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The need for careful study design when investigating the benefits of psychological interventions for trauma survivors: a commentary on Renner, Bänninger-Huber, Peltzer (2011)

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Abstract

Methodological concerns are explored and questions raised about the validity of conclusions reached in a recent article by Renner, Bänninger-Huber and Peltzer (2011). These authors reported treatment outcomes of Chechen asylum seekers and refugees with Posttraumatic Stress Disorder (PTSD), anxiety and depression following treatment with Group Cognitive Behavioural Therapy (CBT); a Culture-Sensitive and Resource Oriented Peer Group (CROP); Eye Movement Desensitization and Reprocessing (EMDR); and a wait-list condition. They concluded that CROP was significantly superior to wait-list and as effective as CBT in reducing symptomatology, and that EMDR was ineffective. However the study contains serious methodological problems including a lack of randomization information, a lack of independent evaluators, inadequate treatment fidelity, and inadequate treatment dosage. Furthermore, the small sample size, high attrition rate and unequal group numbers compromise the statistical power of this study, and possibly compromise the underlying statistical assumptions rendering any conclusions unreliable. This is serious given that misrepresentation of data is damaging to treatment models and clinical practice where such articles guide clinician's treatment choices.

Keywords: *methodological rigour, research design, Posttraumatic Stress Disorder, EMDR*

Investigation into the effectiveness of treatments for Posttraumatic Stress Disorder (PTSD) in western and non-western cultures is vital as our societies become increasingly diverse. It cannot be assumed that a treatment proven to be effective in one culture will necessarily be effective when working with individuals from another culture.

An article published in this journal by Renner, Bänninger-Huber and Pelzer (2011) claimed to provide scientific data on the effectiveness of a Culture-Sensitive and Resource Oriented Peer (CROP) group method in comparison to Cognitive Behavioural Therapy (CBT), Eye Movement Desensitization and Reprocessing (EMDR) and a wait-list group. The participants were Chechen asylum seekers and refugees with symptoms of Posttraumatic Stress Disorder (PTSD). Methodological flaws such as unequal group sizes (CROP n=9, CBT n=10, EMDR n=6, WL n=7), unequal session numbers (CROP and CBT groups receiving 15 sessions in comparison to three EMDR sessions) and possible treatment and therapist bias compromised the results and the ability to compare EMDR to the other intervention groups. A critique of these methodological flaws is presented to highlight the importance of methodological rigour in treatment outcome studies.

Methodological differences in studies have been found to lead to different conclusions about treatment efficacy (Kazdin, 1994). In recent years it has been highlighted that the quality of reporting of randomised controlled trials (RCTs) is not optimal and that without transparent reporting, readers cannot judge the reliability and validity of trial findings.

A group of scientists and editors developed the CONSORT (Consolidated Standards of Reporting Trials) statement to improve the quality of reporting of RCTs (Schulz, Altman & Moher, 2010). Two notable studies specific to PTSD have also aimed to guide methodological rigour in this field; Foa and Meadows (1997) and Maxfield and Hyer (2002). Both referred to a gold standard research design which is a representation of standards that are understood when conducting and reviewing research in psychotherapy. These guidelines have enhanced our capacity to design, evaluate and

draw accurate conclusions that ultimately guide our clinical decisions.

Foa and Meadows (1997) described seven parameters as being critical to a methodologically strong outcome study: 1) Clearly Defined Target Symptoms; 2) Reliable and Valid Measures; 3) Use of Blind Evaluators; 4) Assessor Training; 5) Manualized, Replicable, Specific Treatment Programs; 6) Unbiased Assignment to Treatment; 7) Treatment Adherence. Maxfield and Hyer (2002) looked at whether differences in research outcomes were related to methodological differences. Their study employed a gold standard research scale, adapted from Foa and Meadows (1997), to critique methodological strengths and weaknesses and their association with effect sizes for research publications on EMDR. This examination demonstrated a significant correlation between gold standard research methods and treatment outcomes. Maxfield and Hyer (2002) concluded that assessment reliability and treatment fidelity were critical factors in methodological rigour. Overall, as the methodology became more rigorous, the treatment effect had become positive and size of the effect larger (Maxfield & Hyer, 2002). Bearing these results in mind, we have used these gold standards to critique the paper by Renner, Bänninger-Huber and Pelzer (2011).

The lack of adequate information regarding randomization in the Renner et al. (2011) paper is of major concern. Although the authors stated that "participants were assigned to the above mentioned conditions at random" (p.5), the process of random assignment was not disclosed. The unequal cell sizes (CROP n=25, CBT n=21, EMDR n=17 and Wait List (WL) n=31) may indicate a lack of adequate random allocation sequencing. According to CONSORT guidelines, randomization procedures and the allocation ratio should be identified as it is an integral part of controlled research (Schulz et al., 2010). Allowing readers to assess the generation of the random allocation sequence permits them to uncover the likelihood of selection bias in group assignment; and to assess whether any differences in outcomes between groups reflect the treatment rather than extraneous factors (Foa & Meadows, 1997; Maxfield & Hyer, 2002; Schulz, Chalmers, Hayes & Altman, 1995).

