

## Hazards Education in Schools: Current Findings, Future Directions

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### **Abstract**

The presentation at the workshop focuses on hazards education for youth in school settings. While hazards education programs appear to be relatively widespread, published research on their effectiveness is virtually nonexistent. While the focus in our research is on examining the overall effectiveness of these programs, a direction of our research programme has been on addressing the link between learning in school and preparedness in youth and in the home. This paper briefly reviews our research program to date. Overall, findings support hazards education programs in the following areas: increasing awareness, realistic risk perceptions, and knowledge of protective behaviors. In terms of emotionally focused coping, participation in education programs is also linked to reduced fears of hazards. Factors also have been found to relate to each other. As a salient example, in our first large scale study, children with increased knowledge reported increased perceptions of being injured across a range of hazards. However, these same children also reported significantly, and much, lower levels of hazard-related fears compared to those who believed injury less likely. Our more recent research has found a link between education and an increased number of child- and parent-reported hazard adjustments in the home. Predictors of adjustments at home included education programs that (a) promote an emergency management perspective and (b) promote interaction between children and their parents. Finally, in early and more recent research, involvement in multiple programs over time has been linked with a number of benefits that includes increased knowledge and hazard adjustments in the home. These findings underscore a growing recognition that school programs should be included as one of a number of pathways that communities use to increase their resilience to the impacts of major hazards. Findings also provide a foundation for future research that, in our case, involves quasi-experimental designs.

## Background

In the literature that is available on hazards education for youth [Lidstone 1996, 2001], speculation has focused on the potential for these programs. This has included the premise that educating children might be a pathway leading to increased preparedness at home.

Despite this promise, there is little empirically-based literature that has assessed the potential of these programs from an emergency management readiness perspective. Where any data exists, it is focused on response to and recovery from hazards: that is, the effects of hazards and disasters on children over time [La Greca et al. 1996; Ronan 1997; Ronan et al. 1999]. The thrust of findings here are that reactions are a function of a number of interrelated factors including (a) direct exposure that leads to a perception of threat and increased risk, (b) demographic and pre-existing factors (e.g., age, gender, ethnic background; pre-existing social and emotional problems; medical problems), (c) problem- and emotionally- focused coping resources, (d) social support and (e) prominent life stressors [La Greca et al. 1996; Ronan 1997]. In addition, recent data from our research program have supported the efficacy of psychoeducational programs in helping children reduce fears and PTSD symptoms and increase their ability to cope with hazard-related stimuli [Ronan et al. 1999].

On the other hand, little published research has examined children's risk perceptions and the potential role for readiness-based hazard education [Lidstone 1996; Ronan et al. 2001a]. In this area, most of the available literature is focused on educational curricula (e.g., geography course content [Lidstone 1996]). A prominent authority in this area, John Lidstone recently concluded that the examination of these programs from a readiness perspective has not been forthcoming [Mileti et al. 1993a]. However, research has assessed the merits of education programs in schools aimed at other areas involving risk (e.g., sex education, asthma [Besharov et al.; Christiansen et al.]). Our own extensive literature review has confirmed this dearth of research. Evaluations of the effectiveness of hazard education programs for children are needed.

As is known from research using adult samples, a number of factors have been linked to readiness and responses to warnings [Drabek 1986; Lindell et al. 1992, 2000; Mileti et al. 1990, 1993a and b]. In addition, adult-based research has potential to inform research and theory related to risk perceptions, readiness, and the value of public education programs. However, we want to emphasize that children are not adults. The fact is that children are reliant on parents and other adults. In this area, they obviously do not have independence necessary for the level of risk mitigation and readiness activities seen in adult populations. Thus, while youth are able, and often taught in education programs, to engage in certain problem- and emotion-focused protective activities (e.g., "duck, cover, hold" in an earthquake, "stress inoculation"), adults necessarily control important environmental contingencies. As a consequence, when educating youth, it may be useful to include information that assists children to differentiate along these lines. That is, children should be told what they are able to do to be better prepared physically and emotionally as well as those areas where adults (e.g., parents, teachers) have more control. In

this latter area, helping them learn what information they might share with adults to promote readiness, response, and recovery may be worthwhile [Ronan et al. 1999; Johnston et al. 2000]. An idea based in common sense is that the more a child is educated and encouraged to share this information, the more there exists potential for caregivers to be better informed. Thus, the idea of an interactive perspective has appeal in this area [Ronan et al. 2001a; Mileti et al. 1993a].

However, given a lack of research assessing baseline levels of awareness, risk perceptions, and readiness in child samples, our research began with a study that addressed these issues along with factors related to hazards education programs [Ronan et al. 2001a]. This study was followed by a more recent study looking more closely at factors related to hazards education programs [Ronan et al. 2001b]. These studies are now summarized.

