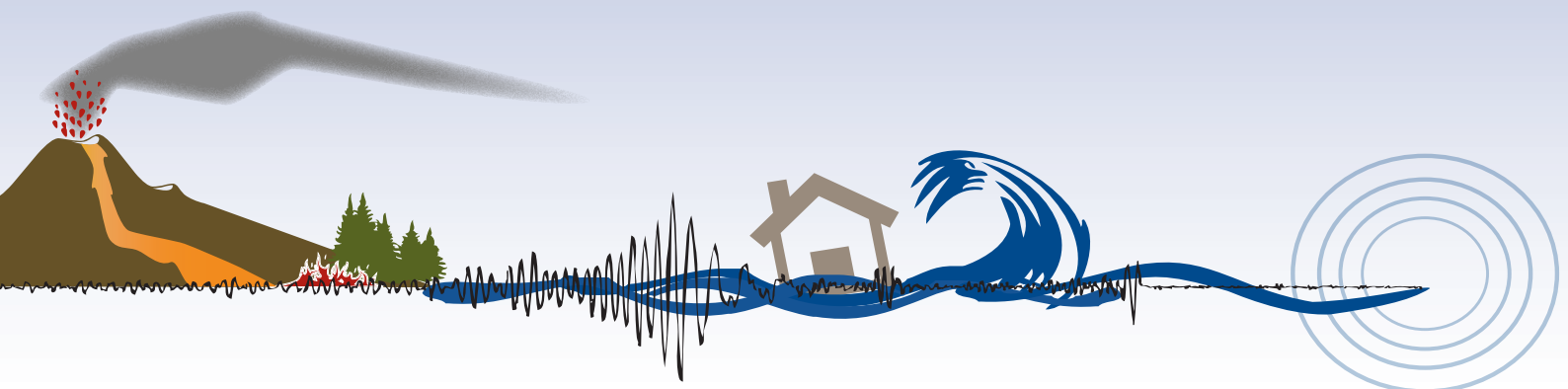




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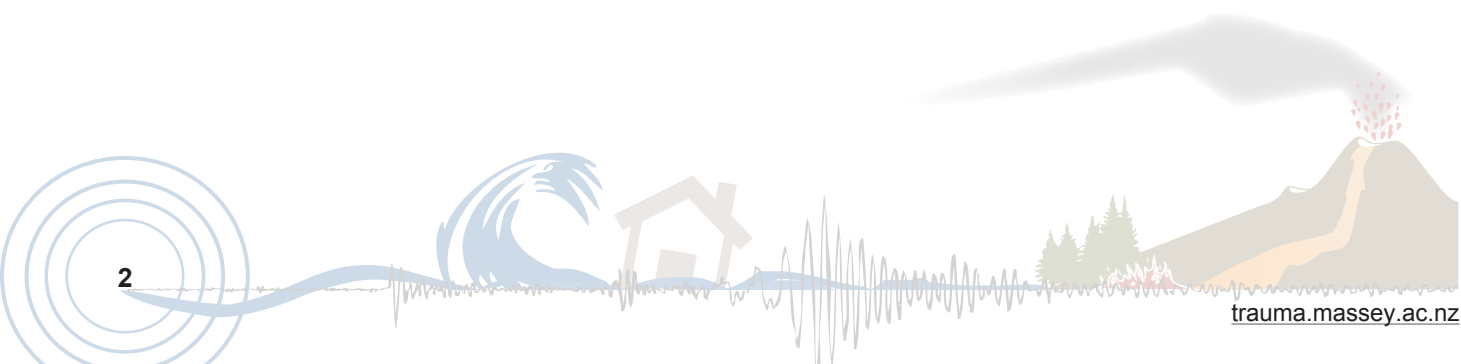
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New Zealand wheelchair users' preparedness for emergencies

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Abstract

People with disabilities are disproportionately affected by emergency situations. They experience higher mortality rates and greater vulnerability than the general population due to disrupted infrastructure and services. Although personal preparedness has been identified as one of the most effective ways to mitigate the emergency-related risks, personal preparedness among people with disabilities is reported to be low. The aim of this study was to investigate emergency preparedness of wheelchair users in New Zealand and to compare their preparedness levels with those of the general population. A nationwide survey of adult, community dwelling wheelchair users was conducted. Of 101 participants, less than 30 percent had made emergency preparations for a future emergency which is substantially lower than the rate reported among the general New Zealand population. Fewer than 20 percent of survey participants were planning for their disability specific needs. Personal preparedness barriers identified included the need for assistance from someone else to carry out planning activities (50%), lack of disability relevant information (37%), limited accessibility to information (24%), cost (23%), and being unable to stockpile medications (20%) or consumables (11%). Overall, participants reported lower levels of personal emergency preparedness and

a higher incidence of barriers to preparedness than reported by the general New Zealand population. A comprehensive plan of further work and research could enable genuinely inclusive emergency planning for future emergency events in New Zealand. To achieve this outcome, emergency planners, responders and researchers must partner with disabled people so that planning meets the emergency related needs of disabled New Zealanders.

Keywords: *emergency preparedness, wheelchair users, people with disabilities, disaster management, emergency planning*

New Zealand is an island nation whose landscape has been shaped by earthquakes, volcanic eruptions, floods and other natural events over millions of years. Many such events have had destructive social and environmental consequences throughout New Zealand's history of human habitation, triggering local or national emergencies (Officials' Committee for Domestic and External Security Coordination, 2007). Of these natural hazard events, flood is the most common type of emergency in New Zealand. In addition, around 150 earthquakes are strong enough to be felt each year, with a further ten to fifteen thousand smaller earthquakes recorded per year.

While all members of a community are exposed to the risks associated with disasters at similar rates, vulnerability is not shared equally among the population. An individual's vulnerability during disaster is influenced by socio-economic status, degree of social empowerment and access to resources that can mitigate risk or assist recovery from emergencies (United Nations, n.d.). Within this context, a range of international experience (Adams, Kaufman, van Hattum & Moody, 2011; Bethel, Foreman & Burke, 2011; Brunkard, Namulanda & Ratard, 2008; Chou et al., 2004; Doocy, Daniels, Packer, Dick & Kirsch, 2013; Fujii, 2012; Hogan et al., 2011; Markwell & Ratard, 2008; Ramirez & Peek-Asa, 2005; United Nations, n.d.; White, Fox, Rooney & Cahill, 2007) has shown that the elderly and people with disabilities are at greater risk of further disablement, injury or death in emergency situations, compared to the general population.

In 2013, people with disabilities represented nearly a quarter of the New Zealand population with over one million people having at least one disability (Statistics New Zealand, 2014a). Physical impairment resulting in mobility issues was the most common disability reported as at 2013, affecting 13 percent of the general population (557,000 individuals) (Statistics New Zealand, 2014b). The New Zealand age-adjusted disability profile demonstrates there is a slightly higher rate of disability for Māori (32%) and Pacific people (26%) compared to New Zealand European (24%) people. Asian populations had the lowest rate of age-adjusted disability, at only 17 percent. Higher rates of disability among Māori may worsen other socio economic difficulties faced by the indigenous populations of New Zealand. This is because people with disabilities in NZ tend to have poorer outcomes across a range of social and economic factors than the non-disabled population. They are more likely to live alone, reside in areas of greater deprivation, be unemployed and have lower personal and household incomes (Office for Disability Issues, 2013; Statistics New Zealand, 2014c).

Personal preparedness has been identified as one of the most effective ways to mitigate risks associated with emergencies (Levac, Toal-Sullivan & O'Sullivan, 2012; Smith & Notaro, 2015) and is a core aspect of emergency planning for New Zealand (Ministry of Civil Defence & Emergency Management, 2010). Community members are generally encouraged to ensure they can be self-sufficient for at least three days. This includes stockpiling and maintaining a supply of food, water and other emergency survival items, having a survival plan which includes what to do both at home and away, and having a plan for contacting family or other significant people (Levac et al., 2012; Ministry of Civil Defence & Emergency Management, 2010). People with disabilities are additionally encouraged to consider evacuation route planning, stockpiling consumable products and medications, making arrangements with carers and support networks and alternative options for essential equipment (Federal Emergency Management Agency, 2015; Ministry of Civil Defence & Emergency Management, n.d.; National Organization on Disability, 2009).

Personal preparedness among people with disabilities is reported to be relatively low in developed western countries (Gershon, Kraus, Raveis, Sherman & Kailes, 2013; National Organization on Disability, 2005; Smith & Notaro, 2009; Smith & Notaro, 2015; Wolf-Fordham,

Curtin, Maslin, Bandini & Hamad, 2015). Research by McClure et al. (2011) identified a sharp division between United States wheelchair users with spinal injuries who felt they could safely evacuate their homes (85%) and those who had managed to formulate a feasible evacuation plan (64%). Although issues underlying such poor levels of preparedness are generally under-researched, they are likely to include: a lack of disability-accessible information; the cost of setting up an emergency survival kit; an inability to stockpile consumable items especially medications; relying on others to assist with making preparations, or; for some socially isolated individuals, making and maintaining support networks (Riscoe, Schlegelmilch & Paturas, 2013).

Emergency preparedness and planning remain important issues for people with disabilities due to their increased vulnerability to disasters and other emergencies. Brereton (2012), Dunn, Nicholls, Cassidy and Sinnott (n.d.), Phibbs, Good, Severinsen, Woodbury and Williamson (2014; 2015), Phibbs, Woodbury, Williamson and Good (2012) have nonetheless noted that there has been little research into levels of preparedness among disabled New Zealanders. The aim of this current study is to address this lack of research, by investigating emergency preparedness among wheelchair users in New Zealand and comparing their levels of preparedness with preparedness in the general population.

Methods

A survey was developed through an iterative process. Multiple drafts were developed following guidelines for writing on-line survey questions and designing on-line surveys, by Ritter and Sue (2007a, 2007b, 2007d). Consultation with stakeholders, including wheelchair users, was an important part of this process. The resulting survey included a combination of Likert scale items and ranked responses, as shown in Appendix A. This version of the survey was administered nation-wide, following ethical approval from the University of Otago Human Ethics Committee (Health) (reference H14/07).

Participants

Potential participants living in New Zealand were invited to participate if they were 18 years or older, used a wheelchair for mobility at least 50 percent of the time, and were residing in the community. They self-identified as meeting these inclusion criteria, rather than being

screened. Wheelchair users living in residential care facilities were excluded because they do not face the same emergency-related issues as wheelchair users living in the community.

Recruitment

Recruitment used the snowball sampling method, which relies on potential participants being referred by their peers. According to Ritter and Sue (2007c), this method can be effective when there is no clear sampling frame. This was the case for the current research because New Zealand based wheelchair users come from geographically, socially and diagnostically diverse backgrounds and usually have more than one type of funding support. This means there is no comprehensive, pan-disability, list of people who use a wheelchair for mobility.

We approached organisations who advocate for, or provide services to, people with disabilities - especially those with mobility impairments. An email was sent to 79 individuals within various disability organisations throughout New Zealand. The email contained a brief overview of the research aims, a pre-prepared advertisement for use in publications or notifications, a copy of the written information sheet, and the link to a webpage with further information. The 79 individuals were asked to advise their organisation's members about the survey using any means, including but not limited to: email, newsletters, publications and Facebook.

Snowball sampling was achieved by asking the same individuals to forward the email and associated content to any other individuals or organisations that they felt was appropriate. Health service providers throughout New Zealand were also approached and asked to refer suitable participants to the study, in a similar way to the service and advocacy organisations. Health service providers' contacts included home care/support agencies and allied health professionals working with wheelchair users. The latter were contacted via district health boards' allied health leaders forums and the special interest groups of professional bodies for physiotherapy and occupational therapy. A further 16 people or organisations were contacted as a result.

Data collection

Participants were able to complete the survey online, or as a paper-based survey. Paper-based surveys were directly provided by the researchers. Copies were also

made available via health service providers before being posted back to the researchers. All paper-based survey data were manually entered as part of the online data.

Analysis

All data were then exported from the online survey website for analysis using Statistical Package for the Social Sciences (Version 22, 2013). Descriptive statistical analyses included the frequencies of particular survey responses. Risk ratios were calculated with 95 percent confidence intervals. Statistical significance was set at a concomitant level of $p < 0.05$.

Results

One hundred and one individuals completed the survey; 84 online and 17 paper-based. The largest number of participant responses were from the Waikato ($n = 19$), Auckland ($n = 18$), Canterbury ($n = 14$) and Wellington ($n = 13$) regions. No responses were received from the Gisborne or Hawke's Bay regions or from the West Coast of the South Island. All participants indicated they had some or all of the following: provision of food and water, an emergency plan, organisation of a support network, stockpile of consumables/medication/disability specific requirements. There were 28 participants (28%) who indicated that they were prepared for an emergency. Of those, five were Māori and this represented nearly 50 percent of Māori participants in the study compared to 27 percent ($n = 21$) of the NZ European participants.

A slightly higher number of males ($n = 51$) than females ($n = 47$) completed the survey while three participants did not specify gender. There was an even spread of ages represented, with the exception of the youngest category: 18-24 year olds ($n = 4$). Four of the six remaining age categories had between 16 and 19 participants while the 55-64 year old category had the highest number of participants ($n = 25$). New Zealand Europeans accounted for 77 percent ($n = 77$) of participant ethnicities with 11 percent of participants ($n = 11$) identifying as New Zealand Māori and the remaining 13 percent being made up of other ($n = 10$, 10%), Cook Island Maori ($n = 1$, 1%), Samoan ($n = 1$, 1%) and Chinese ($n = 1$, 1%). These characteristics and other participant demographics are summarised in Table 1.

Seventy one percent of the participants ($n = 71$) reported using a wheelchair for all their mobility needs, the remaining twenty-five percent of participants ($n = 25$) indicated they used a wheelchair but that they could also walk to some degree. Two participants reported

Table 1.
Demographic Characteristics of Participants

Demographic variable		Total <i>n</i> % (%)	Prepared for emergency	
			Yes	No
Age category (years)	18-24	4 (4%)	1	3
	25-34	17 (17%)	6	11
	35-44	19 (19%)	5	14
	45-54	17 (17%)	0	17
	55-64	25 (25%)	9	16
	65 or older	16 (16%)	6	10
Gender	Male	51 (50%)	16	35
	Female	47 (47%)	11	36
Ethnicity (participants were able to identify as more than 1 ethnic group)				
	NZ European	78 (78%)	21	57
	NZ Māori	11 (11%)	5	6
	Other	10 (10%)	1	3
	Cook Island Māori	1 (1%)	0	1
	Samoan	1 (1%)	0	1
	Chinese	1 (1%)	0	1
Main reason for mobility impairment	Spinal Cord Injury	52 (52%)	12	39
	Other neurological condition	34 (34%)	12	22
	Multiple sclerosis	6 (6%)	1	5
	Medical or degenerative condition	3 (3%)	1	2
	Amputation	2 (2%)	0	2
	Stroke	1 (1%)	1	0
Duration of mobility impairment	5 years or less	14 (14%)	4	10
	6-10 years	13 (13%)	5	8
	11-15 years	13 (13%)	1	12
	16-20 years	11 (11%)	1	10
	More than 20 years	46 (46%)	16	30

† Totals may not add to *N* = 101 due to missing data (participant non-response).

that they did not use a wheelchair. Their responses were still included because these participants had relevant mobility impairments and had simply used other forms of mobility devices such as mobility scooters. Just over a quarter of participants in both full time and part time wheelchair user groups reported being prepared. This equated to 27 percent (*n* = 19) of full time wheelchair users and 25 percent (*n* = 6) of part time wheelchair users surveyed.

Five of the nine participants who lived alone with no carers reported being prepared, compared to a quarter of participants in any other living situation (*n* = 22). Conversely, 15 percent (*n* = 27) of participants living with family/whānau or a partner and not requiring any carers reported being prepared. This compared to 32%

(*n* = 71) of participants in any other living situation. Only one person out of 13 (8%) living in a rural location or township reported being prepared, compared with three (25%) living in towns and 16 (38%) living in cities respectively. These figures are summarised in Table 2.

Only 14 (14%) participants aged 35 to 54 years old reported being prepared. This was a significantly lower (*p* < .05) proportion than participants aged between 18 -34 years (33%), and participants over 55 years of age (36%) combined. Similarly, participants who had experienced a mobility impairment for 11 to 20 years were significantly less likely to be prepared when compared to participants with less than 10 years or over 20 years of mobility impairment. The only statistically significant demographic difference between these

Table 2.
Living Arrangements and Location of Participants

Demographic variable		Total <i>n</i> (%)	Prepared for emergency	
			Yes	No
Living situation	Live alone, no carers	9 (9%)	5	4
	Live alone, carers	24 (24%)	7	17
	Live with family/whanau/ partner, no carers	27 (27%)	4	23
	Live with family/whanau/ partner, carers	26 (26%)	8	18
	Live with others (eg: flatmates), no carers	4 (4%)	1	3
	Live with others (eg: flatmates), carers	7 (7%)	2	5
Rural or urban location	Live in rural area/township ($< 1,000$ people)	13 (13%)	1	12
	Small town (1,000-10,000 people)	12 (12%)	3	9
	Large town (10,000-50,000 people)	18 (18%)	7	11
	City (Over 50,000 people)	55 (55%)	16	39

∇ Totals may not add to $N = 101$ due to missing data (participant non-response).

Table 3.
Association between Age and Duration of Impairment with Preparedness

Demographic	Category	Risk Ratio	95% confidence interval range
Age	35-54 years	(ref)	XX
	18 – 34 years	2.4	0.8, 6.6
	Over 55 years	2.6*	1.0, 6.5
Duration of mobility impairment	11 – 20 years	(ref)	XX
	0 – 10 years	4.0	0.95, 16.7
	More than 20 years	4.1*	1.0, 16.6

(ref)= reference group, * = statistically significant, $p < 0.05$

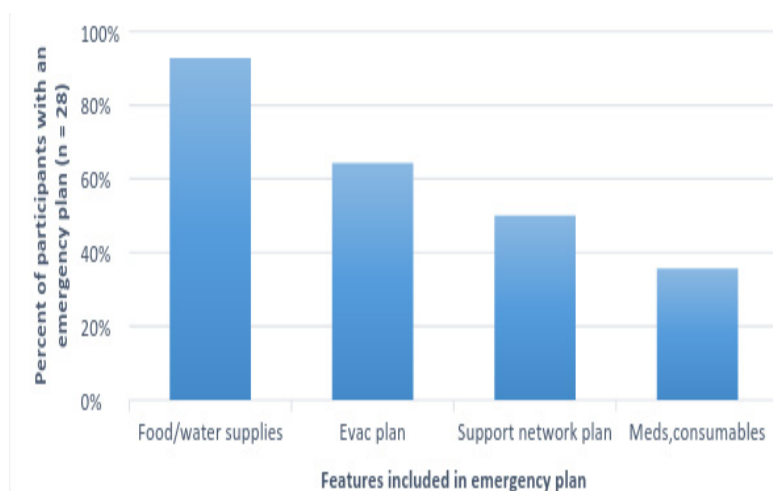


Figure 1. Items included in emergency preparations

groups was that participants with 11 to 20 years of mobility impairment were more likely to be full time wheelchair users ($RR = 2.4$, 95% CI (1.3, 4.5), $p < 0.01$). Further details are provided in Table 3.

There were no other statistically significant relationships identified between participant demographics, including gender, and emergency preparedness. However, subtle trends were observed relating to ethnicity, living situation, urban versus rural residence, and previous emergency exposure. These trends included higher rates of preparedness reported by Māori, participants living alone, and participants living in small towns or cities. Although it did not represent a statistically significant difference, thirty percent of participants who had been in a natural disaster were prepared compared to 26 percent of participants who had not.

Preparedness Responses

Provisioning food, water and other supplies was the most common preparedness action reported by participants. This aspect of preparedness was reported by 93 percent ($n = 26$) of the 28 participants who reported being prepared for an emergency. As shown in Figure 1, participants were less likely to have planned for more disability specific issues such as making an evacuation or support network plan, or stockpiling medications and other disability-related consumables. Note that the survey let participants select one or more features of their emergency plan, meaning that totals do not sum to 100 percent.

Seventy-three participants reported that they were not prepared for an emergency. Over half ($n = 43$, 58%) of these participants reported thinking about getting prepared without any physical preparedness. Twenty four percent ($n = 17$) of participants who were not prepared reported that they did not know what to plan for. Ten (14%) identified cost as a reason for not making emergency preparations and eight (11%) stated that they had not thought about it at all. Very few of the non-prepared participants ($n = 4$, 6%) stated that they had not taken any action because they did not think that preparedness was important.

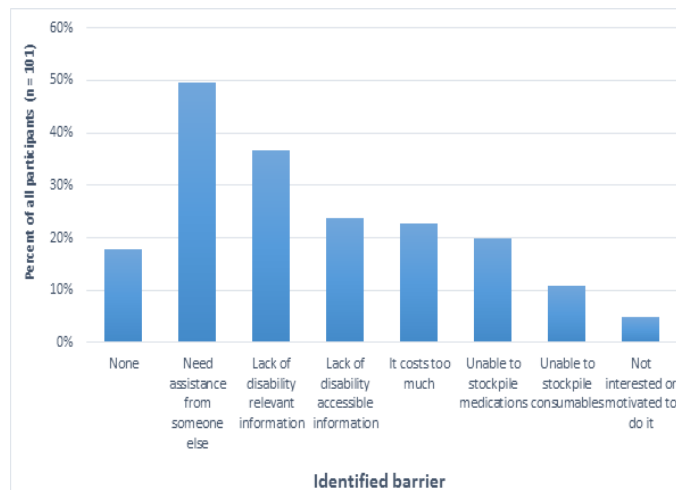


Figure 2. Emergency preparedness barriers identified by all participants

Among all 101 participants, need for assistance from others was the most common barrier to making physical preparations or planning. As shown in Figure 2, other barriers included: lack of disability relevant information, inaccessible information, cost, and being unable to stockpile medications or consumables. Only five participants reported that a lack of interest or motivation was a barrier to getting prepared for an emergency.

Discussion

The aim of this study was to investigate emergency preparedness among a population of disabled people living in New Zealand. Key results included that fewer than 30 percent of participants appeared to be prepared for an emergency. Participants' preparations tended to focus on having a general emergency survival kit, including food and/or water. However, fewer than 20 percent of all participants had provided for their own disability-specific requirements. Over 80 percent of participants who were not prepared had thought about preparedness but had not initiated any planning steps. The need for assistance from another person was identified as a barrier for over half of unprepared participants.

The current study sample was less prepared than the NZ population as a whole. Less than 30 percent of the participants in this study reported stockpiling emergency survival items. This is much less than a rate of 86 percent in the general NZ population (Colmar Brunton, 2014). While having emergency survival items is an important aspect of preparedness, being fully prepared also involves having and regularly updating emergency survival items, and having a plan that includes what to do

when at home or away (Colmar Brunton, 2014). Colmar Brunton (2014) found that only 15 percent of the general NZ population were likely to have both emergency survival items and a plan. This is similar to the current findings, where only 18 percent of participants reported having an emergency plan.

