Stories or Statistics? Farmers' Attitudes Toward Messages in an Agricultural Safety Campaign

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Abstract

Farming is the second most hazardous occupation in the U.S. The high mortality rate is due in large part to farm equipment hazards, particularly tractor overturns. Injuries and deaths associated with tractor overturns could be prevented with the use of a rollover protective structure (ROPS). In spite of the known dangers associated with overturn incidents, farmers are reluctant to retrofit ROPS on older tractors. Few agricultural safety campaigns target the issue of ROPS retrofits, and none have been evaluated systematically. This article reports a study that examines a set of messages that were central to the Community Partners for Healthy Farming project. This study indicates that narrative–based messages and messages incorporating fear appeals are more favorably evaluated by farmers than messages that simply inform farmers or messages that rely on statistics.

Keywords. *Rollover protective structures, ROPS, Safety campaigns, Narratives, Statistics, Fear appeals.*

The agriculture industry is one of the most dangerous in the U.S.; in fact, it ranks second only to mining in the incidence of fatal injury (DeRoo and Rautiainen, 2000; NIOSH, 2000) and is tied for third place (with transportation and public utilities) behind construction and manufacturing in the incidence of non–fatal injuries (NIOSH, 2000). The hilly terrain of some regions of the U.S. contributes to a higher rate of tractor overturn incidents; it is this type of terrain that contributes to a higher incidence of morbidity and mortality among farmers in Kentucky. It is estimated that of all farm occupation–related deaths in Kentucky, two–thirds are due to incidents involving farm equipment, especially tractors (CDC, 1995; Struttmann et al., 1996; Struttmann et al., 1998). Nearly all of the deaths associated with tractor overturns could be prevented with the installation of a rollover protective structure (ROPS) on tractors and the use of a tractor seatbelt (CDC, 1993; Reynolds and Groves, 2000).

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Unfortunately, persuading farmers to install a ROPS and use a seatbelt is no easy matter. One central issue is the type of message employed to advocate these actions. This article will describe a community–based intervention and then detail a study designed to assess the types of persuasive messages that farmers and members of farming communities evaluate most favorably. This information could be vitally important to the development of future campaigns in other farming communities.

Persuasive Campaigns in Farming Communities

The dearth of research applying well–established principles of social science, especially those pertaining to health campaigns, to agricultural safety campaigns is rather surprising. Farming is one of the nation's most hazardous occupations, yet a great deal of the risk can be minimized with some relatively minor alterations in the farmer's working environment. These circumstances warrant the application of the principles and theories frequently applied in the area of health communication, yet very little has been done in this regard.

Unfortunately, even the few published studies on community–based farm safety campaigns (or other interventions) suffer from poor assessment procedures. It is rare for control counties to be incorporated into research designs, and even pretest/post–test evaluations are not the norm (DeRoo and Rautiainen, 2000; McCurdy and Carroll, 2000; Rivara and Thompson, 2000). The usual protocol described in published studies on agricultural safety campaigns involves the description of how a safety campaign was designed and implemented. If an evaluation is present, it is usually a description of a survey of a sample of people who received the intervention (DeRoo and Rautiainen, 2000). The most common types of farm safety interventions include safety fairs, day camps, certification programs, workshops, and courses for farm families, youth, and agricultural workers (Chapman et al., 1996; DeRoo and Rautiainen, 2000). The most common evaluations focus on changes in safety attitudes, knowledge, and/or behavior (rather than actual rates of injury), often measured as retrospective self–report (e.g., "Did this program improve the likelihood that you will install a ROPS?") (DeRoo and Rautiainen, 2000).

It is important that future studies improve upon current research practices so that agricultural safety interventions increase in their power to produce the behavior change necessary to save lives. This study represents one facet of evaluation efforts designed to assess not just the impact of the entire campaign (especially on the number of ROPS purchased and retrofitted) but to assess the elements of the campaign that may have contributed to the success of the program.

Community Partners Intervention

The Kentucky Community Partners for Healthy Farming project was a federal grant–funded three–year project designed to promote the use of rollover protective structures (ROPS) and seatbelts. Farm community leaders from more than 40 organizations in two intervention counties (Barren and Fleming) assisted in the development and field testing of program materials and campaign strategies. In addition to offering $100 to $250 incentive awards toward the cost of the ROPS, the campaign consisted of interpersonal and mass communication components, including peer– and investigator–led presentations and discussions, group activities, demonstrations, public displays of photographs of tractor overturns (at county fairs and local banks, for example), newspaper articles, public service announcements broadcast over local radio stations, and graphic message stuffers (brief text messages

accompanied by simple graphic illustrations). These graphic message stuffers were placed inside paychecks from major county employers and company billing statements, as well as distributed as countertop handouts by local businesses and agencies. In addition, messages were distributed by local equipment dealers and other businesses. These 3″ × 8½″ messages were photocopied onto color paper and had a black–and–white line drawing or graphic to illustrate the concept highlighted in the message. It is this message series that we decided to target for further evaluation in this study.