To ensure that therapist and treatment effects can be separated, not only should the allocation to treatment condition be randomized but also treatment should be delivered by at least two therapists to whom participants are randomly assigned (Foa & Meadows, 1997; Maxfield

& Hyer, 2002). In the Renner, Bänninger-Huber and Pelzer (2011) study participants in the CBT and CROP groups were assigned to one of two therapists based on gender, whereas just one therapist delivered EMDR. This design introduced the possibility of therapist effects, where therapist characteristics such as training and competence, personal characteristics and experience levels can interfere with treatment delivery and treatment outcomes (Elkin, 1999). The introduction of a second therapist in the EMDR group, and computer generated randomization to conditions and therapists would have removed extraneous factors while also ensuring equal distribution to each condition.

Gold standard research requires use of blind independent assessors to combat expectancy and demand bias in participants and therapists. Renner, Bänninger-Huber and Pelzer (2011) did not disclose whether the assigner of conditions was blind to participant assessment or whether the evaluator (the first author) was blind to condition allocation when collecting outcome data. This introduced the possibility of bias in the study results. Furthermore, there was no disclosure stating whether those assessing the outcome data were blind. If they were not there could have been a bias in the selection of analytical strategies and removal of data or selection of time points (Wood, Egger, Gluud, Schulz, Juni, & Altman et al., 2008). Ultimately, this lack of clarity raises questions about the validity of the study results.

The main goal in a treatment outcome study is the specification of treatments and an evaluation of their feasibility and efficacy (Perepletchikova, Treat & Kazdin, 2007). The interpretation of treatment effects requires affirmation that the treatment was delivered as it is designed. Otherwise ambiguity in evaluating both what the intervention was and why it produced effects is introduced (Kazdin, 2003; Perepletchikova, Treat & Kazdin, 2007). Lack of treatment protocol and treatment fidelity checks introduces possible inconsistencies and bias in treatment delivery across patients and therapists. Maxfield and Hyer (2002) found a "large significant correlation between treatment fidelity and effect size" (p.36) when reviewing EMDR studies. They reported that studies which assessed treatment fidelity showed larger treatment outcomes than studies that did not assess treatment fidelity. The Renner et al. (2011) paper used three treatment programs, CBT, CROP and EMDR, in their study and did not appear to follow specific treatment protocols, nor were there any reported treatment fidelity checks to ensure treatment integrity. These deficiencies

not only introduced possible inconsistencies and bias but also compromised the replicability of the study. Incorporating a treatment protocol for EMDR and CBT, a documented manual for CROP groups and a sufficiently experienced independent evaluator of treatment delivery would have eliminated confounds and possible bias.

Methodological questions must also be raised in relation to the sample size and attrition rates. The section of the Renner et al. (2011) paper outlining the design specifies data were collected from 94 participants (CROP n=25, CBT n=21, EMDR n=17 and Wait List (WL) n=31). Within the paper it was stated that analysis of data was completed on only 32 participants (CROP n=9, CBT n=10, EMDR n=6 and WL n=7). A low N can decrease the statistical power therefore influencing the likelihood of a type I error (i.e., concluding the means were different when they were not hence recording a false positive result); or type II error (i.e., concluding the means were not different when there is a difference hence recording a false negative result). Such errors can be addressed by assessing the adequacy of the statistical power when choosing the statistical analysis and the alpha level to be used. The authors stated that the "sample size was planned beforehand with respect to expected statistical power" (p.7), indicating the consideration of statistical analysis and therefore statistical power for a sample size of 94. There was no indication of an adjustment to the type of analysis or the alpha level, using techniques such as the Bonferroni correction, in order to conserve statistical power (Gravetter & Wallnau, 2007).

The high attrition rates raise the possibility that key assumptions required for statistical analysis may be violated (Gravetter & Wallnau, 2007). CONSORT guidelines specify that losses and exclusions following random allocation should be reported and discussed. Without this it is difficult to determine the reason for attrition and whether the attrition affects the interpretation of results (Schulz et al. 2010). In the paper the authors did not specify at what phase of the study and why participants were lost. An intention to treat analysis could have been used to avoid erroneous conclusions (Wood, White & Thompson, 2004). Ultimately the study seems underpowered statistically and the authors did not identify changes to methods or statistical considerations to combat this decrease in statistical power. Interpretation of the results section of Renner et al. (2011) is also difficult. The authors reported N and p values but did not include F ratios, degrees of freedom, effect size or confidence intervals. These flaws make it difficult to draw significant conclusions from the study data and in identifying any clinically meaningful treatment effects.

Of great concern is the inadequacy of treatment dosage, treatment fidelity and sample size for the EMDR condition. The final sample size in the EMDR group was only six participants. Furthermore, Renner et al. (2011) specified that only 50% of the EMDR group received the "actual EMDR technique" (p.1). EMDR treatment was defined in the paper as consisting of three sessions during which the therapist collected participants' trauma history; conducted brief counselling; and, if the therapist felt that it was appropriate, administered the actual EMDR technique. Thus, three participants appear to have received only 1 to 2 sessions of an EMDR technique. No treatment protocol or independent fidelity check was used to clarify what the EMDR technique consisted of, introducing possible bias and treatment confounds that compromise outcomes.