Only a small proportion of the current participants reported including disability specific items in their emergency preparations. Fourteen percent had a plan with their support network and only 10 percent had put aside disability-specific medications or consumables. These results are similar to findings in Phibbs et al. (2014) where 20 percent of survey respondents with a disability reported having adequate emergency supplies and 12 percent had reported having an emergency plan. At the time of writing, there was no way to readily compare the current results with preparedness among other subgroups of the general NZ population, for example, people living with chronic health problems.

Need for help from others was the most common barrier to personal preparedness among the current participants. This does not appear to be a barrier for the general NZ population (Colmar Brunton, 2014). People with mobility impairments are more likely to require external assistance to meet basic needs, to effect an evacuation, or to sustain care requirements in the aftermath of an emergency. This means they are less likely to be able to personally develop an effective plan. A number of other studies and reports (Bethel et al., 2011; Brereton, 2012; Castaneda, 2011; Fox, White, Rooney & Rowland, 2007; Hogan et al., 2011; Kailes & Enders, 2007; Markenson, Fuller & Redlender, 2007; Ministry of Civil Defence & Emergency Management, 2013; National Council on Disability, 2005, 2006) have identified this need for additional assistance, during and following an emergency.

Cost was a barrier for nearly a quarter of the current participants. This was a higher rate than among the general NZ population where 14% indicated that cost was a barrier (Colmar Brunton, 2014). This marked difference in cost-related barriers was also identified by Phibbs et al. (2014). Kohn et al. (2012) and Smith and Notaro (2009) have identified that low socioeconomic status is an additional risk factor to being less prepared, among populations with a disability.

The current results indicate that ethnicity may not be a barrier to emergency preparedness in New Zealand. Although the current results are based on a small

sample, Māori participants reported the highest levels of preparedness. Kenney and Phibbs (2014) described Māori cultural practices which may facilitate disaster risk mitigation, recovery and community resilience. They noted that the cultural concepts of *whakapapa* (genealogy) and *whānau* (family) provide “a stable emergency management infrastructure for Māori” (Kenney & Phibbs, 2014, p. 759) and that the *marae* (Māori community) has, for centuries, been able to rapidly mobilise support at times of adversity. It is possible that Māori participants had an emergency plan that was based upon the collective preparedness of the *iwi* (tribe) or *whānau*, rather than the individual.

A lack of information that is relevant to, and accessible for, people with disabilities was identified as a barrier for current participants and participants in other national and international studies (Phibbs et al., 2014; Priestley & Hemingway, 2007; Spence, Lachlan, Burke, & Seeger, 2007; Sullivan & Häkkinen, 2010). It seems that emergency preparedness information needs to be tailored to suit a range of disability types. It has been recommended that the development and dissemination of information needs to involve disabled people working in partnership with emergency planning and response agencies (Connecticut Developmental Disabilities Network, 2005; Fox et al., 2007; National Council on Disability, 2005; Phibbs et al., 2012; Rowland, White, Fox & Rooney, 2007).

The current participants identified that a lack of disability-specific information was a barrier to emergency planning, rather than a lack of access to this information. New Zealand’s disability specific emergency preparedness information nonetheless appears consistent with international guidelines. It is available in various languages and formats, including formats for people with vision impairments, and has been improved and updated following recent large seismic events in New Zealand (Federal Emergency Management Agency, 2015; Ministry of Civil Defence & Emergency Management, n.d.; National Organization on Disability, 2009). Concerns raised by our participants may therefore reflect a lack of awareness of the availability of relevant information, such as knowing where to find it. Concerns may also reflect an assumption that information will not be relevant to their specific needs. Further consultation may be required in any case, as outlined below.

Conclusion

Participants in this study were less prepared for emergencies than the general New Zealand population and this has the potential to increase their vulnerability during and following emergencies. Major barriers to emergency preparedness were:

- the need for assistance from another person to effect emergency preparations;
- awareness of and access to disability specific information;
- cost, and;
- an inability to stockpile disability related consumables, especially medications.

The main limitations of this study are the recruitment strategy and the small sample size. These sampling limitations have resulted in an inability to generalize results to the wider NZ disabled population. A snowball recruitment strategy was selected because the complex reasons leading to mobility impairment and reliance on a wheelchair for mobility meant the population sample was poorly defined in preexisting data. Snowball sampling is non-randomised. It may restrict the diversity of a sample because initial participants tend to refer people with similar characteristics to themselves (Ritter & Sue, 2007c). There is also a potential bias towards people with an interest in the topic. This bias may have led to an over-estimated level of preparedness among New Zealand wheelchair users.

The current research was also unable to control how, or to whom, information about the study was distributed. This meant we were unable to compare participant characteristics with characteristics of individuals who were eligible but who chose not to participate. This combined with the small and non-systematic sample to limit the generalizability of the current research study. Furthermore, while statistically significant associations between study variables were identified, the confidence intervals associated with some of these findings indicated uncertainty regarding where the true risks may actually lie.

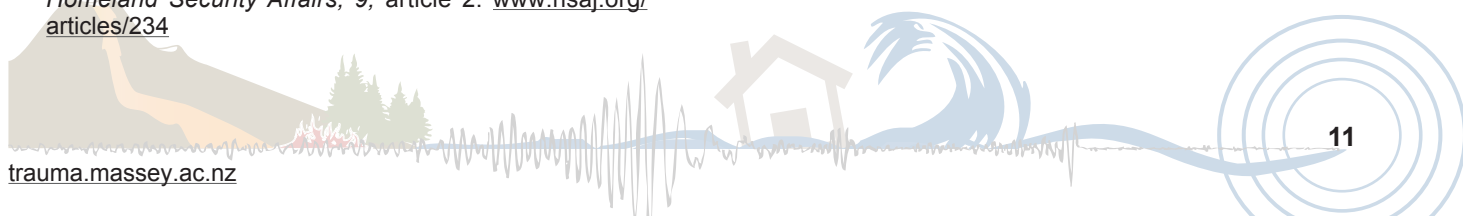
The current research nonetheless highlights the need to focus on particular aspects of preparedness among people with disabilities. People with disabilities comprise nearly one quarter of all New Zealanders. This means there is a critical need for a comprehensive plan of further work and research to enable a truly inclusive emergency

planning approach to future emergency events. In order to achieve this outcome, it is essential that emergency planners, responders and researchers actively partner with disabled people and their communities. This will help to ensure that planning and associated information meets the needs of, and improves outcomes for, disabled New Zealanders in emergency situations.

References

- Adams, V., Kaufman, S. R., van Hattum, T., & Moody, S. (2011). Aging disaster: mortality, vulnerability, and long-term recovery among Katrina survivors. *Medical Anthropol*, *30*, 247-270. doi: 10.1080/01459740.2011.560777
- Bethel, J. W., Foreman, A. N., & Burke, S. C. (2011). Disaster Preparedness among medically vulnerable populations. *American Journal of Preventive Medicine*, *40*, 139-143. doi.org/10.1016/j.amepre.2010.10.020
- Brereton, R. (2012). *Disability-inclusive emergency preparedness and response: learning from the Canterbury earthquakes: Key themes from a symposium held in Christchurch on 28 and 29 May 2012*. Retrieved from www.odi.govt.nz/resources/guides-and-toolkits/emergency-preparedness-and-responsiveness/symposium-may-2012/record-of-emergency-preparedness-symposium-september-2012.doc
- Brunkard, J., Namulanda, G., & Ratard, R. (2008). Hurricane Katrina Deaths, Louisiana, 2005 *Disaster Medicine and Public Health Preparedness*, *2*, 215-223. doi: 10.1097/DMP.0b013e31818aaf55
- Castaneda, M. A. (2011). *Including people with disabilities in disaster preparedness: A delphi study*. (Doctoral Dissertation, Pepperdine University, Malibu). Retrieved from <http://pepperdine.contentdm.oclc.org/cdm/ref/collection/p15093coll2/id/211>
- Chou, Y. J., Huang, N., Lee, C. H., Tsai, S. L., Chen, L. S., & Chang, H. J. (2004). Who is at risk of death in an earthquake? *American Journal of Epidemiology*, *160*, 688-695. doi: 10.1093/aje/kwh270
- Colmar Brunton (2014). *Ministry of Civil Defence and Emergency Management: Campaign monitoring research*. Retrieved from www.civildefence.govt.nz/assets/Uploads/publications/grgt-survey-results-2014.pdf
- Connecticut Developmental Disabilities Network (2005). *A guide for including people with disabilities in disaster preparedness planning*. Retrieved from www.uconnuconnedd.org/pdfs/resources/a_guide_for_disaster_planning.pdf
- Doocy, S., Daniels, A., Packer, C., Dick, A., & Kirsch, T. D. (2013). The human impact of earthquakes: a historical review of events 1980-2009 and systematic literature review. *PLoS Currents*, *5*. doi: 10.1371/currents.dis.67bd14fe457f1db0b5433a8ee20fb833
- Dunn, J., Nicholls, J., Cassidy, B., & Sinnott, K. A. (n.d.). *Systems to Advise of Vulnerable Persons in Emergencies (SAVE): Wheelchair Users: Scoping Project Report*. (Unpublished report)
- Federal Emergency Management Agency (2015). *Prepare for emergencies now: Information for people with disabilities*. Retrieved from https://www.fema.gov/media-library-data/1440775166124-c0fadbb53eb55116746e811f258efb10/FEMA-ReadySpNeeds_web_v3.pdf
- Fox, M. H., White, G. W., Rooney, C., & Rowland, J. L. (2007). Disaster preparedness and response for persons with mobility impairments: Results from the University of Kansas Nobody Left Behind Study. *Journal of Disability Policy Studies*, *17*, 196-205. doi: 10.1177/10442073070170040201
- Fujii, K. (2012). *The Great East Japan Earthquake and disabled persons: Background to their high mortality rate*. Retrieved from www.dinf.ne.jp/doc/english/twg/escap_121031/fujii.html
- Gershon, R. R., Kraus, L. E., Raveis, V. H., Sherman, M. F., & Kailes, J. I. (2013). Emergency preparedness in a sample of persons with disabilities. *American Journal of Disaster Medicine*, *8*, 35-47. doi: 10.5055/ajdm.2013.0109
- Hogan, T. P., Holmes, S. A., Rapacki, L. M., Evans, C. T., Lindblom, L., Hoenig, H., . . . Weaver, F. M. (2011). Disaster preparedness and response practices among providers from the Veterans Health Administration and veterans with spinal cord injuries and/or disorders. *Journal of Spinal Cord Medicine*, *34*(4), 353-361. doi: 10.1179/2045772311Y.0000000011
- IBM Corporation (2013). IBM SPSS Statistics for Windows (Version 22.0). Retrieved from www-03.ibm.com/software/products/en/spss-statistics
- Kailes, J. I., & Enders, A. (2007). Moving beyond "special needs". *Journal of Disability Policy Studies*, *17*, 230-237. doi: 10.1177/10442073070170040601
- Kenney, C., & Phibbs, S. R. (2014). Shakes, rattles and roll outs: The untold story of Māori engagement with community recovery, social resilience and urban sustainability in Christchurch, New Zealand. *Procedia Economics and Finance*, *18*, 754-762. doi: 10.1016/S2212-5671(14)00999-X
- Kohn, S., Lipkowitz Eaton, J., Feroz, S., Bainbridge, A. A., Hoolachan, J., & Barnett, D. J. (2012). Personal disaster preparedness: An integrative review of the literature. *Disaster Medicine and Public Health Preparedness*, *6*, 217-231. doi: 10.1001/dmp.2012.47
- Levac, J., Toal-Sullivan, D., & O'Sullivan, T. L. (2012). Household emergency preparedness: A literature review. *Journal of Community Health*, *37*, 725-733. doi: 10.1007/s10900-011-9488-x
- Markenson, D., Fuller, E., & Redlender, I. (2007). *Emergency preparedness: Addressing the needs of persons with disabilities: A national consensus conference: Executive summary and final report*. Retrieved from www2.ed.gov/rschstat/.../guide-emergency-management-pwd.pdf
- Markwell, P., & Ratard, R. (2008). *Deaths directly caused by Hurricane Katrina*. Retrieved from <http://new.dhh.louisiana.gov/assets/oph/Center-PHCH/Center-CH/step1/specialstudies/KatrinaDeath1.pdf>
- McClure, L. A., Boninger, M. L., Oyster, M. L., Roach, M. J., Nagy, J., & Nemunaitis, G. (2011). Emergency evacuation readiness of full-time wheelchair users with spinal cord injury. *Archives of Physical Medicine and Rehabilitation*, *92*, 491-498. doi: 10.1016/j.apmr.2010.08.030
- Ministry of Civil Defence & Emergency Management (2010). *Working from the same page: Consistent messages for CDEM*. Retrieved from www.civildefence.govt.nz/cdem-sector/consistent-messages-for-cdem/
- Ministry of Civil Defence & Emergency Management (2013). *Including people with disabilities: Information for the CDEM sector*. Retrieved from www.civildefence.govt.nz/

- [assets/Uploads/publications/is-13-13-including-people-with-disabilities.pdf](#)
- Ministry of Civil Defence & Emergency Management (n.d.). People with disabilities or special requirements. *Get ready get thru*. Retrieved from <http://getthru.govt.nz/how-to-get-ready/people-with-disabilities/>
- National Council on Disability (2005). *Saving lives: Including people with disabilities in emergency planning*. Retrieved from <http://www.ncd.gov/publications/2005/04152005>
- National Council on Disability (2006). *The impact of Hurricanes Katrina and Rita on people with disabilities: A look back and remaining challenges*. Retrieved from www.ncd.gov/publications/2006/Aug072006
- National Organization on Disability (2005). *Functional needs of people with disabilities: A guide for emergency managers, planners and responders*. Retrieved from <http://nod.org/assets/downloads/Guide-Emergency-Planners.html#toc>
- National Organization on Disability (2009). *Disaster readiness tips for people with disabilities: Prepare yourself*. Retrieved from <http://nod.org/assets/downloads/Readiness-Tips-Disabilities.pdf>
- Office for Disability Issues (2013). *Disability and formal supports in New Zealand in 2006: Results from the New Zealand Disability Survey*. Retrieved from www.stats.govt.nz
- Officials' Committee for Domestic and External Security Coordination (2007). *National Hazardscape Report*. Retrieved from www.civildefence.govt.nz/assets/Uploads/publications/national-hazardscape-report-sept-2007-complete.pdf
- Phibbs, S. R., Good, G., Severinsen, C., Woodbury, E., & Williamson, K. (2014). What about Us? Reported experiences of disabled people related to the Christchurch earthquakes. *Procedia Economics and Finance*, 18, 190-197. doi: 10.1016/S2212-5671(14)00930-7
- Phibbs, S. R., Good, G., Severinsen, C., Woodbury, E., & Williamson, K. (2015). Emergency preparedness and perceptions of vulnerability among disabled people following the Christchurch earthquakes: Applying lessons learnt to the Hyogo Framework for Action. *Australasian Journal of Disaster and Trauma Studies*, 19, 37-46. URL: http://trauma.massey.ac.nz/issues/2015-IRDR/AJDTs_19-IRDR_Phibbs.pdf
- Phibbs, S. R., Woodbury, E., Williamson, K., & Good, G. (2012). Issues experienced by disabled people following the 2010-2011 Canterbury earthquake series: evidence based analysis to inform future planning and best practice guidelines for better emergency preparedness. *GNS Science Report*, 40, 1-53. URL: www.whariki.ac.nz/massey/fms/Colleges/College%20of%20Humanities%20and%20Social%20Sciences/Psychology/Disasters/pubs/GNS/2012/Phibbs_et_al_SR%202012-040.pdf
- Priestley, M., & Hemingway, L. (2007). Disability and disaster recovery. *Journal of Social Work in Disability & Rehabilitation*, 5, 23-42. doi: 10.1300/J198v05n03_02
- Ramirez, M., & Peek-Asa, C. (2005). Epidemiology of traumatic injuries from earthquakes. *Epidemiology Review*, 27, 47-55. doi: 10.1093/epirev/mxi005
- Riscoe, P., Schlegelmilch, J., & Paturas, J. (2013). Evacuation and sheltering of people with medical dependencies – Knowledge gaps and barriers to national preparedness. *Homeland Security Affairs*, 9, article 2. www.hsaj.org/articles/234
- Ritter, L. A., & Sue, V. M. (2007a). Introduction to using online surveys. *New Directions for Evaluation*, 2007, 5-14. doi: 10.1002/ev.230
- Ritter, L. A., & Sue, V. M. (2007b). Questions for online surveys. *New Directions for Evaluation*, 2007, 29-36. doi: 10.1002/ev.233
- Ritter, L. A., & Sue, V. M. (2007c). Selecting a sample. *New Directions for Evaluation*, 2007, 23-28. doi: 10.1002/ev.232
- Ritter, L. A., & Sue, V. M. (2007d). The survey questionnaire. *New Directions for Evaluation*, 2007, 37-45. doi: 10.1002/ev.234
- Rowland, J. L., White, G. W., Fox, M. H., & Rooney, C. (2007). Emergency response training practices for people with disabilities: Analysis of some current practices and recommendations for future training programs. *Journal of Disability Policy Studies*, 17, 216-222. doi: 10.1177/10442073070170040401
- Smith, D. L., & Notaro, S. J. (2009). Personal emergency preparedness for people with disabilities from the 2006-2007 Behavioural Risk Factor Surveillance System. *Disability and Health Journal*, 2, 86-94. doi: 10.1016/j.dhjo.2009.01.001
- Smith, D. L., & Notaro, S. J. (2015). Is emergency preparedness a 'disaster' for people with disabilities in the US? Results from the 2006-2012 Behavioral Risk Factor Surveillance System (BRFSS). *Disability and Society*, 30, 401-418. doi: 10.1080/09687599.2015.1021413
- Spence, P. R., Lachlan, K., Burke, J. M., & Seeger, M. W. (2007). Media use and information needs of the disabled during a natural disaster. *Journal of Health Care for the Poor and Underserved*, 18, 394-404. doi: 10.1353/hpu.2007.0047
- Statistics New Zealand. (2014a). *2013 New Zealand Disability Survey*. Retrieved from www.stats.govt.nz/browse_for_stats/health/disabilities.aspx
- Statistics New Zealand. (2014b). *Disability Survey 2013: All tables*. Retrieved from www.stats.govt.nz/browse_for_stats/health/disabilities.aspx
- Statistics New Zealand. (2014c). *Social and economic outcomes for disabled people: Findings from the 2013 Disability Survey*. Wellington, New Zealand: Statistics New Zealand.
- Sullivan, H. T., & Häkkinen, M. T. (2010). Preparedness and warning systems for populations with special needs: Ensuring everyone gets the message (and knows what to do). *Geotechnical and Geological Engineering*, 29, 225-236. doi: 10.1007/s10706-010-9363-z
- United Nations. (n.d.). Disability, natural disasters and emergency situations. *United Nations Enable*. Retrieved from www.un.org/development/desa/disabilities/issues/disability-inclusive-disaster-risk-reduction-and-emergency-situations.html
- White, G. W., Fox, M. H., Rooney, C., & Cahill, A. (2007). *Assessing the impact of Hurricane Katrina on persons with disabilities*. Retrieved from http://rtcil.org/products/NIDRR_FinalKatrinaReport.pdf
- Wolf-Fordham, S., Curtin, C., Maslin, M., Bandini, L., & Hamad, C. D. (2015). Emergency preparedness of families of children with developmental disabilities: What public health and safety emergency planners need to know. *Journal of Emergency Management*, 13, 7-18. doi: 10.5055/jem.2015.0213



Appendix A: Complete Survey Text

Ready to Roll survey: Wheelchair users' readiness

About the survey.

Thanks for showing interest in this survey.

If you've made it this far, you have probably already read the information sheet or watched the video that explains what the survey is about, what your participation would involve and what you need to know to make a decision. If you haven't seen either of these, you can still do so now by going to the website at the address below:
<http://www.burwood.org.nz/projects>

To continue to the survey click on the "next" button below.

***1. I have read the information sheet or watched the information video and agree to take part in this study.**

Yes

No

2. Have you ever been in a natural disaster (eg: earthquake, flood, severe weather event) that has caused damage to any buildings or infrastructure (eg: power, phone, sewage)?

Yes

No

3. Do you currently have an emergency response plan?

Yes

No

Ready to Roll survey: Wheelchair users' readiness

4. Yes, I have an emergency response plan which includes:

Select one or more options from the list below

- Put aside provisions of food, water and other supplies
- Have an evacuation plan
- Have a plan with a support network who will check on each other in an emergency
- Made arrangements for medications, consumables and carers (if needed)

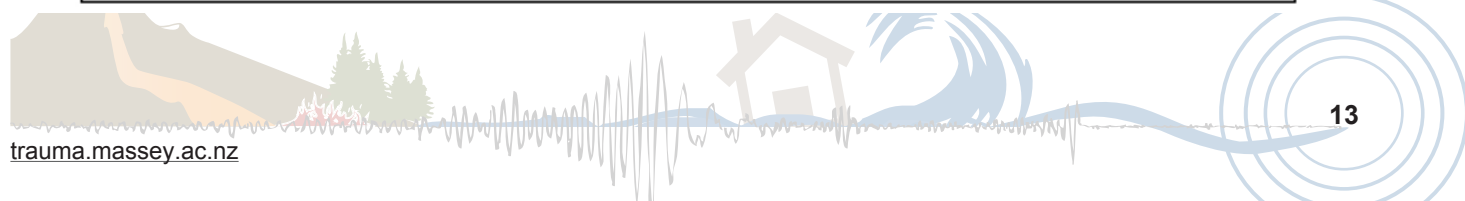
Other (please specify)

5. No, I don't have an emergency response plan because:

Select one or more options from the list below

- I've thought about it but not got around to it
- I've thought about it but it's not important to me
- I've not thought about it
- I don't know what to plan for or how to go about it
- I can't afford to do it

Other (please specify)



Ready to Roll survey: Wheelchair users' readiness

6. What difficulties did you, or might you, come across when making preparations for an emergency?

Select one or more options from the list below

- None
- I need assistance from someone else to help with planning or making physical preparations
- Lack of information that is relevant to people with disabilities
- Lack of information that is accessible to people with disabilities
- Unable to stockpile consumables
- Unable to stockpile medications
- Financial. It costs too much to do it
- I am not interested or motivated to do it

Other (please specify)

7. In an emergency situation, who would you expect to check on you or come to help you?

- No one
- Family / whanau
- Friends
- Neighbours
- Civil defence
- Police
- Ambulance
- Fire Service
- ACC
- GP
- Carer agency or staff

Other (please specify)

Ready to Roll survey: Wheelchair users' readiness

8. Have you made formal plans with any of the individuals or organisations above to check on you in the event of an emergency?

- Yes
 No

Comments:

9. Do you think that a voluntary Disabled Persons Emergency Response Register, to assist with emergency planning, preparation and response is a good idea?