The overall campaign proved successful (Cole et al., 2001). In the year prior to the intervention, equipment dealers in the two intervention counties reported only four ROPS retrofits. In the first year of the project, community leaders in both counties increased the ROPS incentive awards from $100 to $250 each to be awarded to farmers at public drawings. Yet during the first few months that incentives were offered, only a handful of farmers applied for the funds, and some of these farmers forfeited the incentive award rather than spend the additional $350 to $600 needed to install a ROPS. However, as the ROPS promotion campaign was implemented, many farmers began to retrofit their tractors with ROPS: 14 in the first year and 61 in the next 26 months. Of these 75 retrofits, only 12 involved the use of incentive funds.

Context, process, and impact evaluation suggest that the Kentucky ROPS program successfully mobilized community groups to promote ROPS and changed many farmers' attitudes and behavior with respect to retrofitting ROPS (Struttmann et al., 2001). The intended impact of the KY ROPS program is both environmental (the one–time addition of ROPS to unguarded tractors, provided that the ROPS is not damaged in a future overturn) and behavioral (willingness to expend the time and money to have ROPS installed on tractors). If the installation of ROPS on tractors were required by law, then the behavioral component would not be important. However, because such legislation does not exist, changing attitudes and behavior to support ROPS retrofitting is a prerequisite to an environmental control that is known to be from 75% (when seatbelts are not always used) to 99% (when seatbelts are used) effective in preventing injury during tractor overturns (CDC, 1995; Reynolds and Groves, 2000).

The question of *which* messages were effective in promoting attitude and behavior change led to this current evaluation. Although it is clear from the frequency of ROPS adoption that the intervention was successful, it is not clear which of the mass communication messages supported this attitude and behavior change and which were less effective. In particular, the graphic message stuffers were of interest to us because these messages were disseminated with far greater frequency than any other messages. For example, we questioned the effectiveness of messages containing statistical information. While the citation of statistics is generally thought to increase the credibility of messages, many messages used in the campaign containing statistics appeared to be too complex to promote comprehension. By conducting an empirical evaluation of this component of the campaign, some initial observations of what elements contribute to the effectiveness of campaign messages can be offered.

Theories Used to Develop Campaign Messages

Narrative theory (Bruner, 1986, 1990; Cole, 1997; Howard, 1991) and Paivio's dual coding theory (Paivio, 1971, 1978) were instrumental in developing campaign messages. Narrative theory states that since human beings are primarily storytellers,

people will respond more favorably to messages when they are presented in a narrative framework. Cole and his colleagues have used narrative theory to construct highly successful safety interventions for mine workers to promote mine safety practices (Cole et al., 1998b; Passaro et al., 1994), for farmers to promote the use of rollover protective structures (ROPS) (Cole et al., 1997; Cole et al., 1998a), and for primary healthcare workers to promote recognition, correct diagnosis, and treatment of green tobacco sickness (Cole et al., 1996).

In addition to incorporating narratives, the messages in the stuffer series had a small accompanying graphic that was designed to add content to the message or to reinforce message content. Moreover, the graphic was used in order to add visual interest to the message. Paivio's dual coding theory (Paivio, 1971, 1978) has as its central premise that individuals possess two interdependent memory coding systems, one for language and the other for nonverbal objects and events. Each system encodes and regulates the processing and storing of information for which it is adapted. Dual coding theory points to the utility of accompanying text messages with illustrations because the information presented will be encoded in both semantic (language) and iconic (image) memory.

Not all stuffer messages adhered to the principles of narrative theory and Paivio's dual coding theory, however. Consistent with the general consensus that community members should be involved with the planning and creation of local health and safety campaigns, many of the messages distributed as part of the campaign were created by people active in the intervention communities, including public health nurses, local equipment dealers, county extension agents, and Farm Bureau members. Thus, some of the messages featured injury statistics to communicate the frequency of tractor overturns in Kentucky. Other messages were designed to simply inform readers what a ROPS is and how it works to prevent injury during an overturn.

While incorporating the feedback of community members is an important endeavor, we believe that messages based on narrative theory would be more successful with farmers and farm community members than messages that only use statistical graphs and charts (with explanatory text) to promote the installation of ROPS on farm tractors. In fact, these messages were evaluated in a study of 32 farmers (Morgan and Cole, 2000), which indicated that narrative–based messages were more favorably evaluated than statistics–based messages. However, given the non–systematic development of the message strategies for the graphic message stuffers, a more thorough investigation of specific message variables that can be used to strengthen future campaigns is needed. Next, we will briefly consider the literature on the relative effectiveness of narrative– and statistics–based messages, as well as findings on the use of fear appeals. This literature informs the development of the hypotheses that were tested in our study.

