Responding to hazard effects: promoting resilience and adjustment adoption

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Introduction

Central to contemporary emergency planning is the use of risk management principles to promote resilience to a range of potential hazards. These principles underpin the development of strategies designed to minimise the adverse effects of disruption (Kaniasty & Norris 1999; Lindell & Prater 1999; Lindell & Whitney 2000; Paton & Bishop 1996). Existing attempts to achieve this outcome have enjoyed limited success (Lindell & Whitney 2000; Paton et al., in press). Promoting this capability is also rendered more complex by the fact that reduction initiatives are typically undertaken during periods of hazard quiescence and focus on attempting to motivate people to deal with infrequently occurring and destructive or disruptive hazards (e.g., earthquakes, volcanic eruptions, landslides) whose nature and intensity do not lend themselves readily to mitigation by individual action (Sjöberg 2000; Spedden 1998). Effects perceived as insurmountable and emotionally threatening can lessen the likelihood of adjustment adoption. Focusing on hazards, loss and vulnerability may thus not represent the most appropriate paradigm for planning and encouraging adjustment adoption. An alternative involves identifying the factors that facilitate individual, community and institutional resilience (Buckle, Mars, & Smale 2000; Carver 1998; Tobin 1999; van den Eyde & Veno 1999; Violanti, Paton & Dunning 2000).

Resilience

Resilience describes the capacity of systems to maintain their integrity and the relationships and balance between elements in the presence of significant disturbances by drawing upon internal resources and competencies to manage the demands, challenges and changes encountered. Resilience can operate at several, interdependent levels. For example, the ability of a community to use its own resources to maintain its integrity and balance following disruption by hazard activity requires that attention be given to safeguarding the built environment and lifelines, economic and business continuity, the continuity of social and administrative institutions (including the mechanisms linking them with community members), and the development of the capacities of individuals (Buckle et al. 2000; Chavis 1995; Eng & Parker 1994; Paton & Bishop 1996; Paton & Smith, in prep.; Tobin 1999).

While relationships between these levels have been modelled (Tobin 1999), the diversity of the elements proposed, the lack of an overarching theoretical framework, and a lack of operational definitions of core elements currently limit attempts to comprehensively test this model. This paper focuses on one element of Tobin's composite model, psychological resilience, and seeks to operationalise it. Specifically it discusses the psychological mechanisms that facilitate individual capability to resist adverse hazard effects and that underpin the adoption of measures to minimise disruption.

A focus on individual resilience and adjustment adoption is important in communities vulnerable to highly disruptive and destructive hazard activity that can temporarily incapacitate institutional resources. When this disruption occurs, individuals will be responsible for their safety and well-being until institutional resources recover. While adopting this approach, a conceptual and practical distinction between individual and collective (community) responses is acknowledged. We also discuss strategies to facilitate the development of individual resilience through empowerment. This approach provides a precursor to the development of a model capable of integrating individual and collective (community) resilience (Paton & Smith, in prep) and provides links with models of institutional resilience (e.g., Buckle et al. 2000).

Resilience in an all-hazards environment

To be of value for emergency planning, resilience variables must have predictive validity independent of the community or hazard under investigation. This paper examines the ability of a model describing individual resilience to a toxic waste hazard (Bachrach & Zautra 1985) to predict resilience to volcanic hazard effects. If the utility of this model can be verified against another hazard, and with residents of a different community, the predictive capability of the model will be enhanced. The model described by Bachrach & Zautra (1985) comprised three factors: sense of community, coping style and self-efficacy.

Self-efficacy describes individuals' appraisal of their performance capability and influences their receptivity to information and the likelihood of their adopting risk reduction behaviours (Bennet & Murphy 1997; Lindell & Whitney 2000; Yates, Axom, & Tiedeman 1999). Problem-focused coping (confronting the problem) represents a mechanism for facilitating resilience (Bachrach & Zautra 1985; Yates, et al. 1999). Sense of community (feelings of belonging and attachment for people and places) facilitates involvement in community response following disaster and increases access to, and utilisation of, social support networks (Kaniasty & Norris 1999; van den Eyde & Veno 1999).

