

Persuasive Methods of Communication

Evidence Base for Injury Prevention

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Evidence that informs the design of communications has been examined to increase the effectiveness of transferring information and communicating with the public. The key areas identified in the report include a variety of design variables (use of wording, colour and pictorials), mode of message delivery, the risk communicator and the audience.

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Acknowledgements

The review of evidence has been based on '*Designing Communications for Civil Emergencies: Evidence from the Research Literature*' (Hellier, E., Edworthy, J., White, M., Aldrich, K., Costello, A., & Gabe-Thomas, E, 2007).

1. Executive Summary

There are various methods of communication that local authorities use to communicate messages to the public providing information about potential risk and increasing awareness of hazards. However, there is a lack of specific research to guide authorities about designing communications which suggests 'they tend to be created with reference to technical considerations and legal obligations rather than to the psychological principles that determine their effectiveness'¹.

The Sustainable and Safer Travel Team use a variety of avenues to communicate with the public. Examples of methods of communication include leaflets, websites and road signs. Technical road signs include Variable Message Signs (VMS) which are used for a variety of reasons on the highway including providing information, warnings or instructions to drivers and riders². The use of VMS displaying information on disruptions to the network has been suggested to reduce the effectiveness as a channel for communicating urgent warnings³. The report highlights key aspects of communication design that can be applied to VMS and other methods of communication that local authorities can use to ensure messages are exchanged effectively (see Appendix 1 for examples of VMS and evidence-based recommendations).

Evidence that may inform the design of communications with an emphasis on persuading and influencing the public has been reviewed. The majority of this research has been undertaken on warning perception, advertising, learning processes and risk perception. The extent to which these findings can be generalised to the design of road safety and sustainable travel communications is not clear. However, due to the lack of research directly examining this area, evidence has been drawn from other research areas. Evidence-based recommendations have been made from the available evidence to guide future work on the design and delivery of communication.

The review of evidence suggests that effective warning information components include; a signal word (attract attention/indicate level of hazard); explanation of the consequences of being exposed to the hazard and clear instructions for avoiding the hazard. The way in which warning communication is worded has been shown to be an important determinant of outcomes such as believability, perceived hazard, trust, and compliance. Explicitness of messages results in enhanced behavioural compliance. Negatively framed statements that instruct consumers which behaviours to avoid are more effective than those informing consumers which behaviours to engage in. The public must feel that they are receiving the whole truth otherwise they may not believe the message or perceive it to be credible. The colour red is perceived as implying high level of hazard, followed by orange, yellow then blue and green, white implying least hazard. Pictorials are shown to be effective when communicating simple, concrete concepts rather than more abstract concepts.

The main modes of communication delivery outlined in the literature include print, audio and audiovisual. Maximum levels of compliance are obtained when messages are delivered simultaneously by print and audio. Audio delivery alone results in the poorest memory for material followed by audio presentation with visual aids.

Mental models (belief and understanding that individuals have about a particular topic) provide an overview of what people care about, their beliefs and priorities for action. Communication should be formed around these terms. Messages should reduce memory load by reducing irrelevant information and should allow recipients to access prior knowledge. Persuasiveness increased with message repetition at first, however, too much repetition led to reactance and tedium. Tailoring information can be achieved by presenting information that is personally relevant to the recipient.

When presenting communications that require compliance, the sender is essentially setting a goal for the recipients to comply with the advice given. Successful goal attainment requires that individuals set both goal intentions and implementation intentions.

2. Recommendations for the Safer and Sustainable Travel Team

Communication and tailoring

- ❖ Communications should include the following information components; a signal word; details of the hazard; explicit consequences of exposure to the hazard and instructions on how to mitigate the effects of the hazard. When it is not possible to include all information components, the hazard and instruction statements are the most important to retain.
- ❖ Risk communication needs to complete individual's mental models of risk, dispelling misconceptions and providing missing information.
- ❖ Messages could be tailored in terms of language, reading level and content for the target audience. Messages could be checked for readability and understanding by target audience.
- ❖ Messages could be designed so that redundant information is eliminated and ensure that the structure of the message is logical and consistent with prior knowledge to reduce memory and information processing loads.