Narratives Versus Statistics

The question of the persuasiveness of narrative– versus statistics–based messages has been pursued by many researchers. Narratives are alternately termed case studies, anecdotes (or anecdotal evidence), or stories. Even when not taken directly from the lives of real people, narratives take the form of a "true story." Statistics–based messages, on the other hand, rely on the "law of large numbers" and rely on the experiences of a population of people rather than a single case. While statistics–based messages are assumed to be more credible because they take on the veneer of rationality, narratives have an advantage because they are more involving to readers.

Most studies indicate that narrative–based messages are more persuasive than statistics–based messages (Baesler and Burgoon, 1994; Cox and Cox, 2001), though this effect may be moderated by factors such as issue involvement or whether audience members initially agree or disagree with the position being advocated (Slater and Rouner, 1996). Slater and Rouner (1996) concluded that an audience favorably predisposed to a message will find a statistics–based message more persuasive, while (most relevant to health campaigns) audiences resistant to the position advocated by a message will find narrative–based messages more persuasive.

Hypothesis 1: Narrative–based graphic message stuffers will be more successful than statistics–based messages.

What is generally agreed upon by health communication researchers and social influence theorists is that (all other things being equal) persuasive messages are more successful at producing attitude, belief, and behavior change than informative messages. However, many public health practitioners appear to believe that informing the public about a health threat is sufficient to change attitudes and behaviors relevant to that threat. While many of the Community Partners program's messages were designed with a number of theories in mind, there were messages that were designed simply to inform the public about the risks of overturns or about ROPS in general. This study, therefore, was also designed to help us determine the relative effectiveness of information–only messages compared to narrative–based messages.

Hypothesis 2: Narrative–based graphic message stuffers will be more successful than informative messages.

Fear Appeals

Narrative theory is not the only theory that can be used to construct persuasive messages for promoting ROPS and seatbelt use. Fear appeals have been used successfully in many health interventions, though the wisdom of using fear appeals has been questioned in the past. Current research on fear appeals indicates that in order to be effective, fear appeals should have several components. First, messages should include information about the severity of the problem (farmers die because they don't have ROPS and don't use their seatbelts) and the immediacy of the threat (an overturn can happen at any moment) (Levanthal, 1970; Witte, 1992; Witte and Allen, 2000). The literature also notes that it is critically important that fear appeals include information that promotes the efficacy of the proposed solution (ROPS are extremely effective in preventing injury and death) and the reader's own self–efficacy in implementing the solution (including a list of local equipment dealers' addresses and phone numbers, and advancing the notion that getting a ROPS is easy and affordable) (Maddux and Rogers, 1983; Snipes et al., 1999; Witte, 1992; Witte and Allen, 2000).

The Extended Parallel Process Model, a theory of fear appeals, states that when the efficacy component of a fear appeal is lacking, audience members will engage in "fear control" processes (for example, by denying that driving a tractor without a ROPS increases risk of injury or death) (Witte, 1992). However, when the efficacy component is presented effectively, audience members will engage in "danger control" processes (by getting a ROPS in order to reduce the threat of injury or death due to a tractor overturn) (Witte, 1992; Witte and Allen, 2000). Thus, it is vitally important that fear appeal messages contain components relating to threat, severity,

and efficacy. Based on the fear appeals literature, the following hypothesis is advanced:

Hypothesis 3: Graphic message stuffers containing fear appeals will be more successful than informative messages.

Although messages that combine multiple message strategies have rarely been tested against single–strategy messages, Struckman–Johnson et al. (1994) recommend doing exactly that. Because the ultimate objective of this community intervention was to create the most powerful messages possible, we created a "master message" for use in this study. This message combines fear appeals and the use of narrative.

Hypothesis 4: Messages combining the principles of both fear appeals and narrative theory will be more successful than messages based on fear appeals or narrative theory alone.

There is no research available to indicate that either fear appeals or narrative theory would be more successful than the other. Nonetheless, we were interested in which type of message farmers and farm community members would respond to more favorably. Therefore, we pose the following research question:

Research Question: Are fear appeals more successful than narrative–based messages?

The following study was designed to provide an initial test of the type of persuasive messages that farmers will respond to best. This study uses a series of revised messages that test the differences in responses to narrative– vs. statistics–based messages as well as fear appeals vs. simple, informative messages. In addition, this study contrasts a "master message," which combines a theory–based persuasive message, with a simple, information–based message.

