Children's knowledge, cognitions and emotions surrounding natural disasters: An investigation of Year 5 students, Wellington, New Zealand.

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Abstract

New Zealand schools have a responsibility to ensure that children are informed about potential natural disasters, and are prepared with protective strategies. The present study aimed to investigate children's knowledge, cognitions, and emotions concerning natural disasters, with a particular focus on earthquakes and tsunami. Thirty Year-5 school students (aged 9-10 years) from the Wellington region of New Zealand participated in researcher-led focus groups. The children were generally well informed, demonstrating an understanding of causes, characteristics, and potential consequences of earthquakes and tsunami. Thoughts and expectations regarding natural hazards, earthquakes in particular, centred on the unpredictability of natural disasters and on the expectation that there would be significant earthquakes in their region in the future. However, the children demonstrated assurance that the school and family were prepared with emergency supplies, and that they themselves and their families knew strategies for keeping safe in a disaster event. The children discussed these reassurances as a factor in reducing their fear of disasters, fear being the predominant negative emotion discussed by the children. The children indicated that learning at school had contributed to discussions with friends and family, this finding suggesting that disaster education at school is a critical component of children's education and that this education has a flow-on effect at home and in the wider community.

Keywords: *disasters; education; children; earthquakes; cognitions; knowledge; emotions; preparedness*

Introduction

On 22 February 2011, a magnitude 6.3 earthquake struck Christchurch, New Zealand, causing significant damage and the loss of 185 lives (Cubrinovski et al., 2011). The following month, a magnitude 8.9 earthquake off the coast of Japan triggered a tsunami that besieged the coastal town of Sendai and surrounding areas (Stimpson, 2011). While New Zealand has been fortunate not to have experienced a large tsunami in recent history, the Japanese tsunami demonstrated that the impact of a coastal tsunami can be catastrophic. New Zealand's position along the meeting point of the Australian and Pacific tectonic plates (GNS Science, 2011), as well as the country's extensive coastline make earthquakes and tsunami an ever-present threat. Preparing effectively for the threat of natural disasters can help us to mitigate some of the damage done when natural disasters do occur, potentially saving lives and helping the recovery of people impacted by the event. Children have an important role to play in preparation for disasters, as the education of a child can influence others in the home (Evans & Oehler-Stinnett, 2006).

Children's knowledge about natural disasters

Many studies (e.g., Finnis, Johnston, Ronan, & White, 2010; Ronan & Johnston, 2003) have supported the value of hazards education programmes in schools, particularly the learning benefits for children who are repeatedly involved in hazards programmes at different levels of the school system (Ronan & Johnston, 2001; Tarrant & Johnston, 2010b). Finnis, Johnston, Becker, Ronan, and Paton (2007), state that the effectiveness of a school programme can be enhanced by the children learning, not only about the characteristics of a natural disaster, but about what occurs before, during, and after a particular type of disaster.

Becker, Johnston, Paton, and Ronan (2009) discuss a series of one-on-one interviews undertaken with 48

adults across New Zealand to examine factors which lead to disaster preparedness in homes. One of the positive factors discussed by participants was having children who were involved in disaster education programmes at school. Individuals surveyed said that their children would come home with information about preparing for a disaster, and the family or parent and child would make plans or prepare resources together for their home. This suggests that of homes with children in disaster education programmes at school, not only do the children themselves benefit from an effective programme, but potentially the entire family unit becomes better prepared as a result of the information. It is important that all children have the opportunity to learn about natural disasters and to understand protective strategies. If a child learns about the nature of particular natural disasters and knows appropriate safety strategies to apply before, during, and after the event, this knowledge could enable not only the child and his or her family to survive, but also his or her community to survive the event and its aftermath (Ronan & Johnston, 2005).

In relation to studies supporting the value of hazard education programmes in schools (e.g., Finnis, Standring, Johnston & Ronan, 2004; Ronan & Johnston, 2001), Wachtendorf, Brown and Nickle (2008) highlight the need for such programmes to consider the social capabilities of the students involved. Effective hazards education programmes in schools also involve interaction with parents (Ronan, Crellin & Johnston, 2010). A study by Coomer et al. (2008), examining emergency management education in 216 schools encompassing Years 1-13 in the Greater Wellington region, found that 86% of schools surveyed had some form of emergency management education in their curriculum, earthquake being the most widely discussed disaster in Wellington classrooms. Patton and Sylvester (1998) and Johnston, Tarrant, Tipler, Coomer, Pedersen, and Garside (2011) stress the value of children learning and practising hazard education activities and drills at school. Repeated drills can be evaluated right after they are practised, and the learning can be applied immediately if required.