Wording

- ❖ Messages should be checked to ensure that the readability of a message matches the target audiences reading ability. As a generalisation, a reading age of 10 years should not be exceeded when communicating with the general public.
- ❖ Explicit wording could be used where possible as this increases perceived warning appropriateness and behavioural compliance to the requested information on reducing the hazard. For example, 'If you wear your seatbelt, you may avoid a serious injury if you are involved in a crash'.
- ❖ Definitive wording could be used as this increases the perception of a hazard and believability of the message content. For example, 'do not drink and drive'.

Message design

- ❖ When using colours to convey messages, red should be used to indicate the highest level of hazard, followed by orange, yellow, blue, green and white. It is important not too overuse the colour red with hazard as this leads to habituation.
- ❖ Where possible a pictorial could be used as this increases simple warnings salience and can improve comprehension.
- ❖ Larger font size could be used to convey messages associated with the most hazardous situations as this raises the perceived hazard and readability of warning messages.

- ❖ Risk information could be expressed in a numerical form (percentage) rather than using verbal quantifiers (unlikely), as information is more accurately perceived in numerical form.

Delivery modes

- ❖ Delivery modes could be tested with particular materials and population of interest as the most advantageous mode of delivery is context and recipient specific. If it is not possible to test material with the population, printed delivery could be used as this has been shown to result in increased recall for longer and more complex messages than other delivery modes. Audio-visual modes of delivery could be used as this result in better recall of material compared to audio alone.
- ❖ Males tend to remember when items are phrased more negatively and females when they are phrased less negatively, this could be taken into consideration when identifying target audiences.
- ❖ Repeat messages could be used at delivery to improve memory and persuasiveness, but not excessively repeated as this will reduce both of these areas.

4. Evidence

The following section outlines the key recommendations with evidence supporting each of the recommendations. The evidence for the recommendations is varying in strength and this is illustrated by the amount and quality of evidence that is used for support. The key areas examined include design variables, mode of message delivery, the risk communicator and the audience.

4.1 Design variables

Information

⇒ **Communications should include the following information components; a signal word; details of the hazard; explicit consequences of exposure to the hazard and instructions on how to mitigate the effects of the hazard. When it is not possible to include all information components, the hazard and instruction statements are the most important to retain.**

Evidence:

A review of research suggested several key components that should be included when communicating with the public about emergency situations. This included that the message should provide information about the hazard, this is important as it offers the audience with a rationale for making an informed decision about future action. In addition, the location of the hazard should be established in the message. The audience may also want to know how to maximise their safety by undertaking protective behaviours and arranging appropriate plans. Ideally, messages need to be as short as possible to avoid the audience losing interest or not remembering key sections of information⁴.

Information components of warning labels have been reviewed⁵. It was concluded that an effective warning should consist of four information components including a signal word (attract the audience's attention and indicate the level and nature of the hazard), an explanation (consequences of being exposed to the hazard), instructions for avoiding the hazard. It is important that a link is made between the instructions for avoiding the hazard and the hazard itself⁵. Individuals were asked to judge the effectiveness of warning labels and the most important components were the instruction and hazard statements compared to the consequence statement. This is supported by research on pesticide warning information. It was suggested that when all of the information components are unable to be included in a message, the instruction and hazard statements⁶ are the most important for inclusion⁶.

There are a variety of signal words that can be used within a warning message to attract attention and provide the audience with an overview of the hazard by indicating its level of severity and probability⁷. Participants were asked to rate potential signal words on six dimensions, which indicated their arousal strength. 20 words were presented that had a range of arousal strengths. The findings suggest the following terms in descending order of hazard; Deadly, Fatal, Poison, Danger, Hazard, Vital, Sever, Serious, Urgent, Beware, Warning, Harmful, Caution, Alarm, Alert, Careful, Prevent, Needed, Notice, Note⁸.