Assessing resilience

The capability of these variables to act as predictors of resilience can be illustrated using data collected from residents (Paton, et al., in press) of a community exposed to the effects of the eruptions at Ruapehu volcano, New Zealand, in 1995 and 1996. Two years of volcanic activity had resulted in significant disruption to the winter sports industry upon which this community is economically dependent. Residents were surveyed in June (n=92) and September (n=52) 1997 to assess the psychological impact of this disruption. Psychological impact was

assessed using the Hopkins Symptom Checklist – 21 (Green et al. 1988). To promote comparability, data on resilience variables (self-efficacy, coping style and sense of community) were collected with scales used by Bachrach and Zautra (1985). The present discussion focuses on the June data. Where individuals who responded to both surveys could be identified, these data were used to assess changes in the psychological impact of disruption. During the period between June and September, minor eruption activity and media reporting provided constant reminders of eruption threat. As a consequence, the surveys could be differentiated with respect to the threats faced by community members. In June, they faced both economic and eruption threats, whereas in September a good ski season reduced the economic threat.

Self-efficacy ($r = -0.27$, $p < 0.01$) and problem-focused coping ($r = -0.24$, $p < 0.05$) correlated significantly with stress scores in the direction anticipated if they constituted resilience resources. No significant correlation was found for sense of community ($r = -0.01$, ns). Regression analyses confirmed self-efficacy (Beta = -0.24, $p< 0.05$) and problem-focused coping (Beta = -0.23, $p<0.05$) as predictors of psychological resilience. To assess the relative contributions of economic and eruption threat, the stress scores of 31 subjects who completed both surveys were compared. Mean stress scores dropped from 55 in July to 47 in September ($t = -10.66$, $p < 0.0001$, $df = 30$) with the initial recovery of economic activity.

Discussion

Psychological resilience to volcanic hazard effects

The data presented here provide support for the role of self-efficacy and problem-focused as indicators of psychological resilience to volcanic hazard effects. As a consequence of their ability to predict resilience to volcanic and toxic waste (Bachrach & Zautra 1985) hazards, and doing so in individuals drawn from different communities, the predictive validity of these variables within an all-hazards framework is enhanced.

While the anticipated role of 'sense of community' was not supported, this could reflect social fragmentation resulting from hazard activity. A clear distinction between a 'winter sports' group and an 'agricultural' group could be discerned in this community as a consequence of the differential implications of ash fall for their respective livelihoods. Ski field employees were affected whereas those employed in agricultural were not. This distinction could have led to social fragmentation an limited opportunities to utilise social support networks within the wider community. This interpretation has implications for recovery planning. Because this group diversity did not exist prior to this hazard activity, and emerged as a consequence of a specific set of circumstances, recovery planning and intervention strategies should be guided by the anticipation of how hazard activity may differentially affect community dynamics (Paton & Bishop 1996). A failure to find the anticipated effect for 'sense of community' is thus understandable within this sample. It is important that future research continues to examine the potential of these variables to influence resilience and to explore the environmental contingencies that mediate their role.

Risk perception issues

During the first survey the community faced both economic and eruption threats. During the second the economic threat had subsided but the eruption threat remained. The significant decrease in stress scores suggests that respondents perceived economic and volcanic threats differently, and attributed greater salience to the former. If so, risk communication messages should focus on the specific implications of hazard effects for salient community activities. For example, information concerning ash threat would be attended to more readily if framed in terms of its effect on economic activity. Similarly, risk reduction strategies should focus on actions to safeguard economic integrity against disruption from these effects.

Economic factors may also influence the manner in which community members impose meaning on hazard activity. For example, some 91% of respondents were financially dependent upon winter sports for their livelihood. Their consequent vulnerability to ash and lahar activity led to these becoming salient components of their risk perception and motivated their participation in the surveys. Information from focus groups suggested that community members employed in agriculture, for whom ash fall did not have any direct consequences, attributed a lower level of risk to volcanic activity and influenced their low level of participation in the survey and their reluctance to support the expenditure of public funds on hazard adjustments for a problem they did not perceive to exist. This conclusion is consistent with those suggesting that attitudes to hazard adjustments, rather than the characteristics of the hazard itself, are more predictive of risk perception (Lindell & Whitney 2000).