## Summary of Initial and Current Findings

### *Initial Findings*

In our first study, we investigated risk perceptions and preparedness in 440 school children and young adolescents using self-report measures assessing multiple factors related to risk perceptions, readiness, and hazard education involvement. In general in this study, participants were aware of problem- and emotion-focused strategies related to the occurrence of a future hazard. Our findings indicated reasonably accurate perceptions of risk, knowledge related to response-related protective activities promoted by New Zealand emergency management authorities across a range of hazards (going one kilometer inland in a tsunami, closing windows and doors during a volcanic eruption, etc), and a belief that was moderate to strong that they would be able to cope emotionally with the effects of a future hazard. Further, factors were found to relate to each other. For example, youth with unrealistic perceptions of risk also reported increased fears of hazards, a reduced belief in their coping ability, and decreased knowledge of protective behaviors compared to participants with more realistic perceptions of risk.

This study also found some support for hazards education programs in these areas. That is, children reporting involvement in education programs also reported more realistic perceptions of risk, reduced fears, and increased knowledge of protective behaviours compared to those not involved in such programs. Additionally, participants who reported involvement in two or more programs were significantly more knowledgeable compared to children reporting involvement in one program only.

Despite the beneficial effects on knowledge, risk perceptions, and emotional arousal, our preliminary research did not see any differences between educated and uneducated children in terms of their reports of home based hazard adjustments [Ronan et al. 2001a]. Levels of home-based hazards adjustments were low across groups and not all that different from levels reported in the adult literature. However, a limitation of this research was sole reliance on children's reports of a limited number of home-based ad-

justments.

### ***Current Findings***

Our second major study [Ronan et al. 2001b] aimed to replicate and extend the research [Ronan et al. 2001a] summarized in the previous section. In terms of a role for hazards education in promoting hazard readiness activities at home, this study included child and separate parent reports of a broad range of readiness activities undertaken at home. Underlying this study were the following hypotheses related to hazards education involvement: (a) increased knowledge of protective actions, (b) increased planning and practice by families for hazard-related emergencies, and (c) increased home-based readiness activities. Particular features of education programs including an increased focus on promoting interaction between children and parents, a specific emphasis on emergency management, and multiple education programs were further hypothesized to be facilitators of readiness (hazard adjustments) at home.

These and other aspects related to hazards education programs were assessed in a large sample of 560 children. Overall, the results supported our hypotheses and established a link between education programs and increasing hazard readiness activity at home based on both child and parent reports of hazard adjustments adopted at home (see also next section for some specific illustrations). Findings here supported education program participation as related to increasingly realistic perceptions of risk, increased knowledge, an increased frequency of interaction with parents, and increased hazards adjustments reported by children and parents. Findings identified specific aspects of these programs as particularly important predictors of home based preparedness activity: the providing of emergency management focused information, involvement in multiple programs, and, significantly, an increased frequency of interactions between children and caregivers about what children learned in these programs. This includes a related finding that encouraging children to talk with parents about what they learned was also significantly correlated with home-based hazard adjustments.

### **Future Directions**

#### ***Application of Current Findings and Recommendations***

Taken together, our research suggests particular features of hazards education programs to be important in promoting readiness at home. First, the adoption of an emergency management perspective appears useful. This does not preclude a focus on additional features (e.g., the science of hazards) in education programs. However, given that emergency management programs, of the different types of programs assessed, related most strongly with both child and parent reported readiness activity at home. Further, emergency management related knowledge of protective behaviors was a significant predictor of home-based readiness activities.

Second, programs should encourage interaction between children and parents. This form of this interaction needs to be specified. That is, rather than generally encouraging them to go home and discuss what they learned, it may be more worthwhile to have them bring home specific information about how to prepare. Our current quasi-experimentally based research is looking at different levels of information provision by these programs to assess this issue more closely. Nevertheless, more interaction between children and parents should be encouraged.

Third, having children involved in multiple programs over time appears necessary. Recent programs involvement (i.e., during the past two years) along with multiple program involvement related significantly to both child- and parent-reported adjustments. An implication here is that any initial program efficacy, including beneficial effects on hazard adjustments, may begin to diminish with time. Thus, a graduated sequence of hazards education programs that exposes children to new material, at a developmentally appropriate level, while providing refreshers on previously learned information, is recommended.

We support an interactive model. The more that emergency management-focused guidance is provided in a sequence of multiple programs encouraging specific forms of interaction, the more that benefits should accrue [Mileti et al. 1997].

Overall, our findings suggest hazard education programs as helpful in achieving the following: (a) increased awareness, (b) realistic risk perceptions, (c) emergency management related knowledge, and, with an emphasis on specific features emphasized earlier, (d) increased levels of readiness activity at home. The modest size of the correlations and the amount of variance accounted for in regressions, similar to findings in the adult literature, supports the idea that multiple programs offered across multiple levels (schools, communities, elsewhere) are necessary [Mileti et al. 1997].