Wording

⇒ **Explicit wording increases perceived warning appropriateness and behavioural compliance when compared to non-explicit.**

Evidence:

Explicitness has been identified as a dimension of wording that increases perceived warning appropriateness and behavioural compliance. For example, 'If you drink while you are pregnant, your child may be born with Fetal Alcohol Syndrome and need institutionalisation' resulted in an increased perceived severity of injury and intention to comply when compared to non-explicit wording, such as 'Mixing alcohol and medicine can be life-threatening'⁹. In addition, the influence of explicit wording on behavioural compliance to product warnings has been examined. The findings suggest that increasing the explicitness of wording of instructions 'wear rubber gloves and protective glasses' increased behavioural compliance compared to non-explicit instructions 'avoid contact with eyes and skin'. The same results have been shown with pesticide warning labels. Furthermore, the use of personal pronouns, for example 'You must wear gloves' were rated as more appropriate and increased behavioural compliance to the statements compared to those without personal pronouns⁶. Explicit warnings on children's products were shown to be perceived as more hazardous and the possible injuries being more severe compared to no warning and non-explicit warnings¹⁰.

⇒ **Messages should be checked to ensure that the readability of a message matches the target audiences reading ability. As a generalisation, a reading age of 10 years should not be exceeded when communicating with the general public.**

Evidence:

One in six people in the UK have a literacy level that is below the level expected of an eleven-year old¹¹. The Flesch Scale can be used to determine the comprehension difficulty of written material through measuring reading ease and human interest. The elements that are

analysed include; average sentence length in words; average word length in syllables; average percentage of 'personal words; average percentage of personal sentences'¹².

⇒ **Definitive wording (e.g. animals will be endangered) increases message believability, perceived hazard and appropriateness when compared to probabilistic wording (e.g. may be dangerous to animals).**

Evidence:

It is suggested that messages should be stated in terms of being certain, even in situations where elements of the message are less than certain. This is due to the public needing to feel like they are receiving the whole truth and the messages are credible⁴. Comparisons have been undertaken examining probabilistic statements of risk 'avoid contact with eyes or skin' with definite instructions 'do not get in eyes or on skin'. The definite instructions were shown to score significantly higher on believability compared to probabilistic instructions¹³. Definitive statements have also been found to increase hazard association¹⁴.

Colour and pictorials

⇒ **The use of colour can convey different levels of hazard from red as the most hazardous followed by orange, yellow, blue, green to white as the least hazardous.**

Evidence:

The main emphasis on research addressing colour has focused on using colour to code the level of hazard in the warning. Research on a variety of messages including warning labels, food labels and visual displays has revealed a number of colours to be consistent in Western Culture. The colour red is perceived as a high level of hazard, followed by orange and yellow, then blue and green, the least hazard is represented with white^{14,15,16,17,18}.

Colour has also been linked to the noticeability of warnings on the identification of labels¹⁹, and increased perceived readability^{20,21}. The use of the colour red on labels has led to higher levels of compliance compared to black or green one²².

⇒ **Use of pictorials can increase a simple warning's salience and can improve comprehension.**

Evidence:

A review of literature on the use of pictorials suggested that they could increase the warnings salience and likelihood of being noticed. Pictorials were most effective when communicating simple concrete instructions compared to abstract instructions⁵.

Pictorials are important to increase warning comprehension with audiences such as children and non-native English speakers.

Message Formatting

⇒ **An increase in font size raises the perceived hazard and readability.**

Evidence:

Increases in font size and border width increased the perceived hazard on a label¹⁵.

⇒ **Risk information is more accurately perceived if it is expressed in numerical (percentage) form, rather than by using verbal quantifiers (e.g. 'unlikely').**

Evidence:

Research examined patients understanding of verbal descriptions for side-effect risks of medicines. These were either presented verbally or numerically, findings suggested that verbal descriptions led to an overestimation of the likelihood of risk²³.

4.2 Mode of Message Delivery

- ⇒ **The most advantageous mode of delivery appears to be context and recipient specific; this suggests that the efficacy of different delivery modes should be tested with the particular materials and population(s) of interest.**
- ⇒ **Printed delivery results in better recall for longer and more complex messages than any other delivery mode.**

Evidence:

It is important to understand which communication delivery is more advantageous; however it is also important to consider communication modes available to different sections of the population²⁴. This means that different delivery modes should be tested with the recipients to ensure that the messages are received.

Printed material is more advantageous when presenting complex information for longer periods of time and allowing the audience to view the information at their own reading pace²⁵. Printed material has shown to out-perform other modes of delivery when communicating health information. This is suggested to be due to whilst messages are being broadcasted; the audience are unable to read at their own pace. In addition, recipients of a broadcasted message can be distracted by engaging in other activities²⁶.

