

Persuasive communication issues in disaster management

A review of the hazards mitigation and preparedness literature and a look towards the future

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Natural and man-made hazards and disasters not only lead to physical destruction of property, injuries and deaths, but also to a variety of psychological disorders (e.g. anxiety, post-traumatic stress disorder, depression, etc.). These psychological reactive impacts have been documented for a variety of hazards and disasters such as floods (e.g. Hansson, Noulles, & Bellovich, 1982a, 1982b; Phifer, Kaniasty & Norris, 1988), earthquakes and volcanoes (e.g. Aptekar, 1991; Larrain & Simpson-Housley, 1990), hurricanes (e.g. Aptekar, 1991; Saylor, Swenson, & Powell, 1992), toxic waste (e.g. Baum & Fleming, 1993; Baum, Fleming, Israel & O'Keefe, 1992), and nuclear war (e.g. Fiske, 1987).

In fact, a recent review of 52 studies of these and other hazards such as fires, explosions, nuclear accidents, tornados, blizzards, and ship wrecks, found a consistent, positive relationship between disasters and psychopathology (Rubonis & Bickman, 1991a). It seems to be the case that negative events such as hazards and disasters tend to elicit more physiological, affective, cognitive, and behavioural activity, in general, than neutral or positive events (e.g. Taylor, 1991).

In spite of all the above hazard-related effects, however, it appears that persons living in disaster-prone areas are not generally prepared for such events, although there appears to be some confusion in the literature over this issue (e.g. Bourque, Shoaf, & Russell, 1995; Duval, Mulilis & Lalwani, 1995; Mulilis & Duval, 1990a, 1990b, 1991a, 1991b, 1993; Mulilis, Duval, & Lipa, 1990; Russell, Goltz & Bourque, 1995; Turner, Nigg & Paz, 1986). It may well be that, in many cases, attempting to manage disasters via adoption of hazard or disaster mitigation and preparedness activities requires overcoming certain beliefs and attitudes about the behaviours involved in these activities

and the effectiveness of their outcomes. Thus, in such cases, the use of persuasive communication techniques may be a viable option to initiate these activities.

A review of the past

The classical approach to the topic of persuasive communications is to view it in terms of a series of inputs and outputs, where the input or independent variable is the persuasive communication, and the output or dependent variable is attitude or behaviour change (McGuire, 1969, 1985). The communication is then analyzed in terms of who says what, via what medium, to whom, and directed at what kind of behaviour (Lasswell, 1948).

Using this approach, the input communication variables can be divided into five broad classes (Lasswell, 1948; McGuire, 1969, 1985):

- *source of the communication* — credibility, trustworthiness, attractiveness, liking, similarity, power
- *message characteristics* — style, clarity, forcefulness, speed, ordering, amount of material, repetition, number of arguments, extremity of position
- *channel variables* — media type (such as television, radio, newspapers, face-to-face communication) verbal versus non-verbal communication, context of the channel
- *receiver variables* — age, intelligence, gender, self-esteem, level of active participation, incentives for participation
- *target or destination variables* — attitudes versus behaviour, decay of induced change, delayed-action effects, resistance to persuasion.

Early research in this area focused on this input-output approach, and in fact, was the basis of the classic 'Yale Model' developed by Carl Hovland and his colleagues (Hovland, 1954, 1957; Hovland, Janis & Kelley, 1953; Hovland & Rosenberg, 1960; Sherif & Hovland,

1961). While different approaches to using persuasive communication in the hazards field have been suggested (e.g. cause and effect of public response — Mileti & Sorensen, 1988; Sorensen & Mileti, 1987; and systems approaches focusing on the interaction of hazard type, situational forces, and management strategies — Lindell & Perry, 1992; belief system theory and value self-confrontation — Grube, Mayton & Ball-Rokeach, 1994), nevertheless, much of the research typically conducted in this area has been based on this 'Yale Model' (e.g. Kasperson & Stallen, 1991; Mileti, Farhar, & Fitzpatrick, 1990).