Although further methodologically rigorous studies are required to ascertain the ideal treatment dosage of EMDR in multiple trauma populations, there is empirical literature (mainly pertaining to veterans and child abuse victims) that suggests this population requires additional sessions (Carlson, Chemtob, Rusnak, Hedlund & Muraoka, 1998; Boudewyns & Hyer, 1996). For example, Russell, Silver, Rogers and Darnell (2007) concluded that combat veterans who had suffered multiple traumas required between 3.8 (nonwounded) and 8.5 (wounded) sessions of EMDR. Maxfield and Hyer (2002) suggested that an adequate course of treatment be included as part of the gold standards of research, as their findings indicate an insufficient course of EMDR treatment may interfere with treatment efficacy. It has been noted by the International Society for Traumatic Stress Studies (Chemtob, Tolin, vander Kolk & Pitman, 2000) and the Departments of Veterans Affairs and Defence Joint Clinical Practice Guidelines for PTSD (see Russell et al., 2004) that randomized studies of EMDR, with veterans who have experienced multiple traumas, are often flawed due to insufficient treatment doses for this population. Thus, one or two sessions of EMDR most likely is insufficient.

This leads to questions relating to the authors' level of understanding regarding the theory and practice of EMDR. Renner, et al. (2011) reported that the EMDR technique was not used in some cases due to the inability of the participant to visualize a specific traumatic event, because they had incurred multiple traumas.

However, existing research has been conducted consistently demonstrating that EMDR is beneficial for clients with multiple traumas. Spates, Koch, Cusack, Pagoto and Waller (2008) indicated in their meta-analysis that EMDR is efficacious in treating both civilian and military populations who often incur multiple traumas. Carlson et al. (1998) randomly assigned 35 Vietnam combat veterans with PTSD to 12 sessions of EMDR, biofeedback relaxation (RXT) or a control group. The Results of this study showed only 2 of 9 participants in the EMDR group met criteria for PTSD on the CAPS at follow-up, a significantly greater reduction than the RXT group where 7 of the 9 participants met criteria for PTSD at follow-up. Boudewyns and Hyer (1996) compared 61 veterans who received 5 to 7 sessions of EMDR with eyes open and eyes closed plus 8 group sessions with treatment as usual plus group sessions. All groups improved significantly on structured interviews measuring PTSD symptoms; the two EMDR groups (with and without eye movements) showed larger improvements on mood and physiological measures compared to standard therapy. Edmund, Rubin and Wambach (1999) used a randomized control study to assess the efficacy of EMDR with 59 adult female childhood sexual abuse survivors. Following six 90 minute EMDR sessions symptoms decreased significantly more than in the control group. Rothbaum (1997) randomly assigned 18 adult female rape victims, most suffering from multiple traumas, to four 90 minute sessions of EMDR compared to a wait list control. Scores on PTSD and depression scales decreased significantly in the EMDR group, with 90% no longer meeting full criteria for PTSD after treatment.

In sum, the Renner et al.(2011) study contained methodological flaws that reduce confidence in the overall conclusions about the effectiveness of EMDR, CBT and CROP treatments. All research has flaws. The question is to what extent the flaws erode the credibility of the research. In this case we suggest the answer is 'substantially', due to failure to meet several gold standard criteria: randomization; blind evaluators; treatment adherence / fidelity; and treatment dosage. This applied particularly to EMDR but also raises questions about the strength of treatment effects for CBT and CROP in this study of trauma survivors.