This discussion suggests that assessments of risk perception should accommodate the contingent and interactive influence of social, employment, geographical and temporal factors. These observations also post a warning for researchers. Given the differences in risk perception between groups that emerged as a consequence of their participation in specific economic activities, an analysis that included all community members could obscure important relationships. Those unaffected could restrict the variance of the dependent variable (e.g., stress), introducing a downward bias in the correlation coefficients (Lindell & Whitney 2000). In addition to providing insights into the mechanisms that underpin psychological resilience to disruption from hazard effects, the efficacy and coping variables described here also provide a basis for increasing the adoption of risk reduction behaviour.

Community involvement and risk reduction

Self-efficacy has been implicated as a determinant of the adoption of risk reduction behaviour in the Theory of Planned Behaviour (TPB) (Ajzen 1991; Bennett & Murphy 1997). This model is developed here to explore the relationship between risk perception and adjustment adoption (*figure 1*). A prominent role for self-efficacy and problem-focused coping is also evident in the Person-Relative-to-Event (PrE) model (Duval & Mulilis 1999; Mulilis & Duval 1995). Both the PrE model and the TPB model have demonstrated a capability to predict the adoption of risk reduction behaviours (Ballantyne et al. 2000; Bennett & Murphy 1997; Lindell & Whitney 2000; Duval & Mulilis 1999).

In this model, motivation to act is triggered by the perception of a threat, but the key elements are action-outcome expectancies, self-efficacy judgements, past experience, and social norms. Outcome expectancies, response efficacy (e.g., decisions regarding whether the person has the time, skills, resources to adopt and adjustment) and self-efficacy judgements are concerned with considering whether risk may be reduced and whether the required actions are within the capabilities of the individual or group. In this model, action-outcome expectancies precede efficacy judgements.

People make assumptions about whether outcomes are possible before considering engaging in behaviour (e.g., an intention to adopt a preparatory measure or to change risk behaviour). If favourable, the individual moves to the action phase; a phase strongly influenced by self-efficacy expectations. The number and quality of action plans and the amount of effort and perseverance invested in risk reduction behaviours is strongly dependent on one's perceived competence and experience (Bennett & Murphy 1997). Adjustment adoption is also influenced by past experience and is more likely to be maintained if supported by the social and structural environment (Tobin 1999).

This model illustrates the complexity of the response to risk and helps explain why the expected link between risk perception and adjustment adoption has proved elusive. For example, as discussed above, the level of perceived risk attributed to the same hazard event can be diverse. Further, irrespective of the level of perceived risk, people are unlikely to act if they perceive hazard effects as insurmountable (low outcome expectancy) or if they do not perceive themselves as having the competence to act (low self efficacy). Outcome expectancy could also be undermined by resource inadequacies (low response efficacy) or if people transfer responsibility (low perceived responsibility) from themselves to formal emergency management agencies (Ballantyne et al. 2000; Mulilis & Duval 1995; Lindell & Whitney 2000). Alternatively, the process could be disrupted if a normative bias elicited by prior experience lessened the threat attributed to a hazard or its consequences or resulted in an overestimation of performance capability.

According to this model, for risk reduction behaviour to occur, strategies must aim to develop the outcome expectancies, efficacy, experience and social context necessary for its realisation. Further, the model must be capable of functioning effectively during periods of quiescence for infrequently occurring hazards. One way of harnessing the potential of this model that we are currently exploring involves its application within a community empowerment process.