This approach has, in fact, been quite popular in directing efforts at preparation and mitigation, and includes investigations of the

- *source* (e.g. Danzig, Thayer & Glanter, 1958; Nigg, 1982; Palm, 1981; Perry & Greene, 1983; Perry & Nigg, 1985; Sorensen & Mileti, 1987)
- *message* (e.g. Bolduc, 1987; Browers, 1980; McKay, 1984; Nigg, 1982; Perry & Mushcatel, 1984; Perry & Nigg, 1985; Regulska, 1982; Ressler, 1979; Wilkins, 1985)
- *channel* (e.g. Carter, 1980; Dutton, Rogers & Jun, 1987; Grant, Guthrie & Ball-Rokeach, 1991; Morentz, 1980; Needham, 1986; Needham & Nelson, 1977; Perry & Nigg, 1985; Rogers, 1987, 1992; Wenger, James & Faupel, 1980; Wilkins, 1985)
- *receiver* (e.g., Cullen, 1980; Holt, 1980; Perry, Green, & Mushcatel, 1983; Nigg, 1987; Regulska, 1982; Sorensen & Mileti, 1987; Turner, 1983)
- *target* (e.g. Covelto, von Winterfeldt & Slovic, 1986; Danzig, Thayer & Glanter, 1958; Mileti & O'Brien, 1992; Nigg, 1987; Perry, Green & Mushcatel, 1983).

Despite its popularity, the 'input-output' approach to persuasive communication is not the only theoretical formulation that has been used in this

area of hazards research. Other researchers, for example, have focused on exactly how the processing of persuasive information affects attitude change.

In their elaboration likelihood model, for example, Petty and Cacioppo (1981, 1986a, 1986b) have postulated that persons subjected to persuasive messages process information, and thus change attitudes, using two routes: a *central route*, in which the person attends to, and is influenced more by, the cognitive information in the message, and a *peripheral route*, in which a person attends to, and is influenced more by, cues available in the persuasive context (e.g. attractiveness of the source). Chaiken and her colleagues (Chaiken, 1980, 1987; Chaiken, Liberman & Eagly, 1989) have used a similar approach in their heuristic-systematic model, distinguishing between systematic processing (i.e. influence due to cognitive elaboration of the persuasive augmentation) and heuristic processing (i.e. attitude change due invoking heuristics such as 'experts can be trusted').

More recently, these researchers have investigated interaction effects of information processing channels with various 'Yale model' communication variables such as need for *cognition of the receiver* (e.g. Cacioppo & Petty, 1982; Cacioppo, Petty & Kao, 1984; Cacioppo, Petty, Kao & Rodriguez, 1986; Haugtvedt & Petty, 1992), *involvement of the receiver in the message* (e.g. Johnson & Eagly, 1989, 1990; Petty & Cacioppo, 1990), *message repetition effects* (e.g. Cacioppo & Petty, 1989), affect or mood of the receiver (e.g. Petty, Schumann, Richman & Strathman, 1993), *source credibility, argument ambiguity of the message, and task importance of the message* (e.g. Chaiken & Maheswaran, 1994), attitude strength and resistance of the receiver (e.g., Pomerantz, Chaiken, & Tordesillas, 1995), *motivation and priming of the receiver* (e.g. Thompson, Roman, Moskowitz, Chaiken & Bargh, 1994), and the *effects of the values of the receiver on their beliefs, attitudes, and behaviours* (e.g. belief system theory and value self-confrontation — Ball-Rokeach & Loges, 1994; Grube, Mayton & Ball-Rokeach, 1994). This latter approach may be particularly important in view of the changing values that occur within populations and their subsequent effect on attitudes (e.g. Rokeach & Ball-Rokeach, 1989).

While this information processing approach to persuasive communications

has been used quite extensively, other researchers have focused more on the emotion or affect associated with the communication. A popular version of this type of approach is the use of *fear-arousing* or *negative threat appeals* (see McGuire, 1985, for usage of this term). Research efforts in this area originated with Janis and his colleagues (Janis & Feshbach, 1953; Janis & Terwillinger, 1962), and took an 'events' approach to attitude change in which the persuasive communication was directed at the fear associated with the event (i.e. the particular hazard or disaster).