- ⇒ **Audiovisual modes of delivery result in better recall of material than audio alone.**

Evidence:

Printed information has been shown to out-perform audio information for compliance, when presenting the message alone. However, maximum levels of compliance were found when the messages were delivered simultaneously through print and audio²⁷.

4.3 The Risk Communicator

- ⇒ **The government and industry are the least trusted sources of information; more trusted sources include doctors, academics and non-profit making voluntary organisations.**
- ⇒ **Important components of trust include openness, honesty, responsiveness, knowledge, accuracy, expertise, fairness, and concern.**

Evidence:

Research implies that the public hold strong beliefs about the levels of trust they attribute to different sources of information. Information about food hazards suggests the least trusted source being tabloid newspapers, followed by MPs and government ministers. However, trust in different sources changed depending on the hazard type. Medical sources were most trusted for medical related areas. It is outlined that the source of risk communication should be chosen carefully to integrate with the nature of the message being communicated²⁸.

Trust has been described as a multidimensional concept with links to perceptions of accuracy, knowledge and concern with public welfare. In comparison, distrust has been associated with distorting information by the source and a history of providing unreliable information²⁹.

- ⇒ **Admitting mistakes does not necessarily lead to a reduction in trust, particularly if those mistakes are of an overly cautious nature.**

Evidence:

Research suggests that when experts are wrong, this does not necessarily lead to negative outcomes for trust and experts being right were not necessarily positive for trust. Experts admitting to mistakes when they were over-cautious led them to being trusted and appear honest and open³⁰.

- ⇒ **Communicator credibility is related to their expertise and trustworthiness.**

Evidence:

Studies have implied that there are two main dimensions that are linked to the credibility of the communicator. This includes an expertise and trustworthiness dimension³¹. The expertise dimension includes whether the communicator is perceived to be in position to know the truth. The trustworthiness dimension is linked to whether the communicator is likely to be telling the truth.

Surveys were undertaken exploring modes of communication and trustworthiness³². National and local TV and radio were shown to be the most trusted mode of communication with all age groups. This is followed by national newspapers, a visit and local newspapers. The communication method that was shown to be the least trusted mode included email, SMS-text message, mobile phone and home phone. Several suggestions were provided for increasing the perceived trust of email and SMS-text. This included ensuring that the message source was identifiable, incorporating a mechanism for allowing verification of the message and showing message identifies, such as logos.

4.4 The Audience

Mental Models

- ⇒ **Understanding the recipient's mental model of a risk is essential as this will be partly what guides their subsequent behaviour and their interpretation of an emergency communication.**
- ⇒ **Risk communication needs to complete the recipients' mental model of a risk, dispelling misconceptions and adding missing information.**

Evidence:

Mental models are the beliefs and understanding that individuals have about a particular topic. The models are often not detailed or accurate representations of concepts and events; they are rough rules of thumb and a vague understanding of the environment. They may be incomplete, unstable and their boundaries blurred with other models³³. Therefore individuals' mental models of emergency situations may be derived from a variety of information sources that may be inaccurate. It is important that communications add information that is missing and inaccuracies are identified. In order to determine this, the recipient's mental models need to be established²⁸.

A framework for designing risk communications has been outlined with three main features. This includes that the recipient of communication needs a basic understanding of the exposure effects to make decisions about the hazard, the recipients existing beliefs will influence how they interpret new information and risk should be presented with effective text structure and reinforced with textual aids³⁴.

Risk perception

- ⇒ **Risk perception is a subjective response to a risk that predicts compliance with risk communications.**

Evidence:

Studies have linked increases in risk perception with increases in compliance, intended compliance and the tendency to attend to warning information^{35,36}.

⇒ **High levels of risk perception are also associated with events that have happened more recently and that have evoked a strong emotional response.**

Evidence:

It is suggested that when individuals predict the likelihood of an event occurring in the future they are influenced by recent events³⁷.