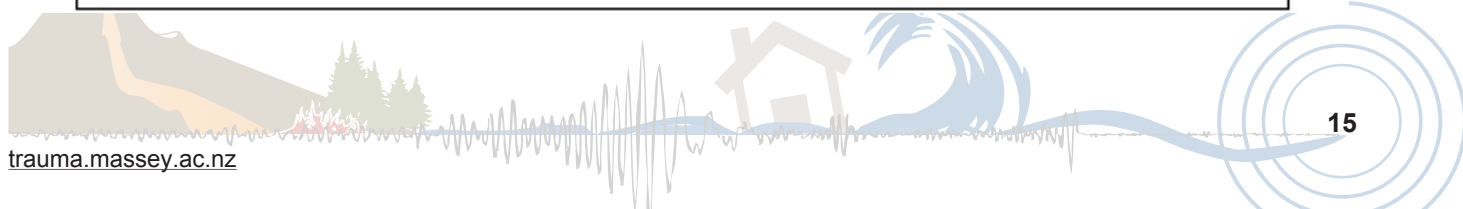
- Yes
 No
 Unsure

Comments:

10. If one was developed, would you participate in a voluntary Disabled Persons Emergency Response Register?

- Yes
 No
 Only if my concerns were adequately addressed
 Don't know

Comments



Ready to Roll survey: Wheelchair users' readiness

19. Which option below best describes your living situation?

- Live alone, no carers required
- Live alone, carers required
- Live with family/whanau, spouse/partner, no other carers required
- Live with family/whanau, spouse/partner, carers required
- Live with others (flatmates / boarder etc.), no carers required
- Live with others (flatmates / boarder etc.), carers required

Other (please specify)

20. What type of building is the home you live in?

- Single storey, stand-alone house
- 2 or more storey, stand-alone house
- Unit or apartment – single storey
- Unit or apartment – part of 2 or more storey building
- Single storey house or unit within a complex (eg: retirement village, marae)

Other (please specify)

21. What do you use for mobility most often?

- Fulltime manual wheelchair
- Manual wheelchair, can walk a bit (with or without aids)
- Fulltime power wheelchair
- Power wheelchair, can walk a bit (with or without aids)
- Do not use a wheelchair but have limited mobility

Other (please specify)

Ready to Roll survey: Wheelchair users' readiness

22. What is the main reason for your mobility impairment?

- Stroke
- Multiple Sclerosis
- Traumatic Brain Injury
- Spinal Cord Injury
- Other neurological condition (eg: Parkinsons disease, Motor Neuron Disease, Muscular Dystrophy)
- Amputation
- Medical or degenerative condition (eg: arthritis, cancer, COPD)

Other (please specify)

23. How long have you had a mobility impairment?

- 5 years OR LESS
- 6 - 10 years
- 11 - 15 years
- 16 - 20 years
- MORE THAN 20 years

24. What region of New Zealand do you live in?

North Island / Te-Ika-a-Maui

South Island / Te Waipounamu

Select your region from
the drop down menus

25. Do you live in a rural or urban area?

- Live in a rural area or township
- Small town (1,000 - 10,000 people)
- Large town (10,000 – 50,000 people)
- City (over 50,000 people)

Ready to Roll survey: Wheelchair users' readiness

26. What age bracket do you belong to?

- 18 - 24 years
- 25 - 34 years
- 35 - 44 years
- 45 - 54 years
- 55 - 64 years
- 65 years or older

27. What gender are you?

- Male
- Female

28. Which ethnic group do you belong to?

Mark the space or spaces which apply to you.

- New Zealand European
- Māori
- Samoan
- Cook Island Maori
- Tongan
- Niuean
- Chinese
- Indian

• Other such as DUTCH, JAPANESE, TOKELAUAN. Please state:

That's the end!

Many thanks for taking the time to complete this questionnaire.

If you wish to make any enquiries about this survey, or receive a copy of the grouped results, please contact Jason Nicholls by email: nicja964@student.otago.ac.nz

Alternatively, if you have any concerns about ethical issues related to this survey please contact Gary Witte (Human Ethics Committee Administrator, phone +64 3 479 8256 or email gary.witte@otago.ac.nz.)

Getting through: Children's effective coping and adaptation in the context of the Canterbury, New Zealand, Earthquakes of 2010-2012

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Abstract

Children may experience distress and can become vulnerable as the result of a disaster. However, recent research suggests that children experiencing such adversity can address adversity by employing their capacities to adapt. The present study investigates how children coped effectively with a disaster, the Canterbury, New Zealand earthquakes of 2010-2012, and identifies strategies, processes, and resources that promoted effective coping and adaptation. Semi-structured interviews took place with 38 children from three different age groups, with 31 parents, and with 11 teachers and principals from five Canterbury schools. Children were interviewed twenty months after the first earthquake, during an ongoing aftershock sequence, and six selected children were interviewed again sixteen months later. Thematic analysis of interview data identified multiple, inter-connected coping strategies and resources in the children that were fundamental to their post-disaster adaptation. Children coping effectively employed a repertoire of diverse coping strategies in a flexible and pertinent manner. Three key strategies employed by the children were emotional regulation, positive reframing, and problem-solving.

Sixteen months later, the children had shifted their focus away from coping with earthquakes to coping with everyday problems. It is expected that findings from this study will contribute to future interventions for promoting effective coping and adaptation by children.

Keywords: *Children, effective coping, adaptation, earthquake, disaster, Canterbury*

Disasters affect millions of children each year and represent particularly complex experiences that can disturb or compromise children's future development. Earthquake disasters arrive with no warning, so that children experience these as sudden, shocking events (Margolin, Ramos & Guran, 2010). Often, aftershock sequences can last for several years. With each successive earthquake, children's routines are disrupted and multiple support systems in the children's context can be negatively and progressively impacted. In the terms of ecological systems theory (Bronfenbrenner, 1992), this includes their micro-system of families, and exo-systems of community neighbourhoods and schools.

The context of the present study is the Canterbury, New Zealand earthquakes of 2010-2012. Two major earthquakes, of Mw 7.1 in September 2010, and Mw 6.3 in February 2011, and over 10,000 aftershocks produced significant physical, social, and economic impacts on the region (Potter, Becker, Johnston & Rossiter, 2015), and particularly on the city of Christchurch. Psychosocial repercussions of such disasters can be of long duration (Ghuman, Brackbill, Stelman, Farfel & Cone, 2014; Goenjian et al., 2011). The long duration of these repercussions, coupled with a need to cope with the consequences of aftershocks as well as demands and challenges that change over time, makes understanding children's effective coping and adaptation particularly important. The need for such work can also be traced to a lack of existing research in this area.

Historically, most research on children's disaster experiences stems from investigation of children who have manifested trauma symptoms, so less is known about how and why some children respond effectively (Bonanno, Brewin, Kaniasty & La Greca, 2010).

However, children's reactions are diverse; not all children are traumatised or overwhelmed by their disaster experience (La Greca et al., 2013). Recent research on children's adaptation in disasters is comparable with work on adult populations and suggests that most children experience adaptive outcomes (Kronenberg et al., 2010) and that children will cope effectively with the experience, given support and time (Osofsky & Osofsky, 2013). That is, they can function at an age appropriate level (Masten & Obradovic, 2008).

When facing a disaster, children experience variable levels of distress and there is a need to react in some way by mobilising coping processes (Folkman & Moskowitz, 2004). Coping in these contexts has been generally defined to encompass a myriad of thoughts and behaviours individuals use to deal with stressful experiences (Skinner, Edge, Altman, & Sherwood, 2003). Coping strategies and the way children use their strategies appear to be core processes that underpin a pathway of adaptation (Compas, Connor-Smith, Saltzman, Thomen, & Wadsworth, 2001), although some strategies may hamper a child's recovery (Lack & Sullivan, 2008).

In contrast with their adult counterparts, where coping strategies may comprise a more established repertoire, coping in children is thought to change across different developmental phases (Zimmer-Gembeck & Skinner, 2011), and may evolve over the course of a disaster. However, an integrated picture of children's coping experience in disasters is still in progress (Pfefferbaum et al., 2013). Furthermore, the way that much research has focused on maladjustment rather than positive functioning means that certain processes for effective coping in the face of adversity may have been missed (Taylor & Stanton, 2007).

Very little is known about the underlying processes used by children who experience adversity and yet demonstrate positive adaptive outcomes (Cicchetti, 2013; Masten & Narayan, 2012). Questions remain about *how* children cope effectively with disaster and disaster consequences (Jensen, Ellestad & Dyb, 2013). As opposed to assessing scores on established measures of coping, there are gaps in our understanding of how children perceive their own experiences, their vulnerabilities and capacities (Peek, 2008). One answer to understanding how children experience a disaster is with the children themselves. Talking to children about their experiences of a disaster is a valid investigative

approach and prior research suggests that children are accurate reporters of their own experiences (Balaban, 2006). Being able to use children's knowledge to understand coping and adaptation is especially important in the context of complex, prolonged disaster recovery settings and, ultimately, for the design of future interventions to promote effective coping.

To understand children's experiences and the consequences for their well-being, the question then shifts to consider how to investigate children's coping. Considering the paucity of research into just how disasters are understood and experienced by children (Gibbs, Mutch, Connor & Macdougall, 2013), there is a large scope to contribute to research by gathering rich, contextual data about effective coping strategies by talking to the children themselves.

Method

Aim

The present study aims to investigate children's effective coping experience from the children's own perspective. Note that children within this study are defined, according to the United Nations Convention on the Rights of the Child (UNCRC), as persons aged 18 and younger.

Theoretical perspective

A descriptive phenomenological framework is a pertinent approach for investigating children's own experience of coping. This approach enables exploration of the way complex meaning is built out of simple units of subjective experience (Merriam, 2002), and allows a phenomenon to be understood in depth (Camic, Rhodes & Yardley, 2003). Phenomenological methodology enables investigation of children's multiple perspectives and contexts that exist in their experience of living in a particular social context (Kvale & Brinkman, 2009).

Participants and procedure

Following ethics approval by the Massey University Human Ethics Committee, 12 schools in Christchurch were initially sent information sheets and invited to participate in the study. The 12 schools were purposively sampled in various geographical areas of Christchurch that would provide an overview of the impact of the earthquakes on children across the city. Ultimately, principals of five schools consented to their school taking part in the study. These schools comprised three primary and two secondary schools covering north,

south, west and east locations. Invitations to participate, information sheets and consent forms were then sent to teachers nominated by their principal on the basis that these teachers were particularly articulate and willing to participate in the study. Consenting teachers then sent information sheets. Consent forms were sent home to all parents of the teachers' students.

Five children were randomly selected for interviewing from the lists of consenting parents and children. Table 1 shows a detailed list of all participants. The random selection of consenting children was carried out to include students with a variety of experiences (O'Reilly & Parker, 2012; Patton, 2002). In total, 32 children were interviewed to obtain adequate in-depth data on coping, and to investigate a wide range of children's perspectives. The study was conducted with 5, 9 and 15 year-old age groups, to understand how coping might differ across age.

Five principals and six teachers were also interviewed regarding their perceptions of how the children were coping following the earthquakes, and thirty-one parents were interviewed regarding their perceptions of how their children were coping. Parents, principals and teachers were interviewed so data could be obtained from multiple sources about the children's coping and to help understand the school and community environment in which the children were situated. The interviews of children, parents, principals and teachers were conducted 20 months after the first earthquake (Time 1) at a time of ongoing aftershocks.

For a preliminary investigation of change in coping over time, six children were purposively selected to be

interviewed for a second time (Time 2), sixteen months after the Time 1 interviews and 36 months after the first earthquake, when aftershocks were more-widely spaced. In order to maximise rich data collection, the six children were selected from all age groups in the study. The six children had been articulate in describing their experience within Time 1 data collection and they had demonstrated a range of coping skills. For example, at Time 1, some had reported effective coping, whereas others were still exhibiting post-earthquake distress symptoms such as hair loss and avoidance of public places such as malls and cinemas. Principals, teachers and parents were not interviewed again at Time 2.

Interview protocol and procedure

Before the study began, an interview protocol was developed for each age group before being reviewed by an experienced family therapist and an early childhood educator. The protocol was then tested in a small pilot study, following which slight changes were made to clarify wording.

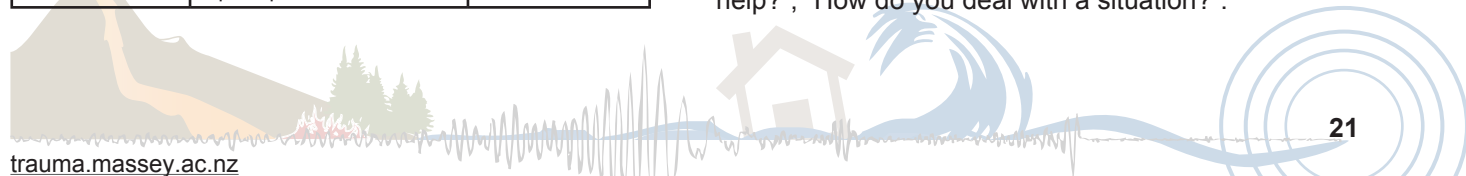
Semi-structured interviews took place in the children's homes, for the five year-olds and some of the nine year-olds, or in their school context. The five and nine year-old children were given the option of drawing and the interview often started from a discussion about the drawings produced.

After briefly explaining to the children that the researcher was interested in hearing about their experiences over the last months, a broad question of "How has it been for you?" was followed by the questions, "What has been the most difficult/tricky thing you've had to deal with?" and, "What seemed to work best that allowed you to deal with that?" These questions were followed by potential prompts such as, "What would you say to a group of people your age that would help them if they had a difficult situation to deal with or manage?" Although earthquakes were not specifically mentioned, the children knew the interviewer was interested in their experiences during a period of multiple earthquakes. All children, except one dealing with major illness in the family, referred to earthquakes as their most difficult recent experience.

Parents were asked: "When your child/adolescent has to deal with some difficulty, how does he/she cope?"; "What works best for them?"; "What doesn't seem to help?"; "How do you deal with a situation?"

Table 1
Participants

Age Group	Time 1: July 2012	Time 2: November 2013
Year 0: 5years-olds 1 class	7 children (4 boys, 3 girls) 6 parents 1 teacher	1 child
Year Five: 9/10 year-olds 3 classes	15 children (9 boys, 6 girls) 15 parents 3 teachers 3 principals	3 children
Year Eleven: 15/16 year-olds 2 classes	10 children (3 boys, 7 girls) 10 parents 2 teachers 2 principals	2 children
Totals	32 children 31 parents 6 teachers 5 principals	6 children



Teachers and principals responded to these broad questions: “How is the class faring?”; “For children coping the best, what have you noticed that makes you think that about them?”; “For children coping less well, what have you noticed that makes you think that about them?”; “How has the situation been for you?”.

Time 2 interviews, involving children only, provided data on how coping may change as children progressively negotiate the challenges and demands of a prolonged disaster recovery. Time 2 interviews opened with the question: “How are you getting on this last year?” followed by “What was difficult?” and “How did you deal with it?”.

All interviews were conducted by the same researcher. Conversations were led by the interviewees, with the researcher guiding with key questions as required. Although parents had consented to their children participating in the study, additional verbal consent was obtained from each child at the time of their interview. For confidentiality, transcripts included pseudonyms for all child participants.

Analysis

The approach to data analysis in the present study was taken from phenomenological methodology developed by Giorgi (2000b; 2012) and Giorgi and Giorgi (2003), and from Braun and Clarke’s (2006; 2014) approach to thematic analysis.

Interviews were recorded and verbatim transcripts were loaded into ATLAS.ti (Version 7.0.89, 2013), which Friese (2012) describes as data analysis software for computer-assisted qualitative analysis. The children’s data were coded before parent, principal and teacher data so that the voices of the children were considered first. Systematic thematic analysis was conducted to identify initial categories related to the children’s coping. At this stage of analysis, the focus was on understanding effective coping examples. However, ineffective coping examples were also identified because these were representative of some of the children’s experiences and could help to understand how effective coping strategies operated.

Consistencies or inconsistencies between different participant data were also examined. For example, parents’ interview data were cross referenced with the children’s data. Cross-referencing of data can be “understood as a strategy that adds rigor, breadth, complexity, richness and depth to the inquiry” (Denzin

and Lincoln, 2000, p. 5). Time 1 analysis was completed before Time 2 analysis was started so that temporal factors could be separated. Analyses were also subject to credibility checks by academic colleagues to obtain consensus and substantiate findings, as recommended by Braun & Clarke (2014).

After immersion in the whole data set, the initial coding was organised into meaningful clusters. From the clusters, a structural description was built up to identify and describe six major themes identified in the children’s effective coping. Findings and discussion are presented under these six themes.

Findings and Discussion

For children, a disaster is a challenging context, yet the analysis identified that children are not always overwhelmed and are far from passive. Many of the children who reported coping effectively demonstrated awareness of the complexity of coping in such a context.

Six major coping themes were identified in children who appeared to cope effectively. With reference to the children’s own words, these themes were:

- “Don’t get worked up about it”
- “Working out what to do”
- “Everything’s gonna be alright”
- “Are you ok?”
- “Go to someone”
- “Getting on”, which in T2 evolved to, “Moving on”.

“Don’t get worked up about it”: Emotional regulation

One of the major coping strategies that enabled the children to stay functional and use their capacities to respond, was to regulate or manage emotions engendered by the multiple earthquakes, for example:

And um, don’t get worked up about it cause then it’s just more scary. (Lucas, 10 years)

Not all children reported coping with their emotions however. A minority of children continued to feel overwhelmed, like Ann:

We haven’t had one in a long time... on Friday there was a [Mw] 5 I think. I was at school. I was just about to leave but then and it started shaking and some people were fine with it, didn’t even feel it, and I was, I—I was just screaming out for Mum. I didn’t know what to do. (Ann, 9 years)

Ann continued to have only one strategy – to “scream”, and was not able to function like the children who were now “fine with it”. However, children coping effectively focused actively on strategies for keeping calm, for example:

Well, I've tried to keep calm... I don't really know how to explain it...Well, I take deep breaths. (Alec, 10 years)

Bi-directional influences from the children's multiple relationships and contexts appeared to affect their capacities for emotional regulation, for example:

They [teachers] remain calm and that's good 'cause you almost see them as role models, and when they're calm, you feel you should be calm. And when you're calm, other people are calm. (Neil, 15 years)

Due to the ongoing aftershocks, the children repeatedly tested out their ways of keeping their emotions to a manageable level. Many children reported learning over time to respond with more self-control to continuing aftershocks, for example:

I used to scream but now Dad said not to scream because it's ok, and it makes it a bit less scary... After the first few, you were gonna scream but then you had to think, it's not going to make it any better. (Abby, 10 years)

During earthquakes, some of the children soothed themselves by using the cognitive coping strategy of “happy thoughts”, moving towards a positive focus to reduce negative, and increase positive, emotions, for example:

I just think, 'oh these are just little ones, it'll be alright. Um, it can't hurt us. (Sarah, 9 years)

Kevin reported visualising his pet to engender positive emotions:

Um, (pause) I just really think about positive thoughts [when there is an earthquake]...like I remember Angus [dog]. The first time I got him, he was so cute and I was really happy. (Kevin, 10 years)

Interestingly, some of the youngest group, five year-olds, could use emergent cognitive coping strategies to engender positive emotions, for example:

I drew a rainbow so that's the thinking I'm feeling in my head...just hide under a table and then I just get one of my friends to talk about something nice

and den one of us, a friend and me just think of it after. (Amelia, 5 years)

The above quotation is an example of how many of the younger children were able to demonstrate mixed coping strategies that sometimes showed emerging complex, sometimes more simple, variants as they dealt with stressors.

A few children were able to use humour as a strategy to regulate emotion, for example:

I make jokes about it all. (Kevin, 10 years)

Practising humour, in the midst of stress and distress, requires a certain energy, cognitive prowess, and comic skill in finding a positive appraisal of the situation for self and others. Positive emotions created by these coping strategies may be *sustainers* that motivate and sustain children in their coping (Fredrickson, 2004). Research by Folkman (2008) has also suggested that experiencing positive emotions may be *breathers* by giving children some respite.

Many of the children reporting regulating emotions often in their lives could talk readily about how they felt. The children used multiple, inter-related processes for emotional regulation, consistent with coping research by Compas et al. (2001) and Folkman & Moskowitz (2004) which conceptualises strategies as processes using multiple dimensions and facets. Additionally, when the children were effective in coping with emotions, they could use other coping strategies, such as problem-solving, that appeared to have a positive accumulative effect.

“Working out what to do”: Problem-solving

The children problem-solved around their difficulties. In the difficult disaster context, children were working out how to keep safe, for example:

You probably have to analyse the situation and then—'what's going on here?'—'Am I in any sort of danger?'...You think 'what do I do next'. (Neil, 15 years)

Many were assisted by their competence in earthquake drills, learnt at school from a young age. This competence appeared to increase their sense of self-efficacy and agency, for example:

Well, we learned how to do um turtles¹ at kindy [kindergarten], and that's just what we do at school.
(Craig, 5 years)

For some of the children, as a result of coping with and reflecting on their situation, they worked out priorities. Their perspectives on life appeared to alter, for example:

It's the little things that really count. You don't need power [electricity] or anything—as long as your family's safe. [My priorities] have really shifted.
(Pippa, 15 years)

Working out new priorities in their changed context may have assisted the children to address their *new normal* (Mooney et al., 2011; Paton & Johnston, 2006) rather than going back to what was. Some children reported learning a greater appreciation of relationships, which is consistent with literature (Cryder, Kilmer, Tedeschi & Calhoun, 2006; van Wesel, Boeije, Alisic, & Drost, 2012) focusing on post-traumatic growth after adversity.

Many children learned to problem-solve around what they could change, for example:

You work out in life there are some things you've got no control over, but you can still affect your day to day basis from what happens... (Blake, 15 years)

Learning flexibility in trying to master what they could control, and leaving what they could not, appeared to enhance children's effective coping and positive adaptation. An interactive relationship between problem-solving and coping could have helped to regulate emotions as solutions were discovered, resulting in a shift of focus. Children's perception of their ability to problem-solve in the earthquake context also appeared to help them appraise present and future challenges in a positive manner.

“Everything's gonna be alright”: Positive appraisal and reframing

The children's use of appraisal was consistent with the Lazarus and Folkman (1984) transactional model of coping, where appraisals of challenges as well as their capacities to respond are part of the coping process. Examples included:

¹ Turtle is the name the young children give the action of *drop, cover and hold* which is the core of the earthquake drill designed for children by the NZ government agencies (MCDEM & Ministry of Education).

I just think everything's gonna be alright. There's not going to be anything, you know, destructive.
(Elise, 9 years)

It's kind of like a game...trying to put ah, um, a positive spin on the whole thing, 'cause if you always think of it negatively, it'll always be that big scary event that happened. (Neil, 15 years)

Children able to positively interpret their situation appeared to experience enhanced optimism and *benefit finding* (Tennen & Afleck, 2002). The latter term, benefit finding, is defined by Helgeson, Reynolds, and Tomich (2006, p. 798) as “the positive effects that result from a traumatic event”. The children who used positive appraisal and reframing effectively were able to use this strategy in real-time to minimise perceived threat, for example:

You never know. It could be wee ones [aftershocks] after big ones. (Joshua, 5 years)

For the five-year-olds like Joshua, almost half of their lives had unfolded within a context of ongoing earthquakes and aftershocks. For the children, their acquired knowledge of earthquake sequences and a capacity to perceive positive aspects of a difficult context appeared to enable them to positively reframe an earthquake as an aftershock. Many of the children accommodated positively to their context, for example:

I'm not so bothered. It's kind of sick but it's become the normal thing. (Prue, 15 years)

Acceptance of a situation by reframing it as *normal*, when not linked with resignation or helplessness, has been found to be an effective coping strategy (Cardena, Dennis, Winkel & Skitka, 2005; Pine, Tarrant, Lyons & Leathem, 2015). Hannah comments on earthquakes and her capacity to accommodate them:

Like um, I used to be really scared of them but I'm kinda getting used to them now. They're not so bad.
(Hannah, 15 years)

The coping strategy of reappraising self, situation and surroundings in a positive frame of reference may have enabled these children to feel less helpless as they redefined the situation, for example:

Now you can drive through town and see everything's getting better. (Pippa, 15 years)

Capacity for positive reappraisal and reframing has been linked to psychological adjustment (Compas et

al., 2013) and well-being (Roelofs, Bögels & Arntz, 2011). The children who were able to appraise and reframe positively appeared to be coping effectively and adjusting to their situation. Psychological adjustment and positive appraisal may have also contributed to the children's broader consideration of the needs of other people.