While results of early research directed at the negative threat appeals approach indicated that increasing the level of fear could result in either increased, decreased, or no change in attitudes (e.g. Berkowitz & Cottingham, 1960; Chu, 1966; Janis & Feshbach, 1953; Janis & Terwillinger, 1962), nevertheless, this approach has continued to be used quite extensively in hazards research on preparedness and mitigation issues (e.g. Cullen, 1980; Hansson, Noulles & Bellovich, 1982b; Perry, Lindell & Greene, 1982; Sanders, 1985; Turner, 1983; Weinstein, 1989).

Perhaps due to inconsistencies in the results of earlier efforts, later research in negative threat appeals shifted focus away from the 'events' approach, and assumed that variables associated with the 'person' (e.g. information or knowledge given to or associated with the person, or attributions that the person makes) dictated attitude change (e.g. Leventhal, 1970; Leventhal, Singer & Jones, 1965). This type of an approach has also been used quite extensively in hazards research on preparedness and mitigation issues (e.g. Carter, 1980; Danzig, Thayer & Glanter, 1958; Needham & Nelson, 1977; Perry, Lindell & Greene, 1982; Regulska, 1982; Ressler, 1979; Rubonis & Bickman, 1991b; Saarinen, 1982; Saarinen & Sell, 1985; Scanlon, 1980; Vitek & Berta, 1982; Wenger, James & Faupel, 1980; Yates, 1992).

Despite this shift in focus of negative threat appeals research (i.e. from an 'events' to a 'person' approach), inconsistencies in resulting attitude change still persisted (e.g. Leventhal, 1970; Leventhal, Singer & Jones, 1965). Perhaps in an effort to clarify these inconsistencies, more recent approaches in this area have focused on the simultaneous effects of both these 'person' and 'event' variables.

This 'person-environment' interaction approach to studying social

behaviour is not a new one, and in fact, dates back to 1935 and the classic work of Kurt Lewin's field theory, or what is more currently referred to as an interactionist perspective (e.g. Blass, 1984). Somewhat similar approaches have been suggested with respect to studying hazards and disasters. For example, Quarantelli (1984) notes that it is the combined variables involved in the community context together with threat conditions in a disaster that determine certain social processes involved in evacuation behaviour. Similarly, Lehman and Taylor (1987) note that it is the combined effect of earthquake generated fear and structural integrity of one's dwelling that determine disaster-related perceptions and coping strategies, perhaps due to a 'mobilisation-minimisation' effect (Taylor, 1991). Likewise, Lopes (1992) indicates that it is the combined effect of fear from disaster damage and person resources about what to do in a disaster that determines preparedness levels.

Perhaps the first theoretical formulation of this person-event approach to persuasive communications was suggested by Rogers and his colleagues in what they called protection motivation theory (Maddux and Rogers, 1983; Maddux, Norton & Stoltenberg, 1986; Rogers, 1975, 1983; Rogers and Mewborn, 1976; Rippetoe & Rogers, 1987). Protection motivation theory proposed that variables associated with both the person (e.g. self-efficacy, outcome efficacy) and the event (e.g. probability of occurrence, severity of damage) imitated attitude change due to persuasive communications.

This approach has had some application in hazard mitigation and preparedness research both with attitudes and beliefs about nuclear war (e.g. Axelrod & Newton, 1991) and earthquake preparedness behaviour (e.g. Mulilis & Lippa, 1985, 1990). While research efforts using this approach have been somewhat successful, nevertheless, efforts to determine exactly how levels and mixes of levels of person and event variables combined in their influence on attitude change have been more problematical (e.g. Maddux & Rogers, 1983; Mulilis & Lippa, 1985, 1990).

In perhaps the most recent approach to persuasive communications, the *person-relative-to-event* (PrE) model of coping with threat (Duval & Duval, 1985; Duval & Mulilis, 1989, 1991; Mulilis, 1991; Mulilis and Duval, 1995, 1996a, 1996b) has been proposed as a

comprehensive instigating mechanism underlying attitude and behaviour change due to fear-arousing communications. This model is based in a theoretical formulation of coping developed by Lazarus and his colleagues (Lazarus, 1966; Lazarus & Folkman, 1984), in which it is proposed that, when faced with a threat, a person will engage in activities that take the form of attempts to manage the threatening situation (i.e., problem-focused coping) and efforts directed toward regulating emotional reactions to the threatening situation (i.e., emotion-focused coping).