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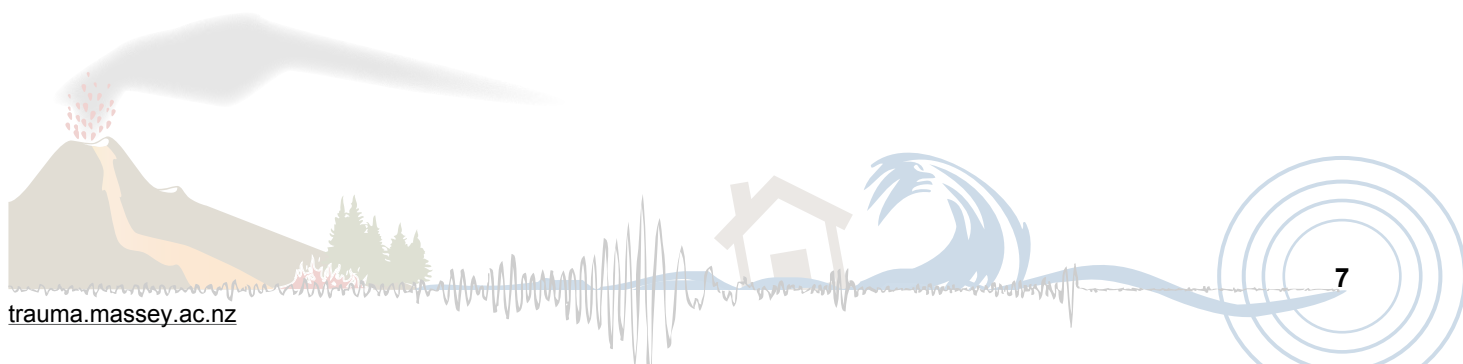
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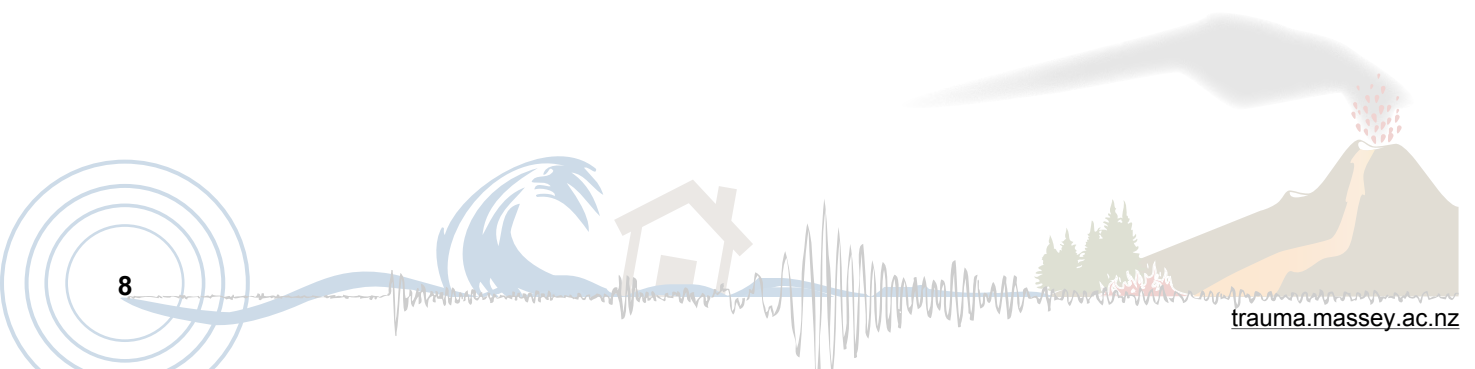
Fallen through the cracks? The role of second responders in the Christchurch emergency: A Wellington perspective

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Abstract

This paper explores the deployment of second responders from the Wellington region to Christchurch during the civil emergencies of 2010 to 2011. Both primary and secondary data were analysed using a realist thematic approach. It was revealed that there were a group of people, known as second responders - employees of local authority and governmental organisations, who 'fell through the cracks' of the emergency management framework. This paper argues that the definition, identification and training of second responders have to be prioritised as a part of emergency management activities. This exploratory study provides the basis for further research into the role of second responders and the challenges confronting both them and those responsible for their deployment.

Keywords: *Christchurch, earthquakes, second responders, emergency management*

New Zealand's position on an earthquake fault line has led to it being referred to as the "shaky isles", in both the popular press and academic literature (Blanchard, 2007; Gilbert, 2008; Johnston, Becker, & Paton, 2012). Yet, as Dowrick and Rhoades (2011) contended, that prior to the Christchurch 2010 and 2011 earthquakes, there have been relatively few major earthquakes in New Zealand's recent history, particularly in terms of seismic events located in highly populated areas. Dowrick and Rhoades (2011) went on to state that the last event with a significant number of fatalities occurred in Napier in 1931. Thus, as Johnston, Becker and Paton, (2011) contended, this situation had led to a high level of complacency and a limited understanding about

earthquake risk throughout New Zealand. However, on September 4 2010 at 4.35 a.m., this complacency was shattered as, Christchurch City, New Zealand, experienced a magnitude 7.1 earthquake. The quake was located on a previously unidentified fault line at Darfield (40 kilometres west of Christchurch City), at a depth of only 10 kilometres (Geonet, 2012).

As this earthquake occurred in the early hours of the morning, there was no loss of life directly attributed to the event. However, injuries did occur and its location and severity meant there was considerable damage to essential services and infrastructure. In response, municipal authorities and governmental organisations from around New Zealand sent employees to the Christchurch region to assist in the restoration of essential services. These employees were referred to as second responders. For the purposes of this study, a second responder is defined as: a worker who operates during the response and recovery phases of an emergency once the area has been made safe by the first responders (Laughey, 1989). Second responders may include construction workers, water and sewage workers, building inspectors and staff who provide aid to those affected by the emergency (Betan, 2010; Laughey, 1989).

Then, on 22 February 2011, a magnitude 6.3 earthquake occurred just 10 kilometres south-east of Christchurch, again on a previously unidentified fault line (Geonet, 2012). Many buildings that had remained standing after the 7.1 September 2010 earthquake had been weakened. The damage caused by the initial quake and the subsequent aftershocks, in excess of 10,000, meant that they could not withstand this 6.3 event and consequently they collapsed. The timing of the earthquake at 12.51 pm (lunch-time) meant many people were in the central business district streets and in their office buildings. Consequently, there were fatalities and a greater number of injuries than occurred in the September earthquake. The substantial damage that occurred impelled the city authorities to request help from international emergency rescue and recovery teams (first responders) to concentrate on finding those people trapped in buildings together with the recovery of bodies. Again, municipal authorities and governmental organisations from around New Zealand sent second

response teams to the area to assist with the restoration of essential services. These responders operated within the framework of the Civil Defence Emergency Act 2002 (Ministry of Civil Defence and Emergency Management, 2014). This Act sets out the requirements for emergency management in New Zealand and provides for the all the phases of the emergency management framework and has at its core the emphasis on regionalism at a local government level. As a result, all emergency management phases are the responsibility of local government and related local agencies.