Community empowerment

In this study a small, but significant ($r = 0.20$, $p<0.03$), correlation between self-efficacy and community involvement (e.g. membership of clubs, local action groups) was noted. While care must be taken in regard to assumptions of causality, this raises the possibility that the observed resilience reflected a capacity developed from participation in dealing with salient issues affecting a community and the operation of generalised efficacy beliefs which facilitated peoples' ability to respond more effectively to unexpected adversity (Bennett & Murphy 1997; Lindell & Whitney 2000). Efficacy beliefs could thus be facilitated by enhancing the psychological capacity to respond effectively to day-to-day issues, increasing personal capacity to respond effectively to hazard effects even if not engaged in risk reduction activities per se. Accordingly, resilience can be developed by empowering community members by facilitating their participation in identifying problems and in developing and implementing strategies to solve or contain problems in ways consistent with their needs, systems and values (Paton & Bishop 1996). The empowerment process will facilitate the development of individuals' self-efficacy and problem-focused coping. Developing strategies within this process may be important when dealing with infrequently occurring hazards and may encourage personal responsibility for safety.

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Since valid and reliable measures of some of these constructs are available, they could serve as key performance indicators for assessing individual resilience and anticipating the likely effectiveness of risk communication and reduction programmes aimed at encouraging adjustment adoption. A measure of the ability of past experience to support the adoption of risk reduction behaviour be derived from Lindell and Prater's (1999) measure of hazard intrusiveness (thinking and talking about, and getting information on, hazards). It may be advisable to include a measure of normalisation bias (Mileti & O'Brien 1992) to assess whether past experience reduces a propensity to adopt recommended behaviours.

Outcome expectancies and development

There remains the problem of creating outcome expectancies that support the adoption of risk reduction behaviours within an environment characterised by infrequent hazard activity. One way of tackling this issue involves developing strategies based on safeguarding or developing valued personal and community assets and practices.

Individuals are more likely to engage in behaviours when the outcome is valued and perceived as achievable. Realising the benefits of the above model requires a shift from a deficit or loss paradigm to one advocating beneficial effects. For example, a deficit or loss paradigm leads to strategies where community members are urged to spend money on strengthening or altering their house or building to reduce the loss from earthquake hazards. From a development or beneficial perspective, attention would focus on encouraging investment in structural alterations to increase the capital or re-sale value of a property or reduce insurance costs (i.e. the focus is on benefits accruing from adopting adjustments).

Benefits could be derived in other ways. For example, in the present study, collaboration between those affected resulted in their developing economic activities (e.g. volcano tourism, arts, crafts) to substitute for those disrupted by volcanic ash fall. Thus they did not focus on dealing with the ash fall problem (insurmountable) per se, but on alternative, more achievable and meaningful, ways of compensating for losses. Similarly, Becker et al. (2000) observed that 38% of their sample of 208 individuals noted benefits (e.g. improved plant growth, increased business and tourism opportunities, and enhanced sense of community) from their volcanic hazard experience.

Focusing on positive activities (e.g. enhancing property values, safeguarding local amenities, developing additional economic and employment resources), which can confer day-to-day benefits on individuals, rather than on uncontrollable and insurmountable threats such as earthquakes or ash fall, will provide for outcome expectancies that are more likely to support intentions to adopt adjustments,

promote resilience, and facilitate personal acceptance of responsibility. Information on beneficial consequences can inform the planning, hazard education and reduction processes and contribute to the development of programs designed to promote resilience, adjustment adoption and development. It is still important, however, to promote specific hazard awareness and the adoption and practice of risk reduction behaviours.

Hazard education and development

Because they are more powerful determinants of behaviour (Bennet & Murphy 1997) attention should be directed to developing specific efficacy. For example, the community development process could be supplemented by providing community members with hazard scenarios. These can be used by them to define the meaning that specific hazards have for them, identify the resources and information they need to define the problems posed by hazard consequences, and to formulate strategies to deal with them that are consistent with community perceptions, beliefs, attitudes and needs. The emergency planning role can be expanded to include assimilating and coordinating these perspectives and needs within their strategic planning, and seeking, as far as possible, to provide the information and resources necessary to sustain empowerment, self-help and resilience.

This process can also be used to identify and rectify misconceptions regarding hazards and their effects, and to encourage acceptance of personal responsibility for preparedness.