Methods and Materials

Sample

One or more of the authors attended Farm Bureau meetings in eight counties to ask farmers and farm community members to complete a survey. This generated a total sample of 433 farmers and farm community members. Two thirds of the sample farm part–time (n = 132) or full–time (n = 161); the remaining are members of the community who either come from farm families or have occupations that rely in whole or in part on the agricultural industry, such as equipment dealers, loan officers, or extension agents. Males comprised 64% of the sample (n = 280). All of the respondents were white and ranged in age from 18 to 74.

Messages

The materials in this study included five messages selected from an original pool of eight messages (three were discarded because they were outside of the scope of this study). The messages included an information–only message, a narrative–based message, a statistics–based message, a fear appeal, and a "master message" that combined a narrative with a fear appeal. All five messages included brief text accompanied by a visual image (graph, chart, or line drawing of a person or farm event). These messages appear in Appendix B.

Instruments

Respondents completed a questionnaire (Appendix A) on their opinions about ROPS and their attitudes toward the message they were asked to evaluate. A principle components factor analysis using a varimax rotation found a five–factor structure. The first and third factors consisted of items pertaining to attitudes about the message; the second factor consisted of attitudes toward ROPS; the fourth and fifth factors consisted of all but one of the reverse–coded items in the survey. Items loading on the fourth and fifth factors were eliminated from further analyses. Table 1 provides the survey items, all five factors, including the primary factors (those with eigenvalues above 1.0), and the factor loadings. The reliability of the resulting message evaluation scale was quite high (alpha = 0.90), although the attitude toward ROPS scale was poor (alpha = 0.58). Thus, for the remainder of this study, only the message evaluation scale will be used as a dependent measure.

Table 1. Factor analysis of survey items (n = 433).

	Factor				
Survey Item	1	2	3	4	5
Message evaluation (eigenvalue = 5.73, 23% of variance)					
Powerful message	**0.81**	–0.02	0.08	0.06	0.05
Persuasive message	**0.80**	0.06	0.26	0.04	0.03
Effective message	**0.78**	0.07	0.12	0.05	0.02
Interesting message	**0.78**	0.05	0.20	–0.04	0.10
Like message	**0.74**	0.15	0.08	–0.04	0.08
Convincing message 1	**0.67**	0.17	0.40	0.08	–0.13
Convincing message 2	**0.54**	0.13	0.39	0.09	–0.08
Made me consider ROPS	**0.51**	0.29	0.41	–0.12	–0.12
Memorable message	0.44	0.17	–0.11	–0.09	0.14
Attitude toward ROPS (eigenvalue = 1.78, 10% of variance)					
Want to get/keep ROPS	0.01	**0.74**	0.12	0.04	0.06
ROPS is waste of money (reverse–coded)	0.15	**0.69**	0.02	–0.09	0.22
Farmers should have ROPS	0.21	**0.67**	–0.07	0.16	–0.16
Message evaluation 2 (eigenvalue = 1.55, 8.8% of variance)					
Message made me think of ROPS differently	0.22	–0.08	**0.64**	0.07	–0.06
Most farmers would want to see message	0.36	0.26	**0.55**	–0.10	0.07
Reverse–coded items (eigenvalue = 1.10, 7.4% of variance)					
Farmers don't need ROPS	–0.003	0.23	–0.25	**0.71**	–0.09
Did not learn anything new from message	0.005	–0.05	0.36	**0.63**	0.12
Message is not convincing	0.17	0.07	0.21	**0.50**	0.33
Message is relevant to my situation	0.22	0.322	0.24	–0.46	0.02
Reverse–coded items 2 (eigenvalue = 1.04, 6.3% of variance)					
Message is confusing	0.16	–0.05	–0.18	0.122	**0.79**
I'd be okay if tractor flipped without ROPS	–0.15	0.37	0.28	–0.09	**0.59**

Task

Respondents first viewed only one of the eight original messages (randomly assigned to each respondent) on the first page of the survey, and then completed the general questionnaire about their attitudes toward ROPS and seatbelts and answered demographic questions. The task took less than ten minutes, but non–responses to various portions of the survey created n–sizes for some analyses that are considerably smaller than the total sample size. After completing the survey, respondents were thanked for their participation and a short debriefing concluded the task.

Results

Table 2 presents the means and standard deviations on the message evaluation scale for each message. Responses to messages did not differ significantly between farmers who already owned ROPS–equipped tractors and those who did not, $t(290) = 1.35$, $p = 0.18$, indicating that farmers with ROPS ($n = 185$) were no more favorably predisposed to ROPS messages than farmers without ROPS ($n = 106$).

Hypothesis 1 predicted that narrative–based messages would be more favorably evaluated by farmers and farm community members than statistics–based messages. The difference between evaluations of the narrative message ($M = 3.94$, $SD = 0.70$) and the statistics–based messages ($M = 3.77$, $SD = 0.81$) was not statistically significant, $t(104) = 1.16$, $p = 0.25$. Thus, this hypothesis was not supported.