Reported benefits of school hazards programmes also include increased awareness of risks and, particularly, more-realistic risk perceptions (Mitchell, Haynes, Hall, Choong & Oven, 2008; Ronan & Johnston, 2001) as well as motivating preparedness (Shaw, Shiwaku, Kobayashi & Kohyashi, 2004). These benefits are demonstrated in Ronan and Johnston's (1999) study examining the effects of witnessing relatively harmless volcanic activity on students aged between 7 and 13 years. Ronan and Johnston found that the most positive effect on coping was to have participated in an information-based intervention group. This finding suggests that knowledge is a key aspect of positive coping, and can assist those young people to understand the processes of a natural disaster and to feel less stressed and out of control following such events.

Children's cognitions concerning natural disasters

Perceptions of risk appear to result in either a lack of action (along with acceptance of inevitability), or motivation to prepare for a particular event (Mileti & Peek, 2002). Shaw et al. (2004) stress that a realistic awareness of potential hazards is critical to motivate preparedness. Shaw et al. point out that it is not necessary to experience a particular type of disaster to create awareness, but that education can create the knowledge and perceptions of events that lend to coping. Perceptions of event-likelihood, and beliefs about one's ability to survive and cope with a disaster are linked to an understanding of the nature of a particular disaster, and to levels of preparedness for the disaster. Preparedness for a disaster is a critical part of hazards education in New Zealand schools (e.g., preparedness is a key component in *What's the Plan Stan?,* the hazards and emergencies programme made available by the New Zealand Ministry of Civil Defence and Emergency Management, to all schools in the country). Expectations about the likelihood of a particular disaster occurring, and thoughts about how the disaster might impact on oneself and one's family, can be instrumental in motivating preparation (Tarrant & Johnston, 2010b). Information and preparation are important tools in allowing children to feel in control of their environment, and when individuals know they have the tools to get themselves through a disaster, there is generally less fear created by the uncertainty of events.

Children's emotions concerning natural disasters

Children have been identified in previous literature (e.g., Ronan & Johnston, 2005) as being at higher risk than adults for distress following a disaster. Unusual events can be frightening, as we have little experience of them. Fear is a normal emotion, and its purpose is to alert us to potential danger. For example, in instances of heightened fear, the fight or flight response is adaptive for survival (Greenberg, Carr & Summers, 2002). Following a significant earthquake in Athens in 1999,

Groome and Soureti (2004) found that levels of stress were highest in people who had thought their lives were in danger during or immediately after the earthquake, demonstrating the link between thoughts and emotion.

Johnston, Ronan, Finnis, Leonard, and Forsyth (2011) investigated children's understanding of natural hazards in 71 Te Anau, New Zealand, children aged 9-11 years who had experienced a significant earthquake. The study was conducted in 2003, seven months after the magnitude 7.1 Fiordland earthquake (August 2003) which was centred 70 km north-west of Te Anau and was approximately 12 km deep (Geonet, 2003). Seven months after the earthquake, 51% of the children were upset by thinking or talking about earthquakes. Johnston et al also found that 30% of the children believed that talking about earthquakes would upset their parents. According to Ronan and Johnston (2003) the children's perceptions of parental upset may provoke similar emotional responses in their children.

Preparedness within the home environment, such as having survival supplies and plans in place, as well as an emotional awareness of the possibility of a disaster and an understanding that they can get through it, can have a positive impact on the likelihood that a child will be able to get through a disaster event both physically and emotionally (Ronan and Johnston, 2005). Where children understand the nature of the hazard, have knowledge of protective behaviours, and know they have strategies for coping with the event, it is likely that negative emotions such as fear and distress can be tempered. Emotions can also be influenced by the behaviours of people around us. For instance, where a child observes that his or her caregivers are calm and appear to be coping in a crisis event, it is more likely that the child will remain calm and cope (Ronan & Johnston, 2003). Ronan and Johnston (2005) demonstrated links between understanding of hazards and emotion, finding that knowledge about emergency management and preparedness led not only to better prepared homes, but also to reduced anxiety toward potential disasters.

Since it is not feasible to protect a child from being exposed to all news coverage and social discussion concerning natural disasters, it is important to be aware of how children understand and respond to the information they do receive. Therefore, the aims of the present study were to investigate the children's knowledge about natural disasters, together with their cognitions and emotions related to disasters.

