Emphasis Terms for Warning Directives on Compliance Intent

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Instructions on how to avoid hazards are an important aspect of warnings. Because message brevity is beneficial for effectiveness, the wording ought to be useful in motivating compliance. Participants (*N*=132) evaluated 37 single and two-word emphasis phrases (e.g., "critical" or "absolutely crucial") that could be added to a directive (or instructions) statement to indicate the degree of compliance necessity. Manipulated were one or two-word (phrase) emphasis terms (e.g., "critical," "must," and "absolutely critical"). Participants rated the compliance intent for each of these. Results showed a wide range of ratings across word/phrase conditions (from "extremely critical" and "urgent" as the highest to "optional" as the lowest). Linear (additive) and non linear effects were yielded by the pattern of means for word/phrase combinations. "Federal Law" was one of the highest rated items confirming similar previous findings. Implications are discussed including the potential for matching terms with hazard levels.

INTRODUCTION

Warnings for signs and labels are generally intended to aid knowledge, promote compliance and serve as a reminder (e.g., Laughery & Wogalter, 2006). In order to accomplish these goals, evidence from previous literature as well as in standards and guidelines (e.g., American National Standard Institute [ANSI] Z535.2, 2002; Westinghouse, 1981) show that various kinds of components of design benefit warnings effectiveness. For example, warning messages generally should have information on the hazard, directives (instructions) on how to avoid the hazard, and consequences from not avoiding the hazard.

Brevity is another goal for warnings designers (Wogalter & Young, 1994) because people are less likely to read lengthy, verbose material. In general, warnings text should be pithy to motivate people to behave in the way(s) being asked (Wogalter, DeJoy, & Laughery, 1999). At the same time the message ought to be explicit as opposed to general (Laughery et al, 1993).

One component of warnings that has been examined in depth is signal words. Numerous studies have examined signal word differences on perceived hazard and urgency (e.g., see Edworthy & Hellier, 2006). Interestingly, other than variants of signal words, few have examined the "urgency" or strength of terms in warnings' instruction or directives statement. This is an important component of warnings because it tells people how to avoid the hazard. The problem is that people do not realize the importance of performing the instructed behavior. Perhaps wording could be added to "bare bones" or "base" directives to enhance the motivation to carry out the instructed behavior. For example, consider

a warning instruction related to a severe respiration hazard. It might state; "Wear XYZ-789 respirator." This "base" directive can be changed to raise or lower a person's motivation to comply with a warning by adding emphasis words such as "imperative" and "crucial." Thus, this basic directive might state "Wear XYZ-789 respirator" or it might include qualifiers (adverbs) such as "extremely" ["It is extremely crucial to wear XYZ-789 respirator"] which may affect the connoted sense of urgency or necessity in performing the warnings directed instruction. A collection of people's evaluations of these additional terms could assist warnings designers in selecting words that match the intended level of emphasis appropriate for a warning's instructions statement.

In an unpublished pilot study by Kim, Wogalter, & Cowley (2007), participants compared a "base" directive" (control) with the same or similar statements containing emphasis terms. Some emphasizers significantly raised compliance intent and some lowered it compared to just the "base" directives alone. A summary of the Kim et al. (2007) data is shown in Table 1.

The present study examined the effects of one-word (emphasis adjective) and two-word phrases (qualifier and emphasis adjective) on compliance intent ratings. The list of evaluated emphasis words was expanded and studied in a more general context. It was expected that the evaluations would show a broad range of ratings of compliance intent and that different emphasis adjectives would yield a wide range of urgency or encouragement to comply. Moreover, adding adverbs might further affect the emphasis connoted and we investigated whether the adverb additions would yield linear (additive) or non-additive effects.

Table 1. Mean ratings and standard deviations (SD) of base directive/control (with no emphasis term) and with 11 emphasizer conditions (from Kim et al., 2007).