Gender

⇒ **In general, women have higher levels of risk perception than men.**

Evidence:

A review of 85 studies that established concern for nuclear power and radioactive waste suggested that women expressed greater concern. Women have been shown to be more orientated towards the home and their family; in comparison males were more concerned by working life such as risks of unemployment and economic problems³⁸.

⇒ **Males remember more when items are phrased more negatively and females remember more when items are phrased less negatively. This may be because women have more of an avoidance response to negative information than males do.**

Evidence:

The difference between in information processing was examined in males and females watching television news and the interaction with the tone of the message. Females were shown to have a stronger avoidance response to negative information compared to men. Males were found to have a higher recognition memory scores for negative items and females positive items³⁹.

Memory

- ⇒ **Messages should seek to reduce memory and information processing loads. This can be achieved by eliminating redundant information and ensuring their structure is logical and consistent with prior knowledge.**

Evidence:

Individuals working memory is limited⁴⁰; increasing age leads to lower levels of recall performance and recognition memory⁴¹. There are a number of ways that messages can be formed so that memory can be increased. This includes the content of the message; the delivery of the message and the way the recipient processes the message. It has been suggested that the content of warnings should be logical and consistent with prior knowledge⁴².

- ⇒ **Dual message delivery modes, that use auditory and visual modalities, can increase the amount of information that can be processed.**

Evidence:

The working memory model⁴³ implies that the amount of information that is processed using both auditory and visual channels is larger than one of the single channels. Therefore by using both of the channels, limited working memory capacity can be increased. Therefore it has been suggested that using both spoken information with written or visual material would improve memory⁴⁴.

- ⇒ **Repetition of a message at delivery can improve memory and persuasiveness, but excessive repetition can reduce persuasiveness.**

Evidence:

The repetition of advertising messages has been shown to have a significant effect on the recall of information for younger and older participants⁴⁵. In addition, research showed that repetition led to increased accuracy recall of warning messages for interactive and non-interactive messages⁴⁶. However, persuasiveness of messages was shown to increase with repetition, but excessive repetition led to reactance and boredom⁴⁷.

Message Tailoring

- ⇒ **Research on message tailoring shows that using messages that are specially designed for a homogeneous group are most effective. Messages can be tailored in terms of reading level, language or content.**
- ⇒ **Recipients prefer tailored messages that are personally relevant.**

Evidence:

Tailored communication has been defined as the practice of delivering messages that are specifically designed for either an individual or a homogeneous group of recipients⁴⁸. In order to tailor messages to recipient(s) this may be undertaken by using appropriate language for their education or background and using larger font size. Tailored print communications were perceived as relevant, credible, read and better remembered⁴⁹. Messages can be tailored by focusing on processes of behaviour change by ensuring the audience are aware of the problem, assisting with the decision making process and implementation of behaviour⁵⁰.

4.5 Compliance

- ⇒ **Encouraging the formation of implementation intentions promotes goal achievement (compliance). This might be achieved by encouraging recipients to consider When? Where? and How? they are going to engage in the compliant behaviour.**

Evidence:

Effective goal attainment requires individuals to form goal intentions and implementation intentions⁵¹. Goal intentions include specific end points, whereas implementation intentions focus on 'When?', 'Where?' and 'How?' the goal can be achieved.

- ⇒ **To increase compliance warnings should emphasize the severity of the consequences of non-compliance, rather than the likelihood of those consequences.**

Evidence:

Information about the severity of a potential injury has been shown to be more influential for recipient compliance compared to information about the injury likelihood⁵².

- ⇒ **High stress situations can reduce behavioural compliance.**

Evidence:

Stress has been shown to influence individual's perceptions and quality of their judgements and decision making. This may influence behavioural compliance⁵³.

5. Summary

The research supporting the recommendations stated above has not been undertaken in the context of designing or delivering communication for road safety and travel awareness. The majority of the research has been conducted in the areas of designing warning signs and labels, health care, advertising and risk perception. The extent to which research findings can be generalised to messages related to road safety and travel awareness is unclear, however there is a lack of specific research on this area, therefore the research available provides a framework and range of factors that are likely to increase the effectiveness of messages.

Ultimately messages being displaying in a road safety context are provided to promote safe behaviours and reduce the occurrence of injury on the road. In comparison, messages through travel awareness may be influencing methods of transport. In both of these areas the key focus is on behavioural change and compliance.