Method

Research Design

Previous studies of New Zealand school children's perspectives on various aspects of disasters, and on their level of preparedness, have been frequently survey-based (e.g., McDermott & Palmer, 2002; Tarrant & Johnston, 2010b). There are few studies conducted in New Zealand that examine children's perspectives of disasters from a qualitative stance. Thus, in the present study, focus groups of 9-10 year olds were employed to gather data. Children of 9-10 years generally have verbal and comprehension skills sufficiently developed to discuss ideas among themselves in controlled group situations (Morgan, Gibbs, Maxwell, & Britten, 2002). Focus group format allows participants to share thoughts, feelings, and information, and can encourage discussion around a topic. Morgan et al. (2002) also suggest that the input from other children in a group can stimulate and encourage discussion and that groups of around four to five children provide an ideal size within which to conduct discussions. Thus, children were grouped in these numbers in the present study.

Data from the focus groups was subjected to thematic analysis to identify themes and categories of discussion in the present study.

Participants

Initial contact was made with 17 schools in the Wellington region. Of these, four expressed interest in participation and were included in the study. Schools came from the north, west, south, and central areas of Wellington. Schools ranged from deciles two to ten. Five students were randomly selected from the roll of each available class (seven Year 5 classes in total across the four schools), and consent forms sent home to parents. The randomly selected students present on the day of the focus groups and who had a completed parent-consent form were included in the study. The students themselves also consented to taking part in the focus groups. A total of thirty children (12 boys and 18 girls) aged 9-10 years participated in the study. Three of the schools were represented by two focus groups each, and the fourth school (Central Wellington) was represented by one focus group. Table 1, below, shows a summary of school and participant information.

Table 1: School and participant summary

School		Participants		
Decile	**Area of school**	**Gender**	**Ethnicity**	**Age (years)**
2	**North Wellington**	Male	NZ Euro	9
		Male	Maori/Euro	9
		Male	Maori/ Cook Isl.	9
		Male	Cook Isl.	10
		Female	Not Stated	9
		Female	Maori/Euro	9
		Female	Samoan	9
		Female	Samoan/Tokelauan	10
		Female	Cook Isl.	10
3	**South Wellington**	Male	Not Stated	9
		Male	Not Stated	9
		Male	Not Stated	9
		Male	Assyrian	9
		Male	Assyrian	9
		Male	NZ Euro	9
		Male	Samoan	9
		Female	Asian	9
		Female	Euro/Samoan	9
		Female	Indian	9
9	**Central Wellington**	Male	NZ Euro	9
		Female	NZ Euro	9
		Female	Maori	9
10	**West Wellington**	Female	British	9
		Female	British	10
		Female	NZ Euro	9
		Female	NZ Euro	9
		Female	NZ Euro	9
		Female	NZ Euro	9
		Female	NZ Euro	10
		Female	NZ Euro	10
		N=30		

Focus Groups

Sessions began with the researcher introducing herself and explaining to the children what was expected to take place in the focus groups. The children were made aware that they could leave at any point if they wished. Each participant chose a pseudonym, which they wrote on a name tag and decorated. Group guidelines were read to the children (for example: *laughing is fine, but not when it hurts people).* A video and voice recorder were used and the children were made aware of this. The researcher explained that these recordings were to help the researcher remember what was said in the focus groups. Focus groups each ran for up to 60 minutes.

Interview-questions

The researcher used a set of 15 core questions focused on knowledge of natural disasters, and cognition and emotion as they relate to natural disasters, earthquakes and tsunami in particular. Knowledge-questions also included enquiry regarding preparedness for natural disasters. The children's discussion was focussed on the key research questions of the study (detailed earlier), but children were able to develop ideas of importance to them, and to extend discussion around their ideas and the core questions. In order to keep the mood positive, groups always ended by discussing how the children could make themselves feel better if they felt stressed or upset about disasters.

Data analysis

Data was transcribed by the researcher, as a simple orthographic transcription which was checked against both video and audio recordings to ensure accuracy. Coding followed the six-phase procedure outlined by Braun and Clarke (2006) and themes were identified within the transcribed data, and assigned categories. Themes and sub-themes were organised under the three main areas of the investigation: knowledge; cognitions; and emotions.

Results and Discussion

Children's Knowledge about Disasters

When the children were asked to describe features of disasters, the most common were: destructive/ dangerous, frightening, and unpredictable. When asked to make a list of natural disasters, many items mentioned in the groups were clearly not natural disasters (e.g. wars or crashes). These errors may imply that the chldren were either unaware that these were not classified as natural disasters or that man-made disasters share some common features with natural disasters, such as provoking fear, and causing destruction. Knowledge is the framework through which we make sense of events and give them meaning. Pieces of information, factual or false, form the framework children use to develop their understanding of disasters.

While not all children were clear on correct geological terminology, children in all groups were able to identify that earthquakes were caused by underground plates "crashing together" and that earthquakes at sea have the potential to cause a tsunami. Several children

from one school were further able to explain that this process causes mountains to form, and land to sink, demonstrating a higher level of knowledge. Those children also mentioned a personal interest in disasters, attempting to seek out information from the focus group leader to extend their understanding. While levels of knowledge about disasters and natural processes varied, all children demonstrated basic understanding of how earthquakes and tsunami occur, and of the risks involved.