Hypothesis 2 predicted that narrative–based messages would be more favorably evaluated by farmers and farm community members than informative messages. This hypothesis was supported. Narrative–based messages ($M = 3.94$, $SD = 0.70$) were significantly better received than informative messages with the same purpose ($M = 3.44$, $SD = 0.92$), $t(112) = 3.21$, $p = 0.002$.

Hypothesis 3 predicted that messages containing fear appeals would be more favorably evaluated by farmers and farm community members than informative messages. Fear appeals were rated higher ($M = 3.75$, $SD = 0.70$) than informative messages ($M = 3.44$, $SD = 0.92$), $t(118) = 2.03$, $p = 0.04$, supporting this hypothesis.

Hypothesis 4 predicted that a “master message” containing both fear appeal and a narrative would be evaluated more favorably by farmers and farm community members than messages relying on either fear appeal or narrative alone. This hypothesis was not supported. The differences between the evaluations of the master message ($M = 3.88$, $SD = 0.69$) and the fear appeal–based message ($M = 3.75$, $SD = 0.70$) was not significant, $t(115) = 1.05$, $p = 0.30$. Similarly, the differences between

Table 2. Means and standard deviations of message evaluation scores.

Message	Message Type	Total Number of Respondents	Mean Message Evaluation Score (SD)
1	Information only	57	3.44 (0.92)
2	Fear appeal	63	3.75 (0.70)
3	Narrative–based	57	3.94 (0.70)
4	Statistics–based	49	3.77 (0.81)
5	Master message: narrative + fear appeal	54	3.88 (0.69)
Total		280	3.71 (0.77)

evaluations of the master message and the narrative–based message ($M = 3.94$, $SD = 0.70$) did not differ significantly, $t(109) = –0.42$, $p = 0.67$.

The Research Question asked whether narratives or fear appeals would be more favorably evaluated. Evaluations of the narrative–based message ($M = 3.94$, $SD = 0.70$) did not differ significantly from evaluations of the fear appeal ($M = 3.75$, $SD = 0.70$), $t(118) = 1.49$, $p = 0.14$.

Discussion

One possible reason for the nonsignificance of the difference between the narrative–based message and the statistics–based message is the attention that we paid to creating an effective statistics–based message. We made special effort to make sure that the statistics–based message was maximally persuasive and highly readable. We presented the same types of arguments in favor of a ROPS and, in the case of statistics, rounded numbers heavily for easier comprehension. In fact, our study mirrored the recommendations of Baesler and Burgoon (1994), who advocated for statistics–based messages that are written in a non–technical manner and that are embedded in a lively (rather than dry) presentational style. The attention paid to creating a brief, readable message that was accompanied by a graphic may have contributed to the effectiveness of the statistics–based message. This study indicates that both types of messages can play an important role in a persuasive campaign, a conclusion echoed by Slater and Rouner (1996).

What is clear, however, is that campaign organizers must be prepared to create messages that are persuasive rather than informative. Although it may be tempting to simply "stick to the facts" about an issue, the results of this study indicate that campaigns that rely solely on informing the public about an issue are not likely to be as successful as campaigns that attempt to actively persuade their target audiences. The "build–it–and–they–will–come" approach to public health education is often apparent in many health campaigns, and quite understandably. It is easy to assume that people will always act in their own self–interest, especially when a behavior can mean the difference between life and death. However, perceptions of risk and perceptions of self– and action–efficacy are not always straightforward. Thus, it is important to carefully design the content and format of a message in such a way that makes it more likely to accomplish its intended goal. Although narrative messages did not have a statistically significant edge over statistics–based messages, narrative messages were significantly better received than informative messages.

Persuasive message strategies involving fear appeals must also have their place in agricultural safety campaigns. Community partners for campaigns of this kind, in our experience, warn against the use of fear appeals. "Scare tactics" seem to be seen as excessive and ultimately ineffective. The concern appears to be that people will "turn off" the message and ignore the health issue. However, this is a view that is based on lay perceptions of fear appeals and not on the academic literature, which prescribes a very specific formula for an effective fear appeal: create a perception of threat, demonstrate the severity of the problem or its consequences, and then demonstrate how the audience member can avoid the threat by following a course of effective (and do–able) action. The findings of this study support the literature on fear appeals, which demonstrates that such message tactics can form the foundation for a persuasive campaign.