Words	Mean	SD
Control (No emphasis term)	4.57	1.94
Mandatory	6.52	1.15
Extremely important	6.14	1.54
Required	6.07	1.40
Absolutely necessary	6.05	1.61
Strongly recommend	5.02	1.55
Important	4.98	1.52
Strongly suggest	4.90	1.76
Necessary	4.86	1.69
Recommended	3.98	1.88
Suggest	3.71	1.57

Specific phrases "Federal Law" and "State Law" were also included in the set to examine their effects in relation to the other words/phrases. Research by Wogalter, Kalsher, and Rashid (1999) suggests that adding terms into warnings referring to governmental entities and the law increases perceived credibility and compliance intent. Previous research has indicated that the law and legal aspects (violations and governmental entities) enhance compliance behavior for helmet and seat belt warnings (e.g., Lehto & Foley, 1991). Since Federal Law takes generally precedence over State Law, a similar pattern was expected to be demonstrated in the ratings.

METHOD

Participants

A total of 132 individuals (76 females, 56 males) participated. Overall average age was 27.6 years (*SD*=10.1). Samples from two population pools were collected: 42% were undergraduate students from North Carolina State University (*M* = 21.5 years; *SD* = 3.8), and 58% were non-student adult volunteers from the community (*M* = 32.0 years; *SD* = 10.8).

Materials and Procedure

Each participant was given a questionnaire that included a consent form, and demographics survey, and a set of materials described below. The questionnaire also included items unrelated to the research reported here.

Participants were told that they would be rating a set of words and phrases that could be inserted into various warning instruction statements to emphasize the need to perform the directed hazard avoidance behavior. They were told that the intent of these phrases was to convince or persuade consumers to carry out the instructed behavior. They were given an example statement where many of the evaluated word(s) could be substituted in the blank: "It is _____ that you obey this warning." This broad statement was intended to provide a general context (rather than any given specific product or situation) under which the words would be evaluated.

A list of words and phrases was generated by the authors who collected a set of one or two-word phrases (from various sources) that could be added to a broad range of warning instructions' statements. This set was further enlarged using a thesaurus and words were included to convey a wider range of importance in a broader, more general range of warning directives. Each term had an adjoining blank where participants recorded their rating. Specifically, participants rated how likely they would obey a warning directive containing the word(s). This is a measure of compliance intent (also called willingness to comply). A 0 to 8-point rating scale was used with the anchors 0 ("not at all likely to obey"), 2 ("somewhat likely to obey"), 4 ("likely to obey"), 6 ("very likely to obey") and 8 ("extremely likely to obey"). Two orders of these questions were administered to participants; one was a randomized order and the other was the reverse of the randomized order.

RESULTS

Three main analyses are presented. The first involved the entire set of 37 word/phrase conditions. Table 2 shows the means and standard deviations of the terms arranged in order from high to low compliance intent. The range of the two most extreme emphasizer terms differed in the means by nearly 5 rating points. The highest rated were "Extremely crucial" (*M* = 6.23) and "Urgent" (*M* = 6.23) and the lowest rated were "voluntary" (*M* = 2.37) and "optional" (*M* = 2.25). According to the anchor labels, these extremes ranged from "very likely to obey" to "somewhat likely to obey."

A one-way ANOVA of the 37 words/phrases indicated a significant effect of statements, $F(36, 4716) = 69.16$, $MSE = 2.19$, $p < .0001$. Tukey's Honestly Significant Difference (HSD) test set at $p = .001$ (due to the large number of potential paired comparisons) was found equal to .60. This value can be used to compare

means. Any mean difference greater than this value is statistically significant.

Selection of terms for use in warnings should not just be based on means. Higher rating variability is indicative of confusion or interpretation differences between participants. As can be seen in Table 2, some words had higher standard deviations than others. The most variable were "compulsory," "imperative," and "discretionary." High standard deviations (SD) compared to lower ones indicate that participants have inconsistent beliefs about how much the terms inspire compliance intent.