“Are you ok?”: Helping others

Repeated earthquakes and aftershocks appeared to give some children occasion to learn about helping others. Many children indicated an increase of empathy, for example:

I hadn't had something like that happen to me before. So I sort of learned how to look after everybody. (Elise, 9 years)

Children in all age groups talked about how they could help others. Joshua reports how he would help a friend coming into the city:

Are you ok? Have you feeled an earthquake before? (Joshua, 5 years)

As a strategy, taking care of others, especially during earthquakes was adaptive and had aspects of distraction as it allowed the children to focus on something other than their own fear or anxiety. This possibly diminished impact and increased a sense of self-efficacy. Helping others may also have increased children's social competency. Improved skills in understanding others may have included how to more accurately judge whom to approach for support and help. While learning to look after others, the children also appeared to take comfort in the security of knowing there was someone they could personally go to for support.

“Go to someone”: Getting support

“Going to someone” appeared to have several aims: to obtain and use emotional support; to discuss solutions; and to feel safe and protected. Cody provided one example:

...I was just making sure I was with my parents the whole time... making sure I was with someone in my family so I could be safe. (Cody, 10 years)

In terms of support-seeking, the present study was consistent with the literature where, in disasters, children seek out support and guidance from proximal and known adults (Jensen et al., 2013; Miller et al., 2012). Seeking support occurred in participants in all three age

groups. It appeared that seeking out and being in the proximity of adults enabled children to reference adults' reactions, gave children reassurance, and may possibly have provided them with models of effective coping and coping assistance, for example coaching.

Many children mentioned qualities in the person from whom they sought support. For example, Joshua stated:

Tell my Mum and Dad - I can tell people I trust. (Joshua, 5 years)

Research with adults (Fralely & Bonanno, 2004) and children (Gaffney, 2006; Osofsky & Chartrand, 2013) states that secure attachment facilitates the development of trust and social relationships. Children in the present study, who demonstrated secure attachment, appeared to have feelings of trust and assurance that caregivers would be available to them in time of need. They felt secure in employing the coping strategy of “going to someone”. Seeking support often provided an external resource that may have contributed to the children being able to “get on”.

“Getting on” and “moving on”

Much disaster research examines data from surveys taken soon after the event (Masten & Osofsky, 2010; Navarro et al., 2016) and longer term strategies around actively choosing to “get on” is rarely discussed in the disaster literature.

In the Time 1 interviews, children who appeared to be managing their situation effectively allowed themselves to project into a future not governed by earthquakes. They were “getting on”, for example:

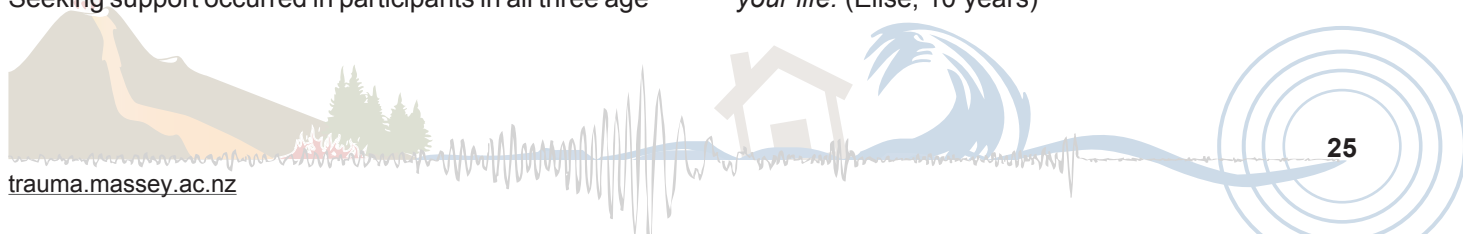
...some of them are ok. They're getting on—like me. (Connor, 10 years)

You get better—three or four steps more and one step back, so you are getting further on. Going faster forward than you are back. (Abby, 10 years)

Although the aftershock sequence was diminishing, the children deciding to “get on” did not appear to be passive. Instead, they were consciously focused on coping by getting on with their own life course.

By Time 2, the children reported “moving on”, concentrating mainly on their future life, for example:

Forget about it eventually, move on...get on with your life. (Elise, 10 years)



Amelia focused on new interests:

I've got a new life. I've got a life of singing. (Amelia, 6 years)

Children in Time 2 interviews reported actively using their coping repertoires, practised during their recovery, for everyday challenges such as school work and relationship conflicts:

I think, like everyone felt a way of how to how deal with earthquakes, and that it was very stressful, and maybe they're applying that sub-consciously to other situations as a coping mechanism. (Pippa, 15 years)

Concerning being able to move on, the current analysis suggests that facing a disaster may have enhanced coping abilities in some children, and may have accelerated coping skills. Nan provides one example:

I think it's kinda made me stronger in a way... [!] might be able to face up to more now. (Nan, 15 years)

There is some evidence that in times of adversity, effective coping may promote children's self-beliefs in their ability to cope with present and future challenges (Seery, Holman & Silver, 2010). In this respect, the final point can be made by one of the children:

Because I know myself that I can get through big earthquakes then I could probably get through this [new challenge]. (Rachel, 9 years)

Conclusion

Findings demonstrated that it was not just the use of certain coping strategies that enabled effective coping. It was the way the children were able to employ these strategies that underpinned adaptation. Age appeared to influence the form of coping strategies employed but not the strategy as such, because children continue development throughout a disaster. Broad developmental and age related elements from the present study are mainly consistent with existing research on children's coping and development by Franks (2011) and Skinner et al. (2003). That is, the children demonstrated an increasingly complex use of coping strategies as their age and developmental capacities increased. They also used adaptive strategies that were similar to adult strategies but often in developmentally appropriate forms. For example, younger children using play to problem-solve how to react in earthquakes, older children using more cognitive strategies.

However, the current findings also suggest that coping skills in children experiencing a disaster may emerge at a younger age than is reported in previous studies. This was seen for example in five year-old Amelia's reported use of emergent cognitive forms, "the thinking I'm feeling in my head" to regulate her emotions during an earthquake. Younger children appeared to be more reliant on adult support, and referenced adult reactions to assist them in their coping. Interestingly, the exceptional nature of the challenge they were facing also appeared to encourage older children, from 15 to 16 years of age, to seek support from adults and to gauge danger by referencing adults' reactions, particularly reactions immediately following earthquakes. By Time 2, older children were reporting less referencing of adult reactions and more instances of seeking support from peers.

Coping strategies appeared inter-linked and complementary. This reinforced prior research, by Zalewski, Lengua, Wilson, Trancik and Bazinet (2011), who found children who are more effective with one coping strategy may also be more effective in their choice and use of other strategies. For example, children in the current research reported using multiple strategies of minimising, working out what to do, and focusing on "getting on" when facing an earthquake aftershock. When employed effectively, there was often a cumulative positive effect between strategies, for example between problem-solving and emotional regulation. This was consistent with coping research by Lazarus (2006) that found coping strategies can complement one another. The children's large coping repertoires appeared not to be indicative of distress, but rather enabled them to address the many challenges of an aftershock sequence that can, as in the Canterbury context, persist for years. This reflects a conclusion from Alisic, Boeije, Jongmans and Kleber (2011), that children with a bigger repertoire of coping strategies may have better recovery outcomes after potentially traumatic events.

Findings did suggest that it is too simplistic to divide coping categories into adaptive/effective or maladaptive/ineffective as such. This is consistent with research by Leipold and Greve (2009) that states it is important to understand both the context of using a strategy and the pertinence of choosing that strategy. For example, the children's use of disengagement and distraction by "taking my mind off it" could be adaptive in reducing distress, specifically when faced with uncontrollable

events such as earthquakes. This use of distraction may have given some respite, allowing the children to remain operational and able to use their other coping strategies.

The way that children used their coping repertoires appeared to have a major effect on their capacity to adapt following the disaster. For instance, a key element that emerged was *flexibility* in many children's choice of coping strategies, meaning that they employed a range of different strategies to better manage diverse challenges. This finding was consistent with Cheng (2003) who suggested that flexibility gives children more options in how they use their coping repertoire. Flexibility may have also increased the children's ability to engage in anticipatory coping, by working out how to deal with possible, future difficulties such as school examinations. However this additional conclusion remains tentative until more research is undertaken. Flexible use of coping strategies appeared to increase adaptive responding in many of the children, and may have promoted children's experiences of self-efficacy, agency, and optimism. For example, the children's experience of increased efficacy in using problem-solving or helping others may have had secondary benefits in helping the children experience a sense of control and increased agency over what could happen to them. It is therefore important to consider coping as a dynamic process over which children who cope effectively can exercise some control.

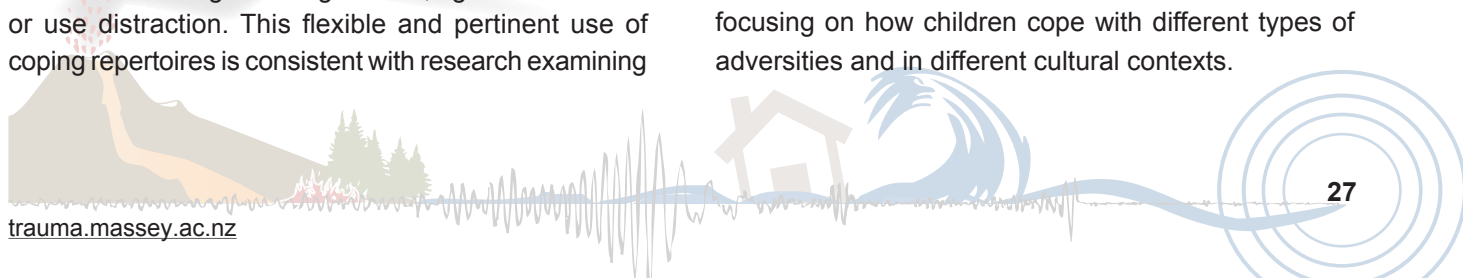
Not only could many children use their coping flexibly, they generally children chose strategies that were pertinent to the stressor and/or their needs. In other words, strategies were chosen that were adapted to the challenges or that responded to their needs at the time. For example, children reported problem-solving when they were able to influence the challenge, and sought support when they needed reassurance. In contrast, children who appeared to be struggling did not demonstrate flexibility or pertinence of choice, but reported the rigid use of a few coping strategies such as avoidance and withdrawal and demonstrated little capacity for emotional regulation. Maladaptive coping was also characterised by the persistent use of ineffective strategies. Children who appeared to be coping did not persist in using a strategy when it was not effective. For example, if a child was unsuccessful in trying to help someone else, he or she would sometimes change strategies and, "go to someone" or use distraction. This flexible and pertinent use of coping repertoires is consistent with research examining

competence in coping with young adults, by Cheng and Cheung (2005) and Kashdan and Rottenberg (2010).

Children's coping skills appeared to be sustained over the period of the study. Children who were able to cope effectively at Time 1, 20 months following the first earthquake, reported being able to cope with new challenges at Time 2, 36 months after the first earthquake. This finding was comparable to rare precedents, where longitudinal research on competence and effective adaptation following adversity suggest there is a substantial continuity of adaptive functioning over time (Masten & Tellegen, 2012).

There was not a particular repertoire or combination of coping strategies that predicted adequate adaptation in the current participant sample. Rather, a range of repertoires was identified among children who appeared to be coping effectively. These different repertoires may have been a result of: the children facing dissimilar disaster challenges, for example: extensive or minimal house damage; appraising events differently; having divergent capacities; or variable access to nearby resources, for example parent and teacher support. This highlights the potential to extend understandings of how event characteristics, coping repertoires, individual perspectives, family, and school contexts interact in contingent and dynamic ways in future research.

Although children are a potentially vulnerable group in a disaster, children in the present study were articulate and active participants in "getting through" the earthquakes and consequences. Their capacities to cope effectively appeared to reflect core processes in adaptive functioning post-disaster, identified in limited prior research. The present study contributes to understanding strategies children can use to cope effectively with disasters, where effective coping has been demonstrated by age appropriate functioning and a reported sense of well-being. The current findings suggest that children can learn effective coping and would likely benefit from interventions that support and coach effective coping strategies. Generalisations from this study should nonetheless be made with caution, because findings are nested in a specific culture and disaster context. Future research will benefit from focusing on how children cope with different types of adversities and in different cultural contexts.



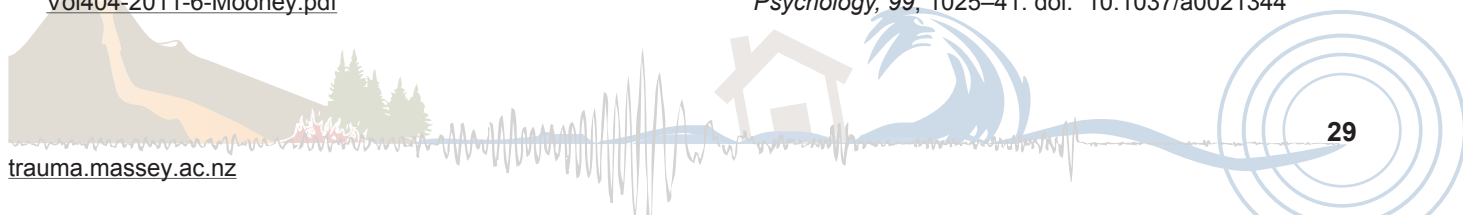
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References

- Alisic, E., Boeije, H. R., Jongmans, M. J., & Kleber, R. J. (2011). Children's perspectives on dealing with traumatic events. *Journal of Loss and Trauma, 16*, 477–498. doi: 10.1080/15325024.2011.576979
- Balaban, V. (2006). Psychological assessment of children in disasters and emergencies. *Disasters, 30*, 178–198. doi: 10.1111/j.0361-3666.2006.00314.x
- Bonanno, G.A., Brewin, C. R., Kaniasty, K. & La Greca, A. M. (2010). Weighing the costs of disaster: Consequences, risks, and resilience in individuals, families and communities. *Psychological Science in the Public Interest, 11*, 1–49. doi: 10.1177/1529100610387086
- Braun, V. & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*, 77–101. doi: 10.1191/1478088706qp063oa
- Braun, V. & Clarke, V. (2014). *Successful qualitative research: A practical guide for beginners*. London, UK: Sage.
- Bronfenbrenner, U. (1992). Ecological systems theory. In R. Vasta (Ed.), *Six theories of child development: Revised formulations and current issues* (pp. 187-249). London, United Kingdom: Jessica Kingsley.
- Camic, P. M., Rhodes, J. E., & Yardley, L. (2003). *Qualitative research in psychology: Expanding perspectives in methodology and design*. Washington DC: American Psychological Association.
- Cardeña, E., Dennis, J. M., Winkel, M. & Skitka, L. J. (2005). A snapshot of terror: Acute posttraumatic responses to the September 11 attack. *Journal of Trauma & Dissociation, 6*, 69-84. doi: 10.1300/J229v06n02_07
- Cheng, C. (2003). Cognitive and motivational processes underlying coping flexibility: A dual-process model. *Journal of Personality and Social Psychology, 84*, 425–438. doi: 10.1037/0022-3514.84.2.425
- Cheng, C., & Cheung, M. W. L. (2005). Cognitive processes underlying coping flexibility: Differentiation and integration. *Journal of Personality, 73*, 859–86. doi: 10.1111/j.1467-6494.2005.00331.x
- Cicchetti, D. (2013). Annual research review: Resilient functioning in maltreated children – past, present, and future perspectives. *Journal of Child Psychology and Psychiatry, 54*, 402-422. doi: 10.1111/j.1469-7610.2012.02608.x
- Compas, B. E., Connor-Smith, J. K., Saltzman, H., Thomsen, A. H., & Wadsworth, M. E. (2001). Coping with stress during childhood and adolescence: Problems, progress, and potential in theory and research. *Psychological Bulletin, 127*, 87–127. doi: 10.1037/0033-2909.127.1.87
- Cryder, C. H., Kilmer, R. P., Tedeschi, R. G., & Calhoun, L. G. (2006). An exploratory study of posttraumatic growth in children following a natural disaster. *The American Journal of Orthopsychiatry, 76*, 65–9. doi: 10.1037/0002-9432.76.1.65
- Denzin, N. K., & Lincoln, Y. S. (2000). Introduction: The discipline and practice of qualitative research. In N. K. Denzin & Y. S. Lincoln (Ed.s), *Handbook of qualitative research*. (2nd ed.) (pp. 1-28). Thousand Oaks, CA: Sage.
- Folkman, S. (2008). The case for positive emotions in the stress process. *Anxiety Stress Coping, 21*, 3–14. doi: 10.1080/10615800701740457
- Folkman, S., & Moskowitz J. T. (2004). Coping: Pitfalls and promise. *Annual Review of Psychology, 55*, 745–774. doi: 10.1146/annurev.psych.55.090902.141456
- Fraley, R. C., & Bonanno, G. A. (2004). Attachment and loss: A test of three competing models on the association between attachment-related avoidance and adaptation to bereavement. *Personality and Social Psychology Bulletin, 30*, 878–890. doi: 10.1177/0146167204264289
- Franks, B. A. (2011). Moving targets: A developmental framework for understanding children's changes following disasters. *Journal of Applied Developmental Psychology, 32*, 58-69. doi: 10.1016/j.appdev.2010.12.004
- Fredrickson, B. L. (2004). The broaden-and-build theory of positive emotions. *Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences, 359*, 1367–78. doi:10.1098/rstb.2004.1512
- Friese, S. (2012). *Qualitative data analysis with ATLAS.ti*. London, UK: Sage.
- Gaffney, D. A. (2006). The aftermath of disaster: Children in crisis. *Journal of Clinical Psychology, 62*, 1001-1016. doi: 10.1002/jclp.20285
- Ghuman, S. J., Brackbill, R. M., Stellman, S. D., Farfel, M. R., & Cone, J. E. (2014). Unmet mental health care need 10-11 years after the 9/11 terrorist attacks: Results from 2011-2012 World Trade Center health registry. *BMC Public Health, 14*, 491. doi:10.1186/1471-2458-14-491
- Gibbs, L., Mutch C., Connor, P. O., & Macdougall, C. (2013). Research with, by, for, and about Children : Lessons from disaster contexts. *Global Studies of Childhood, 3*, 129–141. doi: 10.2304/gsch.2013.3.2.129
- Giorgi, A. P. (2000). Concerning the application of phenomenology to caring research. *Scandinavian Journal of Caring Science, 14*, 11–15. doi: 10.1111/j.1471-6712.2000.tb00555.x
- Giorgi, A. P. (2012). The descriptive phenomenological psychological method. *Journal of Phenomenological Psychology, 43*, 3-12. doi: 10.1037/10595-013
- Giorgi, A. P., & Giorgi, B. M. (2003). The descriptive phenomenological psychological method. In P. M. Camic, J. E. Rhodes, & L. Yardley (Eds.), *Qualitative research in psychology: Expanding perspectives in methodology and design*. (pp. 243-275). Washington DC: APA.
- Goenjian, A. K., Roussos, A., Steinberg, A. M., Sotiropoulou, C., Walling, D., Kakaki, M., & Karagianni, S. (2011). Longitudinal study of PTSD, depression, and quality of life among adolescents after the Parnitha earthquake. *Journal of Affective Disorders, 133*, 509–515. doi: 10.1016/j.jad.2011.04.053
- Helgeson, V. S., Reynolds, K. A., & Tomich, P. L. (2006). A meta-analytic review of benefit finding and growth. *Journal of Consulting and Clinical Psychology, 74*, 797–816. doi: 10.1037/0022-006X.74.5.797
- Jensen, T. K., Ellestad, A., & Dyb, G. (2013). Children and adolescents' self-reported coping strategies during the Southeast Asian tsunami. *British Journal of Clinical Psychology, 52*, 92–106. doi: 10.1111/bjc.12003
- Kashdan, T. B., & Rottenberg, J. (2010). Psychological flexibility as a fundamental aspect of health. *Clinical Psychology Review, 30*, 865–78. doi: 10.1016/j.cpr.2010.03.001