Accordingly, this study explores one aspect of the response to the Christchurch earthquakes – the challenges confronting managers who were responsible for the deployment of secondary responders from the Wellington area to Christchurch from 2010 to 2011. This background context informed the following research question: What barriers, problems and dilemmas were encountered by emergency management staff when deploying second responders to Christchurch during the emergency?

The emergency management framework and its role

The following definition of emergency management was adopted for the purposes of this study: "emergency management is the managerial function charged with creating the framework within which communities reduce vulnerability to hazards and cope with disasters" (Dowrick & Rhoades, 2005, p. 4).

When managing in a crisis emergency managers are guided by the principles of an emergency management framework that comprises four key phases (Blanchard, 2007; Petak, 1985; Sandhu, 2002; Subramaniam, Hassan, & Faridahwati, 2010; Waugh & Streib, 2006). First, is the *reduction* phase, which involves stakeholder groups, for example, politicians, emergency professionals and community groups, deciding how to mitigate the health, safety and welfare risks to a society affected by an emergency. This is achieved, in part, by the implementation of a risk reduction programme. Second, *preparedness and planning*, which consists of developing a response plan and training first responders to save lives and reduce disaster damage. Third, the *response* phase, that is concerned with the provision of emergency aid and assistance, thereby reducing secondary damage and maximising the recovery phases. Finally, phase four, recovery, which includes providing immediate support early during the recovery period,

restoring vital systems to minimal operational levels. The extended recovery process includes restoring the community's quality of life to at least the same level as it was before the emergency. Wilding (2011) wrote, that for this recovery phase to be fully effective then resilient communities are vital. The development of community resilience allows the affected communities to grow the skills, knowledge and ability required so people are able help themselves during an emergency. This includes the identification of the networks of professionals who are able to respond to meet the social, economic and health needs of the community (Paton, Johnston, & Houghton, 1998)

Coleman (2005) went on to assert that while each of the phases of the emergency management framework is unique, they frequently overlap each other, particularly the latter two. However, the effectiveness or otherwise of an emergency management response is often determined in the prevention and preparedness/planning phases. As stated by White (2011, p. 253): "The quality of these two phases determining how well resources within a society can be mobilised to ensure an effective response, thereby facilitating an optimal recovery from a disaster."

Current thinking ascribes equal priority to all the elements of the emergency management framework (Wilding, 2011). Therefore, to ensure an effective response to an emergency it is imperative that resources and responsibilities within the emergency management discipline are planned and co-ordinated both efficiently and effectively (Coleman, 2005). Yet as E. Lagadec (2009) argues, the networks of stakeholders that exist in the 21st Century and who take part in the planning, response or recovery phases add new levels of complexity during crises such as that experienced in Christchurch.

Subsequently, Johnston et al. (2012) drew attention to evidence in international research that emphasized the importance of strong local government capacity and a cohesive system of public, private and volunteer groups in the response and recovery phase. That is, there is a cohesive system of networks where the sharing of knowledge and skills between the different agencies and groups is of the highest quality (Britton, 2001). Thus, the argument of P. Lagadec (1993) was acknowledged, where he stated that emergency management research must not only provide answers for those involved crisis management. It should also broaden horizons and focus thought, so that an awareness of the problem is not the

only outcome. Accordingly, emergency management research has a responsibility to contribute to the body of knowledge so that the strategic responses to an emergency event are improved (Lagadec, 1993; White, 2011). Therefore, the aim of this study is to add to the body of knowledge by assisting those involved in the response and recovery phases of an emergency to improve his or her skills. Consequently, contributing to the overall effectiveness of the emergency management discipline.

Research Design

Conducted in late 2011 and early 2012 this exploratory study was situated in the qualitative paradigm. The impetus for the study arose from a conversation held between a colleague of the researcher and a Wellington manager involved in the deployment of second responders to Christchurch. At this time there was a high level of research activity focussing on events in Christchurch. It became evident that the perspectives of people from outside the Christchurch region may not have been captured.

A qualitative approach was deemed the most appropriate in which to situate the study because it provides a range of methodological tools that enables the researcher to explore the participants' perceptions and experiences about the topic under study (Leininger, 1985; Munhall, 1989; Munhall & Boyd, 1993). Munhall and Boyd (1993) went on to argue that an individual's knowledge is specific to a given situation or context, thus leading to the existence of a diversity of realities. As the aim of the study was to report the experiences, meanings and reality of the participants, a realistic thematic approach as proposed by Braun and Clarke (2006) was used to analyse the data. Thematic analysis is an inductive form of analysis and involves undertaking data collection and analysis simultaneously, the researcher moving between transcripts, memos, notes and the research literature (Patton, 2002). The analysis process results in the researcher identifying analysing and reporting patterns (themes) within data (Braun & Clarke, 2006). As Braun and Clarke (2006) stated, a theme captures something important about the data in relation to the research question and represents patterns of response on the part of the research participants.