Maintaining the competencies that underpin resilience to adversity requires continued participation in problem solving activities and their integration with risk management initiatives. Managing this link between individual capacities and institutional resources has two implications for this process. The first relates to the need for coalitions or partnerships to perform a mediating role (Buckle et al. 2000; Chavis 1995; Eng & Parker 1994). The second involves developing planning models linking individual and community factors.

Relationship between individual and community action

Collective community behaviour can be thought of as the modal behaviour of the individuals who constitute the community. This modal behaviour may influence individual behaviour. In some models, such as the TPB described earlier, this possibility is allowed for by the inclusion of an individual level variable measuring perceptions of normative behaviour. The problem with this approach is that it assumes all relevant trans-individual factors are perceived and that their effects can be captured this way. This may not be the case. Although individual level factors are nested in communities, it is important to realise that, for example, while related aggregate sense of community (SoC) and individual SoC and collective efficacy and individual efficacy are independent constructs (Eng & Parker 1994; Paton & Smith, in prep).

They are not interchangeable, nor do they operate at the same level. Each can independently contribute to the formation of individual and collective beliefs and behaviour. Further, communities can be characterised by factors that are not usually recorded at the individual level (e.g., geographical characteristics, economic indicators, objective risks). Some of these may be directly perceived or misperceived by individuals, however, many will have their effects without entering conscious appreciation. Two issues need to be addressed in developing models that integrate individual and community dimensions: the identification of appropriate indicators for individuals and communities, and the question of appropriate methodologies for research designs and data analyses.

The key to advancing knowledge in this field is the development of testable models that combine an understanding of how people behave in the face of objective risks with how communities function as contexts in which these behaviours evolve and can be modified by planned interventions. Several suggestions as to how this might be achieved emerge from the resilience literature (Kaplan 1999).

Foremost amongst these is the suggestion that models must be focused on specific forms of risk and the specific personal and local factors that ameliorate or amplify negative outcomes or lead to desirable or beneficial outcomes (Paton & Smith, in prep; Tarter & Vanyukov 1999; Violanti et al. 2000). Here we advocate an analysis of the factors and their interactions that explain why some people and some communities fair better than others in the face of adversity. To describe such individuals and communities as 'resilient' falls well short of explaining why they fair better. The mechanisms that underpin this capacity must be defined and must be tested against actual disruption.

As a starting point, we need to differentiate individual and community level factors. The factors listed below are generic and must be tailored for specific hazards (earthquakes, cyclones, explosions, etc.) located in specific geographical and social settings. Appropriate indicators for individuals and communities are described in *table 1* and *table 2*. These lists are not exhaustive. Particular situations may

Personality	hardiness/vulnerability (intelligence, locus of control, neuroticism)
Behaviour	information seeking, networking, coping strategies
Beliefs	risk perception, self efficacy w.r.t. risk, SoC, action plans (behavioral intentions)
Knowledge	factual risk assessments, of resource availability, of appropriate behaviours
Experience	skills training, past hazard experience, interpretation of experience
Outcomes	change in beliefs and knowledge, adjustment adoption

Table 1: Examples of appropriate indicators for individual resilience

Community	aggregate Sense of Community, community competence
Geographical	hazards, risk, response constraints
Economic	income levels, industrialisation, social capital (public facilities)
Community	social institutions, emergency services, training resources,
Resource	public information (availability, access rates)
Outcomes	plans, knowledge, skills