The crucial indicator of the effectiveness of an emergency communication must be the extent to which the recipient complies with the instruction. The key steps of communication involve the message being perceived, understood and remembered by the recipient. Factors likely to influence the effectiveness of emergency communications can be categorised as; design of the message; how it is delivered; who delivers it; characteristics of the recipients; other factors that influence compliance. There is a need to focus more research effort on measuring actual compliance.

6. Appendices

Appendix 1: Variable Message Signs for Motorcycles

The following table shows examples of Variable Message Signs to address motorcycle safety. For each of the signs comments have been provided following the evidence on persuasive methods of communication outlined in this report.

Variable Message Signs	Comments
SUMMER'S COMING MORE BIKERS CHECK MIRRORS	This message includes a signal word 'SUMMERS COMING' (attracts audiences attention and indicates level/nature of hazard), an explanation 'MORE BIKERS' and instructions for avoiding the hazard 'CHECK MIRRORS'. However, it does not provide an explanation about the consequences of being exposed to the hazard. The message also uses explicit and definitive wording with 'SUMMERS COMING MORE BIKERS'. This message also provides information to complete the audience's mental models (belief and understanding that individuals have about a topic) 'SUMMERS COMING MORE BIKERS'. The message clearly states instructions about how to avoid the hazard with the message 'SUMMER' and how to 'CHECK MIRRORS'.
WATCH OUT FOR BIKERS IN YOUR BLINDSPOT	This message includes a signal word 'WATCH OUT', but does not provide an explanation about the consequences of being exposed to the hazard or provide instructions for avoiding the hazard. The message does not include explicit wording. The message does suggest to 'WATCH OUT', but the instructions for avoiding the hazard are unclear
LESS DAYLIGHT LOOK TWICE FOR BIKERS	This message includes a signal word 'LESS DAYLIGHT' and instructions for avoiding the hazard 'LOOK TWICE FOR BIKERS'. The message does not include explicit wording. The message does suggest how the audience may avoid the hazard 'LOOK TWICE FOR BIKERS'.
SUMMER BIKING: LESS THROTTLE ON BENDS	This message includes a signal word 'SUMMER BIKING' and instructions for avoiding a hazard 'LESS THROTTLE ON BENDS'. However, it is not clear exactly what the hazard is and why it should be avoided. The message does not use explicit wording. The message clearly states how the audience may avoid the hazard 'LESS THROTTLE ON BENDS'.
SUMMER BIKING: TAKE EXTRA CARE OVERTAKING	This message includes a signal word 'SUMMER BIKING' and instructions for avoiding a hazard 'Take extra care overtaking'. The use of 'SUMMER BIKING' at the start of lots of messages on the VMS may lead to habituation of the messages and non-compliance. The message states how the audience may avoid the hazard 'TAKE EXTRA CAR OVERTAKING'. However, it is unclear exactly who the message is aimed at rider or drivers.
WINTER BIKING JUNCTIONS: HAVE DRIVERS SEEN YOU?	This message includes a signal word 'WINTER BIKING JUNCTIONS', but does not provide an explanation or instructions for avoiding the hazard. The message does not use explicit or definitive wording. The message does not provide information about how the audience should comply.

Recommendations have been provided for each of the messages:

SUMMER'S COMING MORE BIKERS CHECK MIRRORS	This message contains many persuasive techniques – should be used through VMS
WATCH OUT FOR BIKERS IN YOUR BLINDSPOT	This message needs more work as it does not provide an explanation of the consequences of being exposed to the hazard or provide instructions about how to avoid the hazard
LESS DAYLIGHT LOOK TWICE FOR BIKERS	This message contains a few persuasive techniques – should be used through VMS
SUMMER BIKING: LESS THROTTLE ON BENDS	Confusion over message content – more work required on explicit/definitive wording
SUMMER BIKING: TAKE EXTRA CARE OVERTAKING	This message contains persuasive techniques – should be used through VMS – add whether DRIVERS/RIDERS should TAKE EXTRA CARE OVERTAKING
WINTER BIKING JUNCTIONS: HAVE DRIVERS SEEN YOU?	This message needs more work on providing instructions for avoiding the hazard

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