Implications and Limitations

Developing a persuasive health campaign is a more difficult a task than it might seem on the surface. One of the preliminary tasks is to decide the types of message strategies that will be used in the campaign. One common message strategy is to present statistics on the number of people who have died because their tractors did not have a ROPS (or because the tractor seatbelts were not used). Another common strategy is to use case studies or narratives to tell a story about the consequences to real people when a ROPS is not used. Since resources (including personnel and money to create and disseminate messages) are limited, it is important to know which message strategy is more effective with farmers.

Although it is critically important to have a group of community partners when implementing a health campaign, it is also important to be able to separate perceptions of effective message strategies from what is indicated in the literature (and what is supported by findings of formative research with the target population). We join many other researchers in calling for formative research and message pretesting; we believe that the triangulation of theory (and published research), community member input, formative research, and pretesting is the best way to ensure effective, persuasive health campaigns.

Several limitations warrant attention. First, the possible effectiveness of messages combining narratives with statistics was not considered in this study. Because our attention was primarily on the role that narrative–based messages and fear appeals play in creating an effective campaign, we did not consider that statistics might be used to further strengthen narrative–based messages. Future research should incorporate an investigation of this question. Second, this is a strictly quantitative investigation of farmers' and farm community members' evaluations of ROPS promotion messages. Future research should involve the collection of data on the reactions of farmers to messages in a more holistic fashion so that researchers and campaign organizers have a richer understanding of the elements of messages that should (and should not) be included in subsequent ROPS promotion campaigns. Third, this study focuses only on the reactions of the farmers and farm community members in a single state, thus compromising its generalizability. National studies of message strategies that are likely to be successful with farmers should be conducted.

Conclusion

Other forms of evaluation have already found that the community education intervention program designed to promote ROPS retrofits had a positive impact. However, the fact that this program will be disseminated to other agricultural states warranted further investigation of what worked and why. Persuasive messages were one important component of the larger campaign, yet there was previously no systematic determination of exactly which type of graphic message stuffers (and thus, which theoretical approaches) were the most effective contributors to the campaign.

Clearly, this study is just a beginning. Farm safety interventions are a neglected area with respect to mass communication message evaluation and their impact on farm–related behaviors. Little is known about how farmers (as a largely rural population) respond to specific types of messages. Formative research should be a priority. We believe that the results of these two initial studies point to the efficacy of fear appeals and narrative–based message strategies as an effective way to

favorably influence people in farming communities, particularly in the context of promoting the use of ROPS and seatbelts.

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References

Baesler, E. J., and J. K. Burgoon. 1994. The temporal effects of story and statistical evidence on belief change. *Communication Research* 21(5): 582–602.

Bruner, J. S. 1986. *Actual Minds, Possible Worlds.* Cambridge, Mass.: Harvard University Press.

_____. 1990. *Acts of Meaning*. Cambridge, Mass.: Harvard University Press.

CDC. 1993. Public health focus: Effectiveness of rollover protective structures for preventing injuries associated with agricultural tractors. *Morbidity and Mortality Weekly Report* 42(3): 57–59.

_____. 1995. Farm tractor related fatalities in Kentucky. *Morbidity and Mortality Weekly Report* 44(26): 481–484.

Chapman, L. J., R. T. Schuler, and T. L. Wilkinson. 1996. Agricultural safety efforts by county health departments in Wisconsin. *Public Health Reports* 111(5): 437–443.

Cole, H. P. 1997. Stories to live by: A narrative approach to health behavior research and injury prevention. In *Handbook of Health Behavior Research IV: Relevance for Professionals and Issues for the Future*, 325–349. D. S. Fochman, ed. New York, N.Y.: Plenum Press.

Cole, H. P., R. H. McKnight, and G. C. Rodgers. 1996. Diagnosis and treatment of an agricultural illness: The role of simulation exercises in health professions' continuing education. Paper presented at the 3rd Annual NIOSH Agricultural Health and Safety Conference. March 24–26. Iowa City, Iowa.

Cole, H. P., P. S. Kidd, S. G. Isaacs, M. Parshall, and T. Scharf. 1997. Difficult decisions: A simulation that illustrates cost effectiveness of farm safety behaviors. *J. Agromedicine* 4(1/2): 117–124.

Cole, H. P., L. R. Piercy, and S. C. Westneat. 1998a. Demonstrating tractor overturn fatalities using scale–model tractors and simulated operators. Paper presented at the 4th International Symposium: Rural Health and Safety in a Changing World. October 21–26. Saskatoon, Saskatchewan.

Cole, H. P., C. Vaught, W. J. Wiehagen, J. V. Haley, and M. J. Brnich, Jr. 1998b. Decision making during a simulated mine fire escape. *IEEE Trans. Eng. Management* 45(2): 153–162.