Awareness of current events

To help the researchers' understanding of children's awareness of current events regarding disasters, participants were asked to talk about any disasters that they could recall. The earthquake and tsunami disaster centring on Sendai (Japan) in 2011, and the earthquakes in Canterbury/Christchurch (New Zealand) prior to the present study were mentioned early in every group. In a study of effects on memory and recall in children by Lehmann and Hasselhorn (2010), the authors found that items that were both *repeated* and *recent* were more easily recalled. Events remaining uppermost in children's (and adults) minds can have both negative and positive effects. First, repeated exposure to negative information can lead to believing that events are more common or dangerous than they really are (Comer, Furr, Beidas, Babyar, & Kendall, 2008). Secondly, valuable lessons about disasters, such as preparedness, can also become ingrained through repetition. Children in all of the focus groups indicated that at school they had learnt more about the nature of earthquakes and tsunami following the Japanese and Christchurch events.

Knowledge about safety

All focus groups demonstrated that they had an understanding of how to keep safe in an earthquake or tsunami, either at school or at home. All of the groups could recall what they were required to do for safety drills at their school within the past year. One child discussed the drill procedure with great detail: *After the earthquake [our teacher] would do the roll, just to make sure everyone's there... after we all got checked we go down to the bottom field and stay there until some people would come... if my parents are dead, my next door neighbours, and if my neighbours are dead, my grandma, and if my grandma is dead then I don't know what happens next* (female, 9yrs). Although knowing *what* they did, some groups disagreed among themselves over the exact purpose of the drill.

Children in one particular school were able to identify several different potential earthquake hazards in the room where they were sitting, including an unstable wall (internal division), large windows, a ceiling-mounted projector, a smart-board, and clocks. They mentioned that they had been learning in class about identifying hazards in their environment. Identifying hazards in the immediate environment was mentioned only by this Decile 10 school. Otherwise, in the present study children from different schools appeared similarly informed regarding hazards and protective strategies. That is, findings on knowledge did not vary according to decile ranking (decile rankings representing socio-economic areas). This finding contrasts with two New Zealand studies concerning primary school aged children (Tarrant & Johnston, 2010a; Tipler, Tarrant, Coomer, & Johnston, 2010) where children from lower socio-economic areas were the least informed about natural disasters, and demonstrated the lowest levels of preparedness. It is unclear whether differences between the present study and the Tarrant and Johnston, and the Tipler et al. studies are explained simply by the different type of data gathering, or by the small number of participants in the present study, or by greater attention in schools to disasters and protective strategies following the Christchurch earthquakes that began late in 2010, and the Sendai, Japan earthquake and tsunami that occurred in February 2011. Both of these events occurred after the conductance of the two New Zealand survey studies mentioned above, and before the present study. Children in the focus groups did comment that they had learned more at school about earthquakes and tsunami following the events in New Zealand and Japan, perhaps suggesting a shift in hazards awareness and safety in schools.

All children described having at least one emergency item in their homes, most having several. All groups could identify key items for a home, such as water, food and first aid kits. Some children went into greater detail about emergency items and protective behaviours (such as not overburdening getaway kits). Overall, the children showed pride in the preparations they had undertaken, and demonstrated detailed and informed thinking about their safety during and after a disaster, an earthquake in particular.

Sources of information about disasters

All children had first-hand experience of events such as lightning, thunder, hail and snow, and 23 of the 30 children could recall having felt an earthquake. All

earthquake experiences were described as 'small', with children having had little fear during the event itself, but many children expressed fear of whether there may be another, significant earthquake later.

Outside of school, parents were key sources of information, followed by television, and the internet. One child discussed experiences of getting in trouble for talking about disasters too much at home. It is possible members of the family were upset by recent disasters, and preferred not to hear about them, or perhaps they sought to discourage this child, believing it may be distressing for him. The value of discussion in this age group is that this can "help the child to realise that their reactions are shared by others and provides a framework to help them work through their feelings" (Paton & Sylvester, 1996, p 224). Whatever the reason for discouraging a child to talk about disasters, children who do not have opportunities to ask questions may develop incorrect beliefs about disasters and may experience unnecessary stress as a result of this.

