Hazard	Familiar	Warn	Location
Hazard	.892				
Familiar	-.640	-.632			
Warn	.943	.953	-.623		
Location	-.885	-.807	.486	-.917	
Appear	-.448	-.538	.354*	-.510	.501

\* $p < .002$ , all other  $p$ 's  $< .0001$

perceived to be more hazardous ( $r = .89$ ). Subjects also report that they are more likely to read warnings on less familiar products ( $r = -.64$ ). It is interesting to note that the more hazardous products tended to be the least familiar ( $r = -.63$ ). Hazardousness and familiarity were statistically controlled using partial correlations. The partial correlation between willingness to read and hazardousness -- controlling for familiarity -- reduces this relationship from .89 to .82. This decreases the common variance by about 15%, however, the remaining correlation is still highly significant ( $p < .0001$ ). The partial correlation between willingness to read and familiarity -- controlling for hazardousness -- reduces this relationship from -.64 to -.22. This decreases the common variance by about 36%, and the remaining correlation is only marginally significant ( $p < .06$ ). Perceived hazardousness accounts for 80% of the variance of willingness to read. Thus, there is only marginal effects of familiarity, over and above the effect of hazardousness.

We were also interested in examining whether familiarity would moderate the relationship between willingness to read and perceived hazardousness. Using regression analysis to predict willingness to read warnings with hazardousness and familiarity as predictors yields an overall  $R^2$  of .81 ( $n = 72, p < .0001$ ). With hazardousness as the first predictor, familiarity and its interaction with hazardousness contribute unimportant increments in predictiveness--less than 1.0% in each case ( $p = .07$  and  $p > .30$ , respectively).

The present results clearly show that perceived product hazardousness is the primary

determinant of reported willingness to read warnings. It is thus of interest to examine perceptions of product hazardousness in more detail. Specifically, we would like to know how other kinds of warning expectations relate to this variable. One such expectation is whether or not the product needs a warning. The need for warnings is highly related to willingness to read warnings ( $r = .94$ ). Of course, given our earlier results, it would be expected that product hazardousness should also relate to whether or not a product needs warnings, and indeed, this is the case ( $r = .95$ ).

Another topic of interest is the expected location of warnings. Certainly one reason a warning may not be read is because of its location. It is likely that the probability of noticing (or finding) a warning increases as the distance between the product and its warning decreases. We addressed this point by deriving a distance metric where the ordering of a set of multiple choice responses reflected expectations concerning proximity of the product to its warning. People report that they are more likely to read a warning the closer it is to the product ( $r = -.89$ ). Further, the results show that with greater hazardousness people expect warnings to be located closer to the product ( $r = -.81$ ).

These results suggest that proximity of the warning to the product is important for highly hazardous products. However, one might be concerned that such warnings would detract from the appearance of the product. Subjects were asked, "Do you think a warning that is visible when the product is in use would make the product less attractive?" The results indicate that, as products are perceived to be more hazardous, warnings are considered to detract less from the products appearance ( $r = -.51$ ). For products rated greater than moderately hazardous, subjects reported a mean rating of 2.6 (in the "no" region of the scale).

Finally, the reliability of the hazardousness ratings in this study was tested. Independent hazardousness ratings were obtained from a second group of subjects. Hazardousness ratings exhibited a high degree of test-retest reliability ( $r = .95$ ,  $n = 72$ ,  $p < .0001$ ).

## DISCUSSION

The present results show that the primary

determinant of the likelihood that warnings will be read is the products' perceived level of hazard. Though product familiarity is significantly related to willingness to read warnings, it provides little predictive power beyond hazardousness.

As noted in the introduction, two previous studies addressing related issues yielded contradictory results. Godfrey et al. (1983) found both hazardousness and familiarity to be related to the likelihood of looking for warnings. However, Wright et al. (1982) failed to find relationships between familiarity or product safety and willingness to read instructions.

It is not entirely clear why Wright et al. failed to find relationships between reading instructions and familiarity or safety. As previously mentioned, it is difficult to distinguish between product instructions and product warnings. It is possible that Wright et al.'s subjects were responding to general start-up directions--that is, how to make the product operate--rather than considering other aspects of the instructions like safety warnings. This explanation has some support, given Wright et al.'s results. People in this study report that they are more likely to read instructions that pertain to complex products than to simple ones. This suggests that their subjects primarily responded to concerns of making the product operational, rather than to questions of safety. Why Wright et al. (1982) failed to find a relationship between familiarity and the tendency to read instructions is not particularly obvious. One possibility is that the products were biased toward high levels of familiarity.

The present results show that more hazardous products are less familiar than less hazardous ones. We would suggest that this finding reflects perceptions of products in the real world and is not an artifact of our sample.

Our results showed several other interesting relationships. People expect products of greater hazard to have a greater need for warnings. In addition, with greater hazardousness, people expect warnings to be located closer to a product. Moreover, the results indicate that, as products are perceived to be more hazardous, warnings detract less from the products' appearance.

These results have several implications for

warnings on consumer products. Manufacturers of hazardous products should locate warnings in close proximity to their products, because this is where people expect them to be. Failure to locate warnings properly may lead people to assume the product is less hazardous than it actually is, and thus could lead to incorrect handling of the product. In addition, the present results suggest that manufacturers of hazardous products should not be overly concerned about detracting from the appearance of their products when locating warnings so they are clearly seen.

Another implication of these results is that people may fail to read warnings because they misjudge the hazardousness of the product. This result highlights the need for signal words (i.e., danger, warning, and caution) to indicate the degree of hazard. Additionally, the results of this study extend the findings of Wogalter, Desaulniers, & Godfrey (1985) that warnings involving more hazardous situations are perceived to be more effective than warnings for less hazardous situations. The present results suggest a reason--people are more likely to read warnings in hazardous situations and thus such warnings are more effective.

The present research deals with reported perceptions and expectations, rather than actual behavior. This research is an early step in the direction of determining factors that influence the reading of product warnings. Certainly, a more conclusive step should involve behavioral measures of reading warnings. For example, one question that should be examined in the laboratory or in the field is: for what kinds of products will warnings not be read? Our results suggest that hazardousness is a critical variable related to the reading of warnings.

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