Cole, H. P., L. R. Piercy, T. Struttmann, V. Brandt, J. Muehlbauer, S. C. Westneat, S. E. Morgan, and J. Mazur. 2001. Translating injury surveillance data into a community–based program to reduce farm tractor injuries. Presented to the National Occupational Research Agenda Symposium: Leading Research in Occupational Safety and Health. June 27. Washington, D.C.

Cox, D., and A. D. Cox. 2001. Communicating the consequences of early detection: The role of evidence and framing. *J. Marketing* 65(3): 91–103.

DeRoo, L. A., and R. H. Rautiainen. 2000. A systematic review of farm safety interventions. *American J. Preventive Medicine* 18(4 suppl.): 51–62.

Howard, G. S. 1991. Culture tales: A narrative approach to cross–cultural psychology and psychotherapy. *American Psychologist* 46(3): 187–197.

Levanthal, H. 1970. Findings and theory in the study of fear communications. In *Advances in Experimental Social Psychology*, 119–186. L. Berkowitz, ed. New York, N.Y.: Academic Press.

Maddux, J. E., and R. W. Rogers. 1983. Protection motivation and self–efficacy: A revised theory of fear appeals and attitude change. *J. Experimental Social Psychology* 19(5): 469–479.
McCurdy, S. A., and D. J. Carroll. 2000. Agricultural injury. *American J. Preventive Medicine* 18(4 suppl.): 463–480.
Morgan, S. E., and H. P. Cole. 2000. Old MacDonald never had a ROPS: A theory–based evaluation of messages targeting farmers in an agricultural safety campaign. Presented to the National Communication Association. November 10. Seattle, Wash.
NIOSH. 2000. Worker health chartbook. Washington, D.C.: U.S. DHHS Publication 2000–127.
Paivio, A. 1971. *Imagery and Verbal Processes*. New York, N.Y.: Holt.
_____. 1978. A dual coding approach to perception and cognition. In *Modes of Perceiving and Processing Information*, 39–51. J. Pick, H. L. Pick, and E. Saltzman, eds. Hillsdale, N.J.: Erlbaum.
Passaro, P. D., H. P. Cole, and A. M. Wala. 1994. Flow distribution changes in complex circuits: Implications for mine explosions. *Human Factors* 36(4): 745–756.
Reynolds, S. J., and W. Groves. 2000. Effectiveness of rollover protective structures in reducing farm fatalities. *American J. Preventive Medicine* 18(4 suppl.): 63–69.
Rivara, F. P., and D. C. Thompson. 2000. Systematic reviews of injury prevention strategies for occupational injuries. *American J. Preventive Medicine* 18(4 suppl.): 1–3.
Slater, M. D., and D. Rouner. 1996. Value–affirmative and value–protective processing of alcohol education messages that include statistical evidence or anecdotes. *Communication Research* 23(2): 210–235.
Snipes, R. L., M. S. LaTour, and S. J. Bliss. 1999. A model of the effects of self–efficacy on the perceived ethicality and performance of fear appeals in advertising. *J. Business Ethics* 19(3): 273–285.
Struckman–Johnson, C., D. Struckman–Johnson, and R. C. Gilliand. 1994. Effect of persuasive appeals in AIDS PSAs and condom commercials on intentions to use condoms. *J. Applied Social Psychology* 24(24): 2223–2244.
Struttmann, T. W., E. Moon–Hampton, A. Scheerer, S. H. Pollack, and C. Spurlock. 1996. Occupational fatalities in Kentucky: 1994. *J. Kentucky Medical Association* 94(9): 395–400.
Struttmann, T. W., A. Scheerer, and E. Moon. 1998. Potentially productive years of life lost (PPYLL) in Kentucky due to occupational fatalities. *J. Kentucky Medical Association* 96(9): 369–373.
Struttmann, T., V. Brandt, S. E. Morgan, L. Piercy, and H. P. Cole. 2001. Equipment dealers' perceptions of a community–based ROPS promotion campaign. *J. Rural Health* 17(2): 131–139.
Witte, K. 1992. Putting the fear back into fear appeals: The extended parallel process model. *Communication Monographs* 59(4): 329–349.
Witte, K., and M. Allen. 2000. A meta–analysis for fear appeals: Implications for effective public health campaigns. *Health Education and Behavior* 27(5): 591–615.

Appendix A: Questionnaire

Please read the attached message and answer the following questions. There are no right or wrong answers!