Many participants watched the news daily, and some said they would only watch it when they had been told to, or when they knew that something interesting would be shown. Many of the stories the children described were graphic and caused strong emotional responses. Emotional responses and images of people covered in blood, buildings collapsing, and bodies were all described by the children. For example (referring to the Christchurch earthquakes): *I don't feel sad when I hear about it, but when I see it on the news with all the pictures and stuff it does [make me feel sad]* (female, 9yrs). One child recalled crying while seeing images of Christchurch earthquake destruction on the news, while another described feeling sick. In a study examining the effects of television viewing on children, Comer et al. (2008) found that higher, unmonitored television viewing led to increased perception of children's own vulnerability to world threats. This suggests that viewing news about disasters has the potential to make children feel unsafe. For these reasons, it is important that children's viewing is controlled by parents, and that parents are available to talk to their children about media content to which the children have been exposed (Gentile & Wash, 2002).

Vicarious experience through current events can also have positive effects on individuals. For example, several children told what seemed to be the story of Tilly Smith (see Randall & Berger, 2005). Tilly Smith, a 10 year old British girl on holiday with her parents in Thailand during the 2004 Boxing Day tsunami, warned beachgoers of the approaching tsunami, based on her knowledge about disasters gained through studying tsunami at school. The story of Tilly Smith may have resonated especially with the children recounting the story, as the children in the present study were a similar age to Tilly at the time of the tsunami.

Children's Cognitions about Natural Disasters

For the purposes of the present study, cognitions were considered in terms of thoughts about disasters, and expectations, and beliefs concerning disasters.

Thoughts

Losing family was the primary concern for participants. Most discussion of injury or death was volunteered as being a consequence of not following proper safety procedures. Thoughts about being trapped were also common and children stated that they worried about this, focussing not on injury, but on isolation. One child said: [After an earthquake] *I'd probably feel lonely, because I might be trapped and then probably somebody might not find me* (male, 9yrs). Participants' discussions about their fears mirrored information they had seen on television, or discussions they had had at school concerning major disasters. Their concerns demonstrated that the children had recognised potential risks and considered which risks might affect them personally.

Expectations

Children were asked to name one disaster they believed most likely to affect them in Wellington. Thirty-three percent of the children believed an earthquake to be the most likely disaster. Tsunami, lightning/thunder storm, hail, or tornado were all selected as being the next most likely disaster (10% each). Only 3% of the children believed house fire to be the most likely disaster to affect them. Findings of the present study contrast with findings of an investigation of expectations in a study (Tarrant & Johnston, 2010b) of Intermediate School students aged 11-12 years in Wellington, New Zealand, conducted prior to the Christchurch earthquake and Japan earthquake and tsunami of 2011. When the Intermediate school children were asked about the likelihood of particular disasters affecting them, a house fire (30.9%) was considered to be the most likely form of hazard to affect them at home, followed by earthquake (28.3%). Unsurprisingly, fire was also

the most upsetting for children to think about, with 27% saying that it 'often' scared them. It is likely that in the present study, children's perceptions were influenced by recent, ongoing news events. The recency and levels of destruction in the Christchurch and Japan events, together with follow-up discussions at school, had likely focused children's attention on earthquakes in their own country and, in particular, the likelihood of earthquakes in the vulnerable city in which they live.

Children made attributions about where disasters occur. For example*:* [tsunami] *usually happens in Thailand* (female, 9yrs). The children were largely aware that earthquakes occur in some locations more than others, due to fault lines, and most children held the belief that there would likely be an earthquake in Wellington in the future. Part of the reason the children seemed to expect an earthquake in Wellington may have been their exposure to predictions about this, indicating they had heard predictions at school and, for some of the children, on television. Additionally, at the time the focus groups were held (September, 2011), there had been a national public focus on earthquake-awareness and preparedness following the Canterbury, New Zealand, earthquake sequence that began in September 2010.

Beliefs

One child relayed an event where his family had heard that an earthquake was expected to occur in Wellington on a specific date: *They said it'll happen, so we went to my auntie's house, coz that's the safest place and we said lots of prayers and then it didn't happen… we thanked God in our prayer* (male, 9yrs). While this child was aware of the causes of earthquakes (he had described these previously), he also placed responsibility with God. Participants in another group discussed the role of taniwha in earthquakes, specifically Ngake and Whataitai (whom Maori tradition accepts as residing in the waters of Wellington harbour). [In New Zealand Maori tradition, taniwha are supernatural creatures that may be terrifying or protective (Keane, 2013)]. Two children (one Maori, the other European) in one focus group felt fear regarding the taniwha because they had read stories where taniwha used earthquakes to punish people.

It is important when considering responses to an event, to understand something of the person's essential cultural and religious beliefs. Previous research of the effect of religious beliefs on stress suggests that religion has a buffering effect on stress (e.g., Smith, McCollough & Poll, 2003). In the present study, for example, a child reported feeling safer when his family prayed that a predicted earthquake not occur.