- Kronenberg, M. E., Hansel, T. C., Brennan, A. M., Lawrason, B., Osofsky, H. J. & Osofsky J. D. (2010). Children of Katrina: Lessons learned about post-disaster symptoms and recovery patterns. *Child Development, 81*, 1240-1258. doi: 10.1111/j.1467-8624.2010.01465.x
- Kvale, S., & Brinkmann, S. (2009). *InterViews: Learning the craft of qualitative research interviewing* (2nd ed.). Thousand Oaks, CA: Sage.
- La Greca, A. M., Lai, B. S., Llabre, M. M., Silverman, W. K., Vernberg, E. M., & Prinstein, M. J. (2013). Children's postdisaster trajectories of PTSD symptoms: Predicting chronic distress. *Child & Youth Care Forum, 42*, 351-369. doi: 10.1007/s10566-013-9206-1
- Lack, C. W., & Sullivan, M. (2007). Attributions, coping, and exposure as predictors of long-term posttraumatic distress in tornado-exposed children. *Journal of Loss and Trauma, 13*, 72-84. doi: 10.1080/15325020701741906
- Lazarus, R. S. (2006). Emotions and interpersonal relationships: Toward a person-centered conceptualization of emotions and coping. *Journal of Personality, 74*, 9-46. doi: 10.1111/j.1467-6494.2005.00368.x
- Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal and coping*. New York, NY: Springer.
- Leipold, B., & Greve, W. (2009). Resilience: A conceptual bridge between coping and development. *European Psychologist, 14*, 40-50. doi: 10.1027/1016-9040.14.1.40
- Margolin, G., Ramos, M. C., & Guran, E. L. (2010). Earthquakes and children: The role of psychologists with families and communities. *Professional Psychology: Research and Practice, 41*, 1-9. doi: 10.1037/a0018103.
- Masten, A. S., & Narayan A. J. (2012). Child development in the context of disaster, war, and terrorism: Pathways of risk and resilience. *Annual Review of Psychology, 63*, 227-57. doi: 10.1146/annurev-psych-120710-100356
- Masten, A. S., & Obradovic, J. (2008). Disaster preparation and recovery: Lessons from research on resilience in human development. *Ecology and Society, 13*, 9-24. www.ecologyandsociety.org/vol13/iss1/art9/
- Masten, A. S., & Osofsky, J. D. (2010). Disasters and Their Impact on Child Development: Introduction to the Special Section. *Child Development, 81*, 1029-1039. doi: 10.1111/j.1467-8624.2010.01452.x
- Masten, A. S., & Tellegen, A. (2012). Resilience in developmental psychopathology: Contributions of the Project Competence Longitudinal Study. *Development and Psychopathology, 24*, 345-361. doi: 10.1017/S095457941200003X
- Merriam, S. B. (2002). Introduction to qualitative research. In S. B. Merriam and Associates (Eds.), *Qualitative research in practice: examples for discussion and analysis* (pp.3-17). San Francisco, CA: Jossey-Bass.
- Miller, P. A., Roberts, N. A., Zamora, A. D., Weber, D. J., Burleson, M. H., Robles, E., & Tinsley, B. J. (2012). Families coping with natural disasters: Lessons from wildfires and tornadoes. *Qualitative Research in Psychology, 9*, 314-336. doi: 10.1080/14780887.2010.500358
- Mooney, M. F., Paton, D., de Terte, I., Johal, S., Nuray Karanci, A., Gardner D., ... Johnston, D. M. (2011). Psychosocial recovery from disasters: A framework informed by evidence. *The New Zealand Journal of Psychology, 40*, 26-38. www.psychology.org.nz/wp-content/uploads/NZJP-Vol404-2011-6-Mooney.pdf
- Muhr, T. (2013). ATLAS.ti (Version 7.0.89) [Computer software]. Retrieved from <http://atlasti.com/>
- Navarro, J., Pulido, R., Berger, C., Arteaga, M., Osofsky, H. J., Martinez, M., ... Hansel, T. C. (2014). Children's disaster experiences and psychological symptoms: An international comparison between the Chilean earthquake and tsunami and Hurricane Katrina. *International Social Work, 58*, 545-558. doi: 10.1177/0020872814537850
- O'Reilly, M., & Parker, N. (2012). "Unsatisfactory Saturation": A critical exploration of the notion of saturated sample sizes in qualitative research. *Qualitative Research, 13*, 190-197. doi:10.1177/1468794112446106
- Osofsky, J. D. & Chartrand, L. C. M. M. (2013). Military children from birth to five years. *Future of Children, 23*, 61-77. www.questia.com/library/journal/1G1-349721082/military-children-from-birth-to-five-years
- Osofsky, H. J., Osofsky, J. D. (2013). Lessons learned about the impact of disasters on children and families and post-disaster recovery. In A. M. Culp (Ed.), *Child and family advocacy: bridging the gaps between research, practice, and policy* (pp. 91-105). New York, NY: Springer. doi 10.1007/978-1-4614-7456-2_7
- Paton, D., & Johnston, D. (2006). Identifying the characteristics of a disaster resilient society. In D. Paton & D. Johnston (Eds.), *Disaster resilience: An integrated approach* (pp. 11-18). Springfield, Illinois: Charles C Thomas.
- Patton, M. Q. (2002). *Qualitative research and evaluation methods* (3rd ed.). Thousand Oaks, CA: Sage.
- Peek, L. (2008). Children and disasters: Understanding vulnerability, developing capacities and promoting resilience - An introduction. *Children, Youth, and Environments, 18*, 1- 29. www.jstor.org/stable/10.7721/chilyoutenvi.18.1.0001
- Pfefferbaum, B., Noffsinger, M. A., Wind, L. H., & Allen, J. R. (2014). Children's coping in the context of disasters and terrorism. *Journal of Loss & Trauma, 19*, 78-97. doi: 10.1080/15325024.2013.791797
- Pfefferbaum, B., Weems, C. F., Scott, B. G., Nitiéma, P., Noffsinger, M. A., Pfefferbaum, R. L., ... Chakraborty, A. (2013). Research methods in child disaster studies: A review of studies generated by the September 11, 2001, terrorist attacks; the 2004 Indian Ocean Tsunami; and Hurricane Katrina. *Child Youth Care Forum, 42*, 285-337. doi: 10.1007/s10566-013-9211-4
- Pine, N., Tarrant, R., Lyons, A., & Leatham, J. (2015). Rolling with the shakes: An insight into teenagers' perceptions of recovery after the Canterbury earthquakes. *Kōtuitui: New Zealand Journal of Social Sciences Online, 10*, 116-125. doi: 10.1080/1177083X.2015.1068183
- Potter, S. H., Becker, J. S., Johnston, D. M., & Rossiter, K. P. (2015). An overview of the impacts of the 2010-2011 Canterbury earthquakes. *International Journal of Disaster Risk Reduction, 1717*, 1-9. doi: 10.1016/j.ijdr.2015.01.014
- Rood, L., Roelofs, J., Bögels, S. M., & Arntz, A. (2012). The effects of experimentally induced rumination, positive reappraisal, acceptance, and distancing when thinking about a stressful event on affect states in adolescents. *Journal of Abnormal Child Psychology, 40*, 73-84. doi: 10.1007/s10802-011-9544-0
- Seery, M. D., Holman, E. A., & Silver, R.C. (2010). Whatever does not kill us: Cumulative lifetime adversity, vulnerability, and resilience. *Journal of Personality and Social Psychology, 99*, 1025-41. doi: 10.1037/a0021344



- Skinner, E. A., Edge, K., Altman, J., & Sherwood, H. (2003). Searching for the structure of coping: A review and critique of category systems for classifying ways of coping. *Psychological Bulletin*, *129*, 216-269. doi: 10.1.1.458.1894
- Taylor, S. E., & Stanton, A. L. (2007). Coping resources, coping processes, and mental health. *Annual Review of Clinical Psychology*, *3*, 377-403. doi: 10.1146/annurev.clinpsy.3.022806.091520
- Tennen, H., & Affleck, G. (2002). Benefit-finding and benefit-reminding. In C. R. Snyder & S. J. Lopez (Eds.), *Handbook of positive psychology* (pp. 584-597). New York, NY: Oxford University Press.
- Van Wesel, F., Boeije, H., Alisic, E., & Drost, S. (2012). I'll be working my way back: A qualitative synthesis on the trauma experience of children. *Psychological Trauma: Theory, Research, Practice, and Policy*, *4*, 516-526. doi: 10.1037/a0025766
- Zalewski, M., Lengua, L. J., Wilson, A. C., Trancik, A., & Bazinet, A. (2011). Associations of coping and appraisal styles with emotion regulation during preadolescence. *Journal of Experimental Child Psychology*, *110*, 141-158. doi: 10.1016/j.jecp.2011.03.001
- Zimmer-Gembeck, M. J., & Skinner, E. A. (2011). The development of coping across childhood and adolescence: An integrative review and critique of research. *International Journal of Behavioral Development*, *35*, 1- 17. doi: 10.1177/0165025410384923

In some strange way, trouble is good for people. Posttraumatic growth following the Canterbury earthquake sequence

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Abstract

Posttraumatic growth has been documented after exposure to trauma in individuals with major depression, posttraumatic stress disorder and other anxiety disorders but has not been examined in individuals without these psychological conditions. The current study analysed interview data to explore whether posttraumatic growth was reported by psychologically healthy individuals affected by the Canterbury earthquakes. Transcripts from semi-structured interviews with 99 Canterbury residents with moderate-to-high earthquake exposure, without symptoms of psychological disorders, were examined using thematic and content analysis to identify reported aspects of posttraumatic growth. Three analysts coded emerging themes until theme saturation occurred. Differences in male and female participants' endorsement of themes, including co-existing positive and negative outcomes, were included in subsequent content analysis. Posttraumatic growth was widely reported by both males and females. Relevant themes included improved relationships, feeling stronger in oneself, greater appreciation of life, and spiritual change. Another theme, a stronger sense of community, reflected a qualitatively novel aspect of posttraumatic growth, not reported in prior research. The prevalence

of this theme may have been due to the shared nature of the earthquake sequence. Overall, participants reported positive appraisals of their circumstances, of others, and of themselves. Having a role to play appeared to contribute to important aspects of post-earthquake functioning, including taking action, coping, and making a contribution. Women, more than men, reported the positive strategies of self-care and connecting with others. The current study indicates that psychologically healthy individuals experience posttraumatic growth, suggesting that psychological dysfunction, or substantial or ongoing distress are not needed for posttraumatic growth to occur. This is contrary to existing theories of posttraumatic growth and suggests that current models of posttraumatic growth processes may be incomplete. Existing models may also be improved by considering the role played by psychological resilience by considering collective experiences such as a stronger sense of community.

Keywords: *Posttraumatic growth, Canterbury Earthquakes, thematic analysis, content analysis, sense of community*

Introduction

Where there is ruin there is hope for a treasure.

Rumi (cited by Wilcox, 1997, p. 33)

Positive changes have been reported after exposure to traumatic events such as war, exile, illness, disaster related to natural hazards, assault, and terrorism. Researchers have coined the terms *posttraumatic growth* (Tedeschi & Calhoun, 1996), *stress-related growth* (Park, Cohen & Church, 1996), and *growth through adversity* (Joseph & Linley, 2005) to describe trauma-related positive change. Several domains of posttraumatic growth have been identified, including increased appreciation of life, more meaningful relationships, increased personal strength, changed priorities, and a richer existential and spiritual life (Tedeschi & Calhoun, 2004). However, much of the existing research has been conducted with individuals with marked psychopathology, such as posttraumatic stress disorder, major depression, or other anxiety disorders. It is unclear the extent to which

positive changes can occur without experiencing such psychological dysfunction.

Alongside aspects of posttraumatic growth commonly measured by psychometric instruments such as the Posttraumatic Growth Inventory (Tedeschi & Calhoun, 1996), qualitative research has found reports of posttraumatic growth in the form of increased compassion for others struggling with similar difficulties and more engagement in health-related activities, such as increased exercise and improved nutrition among individuals who survived cancer (Morris et al. 2012). Other research, with nurses in a post-earthquake context, has identified changed perspectives and values, including feeling fortunate (Johal & Mounsey, 2015).

Posttraumatic growth theories synthesised by Janoff-Bulman (2004) outline how trauma creates challenges to particular aspects of one's worldview. Individuals appear to have an inner drive to rebuild these worldviews to incorporate the trauma. This means the views that are modified are typically those challenged by the trauma, leading to positive change that varies according to the type of trauma experienced (Shakespeare-Finch & Armstrong, 2010). Different traumas involve qualitatively different experiences of distress and pose different challenges to one's view of the world, self, and others. If a traumatic illness is experienced, people may be forced to recognise that health is fragile and that it is important to nurture their bodies. Following earthquakes, challenged worldviews might relate to prior beliefs about a stable Earth.

Posttraumatic growth among psychologically healthy individuals has rarely been examined. Theories of posttraumatic growth, from Janoff-Bulman (2004) and Tedeschi and Calhoun (2004) for example, posit that distress is needed to trigger the process of posttraumatic growth. It becomes challenging to apply these extant theories of posttraumatic growth to individuals who are less distressed by an event. This is because, under the current theories, these individuals are thought to engage in less cognitive and emotional processing in response, resulting in less posttraumatic growth. It therefore remains unclear whether psychologically healthy individuals also experience posttraumatic growth, and if so, how it manifests. By extension, it remains unclear whether posttraumatic growth is experienced by psychologically resilient individuals - being individuals with a capacity to maintain adaptive functioning in response to stressors (Mancini & Bonanno, 2010).

On September 4th 2010, Christchurch, New Zealand, was struck by a magnitude 7.1 earthquake which caused widespread property damage, but no loss of life and few injuries. Six months later on the 22nd of February 2011, a second earthquake, of magnitude 6.3, killed 185 people and injured several thousand (Ardagh et al., 2012). Liquefaction, being water-saturated layers of underground sand and silt forced upwards through cracks in the ground, was extensive in the September, and even more so in the February, earthquakes. Parts of some suburbs may never be reoccupied. A state of emergency was declared the day after the February earthquake and the central business district was cordoned off, that cordon lasting, in part, until June 2013. Several thousand houses were found to be irreparable and were marked for demolition.

Research has since explored health and wellbeing impacts of the Canterbury earthquake sequence, finding a substantial minority of the earthquake exposed general population have increased disaster-related psychological difficulties including posttraumatic stress disorder, anxiety disorders, depression and nicotine dependence (Fergusson & Boden, 2014), with higher distress in those with greater earthquake exposure (Fergusson, Boden, Horwood & Mulder, 2014a). Self-reported sleep disturbance, stress, and cognitive dysfunction were widespread (Helton, Head & Kemp, 2011; Kemp, Helton, Richardson, Blampied & Grimshaw, 2011). Cognitive disruption was also identified during a sustained attention to response task in a small Christchurch sample soon after the February earthquake (Helton & Head, 2012). Strain and anxiety found in general practice patients (Johal, Mounsey, Tuohy & Johnston, 2014b) have resulted in practical, emotional, and professional challenges for nurses (Johal, Mounsey, Brannelly & Johnston, 2016), and increased workload for general medical practitioners (Johal, Mounsey, Brannelly & Johnston, 2014a). Earthquake-related psychological impacts have also been reported in a significant minority of medical students (Carter, Bell, Ali, McKenzie & Wilkinson, 2014) and university staff (Bell, Carter, Boden, Ali, McKenzie & Wilkinson, 2016).

However, there were also some notable exceptions. Although short-term increases were seen in anxiolytic and sedative/hypnotic prescriptions, this was not sustained, and no overall impact was observed (Beaglehole, Bell, Beveridge & Frampton, 2015b). There was also a 20 percent reduction in daily psychiatric admissions observed in the 30 days immediately

following the February earthquake (Beaglehole, Bell, Bereridge & Frampton, 2015a). These negative indicators of psychological distress highlight how much of the Canterbury population may have even experienced positive impacts following the earthquakes. However, little research has explored positive changes following the Canterbury earthquakes.

Fergusson, Horwood, Boden and Mulder (2014b) provided one of the very few pieces of research on this aspect of the Canterbury earthquakes. They found that a representative sample of the Canterbury population reported positive changes after the Canterbury earthquake sequence, including: improved relationships with family and neighbours; greater appreciation of life; increased children's maturity; and greater personal strength. Women reported more positive changes than men, and greater immediate impact of the earthquakes related to greater endorsement of positive changes. Johal & Mounsey (2016) examined positive changes reported by nurses after the Canterbury earthquakes and found increased value placed on relationships, clarification of values and priorities, increased self-awareness and confidence, valuing the experience, and viewing themselves as lucky.

Positive impacts were also observed in the education sector. Research with school teachers found that the earthquake sequence galvanised the already strong positive culture within schools, with schools providing support and care for school staff members, who viewed their role as supporting pupils and their families, emotionally and practically (Mutch, 2015). There is also evidence that academic functioning improved overall in response to the February 2011 earthquake: University students' grade average after the February 2011 earthquake improved overall compared to the previous year, although students reporting higher levels of stress, anxiety, and depression achieved lower marks. Such findings suggest a high degree of psychological function amongst some of the affected students. According to Kemp, Helton, Richardson and Blampied (2013), those who were not affected by anxiety and depression after the earthquakes achieved higher grades than expected.

The current study aimed to expand the body of literature on positive psychological impacts of the Canterbury earthquakes, with a focus on psychologically healthy individuals. It used thematic and content analysis to examine the nature of posttraumatic growth in a group of psychologically healthy individuals after the Canterbury earthquake sequence of 2010 and 2011, to:

- explore whether posttraumatic growth is reported by a population of earthquake-affected but psychologically healthy individuals;
- identify factors that psychologically healthy individuals report as contributing to posttraumatic growth;
- examine whether themes previously found to correlate with posttraumatic growth in other populations are evident for psychologically healthy individuals following earthquake-related trauma; and
- compare posttraumatic growth between psychologically healthy males and females.

Methods

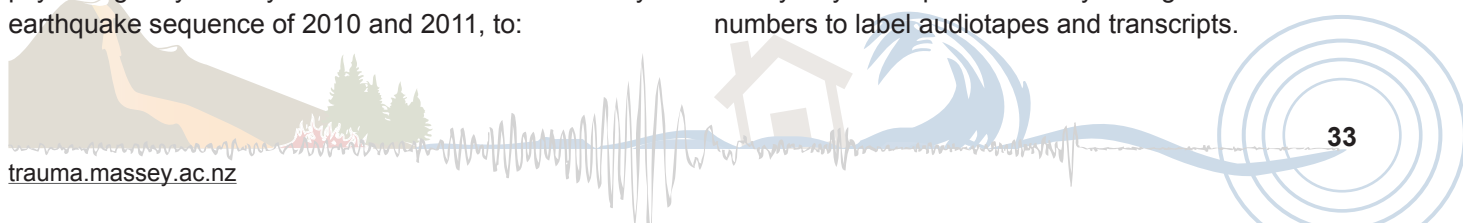
Participants

Participants were psychologically healthy Canterbury residents who self-identified as coping well, without psychiatric diagnoses or having sought treatment for earthquake-related distress - despite moderate-to-high exposure to earthquake-related events such as physical injury or illness, witnessing falling buildings, seeing dead bodies, the death of a loved one, income or property loss, or problems with housing caused by earthquake-related events. Participants were recruited through articles, opinion pieces, and community notices in local newspapers, and via word of mouth.

Procedure

All recruitment and data collection was conducted 2 to 3 years after the September 2010 and February 2011 earthquakes, over the course of 13 months, from January 2013 to February 2014. Potential participants were screened by telephone to determine that they broadly met inclusion criteria. Participants who appeared to be eligible were subsequently met in person, to confirm eligibility and to complete semi-structured open interviews. Details of other assessments conducted over the study timeframe are included in a separate publication, by Smith, McIntosh, Carter, Colhoun and Jordan (2016).

Participants were interviewed by one of six interviewers using structured prompts, asking about their experiences at the time of the earthquakes and the subsequent effects of those earthquakes, including positive effects such as posttraumatic growth. Interviews were recorded, downloaded, and transcribed verbatim. Participant anonymity was preserved by using identification numbers to label audiotapes and transcripts.



Thematic analysis

Thematic analysis was used to explore themes in interview transcripts. Analysis was based on methods established by Boyatzis (1998) for identifying, coding and describing themes within a piece of communication. Ten transcribed interviews were examined and coded independently by three analysts to develop an initial set of themes. Several stages of coding refinement and theme generation produced a consensus on ideas that appeared most important to participants, to the point of theme saturation. An additional set of five, randomly selected, transcripts were then examined independently by the three analysts.

Content analysis

In addition to the rich findings produced by thematic analysis, content analysis can be used to answer different research questions about qualitative data; for example, whether the frequency of endorsement of themes was influenced by gender. Where a sample size allows, as in the current study, it is possible to answer important research questions by converting the codes of interest into a numeric representation. These representations can be used to conduct relevant quantitative comparisons such as Chi-square tests or t-tests, depending on the research question (Boyatzis, 1998, pp. 128-136). Such analysis is rarely conducted in qualitative research due to sample sizes commonly being too small to make meaningful quantitative comparisons between groups within the sample. However this mixed-methods approach to research allows for quantitative and qualitative methods to complement each other and answer different research questions about the same data.

Identified themes were converted to quantitative codes which were applied to all 99 transcripts, using the software NVivo (Version 21, 2012). Two analysts reviewed all coded text to ensure consistent code application. Two analysts then independently analysed ten randomly selected transcripts using the final coding system to determine inter-rater reliability. Inter-rater agreement was calculated as the number of agreements divided by the total number of pieces of coded data. Cohen's *kappa* was also calculated, to help ensure that inter-rater agreement was not solely due to chance.

NVivo data for each sub-code were converted into dichotomous yes/no variables to indicate whether transcripts included each of the codes. These

dichotomous variables were exported into SPSS statistical analysis software, and 2 x 2 Chi-square tests for independence tested whether there were gender differences in the application of each code.

Results

Participants were 33 males and 66 females aged 18-72 years, with an average age of 50 years ($SD = 11.12$). Seventy percent of the sample was married or in a committed relationship, 11 percent were separated or divorced, four percent were widowed, and 15 percent were never married. Median education level was an undergraduate university degree. Seventy-eight participants were of New Zealand European descent, with one participant of Māori descent, one of Cook-Island Māori descent, one Indian, and others of German, Chinese, Irish, Celtic, and other European descent. Further sample characteristics are outlined in Smith et al. (2016).

Thematic analysis results

The majority of identified themes fell into positions along a valenced continuum of participants' appraisals, as shown in Figure 1: from *improvement* of self or situation; to *positive appraisal* of self, others or situation; to *neutral, dispassionate descriptions* of events and actions; to description of the *absence of negative* elements; or to a sense of *burden* related to the earthquakes. Participants' descriptions fell along the entire valenced continuum, with individual participants describing both hardship and positive outcomes.

Posttraumatic growth

Analysis included sub-themes under the theme *Improvement/ posttraumatic growth* that reflected improvement in outlook or circumstances, including improved relationships, feeling stronger in one's self, greater appreciation of life, and spiritual change. They also included one theme reflecting posttraumatic growth after a community-wide trauma: a greater sense of community, as shown in Table 1. The proportion of the sample reporting posttraumatic growth and other themes is shown in Table 2.

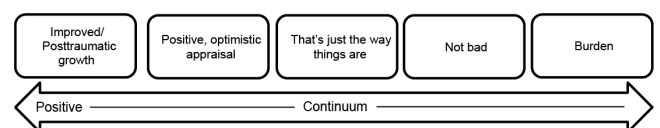


Figure 1. Continuum of valenced themes

Positive appraisal

The theme *positive appraisal* was prominent in participants' descriptions. Several sub-themes relating to this aspect were identified, as shown in Table 3. Participants appeared positive about knowing what they needed in order to cope, and pursuing this. Many perceived prior challenging experiences, including prior earthquake experiences, as positive in promoting psychological health or ways of coping. Participants also reported viewing circumstances or events as humorous or ironic.

That's just the way things are

As shown in Table 4, the theme of *that's just the way things are* reflects sub-themes of neutral descriptions of earthquake events, including acknowledgement of the extraordinary nature of the major earthquakes, the strong emotion or shock they experienced, and hardship and uncertainty for self and for others. Hardships posed challenges and demanded responses, and were described as a reality alongside positive outcomes of the earthquake sequence.

Not bad

As shown in Table 5, the theme of *not bad* included sub-themes of how participants viewed their earthquake experiences in terms of the absence of negative responses, that they did not feel overwhelmed or traumatised, did not feel unsafe, expected loved ones to be unharmed, and that consequences of the earthquakes would not be dire. Sub-themes included

in the code of *not bad* are consistent with the optimistic appraisal noted in other themes.

Burden

The theme *burden* comprised accounts from a minority of participants who described their experiences using negative-valence words such as "ghastly", "devastating", "terrible", "awful", "very stressful", "overwhelming" or "too much". These descriptions of struggle are summarised in Table 6. These terms were distinguished from descriptions of general hardship because they described a sense of extreme difficulty with circumstances, reflecting emotional heaviness and frustration, and difficulty coping with earthquake-related events. This sense was generally associated with circumstances or events which had passed or which were time-bound, rather than an ongoing perception of not coping. Examples included having to accept help from others, employment ending, staying in makeshift accommodation, enduring loud alarms, or having to share an office with many other people.

Non-valenced themes

Two themes included sub-themes from across the continuum of valenced themes, *life philosophies* and *role to play*. Both appeared important for helping participants cope with earthquake-related events.