Table 2. *Mean ratings and standard deviations in descending order of 37 word conditions.*

Words	Mean	SD
Extremely crucial	6.23	1.97
Urgent	6.23	1.67
Extremely vital	6.20	1.88
Federal Law	6.05	2.29
Absolutely necessary	6.04	1.83
Mandatory	6.03	1.87
Critical	6.02	1.92
Extremely important	5.98	1.79
Absolutely crucial	5.89	2.07
Absolutely vital	5.82	2.15
Very vital	5.80	1.93
Vital	5.79	1.97
Very crucial	5.76	2.01
Extremely essential	5.64	2.00
Absolutely important	5.64	1.90
State Law	5.61	2.33
Very important	5.59	1.84
Required	5.57	2.14
Must	5.51	2.10
Crucial	5.49	1.95
Extremely necessary	5.42	2.05
Very necessary	5.39	1.93
Absolutely essential	5.38	2.16
Very essential	5.33	1.92
Strongly recommended	5.32	1.87
Imperative	5.10	2.20
Strongly suggested	5.10	1.90
Essential	5.03	1.94
Necessary	4.95	1.97
Important	4.95	1.74
Recommended	4.15	2.15
Compulsory	3.68	2.45
Suggested	3.33	1.90
Discretionary	3.21	2.20
Please	3.18	2.08
Voluntary	2.37	1.99
Optional	2.25	2.03

A second main analysis specifically examined significant simple effects between the components (emphasis adjectives and qualifiers) and whether the addition of qualifiers to directives increases ratings in a linear or nonlinear pattern. From the initial set of 37 terms, 20 of them were assembled to form a two-factor analysis involving adverb and adjective emphasizers. A 5 (emphasis adjective: "important," "crucial," "essential," "necessary," and "vital") X 4 (qualifier: no adverb, "very," "absolutely," and "extremely") repeated measures ANOVA showed significant main effects for both factors: emphasis adjective, $F(4, 524) = 12.79$, $p < .0001$, and qualifier, $F(3, 393) = 24.11$, $p < .0001$. The interaction was also significant, $F(12, 1572) = 5.87$, $p < .0001$. The means are shown in Figure 1. Comparisons among the main effect adjective means indicated that "vital" had the highest mean rating but was not significantly different from "crucial," but both terms had significantly higher means than the other three terms (which did not differ among themselves).
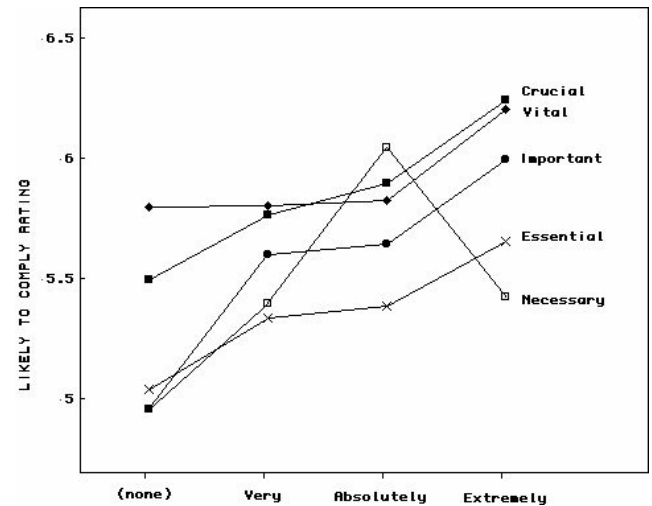

Figure 1. *Graphed means of the emphasis adjective X qualifier interaction.*

Comparisons among \ the qualifier main effect means showed that the presence of a qualifier produced significantly higher ratings than without a qualifier. "Extremely," the highest rated qualifier was significantly higher than "very," but "absolutely," which was intermediate, did not differ from either of the other two qualifiers.

The significant interaction appeared to be due to the emphasis adjective "necessary," when paired with the qualifier "extremely," showing a reduced mean rating,

whereas "necessary," when paired with "absolutely," showed a higher mean rating. For the other emphasizer adjectives in the analysis, the addition of qualifiers produced roughly linear parallel lines.

The third main analysis examined the compliance intent ratings for the terms "Federal Law" and "State Law." Both were given high ratings (see Table 2), with "Federal Law" amongst the highest rated terms in the entire set tested. A planned comparison between the two law terms was significant, $F(1, 131) = 15.58$, $p < .0001$.