Children's Emotions about Natural Disasters

A certain level of fear may motivate preparedness and protective behaviours. Most children acknowledged that they feel fear sometimes, but some expressed much stronger fear reactions such as saying they had had nightmares, or troubling thoughts following the Christchurch earthquake. In addition to some children saying they felt frightened when they thought about earthquakes, some children appeared to be excited about experiencing earthquakes, perhaps feeling that they were part of shared experiences and discussions.

Anger was discussed as a response to a potential earthquake where family members might be hurt. Some children expressed feeling frustrated regarding disasters, saying there is no one on which to place the blame. One child described wanting to 'fight' the earthquake. While the child made this comment jokingly, it is interesting to note that he phrased his anger as a physical response to a physical event, perhaps suggesting this child wanted to exert control over what he perceived as an uncontrollable situation.

Emotion and coping strategies

Children discussed that learning ways to keep themselves safe had helped them to feel more positive about their ability to cope during and after a disaster, and this had also helped to reduce their fear about possible events. Key aspects of coping that the children discussed were preparedness, knowing loved ones were safe, and the use of distraction, discussed below.

Knowledge of correct safety behaviours, and having appropriate preparations in place were expressed throughout discussions as the most important protective factors in disasters. Consequently, almost all of the children expressed feeling safer knowing that their loved ones were also prepared for a disaster (with emergency kits and safety-knowledge) and were aware of what to do in a disaster. When fear of losing loved ones was such a common concern for the children, it was not surprising that the children repeatedly mentioned wanting to know that their loved ones were safe.

Ronan and Johnston (2003) stress the relationship between parental coping and coping in their children. For example, perception of fear in parents led to higher reported fear in children. Similarly, if children perceive their parent as being calm, in control, and aware of

protective behaviours, the children are likely to feel calmer and more confident about their own and the family's safety.

Without specifically referring to coping by name, children referred to becoming engaged in activities that would distract them from fears or worries about earthquakes. They talked about doing activities they enjoy, or of 'having happy thoughts' to cope with fears or worries. One child succinctly described the use of distraction for coping with difficult thoughts, by saying: *It will get anything that gets me worried out of my mind* (male, 9yrs). Avoidance of negative thoughts may have positive implications for mental health, as rumination has been linked with increased occurrences of depression (Abela & Hankin, 2011). Coping strategies help to manage fear and other negative emotions so that these fears do not become intrusive to everyday life. Coping strategies are an important part of the resilience necessary to get through difficult events (Duncan, 1996).

Conclusion

The children demonstrated knowledge about disasters and disaster preparedness, displaying pride at being involved in the process of helping to make themselves and their families safe. The children's pride speaks to the value of the relationship between school and home in developing preparedness. It is important that disaster education programmes spiral through the school curriculum, with repetition of programmes every year, informing children about the nature of specific natural disasters, along with strategies to help keep the children safe and to build their resilience. Disaster education programmes are particularly important for primary school children who are more dependent on adults for their safety and care than are secondary school students. For families, it can be advantageous to include the children when undertaking preparedness in the home. Including the whole family in preparedness can have the dual benefits of improving outcomes in the event of a disaster, and relieving some of the child's anxiety by demonstrating that those around them have the intention and skills to survive and cope. It is of note that the children in the present study were able to demonstrate understanding of multiple coping strategies for dealing with stress around disasters. Further, the children's knowledge of safe practices regarding earthquakes and tsunami was confirmed as a key aspect of their belief that they would be able to cope in the event of an earthquake.

There is some indication from the children's discussion of disaster stories and images, that viewing news stories was linked to a certain amount of stress in some children. The children's stress was further compounded by them having been told either at school, at home, or via the media, that they should be expecting a future serious earthquake in Wellington, the city in which they live. Accordingly, when asked to indicate what they believed to be the most likely disaster to affect them in Wellington, earthquake and tsunami rated highest. Children were able to cite recent disasters of various types, either national or international, that had been given news coverage in the year or so prior to the present study being undertaken. It would be useful to investigate how children conceptualise particular disaster types and their likelihood in their own environment, based on the children's repeated exposure to media coverage of disaster events.

Although the present study was limited to only 30 Year-five children (9-10 year-olds), the study provides a useful perspective of the children's understanding of natural disasters, of their thoughts and expectations concerning a threat in their own environment, of their emotional responses to natural disasters, and of coping strategies in these children. It would be useful for future studies to examine perspectives of natural disasters in teachers and caregivers in order to have a greater context for 9-10 year old children's perspectives and responses.