At this point, it is worthwhile to comment on the issue of whether educating children about risks associated with hazards might have some deleterious emotional effects. As alluded to earlier, we found a relationship between increased knowledge across the range of possible hazards with increased perceptions of the likelihood of being injured [Ronan et al. 2001a]. However, these same participants also reported significantly lower levels of fear (12% versus 28% reported being ‘often scared’ when thinking or talking about hazards, respectively). Thus, as demonstrated in this study, the provision of realistic risk perception appears to reduce, rather than increase, negative emotional arousal. Thus, we advocate for helping children understand realistic risks while providing them with guidance, information, and an encouragement to talk with parents as preferable to the options of not discussing risks or “scaring” children into taking action.

The major limitation of our research thus far is that it is correlational. Thus, while large samples have been used and, in our more recent study [Ronan et al. 2001b], readiness activity at home was assessed using both child and parent ratings, we feel that the next step needs to involve experimental designs. Our current research is now focused on a large-scale effort using a quasi-experimental design that is assessing the efficacy of dif-

fering forms of hazard education [Ronan 2001]. However, we feel that findings thus far provide a good measure of encouragement to other researchers as well as practitioners (e. g., emergency management and school personnel) that hazards education for youth should be one component of multi-element public education campaigns designed to increase the resilience of children, families, schools, and communities.

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## References

- D. J. Besharov and K. N. Gardiner, "Introduction: Sex Education and Abstinence: Programs and Evaluation", *Children and Youth Services Review*, 19, 501.
- S. C. Christiansen, S. B. Martin, and B. L. Zuraw, "Evaluation of a School-based Asthma Education Program for Inner-city Children", *Journal of Allergy and Clinical Immunology*, 100, 613.
- T. Drabek (1986), *Human System Responses to Disasters: An Inventory of Sociological Findings*, Springer-Verlag, New York.
- D. M. Johnston and K. R. Ronan (2000), "Risk Education and Intervention," in H. Sigurdsson (ed.), *Encyclopedia of Volcanoes*, Academic Press, New York.
- A. M. La Greca, W. K. Silverman, E. M. Vernberg, and M. J. Prinstein (1996), "Symptoms of Posttraumatic Stress in Children following Hurricane Andrew: A Prospective Study," *Journal of Consulting and Clinical Psychology*, 64, 712-723.
- J. Lidstone (1996), *International Perspectives on Teaching about Hazards and Disasters*, Channel View Publications, Philadelphia.
- J. Lidstone (2001), "Citizenship in Cities on Volcanoes: Can Education Really Help?" Presentation at *Cities on Volcanoes II*, Auckland, New Zealand.
- M. K. Lindell and R. W. Perry (1992), *Behavioral Foundations of Community Emergency Planning*, Hemisphere Publishing Company, New York.
- M. K. Lindell and D. J. Whitney (2000), "Correlates of Household Seismic Hazard Adjustment Adoption," *Risk Analysis*, 20, 13-25.
- D. S. Mileti & J. H. Sorensen (1990), *Communication of Emergency Public Warnings: A Social Science Perspective and State-of-the-Art Assessment*, Federal Emergency Management Agency.
- D. S. Mileti and C. Fitzpatrick (1993a), *The Great Earthquake Experiment: Risk Communication and Public Action*, Westview Press, San Francisco.
- D. S. Mileti and P. O'Brien (1993b), "Public Response to Aftershock Warnings", U. S.

Geological Survey Professional Paper, 1553-B, 31-42.

D. S. Mileti, and J. D. Darlington (1997), "The Role of Searching in Shaping Reactions to Earthquake Risk Information", *Social Problems*, 44, 89-102.

K. R. Ronan (1997), "The Effects of a Series of Volcanic Eruptions on Children with Asthma", *New Zealand Medical Journal*, 110, 11-13.

K. R. Ronan (2001), "Hazards and Society: An Experimental Investigation of Effectiveness", data collection completed February 2001.

K. R. Ronan and D. M. Johnston (1999), "Behaviourally-based Interventions for Children following Volcanic Eruptions: An Evaluation of Effectiveness", *International Journal of Disaster Prevention and Management*, 8, 169-176.

K. R. Ronan, D. M. Johnston, M. Daly, and R. Fairley (2001a), "School Children's Risk Perceptions and Preparedness: A Hazards Education Survey," *Australasian Journal of Disaster and Trauma Studies*, in press.

K. R. Ronan and D. M. Johnston (2001b) "Correlates of Hazards Education Programs for Youth", *Risk Analysis*, in press.