The theme *life philosophies* concerned the way personal values and approach to life were helpful for coping and living in the post-earthquake environment, as shown in Table 7. For some participants, this was expressed in sub-themes reflecting consciously choosing to view

Table 1.
Codes and Examples of Participants' Responses for Theme of Improvement/Posttraumatic Growth

Improvement/ posttraumatic growth	Coded text from thematic analysis
Greater sense of community	<i>Definitely a greater sense of community...People are friendlier and people in the neighbourhood speak freely to one another. I've lived where I am for three and a half years, I moved to Christchurch from the country and it did take me a while to get to know people locally, but definitely the earthquake has accelerated that.</i>
Greater appreciation of life	<i>It's made me realise that when you have a really good day, you should just be completely in the really good day. I don't have any sort of 'futuring'. I don't 'future' much now at all. I suppose they will rebuild my house one day, but it's just enough now to be in every day as it is.</i>
Self as stronger	<i>Having all been through that experience together it's something that you share and knowing that you can get through gives you more confidence and knowledge that you can cope with these things, that you aren't ignoring how you would cope with a difficult situation, so it does give you strength and courage.</i>
Better relationships	<i>It brought us closer together in that we talked a lot about how the situation wasn't great and financially it might ruin us, but we had each other and we weren't going to let it define us.</i>
Spiritual/ philosophical change	<i>I haven't even felt 'why them and not us?', there's no point worrying about that, and there have been some comments like 'we moved buildings and we were saved' and I think that's great but what about those who didn't move before the buildings collapsed and they weren't saved. I think my faith has become raw, just more basic, uncomplicated, don't worry about answering questions, just know that there is a lot more open and basically we can't change a lot.</i>

Table 2.
Frequency of Codes Referenced for the Total Sample and by Gender

Code	Total sample endorsement <i>n</i>	Male endorsement % (<i>n</i>)	Female endorsement % (<i>n</i>)	χ^2	<i>p</i> value	<i>Phi</i>
Improvement						
Appreciate the present more	57	42.4% (14)	65.2% (43)	3.77	.05	-.22
Better relationships	39	27.3% (9)	45.5% (30)	2.33	.13	-.18
Greater sense of community	61	66.7% (22)	59.1% (39)	.43	.51	.09
Self as stronger	54	39.4% (13)	62.1% (41)	3.71	.05	-.22
Spiritual change or solidification	17	3.0% (1)	24.2% (16)	-	-	-
Optimistic, positive appraisal						
Appreciate others' input	72	66.7% (22)	75.8% (50)	.52	.47	-.10
Committed to Christchurch	16	15.2% (5)	16.7% (11)	-	-	-
Count your blessings	87	81.8% (27)	90.9% (60)	.96	.34	-.13
Knowing what you need	96	93.9% (31)	98.5% (65)	.39	.53	-.13
Sub-codes						
<i>Need exercise</i>	32	39.4% (13)	28.8% (19)	.70	.29	.11
<i>Need the familiar</i>	12	15.2% (5)	10.6% (7)	-	-	-
<i>Need 'home'</i>	21	3.0% (1)	30.3% (20)	-	-	-
<i>Need others**</i>	70	48.5% (16)	81.8% (54)	10.25	.001	-.35
<i>Need self-care*</i>	48	30.3% (10)	57.6% (38)	5.51	.02	-.26
<i>Need to keep busy</i>	28	33.3% (11)	25.8% (17)	.31	.58	.08
<i>Need to look for the positive aspects</i>	15	6.1% (2)	19.7% (13)	-	-	-
Lucky compared to others	53	42.4% (14)	59.1% (39)	1.83	.18	-.16
Lucky compared to what might have been	37	33.3% (11)	39.4% (26)	.14	.71	-.06
Positive sense of self	67	66.7% (22)	68.2% (45)	.00	1.00	-.02
Prior experience as good for current coping	36	39.4% (13)	34.8% (23)	.05	.83	.05
Learn from experiences	34	36.4% (12)	33.3% (22)	.01	.94	.03
See humour or irony	34	39.4% (13)	31.8% (21)	.27	.60	.08
See opportunities	39	42.4% (14)	37.9% (25)	.05	.83	.04
View as fun, exciting, interesting	52	50.0% (33)	57.6% (19)	.25	.62	.07
Not bad						
Expect things will be okay	34	33.3% (11)	34.8% (23)	.00	1.0	-.01
Expect others will be okay	18	18.2% (6)	18.2% (12)	-	-	-
Not traumatised	50	42.4% (14)	54.5% (36)	.85	.36	-.11
How it is						
Acknowledge an extraordinary event	61	57.6% (19)	63.6% (42)	.13	.72	-.06
Acknowledge hardship for others	89	87.9% (29)	90.9% (60)	.01	.91	-.05
Acknowledge hardship for self	98	100.0% (33)	98.5% (65)	.00	1.00	.07
Experience strong emotion or shock	85	81.8% (27)	87.9% (58)	.26	.61	-.08
Uncertainty	50	51.5% (17)	50.0% (33)	.00	1.00	-.01
Life philosophy						
Don't worry about what you can't control	28	21.2% (7)	31.8% (21)	.75	.39	-.11
It is what it is	46	42.4% (14)	48.5% (32)	.13	.72	-.06
Prioritise time and energy according to values	33	24.2% (8)	37.9% (25)	1.28	.26	-.14
Role to play						
	33	37.0% (17)	30.2% (16)	.25	.62	.07
Burden						
	32	18.2% (6)	39.4% (26)	3.61	.06	-.21

* = $p < .05$; ** = $p < .01$

events in particular ways, such as focusing on positive aspects of a situation or focusing on the future, not the past. Others reported applying learning from previous experiences, that life is not easy or fair. Others reflected that particular values were important, being either pre-existing values or values that had changed in response to their earthquake experiences. These values included

valuing people, not possessions, appreciating and enjoying the present, and recognising that death is part of life.

The theme *role to play* reflected participants' contributions to the earthquake recovery as an important part of coping, maintaining self-esteem, and connecting

Table 3.
Codes and Examples of Participants' Responses for Theme of Positive Appraisal

Code	Coded text from thematic analysis
Knowing what you need	<i>Talking about it with my partner [helped me cope], taking time out to be together, even if we didn't go anywhere, just simply scheduling our lives so that no one rings us before 10 am on the weekends, and we have put down some guidelines that the family can ring us only if it's an emergency, other than that, don't bother us. We deliberately schedule some time together. We hadn't thought about that before.</i>
Count your blessings	<i>Again you see the silver lining in everything but one of the really lucky things from my point of view is that I have been able to stay in my home. That's my little sanctuary and I feel safe there, and I've been able to stay there. We have had all the insurance hassles and the house is going to be demolished so I'm not going to be able to live there but the good thing is they aren't going to pull it down for another year, so we can stay there and it gives you time to find something.</i>
Appreciate others' input	<i>We had a wonderful guy coming in, when he could get past the cordon, but sometimes the soldiers or the Police didn't want to let him in. A farmer from Oxford who came in with a truck and trailer and two thousand litres of water and he would go round our little loop and distribute [it], and he came in with other things sometimes, food. That was pretty good.</i>
Positive sense of self	<i>I've always considered myself quite a strong person anyway, but I probably think now if you can survive and get through what we've had to get through in Christchurch in the last two or three years you are a pretty strong person.</i>
Lucky compared to others	<i>Then I managed to come home after I had been at my friend's place and I had power and water and gas, so I was quite lucky whereas a lot of people didn't have those things.</i>
View circumstances as fun, exciting, interesting	<i>I turned on the light and remember seeing the walls bulge, just being really, really excited because it was cool – that first one was like an experience. I had been through a couple of wee earthquakes, just small ones, and had always wondered what it would be like to be in a big one, anyway I got it. It was cool. I was pumped afterwards, this was awesome, everything was shaking.</i>
Seeing opportunities for Christchurch and oneself	<i>I think the city is going to be fabulous, I think it's just going to be an awesome place. I hope that I'm still alive in twenty odd years; it's going to be magic. It's not my regular words, but for the first time ever we will have a city that's a New Zealand city as opposed to being an English city, it's going to be European, Asian, Pacific Island, Maori, it's going to be the lot, when previously we've had a Scottish city in Dunedin, or an English city in Christchurch, those sorts of things, and that's a positive.</i>
Lucky compared to what might have been	<i>There was a sense of 'gosh, that could have been me, had I not been made redundant from that position [in the building that collapsed] or had I been re-employed to do the programme that they were looking for someone to take on again', so there was slightly that 'dodged bullet', grateful to not be there, because I would have been the sort of person that would have been in the office.</i>
Experiences are useful for learning	<i>One of the things that came out of the earthquake for me was the realisation that in some strange way trouble is good for people, because when everything is going well who cares but when the community is threatened there is a survival response and a communal response to preserve the community and the amenities that you have got... I think my experience of the earthquake was an affirmation that I believe about the possibilities of human nature. You had people burgling and burning properties but the statistics will prove that's in the minority. I even believe that crime dropped in Christchurch in the immediate twenty-four months, and also suicides, I don't know whether that's true, so what does that say about what disaster does for us. I lost a friend and people lost husbands and wives and people died but maybe it taught us all something...</i>
Prior experiences as good for coping ability in the earthquakes	<i>Also, prior to the earthquake, a couple of years before that, my partner had died and I would say that going through the last eighteen months of life and his death probably was as traumatic as anything that I did and in the back of my mind I go 'well it's not as bad as that'. I sometimes wonder if I became emotionally fit or resilient, I'm not sure.</i>
See humour or irony	<i>I got in his car and I'll always remember he said to me... 'Put the seatbelt on' and I really wasn't listening, I wasn't processing very well, and I heard him say again more firmly and more commandingly, 'Put your seatbelt on'. And I remember thinking, 'What a strange thing to say (laughs). We've just been in a huge earthquake'.</i>
Committed to Christchurch	<i>I feel a strong sense of us, which I probably have always felt because I am an adopted Cantabrian so I chose to live here, I wasn't born here.</i>

Table 4.
Codes and Examples of Participants' Responses for Theme of That's Just the Way Things Are

Code	Coded text from thematic analysis
Acknowledge hardship for self	<i>It wasn't too bad you know, we had a roof on top [of the makeshift toilet in the garden] and it was all possible and it didn't feel yucky because it was your own home and you could do it like the Scouts would do it. We had no water, I can't recall for how long, four weeks. No electricity, the electricity came back first, but it probably took a week.</i>
Acknowledge hardship for others	<i>[The earthquake] upset the neighbours quite a bit so I spent a bit of time standing around talking to them and had to go into the house next door with the lady because she was too scared to go in by herself, all the ornaments were everywhere</i>
Experience strong emotion or shock	<i>I felt incredibly sad for Christchurch, and I think I was pretty exhausted at that stage, and I felt quite emotional</i>
Acknowledge an extraordinary event	<i>You would see the damage on TV and...there was definitely something happening there, I couldn't put a common handle on it, you definitely felt something, you were seeing history. For a lot of people living through these quakes is similar [to] historical things, to the likes of Princess Di being killed, September 11, moon landings, all these very significant historical markers in our lives.</i>
Uncertainty	<i>You carry on because you can't change it and that's the hardest thing, whereas with a business if something is failing you can find out what it is, adapt and fix it. If you are unwell you can help yourself get better, a good lifestyle, if you are unfit you can do exercising and bring yourself up to a level of fitness where you feel great, all those things give you an element of choice in what you want to do, but those damn earthquakes, you couldn't, there was absolutely nothing</i>

Table 5.
Codes and Examples of Participants' Responses for Theme of Not Bad

Code	Coded text from thematic analysis
Not traumatised	<i>The earthquakes themselves haven't really worried me yet you hear them coming and you almost in your own mind saying 'now I wonder what direction that's from and how big it's going to be' and then it's a competition, so it's not really affected me. They come into the category I can't do anything about it so whatever, and I think I'm quite lucky in feeling that way because I know a lot of people that don't and can't and don't understand this at all.</i>
Belief that circumstances and others would be okay	<i>I didn't at any point feel fearful of the situation or was more shocked thinking, I think within about fifteen minutes we were outside the building so there's no point in thinking about my Mum and daughter, just trust it's all fine until you find out otherwise.</i>

Table 6.
Codes and Examples of Participants' Responses for Theme of Burden

Code	Coded text from thematic analysis
A sense of burden: a feeling of being overwhelmed, having difficulty coping.	<i>I've had to make myself remember that it's attitude that matters and that I'm allowed to have days where I feel like absolute crap and I've been through periods of feeling really dreadful but I've got through them. The Salvation Army knocked on the door one day and said 'are you OK', and I just bawled my eyes out, I didn't know what to do. We had no water, no sewer, we had no phone, no power, we had candles, it was beyond explaining.</i>

Table 7.
Codes and Examples of Participants' Responses for Theme of Life Philosophies

Code	Coded text from thematic analysis
It is what it is	<i>You put things on the timeline and it seems to stretch out further and further. There's nothing you can do about it, you have got to be philosophical and accept that there are a hell of a lot of other people who are in way worse situations. My parents had suffered quite a bit in particular. When I was young my sister died and so I grew up with this kind of sense that we live and work in a broken world, that bad things will happen that one can't expect life to be easy.</i>
Prioritise actions according to your values	<i>There was one guy with quite a bad injury and it was bleeding quite a lot and asked him if he needed help and perhaps it would be a good idea if he went to hospital, but he assured me that he was OK. He seemed OK to me and he looked like he was under control and the bleeding wasn't too bad and he was on a mission. Other than that the people were OK. For me people were the highest value, are they alright?</i>
Don't worry about what you can't control	<i>You don't dwell on the things that have gone wrong and you don't dwell on things that are in the past because you can't change them so you get on and make the most of them now.</i>

Table 8.
Codes and Examples of Participants' Responses for Theme of Role to Play

Code	Coded text from thematic analysis
Role to play – as useful for coping; prescriptive for actions; contributing to sense of self as capable and sense of contributing to greater cause	<i>I'm proud of what I do because it's a good job and you help people in the minimalist way but it's such an extremely important and emotionally raw time in your lives, and the smallest thing you do or say can make even just the smallest bit of difference, but it can really affect their whole being just for that time.</i>

with others – as shown in Table 8. Roles provided a course of action that gave participants purpose and a sense of efficacy. Roles also allowed distractions from worrying about the effects of the earthquakes, allowing participants to carry on with tasks and to view themselves as functional and coping. Acknowledging the value of roles encouraged pride in contributions and a sense of connection to others. These benefits appeared to play a part in aspects of participants' posttraumatic growth such as a sense of increased personal strength and a greater sense of community.

Content analysis results

When treating the themes as quantitative codes, values for Cohen's *kappa* ranged from .58 to .77. This showed moderate to good inter-rater reliability for the ten randomly selected co-rated transcripts. Two of the ten transcripts showed moderate inter-rater reliability and eight transcripts showed good inter-rater reliability. Frequency of agreement on code classification ranged from 76 percent to 85 percent agreement.

Two of the themes were marked by a significant difference between genders. Within the code of *knowing what you need*, a Chi-square test for independence indicated a significant difference between genders for the sub-code 'need self-care', with a higher percentage of women reporting self-care (58%, $n = 38$) compared with men (30%, $n = 10$).

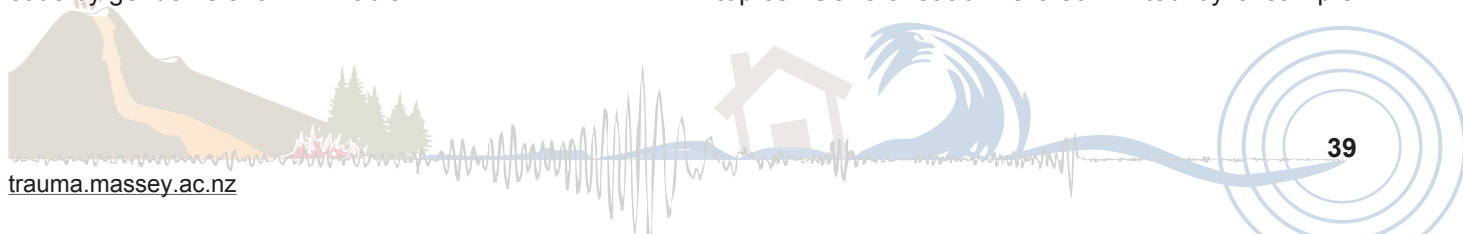
Women were also more likely to report needing to connect with others, and to report that others complemented their coping efforts. A Chi-square test for independence found a significant difference between genders for the code *need others*. More than 81 percent of women ($n = 54$) and 48 percent of men ($n = 16$) reported that others aided their coping. No significant gender differences were found in the other codes. Both Chi-square tests were applied subject to the Yates continuity correction. The resulting distribution of each code by gender is shown in Table 2.

Conclusion

The current study indicates that posttraumatic growth did occur in a psychologically healthy sample of earthquake-affected individuals. Some sub-themes relating to posttraumatic growth were similar to aspects reported by other groups, including after illness or bereavement. These themes included improved relationships, a sense of the self as stronger, a greater appreciation of life, and changes in spirituality or existential thought. However the code or sub-theme, *greater sense of community* reflects a qualitatively novel aspect of posttraumatic growth that has not been commonly reported in studies of posttraumatic growth. The prevalence of this theme can be attributed to the shared experience of the Canterbury earthquakes, as has been identified in other Canterbury earthquake-related research, by Lambert (2014) and Mutch (2015).

In spite of their overall psychological health, the current participants described experiencing some distress associated with potentially traumatic events. They also reported engaging in a process that produced posttraumatic growth. Participants showed evidence of self-awareness to meet their coping needs, and positive appraisals of their circumstances, of others, and of themselves. Having a formal or informal role to play after the earthquakes was important for informing actions, coping, and feelings of having made a contribution. More women described self-care and connecting with others as a positive way to cope, compared to men.

A number of methodological issues are noteworthy when interpreting the current results. The study focused on individuals coping well after the Canterbury earthquakes. This means that results cannot be generalised to the overall earthquake-affected population of Canterbury or to other populations affected by natural hazard events. Six different interviewers interviewed participants using a semi-structured format. Differences between these interviewers may have contributed to differences in how participants were encouraged to pursue particular topics. Generalisation is also limited by a sample



that was initially purposive, rather than using a more generalizable sampling procedure such as random sampling.

This study nonetheless has substantial strengths. Interview data from the full sample of 99 participants were included in thematic analyses. This means the current study is the first research of this kind to examine posttraumatic growth in a relatively large sample of psychologically healthy individuals after community wide earthquake-related events. The use of semi-structured interviews and thematic analysis allowed for an in-depth exploration of the nature of posttraumatic growth in a New Zealand sample, and of participants' perceptions of their experiences.

Accounts of hardship or burden were apparent in participants' acknowledgement of hardship for themselves and others, descriptions of strong emotion or shock, and reports of sometimes burdensome earthquake experiences. These accounts indicate that hardship and difficulty were experienced alongside posttraumatic growth. In line with theory from Lazarus (1983), participants did not deny the reality of the post-earthquake situation or downplay their difficulties in looking for positive aspects of their experiences.

A lot of existing research has examined posttraumatic growth in samples including individuals with marked psychological dysfunction. The current study has shown that psychologically healthy individuals exhibit posttraumatic growth in similar ways to people suffering from psychological disorders. Definitions of resilience suggest that such psychologically functional individuals might experience little disruption and distress in the face of adversity (Mancini & Bonnano, 2010). Models of posttraumatic growth (Janoff-Bulman, 2004; Tedeschi & Calhoun, 2004) propose that such distress is integral to the process of posttraumatic growth. Psychologically healthy and resilient individuals may therefore be expected to exhibit little posttraumatic growth. However, psychologically healthy participants in the current research reported difficulty associated with major earthquake-related events. They had nonetheless engaged in processes that produced posttraumatic growth without experiencing major functional impairment. Findings from the current study show that worldviews were sufficiently challenged and accommodated within a positive framework to produce psychological growth. This would suggest that psychological dysfunction, or substantial or ongoing distress is not needed for posttraumatic growth to occur.

Part of this apparent anomaly may be explained by sub-themes of positive appraisal identified in the current research, specifically in terms of the self, circumstances, and others. Resilient, psychologically healthy individuals have previously been found to experience more positive emotions in adverse circumstances, reporting frustration but also emotions such as interest, excitement, and eagerness (Tugade & Fredrickson, 2004). These positive emotions enable them to attribute more positive meaning to their circumstances. Experiencing positive emotions in a stressful situation can also help broaden an individual's focus, to consider diverse ways of reacting (Fredrickson, 2004), helping facilitate an interplay between positive emotion, openness to experience, resilience, and posttraumatic growth.

The community-wide nature of shared trauma resulting from the Canterbury earthquakes may have resulted in relatively novel facets of posttraumatic growth such as a greater sense of community. This aspect has also been reported in other Canterbury earthquake-related research (Lambert, 2014; Mutch, 2015). It highlights how positive changes can occur in a community and go on to influence posttraumatic growth at the level of the individual. The greater support perceived from a community, captured by the theme *greater sense of community*, may facilitate further posttraumatic growth – considering that perceived support from others has been observed to promote posttraumatic growth in prior research by Lev-Wiesel and Amir (2006) and Taku et al. (2009). This is nonetheless another aspect of the current research that needs to be generalised with caution, considering Janoff-Bulmann's (2004) point that qualitatively different trauma results in different challenges to assumptive worldviews and that this in turn, results in different aspects of posttraumatic growth. Earthquakes are a distinct source of trauma. There are many other traumas which are not experienced on such a wide social scale and which are less likely to lead to such a greater sense of community.

Cognitive processes involved in posttraumatic growth have also been highlighted by the current study. Participants reported a cognitive position of positive appraisal including counting their blessings, appreciating others' input, seeing humour or irony in circumstances, and considering themselves lucky compared with others or compared with what might have been. These cognitive strategies were reported by participants as a way to help them cope and appeared to contribute to posttraumatic growth. Some participants described

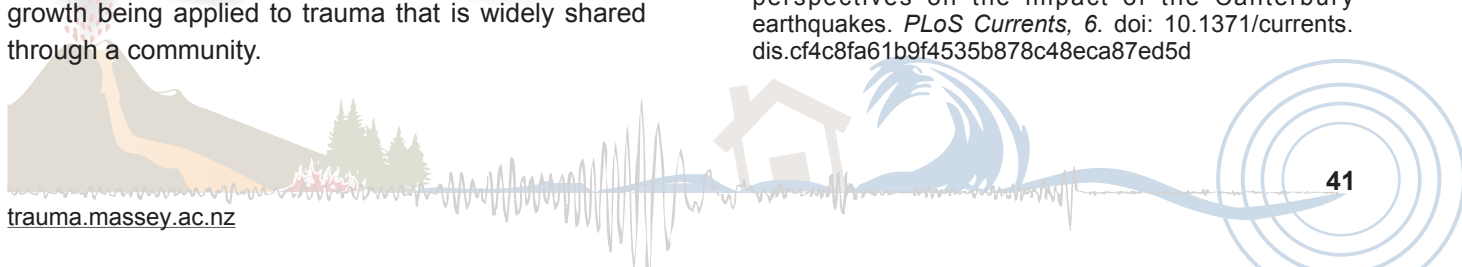
deliberately choosing to take a particular cognitive stance, such as only talking about positive things, not ruminating over loss or difficulty, not focusing on the past, or not focusing on things that couldn't be changed. The extent that individuals recognised that certain ways of thinking could contribute to feeling better or worse, points to the role of metacognition, being aware of a process of thinking rather than simply the content of thinking, in the posttraumatic growth process.