It would also be of value for subsequent studies to consider using a greater number of participants, and examine some of the themes identified in the present study, in greater depth. For example, some of the children discussed the role of media in their understanding of recent disasters, and their viewing of potentially graphic and emotional disaster-images. It could be of interest to investigate children's viewing of disaster footage from the children and their parents' perspectives, to examine how images of natural disasters affect the child's sense of safety.

The children were enthusiastic about the subject matter of the focus groups, and eager to participate when talking about disasters. The children appeared to have enjoyed learning about different types of disasters at school, at home, and via the media. As interest can be a key motivator for learning, it is possible that by engaging students in education programmes that cover a range of disaster types, children from early in primary school may gain a greater understanding of natural disasters, and particularly of disasters to which

they are most vulnerable geographically. Education programmes would include information and learning for appropriate levels of preparedness and would enable learning of strategies designed to assist children to cope in the face of a disaster. Many children (and adults) in New Zealand are exposed to the potential for natural disasters, much of the country being prone to earthquakes and tsunami. Children's natural curiosity, and human interest in dramatic events in particular, provide a springboard for developing comprehensive natural disasters and hazards programmes in our schools that stress preparedness and resilience.

> **If... you know what to do in an earthquake, then you'll probably survive, but if you just stand there going 'what am I going to do?' then you probably won't, because things will start falling** (Female, 10 years).

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References

Abela, J. R., & Hankin, B. L. (2011). Rumination as a vulnerability factor to depression during the transition from early to middle adolescence: A multiwave longitudinal study. *Journal of Abnormal Psychology, 120* (2), 259–271.

Becker, J. S., Johnston, D. M., Paton, D., & Ronan, K. (2009). Community resilience to earthquakes: Understanding how individuals make meaning of hazard information, and how this relates to preparing for hazards. *2009 NZSEE Conference,* Conference Paper No. 4.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3* (2), 77-101.

Comer, J. S., Furr, J. M., Beidas, R. S., Babyar, H. M. & Kendall, P. C. (2008). Media use and children's perceptions of societal threat and personal vulnerability. *Journal of Clinical Child & Adolescent Psychology, 37* (3), 622–630.

Coomer, M., Johnston, D., Edmonson, L., Monks, D., Pedersen, S., & Rodger, A. (2008). Emergency Management in Schools- Wellington. GNS Science Report, 2008/4.

Cubrinovski, M., Bradley, B., Wotherspoon, L., Green, R, Bray, J., Wood, C., Pender, M., Allen, J., Bradshaw, A., Rix, G., Taylor, M., Robinson, K., Henderson, D., Giorgini, S., Ma, K., Winkley, A., Zupan, J., O'Rourke, T., DePascale, G., & Wells, D. (2011). Geotechnical Aspects of the 22 February 2011 Christchurch Earthquake. *Bulletin of the New Zealand Society for Earthquake Engineering, 44* (4), 205-226.

Duncan, D.F. (1996). Growing up under the gun: Children and adolescents coping with violent neighbourhoods. *The Journal of Primary Prevention, 16* (4), 343-356.

Evans, L., & Oehler-Stinnett, J. (2006). Children and natural disasters: A primer for school psychologists. *School Psychology International,* 27 (1), 33-35.

Finnis, K., Johnston, D., Becker, J., Ronan, K. R., & Paton, D. (2007). School and community-based hazards education and links to disaster-resilient communities. *Regional Development Dialogue*, 28 (2), 99-108.

Finnis, K., Johnston, D., Ronan, K., & White, J. (2010). Hazard perceptions and preparedness of Taranaki youth. *Disaster Prevention and Management, 19* (2), 175-184.

Finnis,K., Standring, S., Johnston, D., & Ronan, K. (2004). Children's understanding of natural hazards in Christchurch, New Zealand. *The Australian Journal of Emergency Management, 19* (2), 11-20.

Gentile, D. A., & Walsh, D. A. (2002). A normative study of family media habits. *Journal of Applied Developmental Psychology*, *23*(2), 157-178.

Geonet (2003). *Aug 22 2003 - Fiordland Quake Biggest For Many Years.* Retrieved 22 August, 2013 from: http://info.geonet.org.nz/display/home/2003/08/22/Aug+22+2003+-+Fiordland+Quake+Biggest+For+Many+Years

GNS Science. (2011). Earthquakes at a plate boundary. Retrieved 10 July, 2011, from http://www.gns.cri.nz/Home/Learning/Science-Topics/Earthquakes/Earthquakes-at-a-Plate-Boundary.

Greenberg, N., Carr, J. A., & Summers, C. H. (2002). Causes and consequences of stress. *Integrative and Comparative Biology*, *42*(3), 508-516.

Groome, D., & Soureti, A. (2004). Post-traumatic stress disorder and anxiety symptoms in children exposed to the 1999 Greek earthquake. *British Journal of Psychology,* 95, 387-397.