Ethical challenges within qualitative studies
Qualitative studies present challenges for researchers with respect to ethical requirements. One of these is

the establishment of trust between the researcher and interviewee. As Wilding (2011) argued, if the respondents do not trust the researcher, the data could be of a lesser quality. Additionally, as Miles and Huberman (1994) contended, in qualitative research it is difficult to achieve total anonymity as the researcher knows the identities of the participants. This is particularly pertinent in New Zealand. As a small country with comparatively few organizations in a specific sector, it would be easy to identify individual respondents, even in larger research contexts. Thus, the importance of trust was heightened by the relatively small size of the emergency management community and the ease with which participants could be identified.

It is relevant that this study was situated in the ethical paradigm of utilitarianism. As outlined by Miles and Huberman (1994) utilitarian ethical considerations are based on the premise of informed consent, avoidance of harm, and confidentiality. The purpose of which is to enhance the trust relationship between the researcher and the participant, with the aim of maximising the quality of the data and ensuring the anonymity of the participant.

Consequently, each participant was provided with an outline of the purpose of the research and their rights within established guidelines for research involving human subjects. Each participant signed a formal permission document consenting to participation in the research. Verbal permission was also obtained from each participant to record the interview on a micro-cassette. All research participants were advised that their participation was voluntary and that they had the right to withdraw their consent (i.e., either verbally or in writing) at any time. None did.

In addition to the confidentiality agreement, a verbal outline of the confidentiality processes was provided at the start of each interview. Participants were informed that: (i) any identifying names would either be deleted or given codes in order to maintain anonymity; (ii) all transcripts would be stored in a locked filing cabinet in a locked room; (iii) any computers holding notes and analysis were password protected; and (iv) all publications and reports were written so that participants remained unidentified.

Sample and Data Gathering
The sample size was 8 people, comprising managers who were directly involved in the deployment of staff to Christchurch. The size of the sample was constrained by the numbers of managers in the Wellington region

who were involved in the deployment. As a result of the initial social conversation, a pilot interview of one and a half hours was undertaken with the aim of exploring the issues which had been identified. This interview provided the basis for the development of the interview questions and was coded as part of the analysis process. The remaining primary data was obtained through a semi-structured interview process. A further six interviews of between one and a half hours and three hours were conducted. Two of the interviews had two participants, an emergency manager and a human resources (HR) executive. All interviews were conducted in the Wellington region. All interviews were taped and transcribed immediately thereafter. Notes were also taken during the interviews and incorporated into the analysis process.

Secondary data was obtained from two sources. The first was the empirical literature informing the emergency management discipline. The second was from publicly available information, such as the relevant legislation, news and social media reports, emergency management policies and practices, municipal communications, official reports, organisational debriefing documents. As New Zealand is a comparatively small research environment, documentation was also sourced from Australia, Europe and North America. The use of this material enabled the setting of a context, thereby,

guiding the collection of the primary data. All secondary data was analysed concurrently with the collection of the primary data.

In addition, the researcher attended emergency preparedness awareness sessions conducted for community groups and members of the diplomatic corps. These sessions were conducted by Wellington emergency management professionals with the aim of building community resilience. The focus of the sessions were on preparedness of the local communities with the aim of building resilience thereby enhancing a more effective recovery phase of an emergency. A total of five sessions which lasted between one and a half and two hours were attended and full notes were taken throughout each session. These notes were also analysed thematically. The concurrent data collection and analysis followed the six-steps recommended by Braun and Clarke (2006). These are: familiarisation with the data; the generation of initial codes; searching of themes; reviewing of themes; defining and naming of themes; and producing the report.

Data Analysis and Results

The data analysis identified a core theme 'recognising the role of second responders'. This theme explained the concerns expressed by the research participants about the apparent lack of provision for second-responders in New Zealand emergencies. There were two near-core themes that contributed to the formation of this core theme: a) the shortfall in legislative provision; and b) the human resource implications. It is these themes and their relationship to the core theme that are the focus of this paper.