Table 2: Examples of appropriate indicators for community resilience

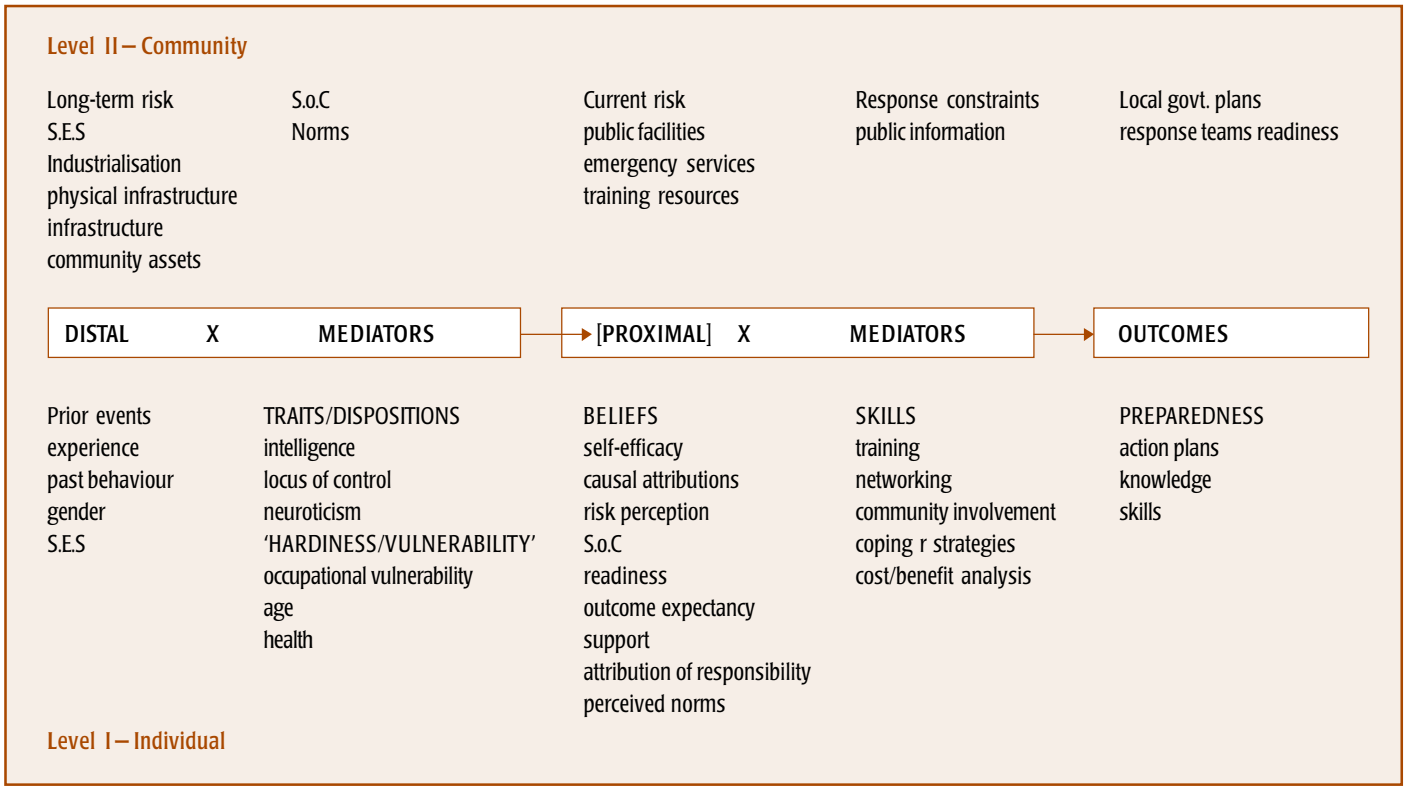

Figure 1: Generic community-individual levels model of preparedness development.

require additional information not covered here, and some measures may be more difficult to obtain that others.

Figure 1 incorporates these variables in a generic model for the development of individual and community preparedness. Distal elements are historical and structural factors that could serve as targets for strategic change. These influence contemporary (proximal) states. The latter represent the resources that underpin resilient capacity and whose efficacy is mediated by the availability of mechanisms that influence the attainment of desired outcomes at each level.

The purpose models such as those described in *figure 1* serve to summarise variables known or hypothesised to affect outcomes germane to preparedness (Paton & Smith, in prep).

It is not intended as a working model. As we have suggested working models need to be tailored for specific hazards and settings and for practical purposes would need to be more parsimonious than the model in *figure 1*.

The issues identified here, and the solutions proposed to deal with them, are best conceptualised over time. Changes in hazard environments, periodic hazard activity, and changes within and between communities over time in prevailing beliefs and levels of preparedness mean that these issues need to be conceptualised within a longitudinal framework. We are currently developing a model, and the methodology, to describe the relationships between these mechanisms and preparedness for us in planning intervention to develop individual and community resilience (Paton & Smith, in prep).