Johnston, D., Ronan, K., Finnis, K., Leonard, G., & Forsyth, J. (2011). *Children's understanding of natural hazards in Te Anau, New Zealand, following the 2003 earthquake.* GNS Science Report 2011/05.

Johnston, D., Tarrant, R., Tipler, K., Coomer, M., Pedersen, S., & Garside, R. (2011). Preparing schools for future earthquakes in New Zealand: lessons from an evaluation of a Wellington school exercise. *The Australian Journal of Emergency Management, 26* (1), 24-30

Keane, B. (2013). Taniwha. In Te Ara: The Encyclopedia of New Zealand, updated 25 September 2011. Retrieved 29 February, 2013 from: http://www.teara.govt.nz/en/taniwha.

Lehmann, M. & Hasselhorn, M. (2010). The dynamics of free recall and their relation to rehearsal between 8 and 10 years of age. *Child Development, 81* (3), 1006–1020.

McDermott, B. M., & Palmer, L. H. (2002). Post disaster emotional distress, depression and event related variables: findings across child and adolescent developmental stages. *Australian and New Zealand Journal of Psychiatry, 36*, 754-761.

Mileti, D. S, & Peek, L. (2002). Understanding individual and social characteristics in the promotion of household disaster preparedness. In T. Dietz & P. C. Stern (Eds.), *New Tools for Environmental Protection: Information, Education and Voluntary Measures* (pp. 125-140). Washington, DC: National Academy Press.

Mitchell, T., Haynes, K., Hall, N., Choong, W., & Oven, K. (2008). The Role of Children and Youth in Communicating Disaster Risk. *Children, Youth and Environments, 18* (1), 254-279.

Morgan, M., Gibbs, S., Maxwell, K., & Britten, N. (2002). Hearing children's voices: Methodological issues in conducting groups with children aged 7-11 years. *Qualitative Research, 2* (1), 5-20.

Patton, D. & Sylvester, A. (1996) Traumatic stress in education. In D. Paton, & N. Long (Eds.), *Psychological Aspects of*

Disasters: Impact, Coping and Intervention (pp. 221-236). Palmerston North, New Zealand: The Dunmore Press.

Randall, C., & Berger, S. (2005). Honour for young girl who saved tourists from tsunami. The Telegraph. Retrieved 23 November, 2011, from http://www.telegraph.co.uk/news/uknews/1506286/Honour-for-young-girl-who-saved-tourists-from-tsunami.html.

Ronan, K., Crellin, K., & Johnston, D. (2010). Correlates of hazards education for youth: a replication study. *Natural Hazards, 53*, 503–526

Ronan, K. R., & Johnston, D. (1999). Behaviourally-based interventions for children following volcanic eruptions: an evaluation of effectiveness. *Disaster Prevention and Management, 8* (3), 169-176.

Ronan, K. R., & Johnston, D. (2001). Correlates of Hazard Education Programs for Youth. *Risk Analysis, 21*(6),1055-1063.

Ronan, K. R. & Johnston, D. (2003). Hazards Education for Youth: A Quasi-Experimental Investigation. *Risk Analysis, 23*(5), 1009-1020.

Ronan, K. R., & Johnston, D. (2005). Promoting Community Resilience in Disasters: The Role for Schools, Youth and Families. New York: Springer.

Shaw, R., Shiwaku, K., Kobayashi, H., & Kobayashi, M. (2004). Linking experience, education, perception and earthquake preparedness. *Disaster Prevention and Management, 13* (1), 39-49.

Smith, T. B., McCollough, M. E, & Poll, J. (2003). Religiousness and depression: Evidence for a main effect and the moderating influence of stressful life events. *Psychological Bulletin, 129* (4), 614–636.

Stimpson, I. (2011). Japan's Tohoku Earthquake and Tsunami. *Geology Today, 27* (3), 96-98.

Tarrant, R. A. C., & Johnston, D. M. (2010a). *An investigation of the relationship between socio-economic status and hazards-preparedness in Intermediate school* children, GNS Science Report 2010/19.

Tarrant, R. A. C., & Johnston, D. M. (2010b). *Preparedness to cope with hazards: A survey of Wellington Intermediate schools*, GNS Science Report 2010/02.

Tipler, K., Tarrant, R.A.C., Coomer, M.A., & Johnston, D. M. (2010). School children's access to hazard education: An investigation according to socio-economic status. *GNS Science Report, 2010/35.*

Wachtendorf, T., Brown, B.,& Nickle, M. C. (2008). Big Bird, Disaster Masters, and High School Students Taking Charge: The Social Capacities of Children in Disaster Education. *Children, Youth and Environments, 18*(1), 456-469