In applying this approach to negative threat appeals, the PrE model not only incorporates both person and event variables, but also specifies a combinatorial rule with regard to how levels and mixes of levels of person and event variables combine in determining the persuasiveness of negative threat appeals. Furthermore, recent research applying this model to earthquake (Mulilis & Duval, 1995) and tornado (Mulilis & Duval, 1996a) preparedness behaviour indicated that outcome measures fit predictions generated by the model to a much greater extent when the moderating effects of felt responsibility for preparing for the threatening event were accounted for.

Inter- and intra-disciplinary issues

It is obvious from the above review that the use of persuasive communications as a technique for changing beliefs, attitudes, and behaviours has a relatively long and varied history. Furthermore, these efforts have cut across a variety of different disciplines. Thus, persuasive communications have been used extensively in the fields of psychology (see above), sociology and hazards research (see above, as well as Drabek, 1986 for an extensive review of the earlier literature), risk communication (see above, as well as Covello, von Winterfeldt & Slovic, 1986 for an extensive review of the earlier literature), health (e.g. Rogers, 1991) and mass communication media (e.g. Dutton, Rogers & Jun, 1987; Grant, Kendall & Ball-Rokeach, 1991; Rogers, 1987, 1992).

While the multi-disciplinary nature of persuasive communications has generated a wealth of information, nevertheless there are drawbacks to such interdisciplinary approaches. Reardon and Rogers (1988), for example, note that 'intellectual separation' may exist across disciplinary divisions resulting in lack of communication of research

findings across divisions. They further note that many times these separations exist because of historical convenience and university politics rather than due to real ideological differences.

Of course at other times, real distinctions do exist across disciplines. For example, while some disciplines (e.g. psychology) have demonstrated renewed interest in fear-arousing communications, other fields (e.g. communications) have questioned the adequacy of such an approach and, to some extent, have abandoned efforts in this direction.

Still other issues exist at the intra-disciplinary level. In the hazards field, for example, research efforts historically seem to have been at least partially dictated by the 'popularity' of particular disasters and hazards. Early research in this area, for example, focused almost exclusively on communication issues in the context of hurricanes and tornados (e.g. Drabek, 1986), with particular interest in how communication of warnings affected hazard preparation and evacuation behaviours. While the issue of warnings has still remained a topic of concern (e.g. Mileti & O'Brien, 1992; Mileti & Sorensen, 1987, 1988), the focus of this concern seems to have shifted to more topical issues such as earthquakes (e.g., Mileti & O'Brien, 1992; Mulilis & Duval, 1995; Mulilis & Lippa, 1990). Interestingly enough, the use of a more comprehensive theoretical approach could incorporate such issues irrespective of the popularity of focus. The PrE model (Mulilis & Duval, 1995, 1996a, 1996b), for example, could incorporate the concept of warning (either pre-event or post-event) as a threat variable regardless of the source of the threat (e.g. hurricane, tornado, earthquake, nuclear catastrophe).

Finally, it is interesting to note that many of the investigations cited herein focused on changing attitudes and beliefs about various aspects of hazards. In regard to mitigation and preparedness activities, however, it maybe that behaviour is a more important determining factor of successful protection against hazards. Furthermore, as Fishbein and Ajzen have noted (Ajzen, 1987, 1991; Ajzen & Fishbein, 1977, 1980; Ajzen & Madden, 1986; Fishbein, 1980; Fishbein & Ajzen, 1972; Fishbein & Stasson, 1990), in general, attitudes do not predict behaviours very effectively. Nevertheless, despite the fact that research in the hazards field continues to support the weak attitude-behaviour link (e.g. Gori & Hays, 1987; Nigg,

1982; Saارينen, 1982), with few exceptions (e.g. Duval, Mulilis, & Lalwani, 1995; Mulilis, 1985, 1991; Mulilis & Duval, 1995, 1996a; Mulilis & Lippa, 1985, 1990; Russell, Goltz & Bourque, 1995; Sorensen & Mileti, 1987; Turner, Nigg, & Paz, 1986), the majority of persuasive communications research on mitigation and preparedness issues continues to focus on attitudes or beliefs.

Where we stand

Due to the long, varied, and multi-disciplinary focus of persuasive communications, assessing what the literature tells us is no easy task. Nevertheless, it is clear that many variables affect the effectiveness of such communications (e.g. attributes of the source, message, channel, receiver, and target). It is also clear that the literature reveals many contradictory and incomplete findings.