DISCUSSION

This study examined a set of words/phrases that could be added to warnings directives that help enhance a person's intent to comply with the warning. Although there has been extensive research on differences among signal words, explicitness of warning text, and other components of warnings, provides some of the first evidence on the use of emphasizer adjectives and qualifiers that could be used in warning directives/instructions. It confirms some unpublished results by Kim et al. (2007) which used a smaller set of emphasizer terms put in context of actual base directive statements of warnings. Together with the Kim et al. (2007) results, it appears that some emphasizers and qualifiers increase compliance intent ratings (e.g., mandatory or extremely important). Some terms, however, reduce compliance intent ratings (e.g., suggest or recommend).

The interaction pattern of the means for the factorial examination of adjective and adverb emphasizers revealed that while some qualifier terms are additive and appear to hold the same connoted meaning across emphasis adjectives, there was one notable exception with the term "necessary." When combined with "extremely" it was lower than would be predicted from the main effects alone; when it appears with "absolutely," it is higher than predicted by a linear addition. The reason for this particular non-additive pattern is unclear but it points out the possible presence of non-linear effects of word combinations not tested here. It further suggests that verification of combinations of words might be necessary in specific contexts. In general, there were linear effects for the other emphasis adjectives and qualifier combinations as seen by the roughly parallel lines shown in Figure 1.

"Federal Law" and "State Law" produced high ratings of compliance intent, with the former being significantly higher than the latter. These high ratings confirm earlier warnings research that suggested that law-related cues and consequences (such as fines for violation) benefit warnings, presumably because they are perceived as more credible. "Federal Law" was among the highest rated emphasis terms, and its higher rating than "State Law" was possibly due to Federal Law taking precedence over State Law and thus the former may seem more powerful than the latter. These results suggest that in some instances, it might be appropriate and worthwhile to mention law in particularly critical warnings.

Actual behavioral compliance research is often difficult to conduct for a host of reasons (Kalsher & Williams, 2006). Consequently, sometimes compliance intent is used in place of behavioral measurement. The link between actual behavioral compliance and people's self-rated "intent to comply" has been validated in prior research (see Kalsher & Williams, 2006). However, intentions are clearly an imperfect substitute for compliance behavior because their prediction depends on a number of specific conditions being met (Kalsher & Williams, 2006).

There are several implications and applications for the results of the present research. First, warning designers might use these results to select appropriate terms commonly used in warning directives. Clearly there are some words in the list that one would not expect to see in a serious warning. Examples are the terms "optional," "voluntary" and "please" because they lack the strident emphasis needed to motivate compliance. However, it is not uncommon to find low-rated terms such as "suggested" or "recommended" in warnings for consumer products. These terms might be deemed inappropriate if compliance is definitively necessary to avoid personal injury consequences; especially if they are combined with behavioral directives that are difficult to motivate because the compliance behavior has a high performance cost (in terms of effort, time, or money) (Hunn & Dingus, 1992; Wogalter et al., 1987). In these situations, emphasis adjectives and qualifiers with high ratings of compliance intent may be necessary to motivate people to perform the directed behavior requested in the warning.

Brevity is an important factor in warning message content because people are less willing to read long warnings and/or there may be space constraints for some product warning materials. The results of Kim et al. 2007 and the present results suggest that some highly rated emphasis terms may be worth adding to warning

directives, even though they increase the base directive's length.

According to Edworthy and colleagues (e.g., Edworthy & Adams, 1996), the selection of warning components ought to be done in a way that matches the level of hazardousness involved so that terms indicate the appropriate level of hazard and are not overused and do not result in habituation. In time, overused words can lose their connoted level of hazard, however, one way to prevent this is to use some of the lower rated terms for less serious hazards.

A warning designer should also consider term variability for inclusion in warnings. Words with highly variable ratings, as indicated by larger standard deviations, suggest lower comprehension / understanding by participants, and less precise interpretation (Wogalter & Silver, 1995). Words like "discretionary" and "compulsory" would fall into this category due to their higher standard deviations and probably ought to be avoided.

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