Themes in the current study show how individuals also responded to their environments in ways that aided adaptation and fulfilment, acting in accordance with their own values to meet needs for autonomy, competence, and relatedness. This is consistent with Joseph and Linley's (2005) theory, that posttraumatic growth is more likely to occur when individuals are following their own values, so that they attribute a positive meaning to changed worldviews. The current participants' reports of knowing what they needed is a clear example of individuals operating in a way consistent with their values in identifying what was needed to help coping, and acting to meet these needs. Positive accommodation of the earthquakes into participants worldview, resulting in posttraumatic growth, was also shown in themes and coded content. Modified worldviews, that life is more fragile and unpredictable than had been thought before the earthquake sequence, appeared to favour an attitude of living for each day and making the most of each moment.

In summary, findings from the current study indicate that psychologically healthy individuals can experience posttraumatic growth. Worldviews appear to have been challenged sufficiently to bring about posttraumatic growth, suggesting that psychological dysfunction, or substantial or ongoing distress, are not needed for posttraumatic growth to occur. This is contrary to existing theories of posttraumatic growth. Existing models of the posttraumatic growth process (Janoff-Bulman, 2004; Joseph & Linley, 2005; Tedeschi & Calhoun, 2004) may therefore be improved by future research into how psychological resilience may influence the positive impact of trauma. Experiences of a stronger sense of community form another relatively novel aspect of posttraumatic growth identified in the current research. This aspect may complement models of posttraumatic growth being applied to trauma that is widely shared through a community.

References

- Ardagh, M. W., Richardson, S. K., Robinson, V., Than, M., Gee, P., Henderson, S., ... Deely, J. M. (2012). The initial health-system response to the earthquake in Christchurch, New Zealand, in February, 2011. *The Lancet*, *379*, 2109-2115. doi:10.1016/S0140-6736(12)60313-4
- Beaglehole, B., Bell, C., Beveridge, J., & Frampton, C. (2015a). Psychiatric admissions fall following the Christchurch earthquakes: An audit of inpatient data. *Australian and New Zealand Journal of Psychiatry*, *49*, 346-350. doi: 10.1177/0004867414560651
- Beaglehole, B., Bell, C., Frampton, C., Hamilton, G., & McKean, A. (2015b). The impact of the Canterbury earthquakes on prescribing for mental health. *Australian and New Zealand Journal of Psychiatry*, *49*, 742-750. doi: 10.1177/0004867415589794
- Bell, C., Carter, F., Boden, J., Ali, A., McKenzie, J., & Wilkinson, T. (2016). Psychological impact of the Canterbury earthquakes on university staff. *New Zealand Medical Journal*, *129*, 18-28. www.nzma.org.nz/journal/read-the-journal/all-issues/2010-2019/2016/vol-129-no-1430-19-february-2016/6812
- Boyatzis, R. (1998). *Transforming qualitative information: Thematic analysis and code development*. London: Sage.
- Carter, F. A., Bell, C. J., Ali, A. N., McKenzie, J., & Wilkinson, T. J. (2014). The impact of major earthquakes on the psychological functioning of medical students: A Christchurch, New Zealand study. *New Zealand Medical Journal*, *127*, 54-66. www.nzma.org.nz/journal/read-the-journal/all-issues/2010-2019/2014/vol-127-no-1398/6211
- Fergusson, D. M., & Boden, J. M. (2014). The psychological impacts of major disasters. *Australian and New Zealand Journal of Psychiatry*, *48*, 597-599. doi: 10.1177/0004867414538677
- Fergusson, D. M., Boden, J. M., Horwood, L. J., & Mulder, R. T. (2014a). Perceptions of distress and positive consequences following exposure to a major disaster amongst a well-studied cohort. *Australian and New Zealand Journal of Psychiatry*, *49*, 351-359. doi: 10.1177/0004867414560652
- Fergusson, D. M., Horwood, L. J., Boden, J. M., & Mulder, R. T. (2014b). Impact of a major disaster on the mental health of a well-studied cohort. *JAMA Psychiatry*, *71*, 1025-1031. doi: 10.1001/jamapsychiatry.2014.652
- Fredrickson, B. L. (2004). The broaden-and-build theory of positive emotions. *Philosophical Transactions of the Royal Society of London Series B-Biological Sciences*, *359*, 1367-1377. doi 10.1098/rstb.2004.1512
- Helton, W. S., & Head, J. (2012). Earthquakes on the mind: Implications of disasters for human performance. *Human Factors*, *54*, 189-194. doi:10.1177/0018720811430503
- Helton, W. S., Head, J., & Kemp, S. (2011). Natural disaster induced cognitive disruption: Impacts on action slips. *Consciousness and Cognition*, *20*, 1732-1737. doi: 10.1016/j.concog.2011.02.011
- Janoff-Bulman, R. (2004). Posttraumatic growth: Three explanatory models. *Psychological Inquiry*, *15*, 30-34. www.jstor.org/stable/20447198
- Johal, S., Mounsey, Z., Tuohy, R., & Johnston, D. (2014a). Coping with disaster: General practitioners' perspectives on the impact of the Canterbury earthquakes. *PLoS Currents*, *6*. doi: 10.1371/currents.dis.cf4c8fa61b9f4535b878c48eca87ed5d



- Johal, S., Mounsey, Z., Tuohy, R., & Johnston, D. (2014b). Patient reactions after the Canterbury earthquakes 2010-11: A primary care perspective. *PLoS Currents*, 6. doi: 10.1371/currents.dis.4ad3beea9e155dd5038a8d2b895f0df4
- Johal, S. S., Mounsey, Z., Brannelly, P., & Johnston, D. M. (2016). Nurse perspectives on the practical, emotional, and professional impacts of living and working in post-earthquake Canterbury, New Zealand. *Prehospital and Disaster Medicine*, 31, 10-16. doi: 10.1017/S1049023X15005439
- Johal, S. S., & Mounsey, Z. R. (2015). Finding positives after disaster: Insights from nurses following the 2010-2011 Canterbury, NZ earthquake sequence. *Australasian Emergency Nursing Journal*, 18, 174-181. doi: 10.1016/j.aenj.2015.09.001
- Joseph, S., & Linley, P. A. (2005). Positive adjustment to threatening events: An organismic valuing theory of growth through adversity. *Review of General Psychology*, 9, 262-280. doi: 10.1037/1089-2680.9.3.262
- Kemp, S., Helton, W., Richardson, J., Blampied, N., & Grimshaw, M. (2011). Sleeplessness, stress, cognitive disruption and academic performance following the September 4, 2010, Christchurch earthquake. *Australasian Journal of Disaster and Trauma Studies*, 2, 11-18. www.massey.ac.nz/~trauma/issues/2011-2/AJDTS_2011-2_Kemp.pdf
- Kemp, S., Helton, W. S., Richardson, J. J., Blampied, N. M., & Grimshaw, M. (2013). How does a series of earthquakes affect academic performance? In K. Pfeifer & N. Pfeifer (Eds.), *Forces of nature and cultural responses* (pp. 51-67). New York: Springer.
- Lambert, S. (2014). Indigenous peoples and urban disaster: Māori responses to the 2010-12 Christchurch earthquakes. *Australasian Journal of Disaster and Trauma Studies*, 18, 39-48. www.massey.ac.nz/~trauma/issues/2014-1/AJDTS_18-1_Lambert.pdf
- Lev-Wiesel, R., & Amir, A. M. (2006). Growing out of ashes: Posttraumatic growth among Holocaust child survivors: Is it possible? In L.G.C.R.G. Tedeschi (Ed.), *Handbook of posttraumatic growth: Research and practice* (pp. 248-263). Mahwah, New Jersey: Erlbaum.
- Mancini, A., & Bonanno, G. (2010). Resilience to potential trauma: Toward a lifespan approach. In J. Reich, A. Zandra, & J. Hall (Eds.), *Handbook of adult resilience* (pp. 259-273). New York: Guilford Press.
- Morris, B.A., Shakespeare-Finch, J., & Scott, J. L. (2012). Posttraumatic growth after cancer: the importance of health-related benefits and newfound compassion for others. *Supportive Care in Cancer*, 20, 749-756. doi: 10.1007/s00520-011-1143-7
- Mutch, C. (2015). Quiet heroes: Teachers and the Canterbury, New Zealand, earthquakes. *Australasian Journal of Disaster and Trauma Studies*, 19, 77-86. www.massey.ac.nz/~trauma/issues/2015-2/AJDTS_19_2_Mutch.pdf
- Park, C. L., Cohen, L. H., & Murch, R. L. (1996). Assessment and prediction of stress-related growth. *Journal of Personality*, 64, 71-105. doi: 10.1111/j.1467-6494.1996.tb00815.x
- QSR International (2012). NVivo (Version 10). Retrieved from www.qsrinternational.com
- Shakespeare-Finch, J., & Armstrong, D. (2010). Trauma type and posttrauma outcomes: differences between survivors of motor vehicle accidents, sexual assault, and bereavement. *Journal of Loss & Trauma*, 15, 69-82. doi: 10.1080/15325020903373151
- Smith, R., McIntosh, V., Carter, J., Colhoun, H., Jordan, J., Carter, F., & Bell, C. (2016). Thriving after trauma: posttraumatic growth following the Canterbury earthquake sequence. *Australasian Journal of Disaster and Trauma Studies*, 20, 125-134. www.massey.ac.nz/~trauma/issues/2016-2/AJDTS_20-2_Smith.pdf
- Taku, K., Tedeschi, R. G., Cann, A., & Calhoun, L. G. (2009). The culture of disclosure: Effects of perceived reactions to disclosure on posttraumatic growth and distress in Japan. *Journal of Social and Clinical Psychology*, 28, 1226-1243. doi: 10.1521/jscp.2009.28.10.1226
- Tedeschi, R. G., & Calhoun, L. G. (1996). The posttraumatic growth inventory: Measuring the positive legacy of trauma. *Journal of Traumatic Stress*, 9, 455-471. doi:10.1007/bf02103658
- Tedeschi, R. G., & Calhoun, L. G. (2004). Posttraumatic growth: Conceptual foundations and empirical evidence. *Psychological Inquiry*, 15, 1-18. doi: 10.1007/bf02103658
- Tugade, M. M., & Fredrickson, B. L. (2004). Resilient individuals use positive emotions to bounce back from negative emotional experiences. *Journal of Personality & Social Psychology*, 86, 320-333. doi: 10.1037/0022-3514.86.2.320
- Wilcox, L. (Ed.). (1997). *Sayings of the Sufi sages*. Washington, DC: MTO Shahmaghsoudi.

Practice update

Get prepared for an emergency: An infographic

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Abstract

Effective preparedness messages increase human capacity to prepare, respond and minimise harm during an emergency. The purpose of this study was to highlight the development of a pictorial infographic resource for earthquake and other emergencies for older people, people with mobility issues and people with literacy concerns in Aotearoa/New Zealand. A case study methodology was used to enable an in-depth description of the processes involved in designing, developing and disseminating the infographic. Case studies provide a medium to represent community-situated knowledge and expertise. They value context, specificity and lived experience. The second two authors drove the initiative, and project managed the production of the infographic. The first author conducted a semi-structured interview with the other two authors to garner details of the process. This interview was transcribed and the case study outline was crafted. The authors went on to produce this paper collectively. The outcomes of this case study include recommending that a multidisciplinary approach be used to engage a range of stakeholders, to produce suitable preparedness messages for a range of audiences. Designing preparedness resources necessitates an iterative method and collective decision-making by relevant stakeholders. International best-practice guidelines provide evidence to ensure suitable resources are produced and gaps in knowledge identified, so that emergency preparedness is accessible for all.

Keywords: *Preparedness, emergency management, infographic, earthquake, disability, community*

This study showcases the development of an infographic to increase awareness about earthquake and emergency preparedness for diverse communities within Aotearoa/New Zealand, and more widely. The global increase in disasters is a constant reminder of the need to adequately prepare. For instance, the 2015 Nepali earthquake killed, injured, and displaced thousands of people who were left without access to drinking water or food. Situated in Southern Asia with a population of approximately 26.4 million, Nepal has been plagued by infectious disease outbreaks as it struggled to rebuild destroyed communities and infrastructure (Basnyat et al., 2015). The Canterbury earthquake sequence of 2010 and 2011 was a stark reminder of the earthquake risk inherent to Aotearoa/New Zealand, an isolated country situated in the southwest of the Pacific Ocean with a population of approximately 4.7 million (Statistics New Zealand Tauranga Aotearoa, 2016). The major February 2011 Christchurch earthquake (magnitude 6.3) killed 185 people, injured many more and caused significant infrastructure damage (New Zealand Police Nga Pirihimana o Aotearoa, 2012).

Aotearoa/New Zealand is located on the Australasian and Pacific tectonic plate boundary, and the capital city of Wellington sits atop a number of active geological faults, making it particularly prone to earthquakes (GNS Science Te Pū Ao, 2016). Consequently, people of Wellington are encouraged to prepare for earthquakes because of potential social, economic and health impacts including death, injury, geographical dislocation, damage to property, and psychosocial distress. The recent disasters experienced in Nepal, Canterbury, and elsewhere emphasise the importance of increasing human capacity to prepare and respond to an emergency to help safeguard against potentially serious harm.

Preparedness strategies occur at the reduction, readiness, response and recovery phases of a disaster. They enable people to identify and eliminate risks, develop competences, save lives and regenerate communities as they rebuild after an emergency strikes (Ministry of Civil Defence and Emergency

Management, 2015; Paton, 2003). To encourage preparedness, targeted self-help programmes and public marketing campaigns aim to inform and educate. Community collaboration and engagement concerning preparedness aims to increase community knowledge to help overcome barriers that can hinder people from preparedness activities. Education strategies are disseminated through various print and social media sites, television and radio channels and public discussion domains. Additionally, scholarly research enables agencies and communities to evaluate the effectiveness of preparedness communication and action. This helps to produce preparedness knowledge, and enables political advocacy to reduce poverty and support minority groups (Frumkins, 2011).

With an understanding of the necessity of both academic and practical work and effectual preparedness messaging, this paper presents a case study outlining the way in which two of the authors, Anna-Marie Miller and Angela Rampton, from the Wellington City Council Neighbourhood and Community Networks team,

produced a targeted infographic signifying what to do when an earthquake hits and how to more generally prepare for a disaster. This infographic is shown in Figure 1. Anna-Marie and Angela have a neighbourhood and community development focus in their roles with the Wellington City Council. Anna-Marie is a Community and Neighbourhood Advisor and Angela is a Neighbourhood Development Coordinator.

Context for infographic

Since the Canterbury earthquake sequence of 2010/2011, earthquake preparedness messages have been prolific within Aotearoa/New Zealand. The standard message advises people to *drop, cover and hold* when an earthquake happens (Ministry of Civil Defence & Emergency Management, 2015). More specifically, when in a building, people are advised to only take a few steps before dropping to the ground because large earthquakes can produce such severe shaking that people are thrown to the ground. The recommendation is to quickly find cover under sturdy furniture, like a table or desk. Holding onto a sheltering object provides protection and stops it from shaking away, while crouching over or getting into a ball position protects the body's main organs (Ministry of Civil Defence & Emergency Management, 2016a).

A study by Johnston et al. (2014) found that two-thirds of the injuries from the Aotearoa/New Zealand Canterbury earthquake sequence were caused by the primary shaking. However the actions people took during the primary shaking and aftershocks also led to injuries: 51.3% Darfield; 19.4 % Christchurch. Where people are and what they do during an event influences injury risk. The Aotearoa/New Zealand Ministry of Civil Defence and Emergency Management (2016a) contend that most deaths and injuries during an earthquake occur due to falling objects, flying glass and collapsing walls and that drop, cover and hold reduces this risk.

Despite the drop, cover and hold message being functional for many, it assumes homogeneity because there are pockets of people who cannot effortlessly drop, cover or hold. While the drop, cover and hold message provides information on what to do immediately should an earthquake hit, it is not fit for purpose for some people (Paton, 2003). Groups that have trouble responding in an emergency situation include older adults and people with limited mobility (Tuohy & Stephens, 2012). People with mobility issues have anxiety about not being able to drop to the ground and, if they can get to the ground,



Figure 1. Get Prepared for an Emergency infographic. Reproduced from *Get Prepared for an Emergency* (p.1) by A. Miller & A. Rampton. Copyright 2016 by Wellington City Council. Reproduced with permission.

they worry they cannot get up again or that they might injure themselves in the process.

This situation was highlighted for Angela, during the 6.5 magnitude Seddon earthquake that affected Wellington in 2013. This earthquake caused minor injuries to four people, liquefaction, damage to buildings, and interruptions to Wellington traffic and human infrastructure (Hancox, Perrin, Archibald, Misra, & Cousins, 2013). At the time, Angela had a colleague on the sixth floor of her Wellington workplace who required a wheelchair for mobility. Angela reported that while able-bodied staff dropped under their desks as the earthquake struck, the colleague had to remain in her wheelchair and could not seek cover. Evacuating the building was also difficult for her colleague. Lifts could not be used so an evacuation chair was necessary. Since the World Trade Centre disaster in 2001, and with the increase in disabled people in the workforce, fire safety communities worldwide are reformulating evacuation strategies to include mobility impairment. Movement speeds and egress movement data are now being collected, although research remains scarce. Ongoing research that accounts for evacuation diversity is essential to enable engineers to understand time required for safe egress in a more inclusive way (Kuligowski, Peacock, Wiess, & Hoskins, 2013).

Other barriers to earthquake preparedness were brought to Anna-Marie's and Angela's attention when they were approached by community organisations frustrated by the lack of simple, coherent and easily understandable information on what to do in an earthquake. It became apparent to them that groups who struggled with the standard 'get prepared' message were culturally and linguistically diverse and had poor command of the English language. One humanitarian group told Anna-Marie and Angela that people struggle with literacy even in their native language. In such circumstances, people cannot sufficiently prepare survival kits because they cannot understand what is required of them. Some of the existing preparedness resources are over 10 pages long, or involve navigating intricate websites (see Ministry of Civil Defence & Emergency Management, 2016a). It seemed that users felt like it is too hard to get prepared. Krum (2014) argues that when people are overloaded with large amounts of data it is difficult to filter non-essential information, focus on the relevant material and remember significant points. This is concerning when the information is potentially life-saving. Trying to assimilate an ever expanding stream of knowledge

produces a form of anxiety, especially when people are aware that they do not understand information that they really need to know (Cairo, 2013; Wurman, 2000).

Understanding vulnerability characteristics, as argued by Paton and Johnston (2001), is important for the development of appropriate risk reduction strategies. People are heterogeneous, so identifying at risk groups and their relationship to the potential hazards enables targeted information that assists in mitigating risk. Anna-Marie and Angela realised they needed to produce a suitable resource for a range of older people, people with mobility issues, and for people with literacy concerns.

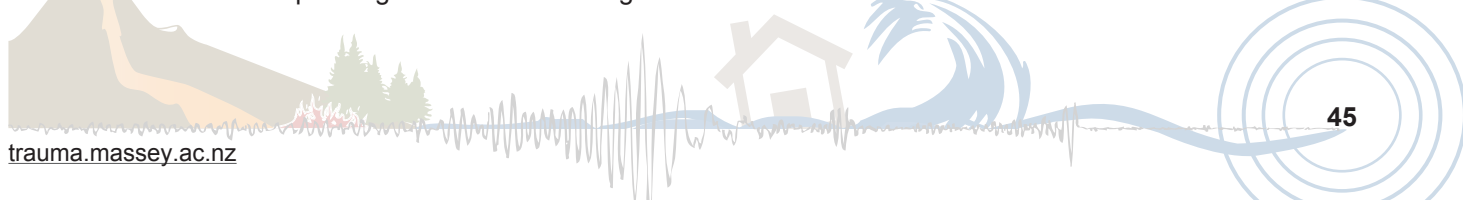
Method

Design

A case study framework was used to produce this paper because it enabled an in-depth investigation of the infographic project. As argued by Yin (2014), case studies explore contextually embedded phenomena. Case studies support community-situated knowledge and expertise, and enable community initiatives to be narrated through the lived experiences of community members. Often misunderstood, it is claimed that case study methodology is problematic because it fails to build theory, lacks generalisability, and represents biased researcher knowledge (Flyvbjerg, 2011). However, the current paper values specificity and lived experience, while resisting a reductionist, objective and decontextualized lens. Following Hays (2004), this work depicts the commitment and energy taken to produce community capacity and exemplifies the importance of practitioner work.

Procedure

To elicit the women's experiences, interviews were conducted in a manner akin to standpoint research. Standpoint epistemology privileges localised, situated and contextual knowledge where the participant practitioner is located as the expert (Marecek, 1989). The crafting of the current paper therefore began when the three authors met to discuss inspiration for, and development of, the infographic. The first author interviewed the other two authors in a subsequent meeting, using a semi-structured interview style. The interviews were then transcribed verbatim and given to the second and third authors to shape a narrative outline from their own accounts.



Analysis

Through a reciprocal co-authorship process, the first author facilitated ongoing discussion and feedback to extend the initial outline. This enabled the case study themes to be refined and new key processes in the design of the infographic to be identified. The authors co-produced the story to provide an example of what practitioner-led initiatives can enable. Co-authorship provided a form of validity checking, whereby each member was able to corroborate the representation of experience and community processes that enabled the infographic to be developed.

Findings and Discussion

The following case study presents processes involved in producing an infographic that aims to increase awareness about emergency preparedness for diverse and marginalised people in Aotearoa/New Zealand, and beyond. The second and third authors' experiences were conceptualised into case study themes that included: the development of the preparedness resource; the importance of multidisciplinary collaboration; working with a media design team; choosing the infographic content; infographic design issues such as colour, materials and logos; public distribution; and national recognition.

Developing Preparedness Material for People with Mobility or Literacy Issues

Anna-Marie and Angela recognised that there was a need for appropriate emergency preparedness messages for people with mobility or literacy concerns. They searched for international resources on how these people should respond in an emergency situation, such as an earthquake, but were unable to find anything that conveyed a suitable message. They found that resources were wordy, confusing or conveyed a sense of panic and used generic stick figure images in yellow and black. Very few provided information specifically relating to people with a range of mobility issues. Phibbs, Williamson, Woodbury, and Good (2012) had previously investigated disabled community experiences during the Canterbury earthquake sequence of 2010/2011. They argued that research should promote awareness about where to find disability accessible information and that institutions should continue to engage in emergency management planning to assist the disabled.

While Anna-Marie and Angela needed emergency preparedness information suitable for people with

mobility issues, they also required a resource that had wider application. After further research it was decided the resource should be picture based so people with limited literacy and English skills could use it. The message needed to be straightforward to engender confidence about knowing what to do in an earthquake and the belief that being prepared for an emergency was easily achievable. Unable to find a resource that fitted these criteria, they decided to create one in collaboration with community, non-governmental and governmental agencies.

Exploring local initiatives, Anna-Marie and Angela found that government departments, including their own, were using pictographs and infographics to display a range of information. Fast growing in popularity because of the potential to reach diverse audiences, infographics transform written and verbal data into simple and accessible graphical layouts. They use stories to engage behaviour, promote knowledge and communicate complex ideas (Cairo, 2013; Tuncali, 2016). Infographics are similar to articles or speeches argued Krum (2014), because they inform and entertain, while also persuading audiences to take action with the information they are presented. Persuasion techniques require that people think about information (O'Keefe, 2008), and a well-designed infographic can encourage thoughtful engagement (Cairo, 2013). A core aim of disaster preparedness messaging is getting people to utilise the information to reduce risk and increase preparedness, such as knowing what to do in an earthquake (Paton & Johnston, 2001). Anna-Marie and Angela realised this form of communication fitted their purposes and was a suitable tactic to get their preparedness message across.