The first identified sub-theme related to a shortfall of legislative provision in the emergency management legislation. These concerns were thematically analysed into the following minor themes: issues of proximity; issues of distance; the legal status of second responders in an emergency; and currency of current legislation. Table 1 shows how the responses of the interviewees were coded into these minor themes.
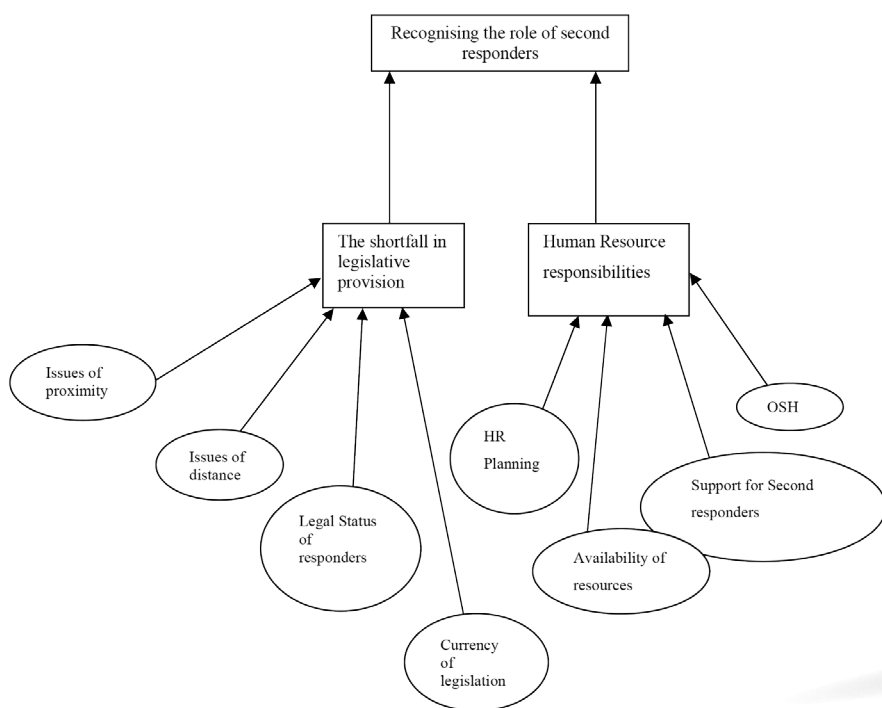

Figure 1. Coding for Thematic Analysis

Table 1

A Sample of the Coding of Interviewee Responses for the Sub-Theme Shortfall in Legislative Provision

Sub-Theme– Legislative shortfall	Coding Items from thematic analysis
Issues of proximity – the planning focussing on events occurring within close geographic proximity	"We have good relationships with our neighbouring people and councils —perhaps we didn't know them as well as we ought of"
	"We knew those [colleagues]from further afield not well at all"
	"Used to being close to the situation – we didn't really think of having to move people and equipment to the South Island"
	"Planning and everything had focussed on local area or the North Island"
	"Everything in the past occurred mainly in the North Island it was relatively easy to deal with"
	"Communication was easy when dealing with local people because we knew them"
Issues of distance – related to challenges arising from managing events happening some distance from the home office	"Getting supplies down there was an issue especially in the early stages – we had to make sure that they had everything they needed as we could not rely on there being the basic necessities"
	"All planes booked – difficulty getting things there by road, train tracks damaged"
	There appeared to be no provision in the legislation to guide people in how to operate
	"Had to be quite stern at times and tell people that is what was happening and we will argue about it later."
Legal status of responders – related to the lack of provision for second responders. No clear guidelines second responders on their role	At time it was unclear who had the authority and power to authorise some things
	"Unclear exactly what the role of our people was under the legislation"
	"Responded immediately" – therefore legislative provisions may not have covered these people – "we were trusting common sense on many occasions"
	Emphasis on trained civil defence people and 'first responders'
	"While managers sending people may have had emergency training – the people we sent in the main did not- we were not sure what their responsibilities were"
Currency of legislation – the need to review legislation not only emergency management legislation to ensure it covers second responders	Questions raised as to the currency of present legislation
	Emphasis on first responders
	"No provision for people outside the emergency management framework who ended up working in the disaster zone"
	"Unsure if this situation had ever been thought about before Christchurch"

Table 2

A Sample of the Coding of Interviewee Responses for the Theme HR Implications

Sub-theme – HR Responsibilities	Coding items from thematic analysis
HR Planning - the on-going HR planning needs re deployment, rotation and skills	How do you ensure local services do not suffer because everyone was in Christchurch
	"How to we ensure rotation of staff to make sure they don't get stressed – something that became evident during the first event"
	"Plan the movement of staff to ensure business as usual in Wellington"
	"How do we determine who has the experience and resilience to operate successfully down there"
	"Became evident that we had to get more involved in people's personal lives – we could not have people down there with stress problems."
OSH – reliance on 'business as usual' OSH training. No specialised second responder training	"there was an over-reliance on prior 'business as usual' OSH training"
	No specialist training for second responders
	"Think of everything as a potential hazard – we had to rely on their common sense"
	Unanticipated event so there has been no prior provision in current OSH legislation
	Spoke of people running on adrenaline and not taking appropriate breaks
	"Rotations to Christchurch being too long – in hindsight we should have given them more breaks"
Physical Resource Availability – This sub-theme related primarily to equipment required to support staff	"the need transport equipment to Christchurch – loaded up trucks with tents and water"
	"Provision of cash because ATM's were not working"
	Safety equipment for staff not available immediately
Support for second responders – ensuring that second responders are appropriately supported during their deployment.	Support for families remaining in Wellington
	"Reassurance especially after major aftershocks – communication"
	Ensuring deployment is a stress free as possible, for example "ensuring reimbursement of expenses"

The second sub-theme was identified and named as those issues related to HR implications. The minor themes contributing to the identification of this theme were coded and named as: HR planning concerns; occupational health and safety (OSH) issues; physical resource availability; and support for second responders. These themes are outlined in Table 2.