Conclusion

Evidence from empirical studies of community members exposed to toxic waste and volcanic hazards suggest that a model comprising efficacy, problem-focused coping, and sense of community can predict resilience to hazard effects and has explanatory power that transcends the specific characteristics of the hazard per se.

Consequently, it can be used to predict resilience and monitor intervention effectiveness within an all-hazards management framework. A second model, which includes outcome expectancy, efficacy, experience, and social norm factors, can provide a framework for hazard education and the encouragement of adjustment adoption.

The process can be facilitated by providing outcome expectancies based on benefits for community members. Since the presence and magnitude of these factors is, to some extent, a function of the level of personal involvement in community activities, the effectiveness of risk management initiatives can be promoted by integrating them with initiatives designed to encourage participation in dealing with personal and community issues.

The development of this field requires the identification of factors that influence resilience at individual and community levels, and the development of models that describe the relationship between levels and the mechanisms that underpin a capacity within systems to maintain integrity and balance when faced with disruptive hazard activity. By ensuring that these strategies are developed and delivered within a resilience/growth framework, community disruption can be minimised and the potential for recovery and growth optimised.

References

Ajzen I. 1991, 'The theory of planned behaviour', *Organisational Behaviour and Human Decision Processes*, no. 50, pp. 179–211.

Bachrach K. M. and Zautra A. J. 1985, 'Coping with a community stressor: The threat of a hazardous waste facility', *Journal of Health and Social Behaviour,* no. 26, pp. 127–141.

Ballantyne M., Paton D., Johnston D. Kozuch M. and Daly M. 2000, *Information on volcanic and earthquake hazards: The impact on awareness and preparation*, Institute of Geological & Nuclear Sciences Limited Science Report #2000/2, Wellington, New Zealand.

Becker J., Smith R., Johnston D. and Munro A. 2000, 'Effects of the 1995–1996 Ruapehu Eruptions on Communties in Central North Island, New Zealand, and People's Perceptions of Volcanic Hazards After the Event', *Australasian Journal of Disaster and Trauma Studies*, in press.

Bennett P. and Murphy S. 1997, *Psychology and health promotion*, Open University Press, Buckingham.

Buckle P., Mars G. and Smale S. 2000, 'New approaches to assessing vulnerability and resilience', *Australian Journal of Emergency Management*, no. 15, pp. 8–15.

Carver C.S. 1998, 'Resilience and Thriving: Issues, models and linkages', *Journal of Social Issues,* no. 54, pp. 245–266.

Chavis D.M. 1995, 'Building community capacity to prevent violence through coalitions and partnerships', *Journal of Health Care for the Poor and Underserved*, no. 6, pp. 234–245.

Duval T.S. and Mulilis J.P. 1999, 'A Person-Relative-to-Event (PrE) Approach to Negative Threat Appeals and Earthquake Preparedness: A field study', *Journal of Applied Social Psychology*, no. 29, pp. 495–516.

Eng E. and Parker E. 1994, 'Measuring community competence in the Mississippi Delta: The interface between program evaluation and empowerment', *Health Education Quarterly*, no. 21, pp.199–220.

Green D.E., Walkey F.H., McCormick I.A. and Taylor A.J.W. 1988, 'Development and evaluation of a 21 item version of the Hopkins Symptom Checklist with New Zealand and United States respondents', *Australian Journal of Psychology*, no. 40, pp. 61–70.

Kaniasty K. and Norris F.H. 1999, 'The experience of disaster: Individuals and communities sharing trauma, in R. Gist, R. and B. Lubin eds., *Response to Disaster*, Taylor & Francis, Philadelphia, PA.

Kaplan H.B. 1999, 'Toward an understanding of resilience: A critical review of definitions and models', in Glantz & Johnson, eds., *Resilience and development: Positive life adaptations*, Academic Press/Plenum Publishers, New York.