Some of these 'gaps' can be explained in terms of non-comparability. For example, Mileti and O'Brien (1992) indicate that research findings on warnings issued before a disastrous event are incomparable with those issued after such an event because the perceptual processes underlying the two types of warnings are not identical.

Other contradictory findings (e.g. early research on fear-arousing appeals) however may be due to more complex issues such as inappropriate mixes of variables and levels of mixes of variables. Solutions to these issues may require a more fundamental and encompassing theoretical approach as discussed below.

Recommendations for future research

As Indicated from the above review, many aspects of persuasive communications designed to address mitigation and preparedness issues have been extensively investigated both within and outside of the realm of hazard research. Yet other issues remain in which the research in this area has not been quite so extensive, or has led to contradictory or incomplete findings. Some of these issues, discussed below, are intended as suggestions for future research.

Assessing mitigation and preparedness activities

a. Standardisation of measurement

While various tools have been proposed to assess mitigation and preparedness activities (e.g. Bourque, Shoaf & Russell, 1995; Mulilis, 1985; Mulilis, Duval & Lippa, 1990; Mulilis & Lippa, 1985, 1990; Russell, Goltz & Bourque, 1995; Schmidt & Gifford, 1989; Turner, Nigg, & Paz 1986), none of these appear to be

sufficiently complete nor comprehensive. Thus, a need exists for a standardised scale to measure mitigation and preparedness activities in order for different assessment studies to be comparable.

b. Recall bias in measurements

Attempts to recall previous information may be biased due to recall errors (e.g. Brehm & Kassir 1996). Thus, assessment of mitigation and preparedness should be limited to estimates of current levels of activities (e.g. Mulilis, 1985, 1991; Mulilis & Duval, 1990a, 1990b, 1991a, 1991b, 1993; Mulilis, Duval & Lippa, 1990; Mulilis & Lippa, 1985, 1990; Turner, Nigg & Paz 1986) as opposed to having respondents attempt to recall previous levels of activities.

Type of event

a. Risk characteristics

There is some evidence to indicate that different types of hazards contain different risk characteristics that may moderate mitigation and preparedness activities. For example, Brun (1992) noted that natural and man-made hazards contain different risk characteristics, and that perceptions of responsibility for managing these two types of hazards were different. Future research is needed to substantiate these findings.

b. Stress response

A few investigations have indicated that receiver responses to hazards are also dependent on the type of hazard involved. For example, Baum and Fleming (Baum & Fleming, 1993; Baum, Fleming, Israel & O'Keefe, 1992) have noted that stress reactions of victims of a leaking hazardous toxic waste dump were different than those of victims of floods. Similarly, Larrain and Simpson-Housley (1990) have noted differences in anxiety reactions due to volcanic eruptions versus the occurrence of earthquakes. In view of these results, it appears that additional research also needs to be conducted in this area as well.

Effect of channel or media variables

Several investigations have indicated that the type of media used in a persuasive communication may affect its effectiveness (e.g. radio – Rogers, 1992; television – Grant, Guthrie & Ball-Rokeach, 1991; networking – Rogers, 1987; computers – Dutton, Rogers & Jun, 1987). Such media may impact different receivers differentially resulting in, for example, different degrees of involvement, and consequently, different

attitudinal and behavioural effects (Aronson et al. 1990; Petty & Cacioppo, 1990). In an age of increasing internet dependency, future research on this topic seems imperative.

Receiver characteristics

a. Age

Several studies have indicated that receiver response characteristics to hazard communications may be age dependent (e.g. preschoolers play following hurricane Hugo – Saylor, Swenson & Powell, 1992; elderly reactions to floods – Kaniasty & Norris, 1993; Phifer, Kaniasty & Norris, 1988). Thus, it appears that additional research is needed to clarify these issues.

b. Gender

There is mounting, yet limited evidence to indicate that receiver response characteristics to hazard communications may also be gender dependent (e.g. Enarson & Morrow, 1996; Fordham, 1996; Morrow, 1995, 1996a, 1996b; Mulilis & Dewhirst, 1996; Mulilis, Boyde & Dewhirst, 1996; Zhang, 1994). Since research on gender aspects of hazard research tends to be somewhat limited in general, it appears that additional research is also needed to clarify these and other gender-related hazard issues.