1. Have you seen this message before? (check one) ____ Yes ____ No ____ Not sure
2. Do you own one or more tractors with a ROPS? ____ Yes ____ No

	Statement	Circle the number that tells how much you **disagree or agree** with each statement				
		Definitely Not		Not Sure		Definitely Yes
3.	This message will help convince farmers to get ROPS on their tractors.	1	2	3	4	5
4.	This is a powerful message.	1	2	3	4	5
5.	This is an effective message.	1	2	3	4	5
6.	Most farmers don't need a ROPS on their tractors.	1	2	3	4	5
7.	This message is confusing.	1	2	3	4	5
8.	This message made me think about ROPS a little differently.	1	2	3	4	5
9.	All farmers should have a ROPS on their tractor(s).	1	2	3	4	5
10.	This message is interesting and kept my attention.	1	2	3	4	5
11.	If I had a tractor without a ROPS, this message would convince me to get a ROPS.	1	2	3	4	5
12.	This message is persuasive.	1	2	3	4	5
13.	I like this message.	1	2	3	4	5
14.	I didn't learn anything new from this message.	1	2	3	4	5
15.	If a tractor doesn't have a ROPS, I would probably be okay if a tractor flipped over.	1	2	3	4	5
16.	I want to have (or keep) a ROPS on tractors I own or drive.	1	2	3	4	5
17.	Most farmers would want to see this message.	1	2	3	4	5
18.	I will probably remember this message.	1	2	3	4	5
19.	This message is not very convincing.	1	2	3	4	5
20.	This message made me think more about getting a ROPS.	1	2	3	4	5
21.	This message is relevant to my own personal situation.	1	2	3	4	5
22.	A ROPS is a waste of money.	1	2	3	4	5

23. **In a few words, please write down what this message is trying to tell farmers.** Please tell us what you think the message means (for example, "the message says that…") rather than what your opinion of the message is (not, for example, "the message is very good").

ABOUT YOU: Your answers will help us understand how to help farmers get ROPS.

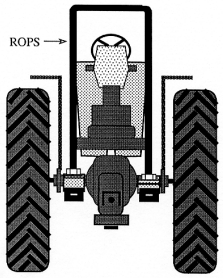
24. Are you: (check one) ____ Male ____ Female
25. In what year were you born? _____
26. What is your primary occupation? ___ Farmer ___ Student ____ Other: _____
27. How much do you farm? (check one) ___ Full–time ____ Part–time ____ Don't farm
28. How many years have you been farming? _____ Years

29. Race/Ethnicity: (check one) ___ White ____ African–American ____ Hispanic/ Latino ___ Other

Appendix B: Message Stimuli

Informative message

What's a ROPS?



ROPS *- Rollover Protective Structure*

During an overturn a ROPS and fastened seat belt hold the operator in a "frame of safety."

ROPS and fastened seat belts protect farmers and their families.

Get a ROPS on your tractor!

Narrative-based message

Who will fill his shoes?

The instant the tractor overturned, their lives changed forever. He was a good husband and father. He loved his wife and kids. They loved him and his way of life as an honest and hardworking farmer. They need him and miss him so much. He won't see his children grow up or enjoy retirement with his wife. Things are hard for his family. It's too late for him and them, but not for you.

Get a ROPS and seat belt on your tractor and buckle up!

Statistics-based message

ROPS and seat belts save lives in more ways than one!

ROPS and seat belts are 99% effective in preventing death during tractor overturns.

In 1994-97, 92 Kentucky farmers died from tractor-related injuries, 55 from overturns.

Many other farmers died when they fell or were thrown from a tractor.

ROPS and seat belts would have saved nearly all of these 92 farmers' lives.

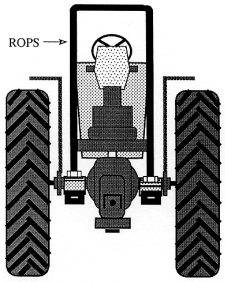
Get a ROPS on your tractor and buckle up!

Kentucky Tractor Deaths 1994-97

> Tractor overturns	55
> Run over by tractors or attachments	24
> Fell or thrown from tractor	7
> Tractor-motor vehicle collisions	6
> Total	92
Potential lives saved by ROPS and seat belts	**83**

Fear appeal

What's a ROPS?



ROPS *- Rollover Protective Structure*

It doesn't matter how experienced you are, or how well you know your land. Without a ROPS and a buckled seat belt, you could die like 55 other Kentucky farmers did in the past two years.

During an overturn a ROPS and fastened seat belt hold the operator in a "frame of safety." A ROPS can be purchased from your local equipment dealer and low-cost loans are available. ***Get a ROPS and buckle up!***

"Master message": Narrative and fear appeal combination

Who will fill his shoes?

The instant the tractor overturned, their lives changed forever. He was a good husband and father. He loved his wife and kids. They need him and miss him so much. Things are hard for his family and now they're wondering how to save the farm.

Everyone who doesn't install a ROPS on their tractors AND use the seatbelt can lose it all: their lives (or the life of a child or grandchild), their families, the family farm.

Think of a ROPS as a one-time payment on a life insurance policy. You can get a ROPS from your local equipment dealer for $500-1000, and low-interest loans are available.