A Multidisciplinary Collaboration

Anna-Marie and Angela were given permission by their organisation to begin the project in October 2014. They adopted a collaborative multidisciplinary approach by engaging a wide range of representative stakeholders in the content and design of the resource. Involving stakeholders in community activities can aid in community cohesion, while strengthening social capital and experiences of efficacy, which all contribute to community resilience (Paton & Johnston, 2001). Initial emails pitching their idea were forwarded to identified stakeholders. All stakeholders responded positively and ongoing consultation occurred with Age Concern, People First, Wellington City Council's Accessibility Advisory Group, Wellington City Council's

City Housing, Red Cross, Refugee Services, Deaf Aotearoa, Arthritis New Zealand, the Ministry of Civil Defence and Emergency Management, Wellington Region Emergency Management Office, and the Centre for Research, Evaluation and Social Assessment. The latter was an organisation that researched older people and emergencies and that Ana-Marie and Angela had previously worked with.

Human centred design, according to Steen (2011), is when designers and potential users collaborate on the development of a product. Designers must balance the tension between their knowledge and expertise with that of the users, while aiming to match end-users' needs and practices. Anna-Marie and Angela employed this approach and initial meetings with stakeholders included discussions about which key messages to include in the infographic resource. During these meetings, various stories from the Christchurch earthquake were recounted. For example, it was highlighted how people were unable to access hearing aid batteries and experienced difficulties when they could not hear instructions. Embarrassment stopped people from confessing that they could not hear and officials just assumed they understood.

Anna-Marie and Angela highlighted how these kinds of multidisciplinary engagement processes take time, patience and professionalism. Figure 2 is from a PowerPoint presentation that Anna-Marie and Angela shared with stakeholders near the end of the infographic process, on the 3rd of July, 2015. The slide showed various versions of the infographic and highlighted the challenges of stakeholder engagement.



Figure 2. Excerpt from PowerPoint presentation by Anna-Marie and Angela.

Choosing a Graphic Design Company

A professional graphic design company was initially consulted to work on the infographic. The potential templates looked promising. However, Anna-Marie and Angela needed to get a balance of quotations before deciding on a graphic company, as is prudent with a small budget and public money. A significantly lower quotation from the Wellington City Council in-house design team led to a contract with this team, even though Anna-Marie and Angela were initially keen to work with the external design company. In hindsight, Anna-Marie and Angela realised this was fortuitous because the in-house designers were easily accessible, professional and patient. Numerous meetings transpired, including several occasions where the graphics team needed to explain the complexity of creating graphics, including the importance of font size and spacing issues, to Anna-Marie and Angela. They had an Easy Read (People First New Zealand Ngā Tāngata Tuatahi, n.d.) guideline for best practice, but applying these suggestions was not straightforward. Designers did not necessarily agree with the best practice approach because it targeted general information materials and did not necessarily convert to specialised or graphic-based documents. Anna-Marie and Angela started listening to their designer team more as trust was built and as they observed the design teams' expertise in action.

Infographic Content

The Emergency Survival Items and Getaway Kit produced by the Aotearoa/New Zealand Ministry of Civil Defence and Emergency Management (2016b) was used as a guide on what information to include, because it provided a comprehensive list of items required during and following an earthquake. However, condensing the needs of diverse groups into a few key items was complex, especially when comparing items that were needed at home with items needed when evacuating. A lot of consideration was given to particular items that had been suggested as essential in early discussions with stakeholder groups but that were not included in government preparedness messages, such as walking sticks. Stakeholders reported that following the Christchurch earthquakes, even people without mobility-related conditions found the uneven and bumpy streets difficult to manoeuvre and needed walking sticks to get around.

Early iterations of the infographic included hearing aids and medications, as shown in Figure 4 and Figure 5. However, it was decided that it was better to encourage

knowing that they could not please everyone. They kept returning to their original purpose as a guiding philosophy, and focused on communicating high-level information with the aim of saving lives and preventing injuries.

Colour, Materials and Logos

As well as testing different emergency preparedness items on the infographic, early iterations involved trialling different colour schemes and graphical design. For examples, see Figure 4 and Figure 5.



Figure 4. Early iteration of Get Prepared for an Emergency.

Figures 4 and 5 demonstrate different foreground and background colour schemes, shaping and layout of the infographic. Colour contrast between background and foreground colours matters to people with low vision, as does image and wording size. The items shown also vary, for example, Figure 4 has a dog on a lead whereas it has been removed in Figure 5. Likewise, Figures 4 and 5 include different emergency items compared to Figure 1. The overall size of the infographic was also pertinent. Fitting everything onto an A4 sheet and making it visually appealing and clear was a challenge.

Choosing the type of print material was another significant decision. The team considered how people would use the resource. It is common knowledge that consumers easily discard paper materials and the authors wanted the infographic resource to have a sense of permanence. However, the project needed to remain financially manageable and the chosen material needed to be cost efficient. After much deliberation, it was decided to create the resource out of stiff A4 card with magnets attached, so that the resource could be displayed on fridges or other suitable surfaces where it could be often and easily referred to. Larger versions of the resource were also produced for display by groups and organisations, and for people with impaired vision requiring larger print. One of these larger versions is shown in Figure 7.

The logos of the Wellington City Council, the Wellington Region Emergency Management Office and the Ministry of Civil Defence and Emergency Management were included to represent the collaborative approach to the project and helped to give the resource credibility. As argued by O’Keefe (2008), credible sources that engage systematic thinking and convincing arguments related



Figure 5. Another early iteration of Get Prepared for an Emergency.

to the data are important to the process of persuasion. Logos representing trusted sources are shown in Figure 6.



Figure 6. Logos on the bottom right hand corner of the Get Prepared for an Emergency infographic. Reproduced from *Get Prepared for an Emergency* (p.1) by A. Miller & A. Rampton. Copyright 2016 by Wellington City Council. Reproduced with permission.

Public Distribution and National Recognition

The final version of the infographic poster shown in Figure 1 was released in July 2015. The overall time frame for the project was longer than expected. With the first email inquiries sent out in October 2014, Anna-Marie and Angela initially aimed to release the infographic on Aotearoa/New Zealand’s national Neighbours Day in late March 2015. Although ambitious, they report that a strict timeline helped focus the work.

While the infographic was being completed, Anna-Marie and Angela published an article about the resource for the June 2015 edition of the Ministry of Civil Defence and Emergency Management magazine, *Impact* (Miller & Rampton, 2015). This magazine is distributed to councils and emergency management offices throughout Aotearoa/New Zealand. It provides brief updates on civil defence and emergency management activities and issues and is available online and in press to anyone who is interested in civil defence and emergency management matters.

The official infographic launch was held on the 1st of September 2015 at the CQ Hotel in Wellington. This was an accessibility sensitive hotel that provided services for people with a hearing or visual impairment or other disabilities (CQ Hotel, 2016). Nikki Wagner, Minister for Disability Issues and then Associate Minister of the Christchurch Earthquake Recovery Authority, and Celia Wade-Brown, then Mayor of Wellington, spoke at the launch. The launch was also attended by local councillors, members of the steering group, and members of disability and senior communities.

After the official launch, Anna-Marie and Angela focused their efforts on a distribution plan to reach a wide range of audiences. The infographic was sent to all stakeholders who had assisted in its development as well as other organisations working with culturally and linguistically diverse communities, older people, or people with mobility issues. It was also circulated to organisations such as the local District Health Board, doctors’ surgeries, libraries, community centres, and Wellington City Council’s City Housing tenants.

The Capital and Coast District Health Board included a version of the infographic in their health passports, a document that holds people’s health information in one place, so their information is easily accessible when visiting medical services. This document outlines the type of communication and support a person requires, which is important for people who have hearing impairments, speak English as a second language, or experience some form of dementia (Wellington City Council, 2015). Health passports are also important resources for emergency preparedness. If people need to evacuate suddenly, a health passport has information about medications that can be given to new medical doctors if full health records are not available. As another part of the distribution



Figure 7. Angela and Anna-Marie during one of their travelling road show presentations of the Get Prepared for an Emergency infographic.

strategy, Anna-Marie and Angela went on what they called a travelling road show. They visited a range of community groups, such as English as a second language classes and retirement villages, to present the poster and to discuss how to respond to and prepare for an emergency.

Feeling satisfied with their substantial efforts in producing the infographic and disseminating this resource, Anna-Marie was surprised when she received a phone call from a Red Cross representative about the misuse of the Red Cross emblem on the infographic first aid kit. The Red Cross representative explained that the Red Cross emblem was first used during World War I when it signified that medical staff were protecting the injured and sick. According to the Red Cross (2016) website, the red cross emblem remains a symbol for the protection of those providing medical care during armed conflict. Consequently, there are regulations surrounding the use of this emblem, and permission to use the emblem must be granted by the Minister of Defence. Anna-Marie and Angela were told to use a green cross for first aid kits as shown on the infographic. They realised it was a lesson in tracking who was checking drafts and how often.

The preparedness infographic has since received national recognition. As shown in Figure 8, the infographic poster received a special commendation in the category of Finalist Best Plain English Document Award from WriteMark Plain English Awards in 2015. WriteMark is an internationally recognised institution that judges the quality of writing for clarity and effect (Writemark Plain English Awards, 2016).

In 2016, Anna-Marie and Angela presented the emergency preparedness infographic poster to a community group in Newtown, Wellington, as part of

a safety evening. Local Aotearoa/New Zealand Fire Service staff were also speaking at the event. Impressed with the simple and easy to read nature of the poster, the Fire Service has created a similar pictorial resource with few words concerning personal fire safety. They are currently looking at ways of producing and distributing this infographic for the public. While presenting information on the infographic at a conference at a local university, the Director of the Joint Centre for Disaster Research encouraged Anna-Marie and Angela to write an article to share the process of developing the infographic. This was the initial motivation for the current paper.

The infographic has been updated since the initial launch, to reflect current knowledge about water-related preparedness. In May 2016, Wellington Water (2016) updated their recommendations about how much water people should store in preparation for an emergency. The recommended amount shifted from three days to at least seven days, to allow time for alternative methods of mass water distribution, for example: Emergency water tanks filled by water tankers in communities around Wellington. There has also been a written version of the poster produced for people who use screen readers, which are electronic devices that speak written texts out loud.

Various district and regional councils, emergency management groups and community groups from around Aotearoa/New Zealand have contacted Anna-Marie and Angela asking for permission to use the infographic in their different areas. Anna-Marie and Angela are pleased with the infographic's success and strongly endorse the use of this resource. They have even sent out the design files to other councils around Aotearoa/New Zealand who want to make slight adjustments to fit their regions. They only request that the Wellington City Council is acknowledged. Colleagues at the Christchurch City Council are looking to have the infographic translated into other languages for their culturally and linguistically diverse communities. Anna-Marie and Angela continue to work in the community development space. They have ongoing discussions about the infographic with interested parties, including the intended end users.

Conclusion

Having limited experience in creating a public infographic, Anna-Marie and Angela encountered many hurdles on their way to producing the preparedness infographic. The following section therefore summarises some of



Finalist Best Plain English Document — Public
Wellington City Council — *Get prepared for an emergency*

Feedback and recommendations from the judging panel

The purpose of this poster is very clear. It presents a really important message, and therefore needs to work well for all citizens, however literate. It absolutely achieves this. It looks like the result of a very good design process. The graphics are entirely relevant and work in perfect tandem with the words. We can't think of any ways to improve it. Excellent work.

We found it hard to judge this poster alongside other entries, as this one has so few words! This makes us think that we need a new 'Best infographic' category in future, so entries like this one can be more fairly judged against other similar entries.

Figure 8. Commendation for *Get Prepared for an Emergency* infographic. Reproduced from *Finalist Best Plain English Document* (p.1) by WriteMark. Copyright 2015 by Writemark Plain English Awards. Reproduced with permission.

their key lessons and suggestions for others who may undertake this type of work.

Anna-Marie and Angela advise people to consult with a wide range of groups before commencing the project, especially with intended end-user groups. Consultation enables community engagement, collaboration and shared knowledge production. In this sense, a human centred design approach, that values the intended end-user throughout the process, helps to direct important design decisions, from initial concept options to distribution strategies (Steen, 2011). Each stage of the infographic design should be an iterative process, where decision-making goes through repeated cycles of consultation and in-depth analysis to ensure that the material best fits the intended audience. When, who and how aspects of the drafting process should be carefully documented, so it is clear who is commenting on what versions.

Anna-Marie and Angela also recommend using international best practice guidelines and examples because they can provide evidence bases for how to engage communities of interest and end-users. It is also necessary to identify gaps in knowledge and communication strategies so that any new resources do not repeat previous design or communication errors, and so that the intended resource provides socially responsible and productive information.

It is vital to craft preparedness messages that value diversity, including cultural diversity. While education strategies can continue to provide generic information for large populations, such messages tend to only target majority groups. Disaster preparedness research and educational strategies should also prioritise minority groups. This should include people with a range of specific needs, such as older adults or people with low literacy or physical disabilities. The way that disabled and mobility impaired people are generally under-researched (Kuligowski et al., 2013; Phibbs et al., 2012) is mirrored in the preparedness domain. People with a disability or who are mobility impaired are under-researched in the disaster field and this needs to change (Phibbs et al., 2012).

Practitioners that work tirelessly to engage and support local communities at the local level also need to be recognised. The infographic resource, Get Prepared for an Emergency, produced by two community-focused Wellington City Council workers has seen preparedness messages reach those who had initially

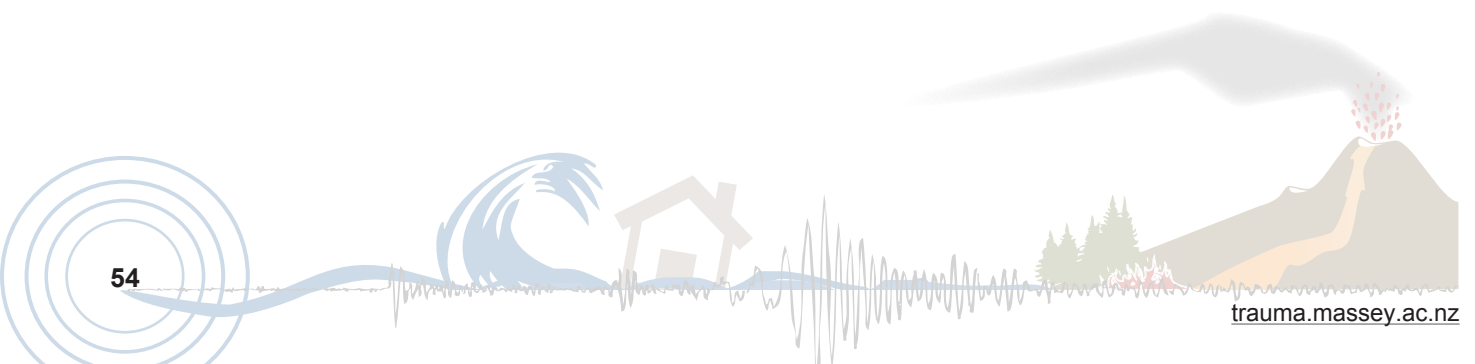
been inaccessible and overlooked. The importance of this work and how it is achieved needs to be communicated, understood and commended.

References

- Basnyat, B., Dalton, H. R., Kamar, N., Rein, D. B., Labrique, A., Farrar, J., . . . on behalf of 21 signatories (2015). Nepali earthquakes and the risk of an epidemic of hepatitis E. *The Lancet*, *385*, 2572-2573. doi:10.1016/S0140-6736(15)61110-2
- Cairo, A. (2013). *The functional art: An introduction to information graphics and visualization*. Berkeley, CA: New Rider.
- CQ Hotel. (2016). *Accessible facilities at CQ Hotels Wellington*. Retrieved from www.hotelwellington.co.nz/accessibility/cq-accessibility.htm
- Earthquake Country Alliance (2016). *How to protect yourself during an earthquake*. Retrieved from www.earthquakecountry.org/dropcoverholdon/#disability
- Flyvbjerg, B. (2011). Case study. In N. K. Denzin & Y. S. Lincoln (Eds.), *The sage handbook of qualitative research* (4 ed. pp. 301-316). London, UK: Sage.
- Frumkins, H. (2011). Bumps on the road to preparedness. *American Journal of Preventive Medicine*, *40*, 272-273. doi:10.1016/j.amepre.2010.11.001
- Gawith, L. (2011). How communities in Christchurch have been coping with their earthquake. *New Zealand Journal of Psychology*, *40*, 121-130. www.psychology.org.nz/publications-media/new-zealand-journal-of-psychology/
- GNS Science Te Pū Ao (2016). *Plate tectonics*. Retrieved from www.gns.cri.nz/Home/Our-Science/Earth-Science/Plate-Tectonics
- Hancox, G. T., Perrin, N. D., Archibald, G. C., Misra, S., & Cousins, W. J. (2013). *Reconnaissance report on liquefaction effects and landslides caused by the M 6.5 Cook Strait earthquake of 21 July 2013, New Zealand*. Retrieved from www.gns.cri.nz/static/pubs/2013/SR%202013-042.pdf
- Hays, P. A. (2004). Case study research. In K. deMarrais & S. D. Lapan (Eds.), *Foundations for research: Methods of inquiry in education and the social sciences* (pp.217-234). New Jersey, NY: Lawrence Erlbaum Associates.
- Health and Disability Commissioner Te Toihau Hauora Hauātanga (2016). *Health passport*. Retrieved from www.hdc.org.nz/about-us/disability/health-passport
- Johnston, D., Standing, S., Ronan, K., Lindell, M., Wilson, T., Cousins, J., . . . Bissell, R. (2014). The 2010/2011 Canterbury earthquakes: context and cause of injury. *Natural Hazards*, *73*, 627-637. doi:10.1007/s11069-014-1094-7
- Krum, R. (2014). *Cool infographics: Effective communication with data visualization and design*. Indianapolis, IN: Wiley & Sons.
- Kuligowski, E., Peacock, R., Wiess, E., & Hoskins, B. (2013). Stair evacuation of older adults and people with mobility impairments. *Fire Safety Journal*, *62*, 230-237. doi:10.1016/j.firesaf.2013.09.027
- Marecek, J. (1989). Introduction. *Psychology of Women Quarterly*, *13*, 367-377. doi:10.1111/j.1471-6402.1989.tb01008.x

- Miller, A.-M., & Rampton, A. (2015). Pictorial emergency preparedness poster. *Impact*, 56, 11. www.civildefence.govt.nz/resources/impact/
- Ministry of Civil Defence & Emergency Management (2015). *Drop, cover and hold is still the right action to take*. Wellington, Aotearoa/New Zealand: Ministry of Civil Defence and Emergency Management.
- Ministry of Civil Defence & Emergency Management (2016a). *Earthquake*. Retrieved from <http://getthru.govt.nz/disasters/earthquake>
- Ministry of Civil Defence & Emergency Management (2016b). *Emergency survival items and getaway kit*. Retrieved from www.civildefence.govt.nz/assets/Uploads/publications/consistent-messages-part-A-emergency-survival-kit.pdf
- Ministry of Civil Defence & Emergency Management (2016c). *People with disabilities or special requirements*. Retrieved from www.getthru.govt.nz/how-to-get-ready/people-with-disabilities/
- Ministry of Civil Defence and Emergency Management (2015). *Guide to the National Civil Defence Emergency Management Plan 2015*. Wellington, Aotearoa/New Zealand: Ministry of Civil Defence and Emergency Management.
- Morgan Foundation (2016). *That little ball of fluff you own is a natural born killer*. Retrieved from <https://garethsworld.com/catstogo/#.V6cQPpN95E4>
- New Zealand Police Nga Pirihimana o Aotearoa (2012). *Christchurch earthquake: List of deceased*. Retrieved from www.police.govt.nz/major-events/previous/christchurch-earthquake
- O'Keefe, D. J. (2008). Elaboration likelihood model. *International encyclopedia of communication*, 4, 1475-1480. www.communicationencyclopedia.com/public/
- Paton, D. (2003). Disaster preparedness: A social-cognitive perspective. *Disaster Prevention and Management: An International Journal*, 12, 210-216. doi: 10.1108/09653560310480686
- Paton, D., & Johnston, D. (2001). Disasters and communities: vulnerability, resilience and preparedness. *Disaster Prevention and Management: An International Journal*, 10, 270-277. doi: 10.1108/EUM0000000005930
- People First New Zealand Ngā Tāngata Tuatahi (n.d.). *Make it clear: A guide to making it easy read information*. Retrieved from www.peoplefirst.org.nz/news-and-resources/easy-read-resources/
- Phibbs, S. R., Williamson, K. J., Woodbury, E., & Good, G. A. (2012). *Issues experienced by disabled people following the 2010-2011 Canterbury earthquake series: Evidence based analysis to inform future planning and best practice guidelines for better emergency preparedness*. Retrieved from www.gns.cri.nz/static/pubs/2012/S%202012-040.pdf
- Red Cross. (2016). *Using the Red Cross emblem*. Retrieved from www.redcross.org.nz/about-us/centenary/world-war-i/using-red-cross-emblem/
- Southern California Earthquake Center (2016). *Protect yourself during earthquake shaking - drop, cover, and hold on*. Retrieved from www.earthquakecountry.org/roots/step5.html
- Statistics New Zealand Tāuranga Aotearoa (2016). *Statistics New Zealand*. Retrieved from www.stats.govt.nz/
- Steen, M. (2011). Tensions in human-centred design. *CoDesign*, 7, 45-60. doi:10.1080/15710882.2011.563314
- Tuncali, E. (2016). The Infographics which are designed for environmental issues. *Global Journal on Humanites & Social Sciences*, 3, 14-19. <http://sproc.org/ojs/index.php/ontsbs/article/view/272/pdf>
- Tuohy, R., & Stephens, C. (2012). Older adults' narratives about a flood disaster: Resilience, coherence, and personal identity. *Journal of Aging Studies*, 26, 26-34. doi:10.1016/j.jaging.2011.06.002
- Victoria State Emergency Service (2016). *What to do in an earthquake*. Retrieved from www.ses.vic.gov.au/get-ready/quakesafe/what-to-do-in-an-earthquake
- Wellington City Council (2015). *Emergency preparedness poster officially launched*. Retrieved from <http://wellington.govt.nz/services/community-and-culture/community-news-and-events/archived-articles/emergency-preparedness-poster-released>
- Wellington City Council (2016). *Get prepared for an emergency*. Wellington, Aotearoa/New Zealand: Wellington City Council.
- Wellington Water (2016). *Water supply resilience - gathering steam: Recent coverage compels action*. Wellington, Aotearoa/New Zealand: Wellington Water.
- WriteMark Plain English Awards (2016). *Who's the clearest of them all?* Retrieved from www.plainenglishawards.org.nz
- Wurman, R. S. (2000). *Information anxiety*. New York, NY: Que.
- Yin, R. K. (2014). *Case study research: Design and methods* (5th ed.). Los Angeles, CA: Sage.

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