c. Social comparison

Many times reactions to persuasive communications are determined not so much by the communication alone, but rather in relationship to how similar others react to it. This issue of social comparison behaviour has been investigated early on in the literature (Schachter, 1951, 1959, 1964; Schachter & Singer, 1962), and more recently, with respect to fear-generated communications (Hansson, Noulles & Belovich, 1982a; Taylor, 1983; Taylor, Buunk & Aspinwall, 1990; Taylor & Lobel, 1989). Nevertheless it appears that more research needs to be conducted in this area.

Targets

a. Type of activity

Persuasion communications directed at mitigation may involve a plethora of specific activities. The question then arises as to what specifically is the object of change of the persuasion. While it seems reasonable that the desired effects involve behavioural change, nevertheless as indicated above, the majority of hazard research in this area has been directed at beliefs or attitudes about mitigation or preparedness. In light of the weak link existing between attitudes

and behaviours, it may be beneficial for future research to be more focused in its target selection. Along these lines, questions to be addressed might include:

- what specific target is the persuasive communication directed at
- how effective would a change in that target be in terms of mitigation or preparedness
- are any interaction effects involved in the target activities (e.g. it may be that an increase in structural mitigation activity may lead to a decrease in other activities such as the purchase of hazard insurance).

b. Delayed action effects

The passage of time from the inception of the persuasive communication until the initiation or completion of the target mitigation may be more critical under some situations than others, and may also be dependent on the specific mitigation activity. Little research has been conducted regarding these issues.

c. Decay of induced change

Substantial evidence exists indicating that levels of mitigation and preparedness activities tend to decay with the passage of time (e.g. Mulilis & Duval, 1990a, 1990b, 1991a, 1991b, 1993; Mulilis, Duval & Lippa, 1990). Thus, it seems reasonable that several issues regarding these effects need to be addressed, such as:

- what point in time, relative to the occurrence of a disaster should mitigation activities be measured
- assuming that mitigation and preparedness levels have been raised due to persuasive techniques, what are efficient ways of maintaining these new levels over time.

Comprehensive theoretical formulation

As indicated in the above review, several different theoretical approaches to persuasive communications have been attempted. While most of these approaches have resulted in limited success in some areas, the majority of investigations have also indicated inconsistencies in other areas. Thus, there appears to be a need for a more comprehensive theoretical formulation to be used in the area of persuasive communications in hazards research. One such candidate might be the PrE model, which could incorporate various 'Yale Model' and other previously investigated factors into general categories of 'person' and 'event' variables. Such an approach would be consistent with the

need for a more dynamic, interactive, process approach called for by Van de Ven and Rogers (1988).

Interdisciplinary approach

Irrespective of the particular research direction taken in the future, it is clear that the multi-disciplinary usage of persuasive communication techniques requires a more unified approach among different disciplines. As Reardon and Rogers (1988) indicate, the intellectual costs of such disciplinary competition are prohibitive. Furthermore, in the area of hazards and disaster research, these costs are ultimately paid for with destruction, injury, and death.

Discussion

In an attempt to explain the variation in the application of persuasive communication techniques to management of disasters via hazard mitigation and preparedness research, a comprehensive review of the literature has been presented and specific recommendations to improve the success of the use of these techniques have been suggested. In this respect, a new model of persuasive communication, the PrE model of coping with threat, has been presented and suggested as a basis for a more comprehensive theoretical framework in this area.

This model is based on an application of Lazarus' coping theory (Lazarus, 1966; Lazarus & Folkman, 1984) to negative threat appeals, and has been successfully applied to mitigation and preparedness efforts in the study of earthquakes and tornados.

Nevertheless, if the model is to be used as a basic theoretical foundation to the approach of persuasive communications in the hazards field, additional fundamental research on the model is needed into issues such as the possible moderating effects of the variables mentioned above, as well as on likely effects of more practical and applied issues, such as those discussed in this article. It is suggested that future research be conducted to pursue the feasibility of using such an approach to mitigate and prepare for the disastrous effects of natural and man-made hazards.

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