Lindell M.K. and Prater C.S. 1999, 'Household adoption of seismic hazard adjustments: A comparison of residents in two areas', *Proceedings of the Community Awareness and Hazards Mitigation Learning Workshop*, National Science Council, Republic of China, Taipei.

Lindell M.K. and Whitney D.J. 2000, 'Correlates of household seismic hazard adjustment adoption', *Risk Analysis,* no. 20, pp. 13–25.

Mileti D.S. and O'Brien P. 1993, 'Public response to aftershock warnings', *U.S. Geological Survey Professional Paper*, 1553–B, pp. 31–42.

Mulilis J.P. and Duval T.S. 1995, 'Negative Threat Appeals and Earthquake Preparedness: A Person-Relative-to-Event (PrE) model of coping with threat', *Journal of Applied Social Psychology*, no. 25, pp. 1319–1339.

Paton D. and Bishop B. 1996, 'Disasters and communities: Promoting psychosocial well-being', in D. Paton and N. Long, eds., *Psychological Aspects of Disaster: Impact, Coping, and Intervention*, Dunmore Press, Palmerston North.

Paton D., Johnston D.M., Bebbington M., Lai C-D., and Houghton B.F., in press. 'Direct and vicarious experience of volcanic hazards: Implications for risk perception and adjustment adoption', *The Australian Journal of Emergency Management.*

Paton D. and Smith L.M., in prep. 'Integrating individual and community models of readiness for natural hazard activity', *Natural Hazards.*

Sjöberg L. 2000, 'Factors in risk perception', *Risk Analysis*, no. 20, pp. 1–11.

Tarter R.E. & Vanyukov M. 1999, 'Revisiting the validity of the construct of resilience', in Glantz & Johnson, eds., *Resilience and development: Positive life adaptations*, Academic Press/Plenum Publishers, New York.

Tobin G.A. 1999, 'Sustainability and community resilience: The holy grail of hazards planning', *Environmental Hazards, no.* 1, pp. 13–26.

Van den Eyde J. and Veno A. 1999, 'Coping with disastrous events: An empowerment model of community healing', in R. Gist, R. and B. Lubin, eds., *Response to Disaster*, Taylor & Francis, Philadelphia, PA.

Violanti J.M., Paton D. and Dunning C. 2000, *Posttraumatic Stress Intervention: Challenges, Issues and Perspectives*, Charles C. Thomas, Springfield, Ill.

Yates S., Axsom D. and Tiedeman K. 1999, 'The help seeking process for distress after disasters', in Gist R. and Lubin B. eds., *Response to Disaster*, Taylor & Francis, Philadelphia, PA.

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This article has been refereed

Conference announcement

Victorian Flood Management Conference Traralgon, October 2001

The next Victorian Flood Management Conference will be held in Traralgon in October 2001. It will be jointly hosted by the West Gippsland Catchment Management Authority and the Latrobe City Council.

From all accounts the inaugural Victorian Flood Management Conference held in Wangaratta in September 1999 was a significant step in raising awareness of flood management.

For the first time, local government planners, floodplain managers, emergency planners, consultants and people from other disciplines were able to come together to discuss developments in flood management. Presentations were made on a wide range of issues including the Victoria Flood Management Strategy, community involvement, the Victoria Planning Provisions, flood insurance, legal liability and flood mapping.

Since the last conference was held many of these issues have continued to evolve and new ones have emerged to command our attention

In a questionnaire taken at the end of the inaugural conference, many of the 140 delegates indicated that there was a strong need for further flood conferences to be held.

The second Victorian Flood Conference will be held in Traralgon from 9th to 11th October 2001. The Conference theme is *Planning for the Inevitable*, which should remind us that that we should never be complacent about the frequency of floods or their impact. This is well illustrated by the fact that the annual cost of damages from floods in Victoria is now estimated to be greater than $56m and is continuing to grow.

The Chairman of the conference organising committee is Wayne Gilmour, Floodplain Manager with the West Gippsland Catchment Management Authority.
For more information, contact Wayne on: 03 5175 7800 (phone)

A conference brochure and call for papers will be released in the near future