As stated previously, the networks of second responders had not been clearly defined and that they themselves were unclear as to their role within the bounds of the relevant legislation. The following discussion outlines these themes more fully.

Discussion

The consensus of the participants was that, while New Zealand has a robust Civil Defence and Emergency Management system and strong relationships exist between the different parties, second responders were one group who were considered to *have fallen through the cracks*. Moreover the different professional associations and networks that ended up being involved in the second response had not been identified nor their role defined prior to the Christchurch earthquakes. Consequently, a different set of challenges arose for those managers who were responsible for the deployment of these employees.

The unrecognized role of second responders
The coding undertaken as part of the thematic analysis identified the presence of an overarching theme – *The unrecognised role of second responders.* The lack of recognition of the different groups of second responders and their deployment to an emergency zone was spoken of with concern by all the participants. The data analysis suggested that the role of Civil Defence Volunteers was recognised and provision was made for their training and development. However, there was no explicit legislative provision that provided for the identification of, and the subsequent training and development, of second responders. Nor was there any evidence of legislative provision for the role of second responders and guidelines for their deployment. One manager whose organization sent teams of employees to aid in the government welfare response commented:

> *...I guess in hindsight what would have been good is to have had established group of people that will always be involved in a response to a national disaster*

Deployments to Christchurch included: building inspectors; the engineers responsible for the repair and maintenance of water and sewage pipes; electrical lines specialists; and public sector administrative workers. The majority had not received any training or development in emergency management nor could they be deemed to be first responders. One manager who had travelled to the Christchurch region stated:

> *...if you had told me the day before that I would be up to my ears in liquefaction in the sewers of Christchurch within the next 72 hours I would have laughed at you. If you had told me I would do twice within six months and the ground would still be shaking I would have told you, 'you were mad'.*

While the secondary responders in this study were not directly involved in the rescue phases in Christchurch, some were sent to the emergency zone within 48-72 hours of the major earthquakes. Therefore, there was the potential for these employees to be involved in the overlap between the response and recovery phases. Furthermore, on-going aftershocks meant that these employees were often present in Christchurch during the larger events and were often were deployed for extended periods of time or on repeat occasions. Yet at the same time those managers responsible for the deployment of second responders were not aware of any guidelines or established best practice readily available to guide their decisions.

The legislative shortfall
The data analysis suggested a perceived gap in the current emergency management legislation in New Zealand. At the time of the research the provisions for emergency management were covered by the Civil Defence Emergency Management Act, 2002. The thematic data analysis indicated that the existing legislative frameworks were not extensive enough to deal with the scale of the emergency that occurred in Christchurch. This is evidenced by how quickly the Government introduced and passed legislation under urgency with a specific focus on the recovery needs of Christchurch. Specifically, at the time of this study, the legislation did not recognise the role of second responders in the event of their being deployed to an emergency such as that which occurred in Christchurch. One comment made by an experienced local government manager related to how, prior to the earthquakes, the different professional networks did not know each other well:

… because we don't work that closely together because we are mostly concentrating on our day jobs so one of the lessons we certainly learnt from this was that we must get closer together … we just need to know each other – we do know each other considerably better now than we did

While this is an expressed ideal – during this research project there was no evidence that this 'getting closer together' had occurred. It was believed that the provision of legislative requirements would ensure that this collaboration would occur.

The analysis of the secondary data revealed that this situation is not unique to New Zealand. The legislation defining who are secondary responders and providing guidelines for their management and protection was sparse. The one recent legislative initiative sourced was The Skilled Trades Second Responders Act of 2009 introduced into the United States Congress. The purpose of this Act was to establish a comprehensive national system for skilled construction workers to assist first responders in the event of a disaster. At the date of writing of this paper, the status of this Act is listed as 'died', noting that it has been referred to committee. While there is evidence of empirical research, such as that of Laughy (1989), the majority of work able to be sourced as part of this study was that developed by practitioners (Betan, 2010; Claussen, 2011; New York Consortium for Emergency Preparedness Continuing Education, 2006). This work occurred subsequent to the 9/11 attacks and were an attempt to ensure preparedness for the future.

The thematic analysis indicated that there had been no prior identification of the networks of professionals who would become second responders during an emergency, such as that which occurred in Christchurch. Consequently, there were issues that arose around communication and the efficient deployment of resources. One HR manager observed somewhat wryly:

…certainly industry groups were to called upon to provide them with support who then went out through their networks to their contacts outside a structured system and created all sorts of confusion because there are requests coming here and from there all over the place.

This comment was one of several received of this nature. Comments that indicated that there was a need for a more formal structure to manage second responder activity. Formalised provision under the legislation would provide the second responder networks with a clearer role definition and communication channels and enhance the ongoing networking opportunities; all with the stated aim of improving the effectiveness of the recovery process.

The second body of legislation that was deemed to impact on the care and protection of second responders was that pertaining to occupational health and safety. Examination of organisational policies and practices indicated that the majority had some form of provision to ensure the safety of staff. However, these policies and practices were based on the presumption the staff were 'in situ' within the organisation's confines or were focussed on the immediate geographic location of the organisation. One manager stated:

…accommodation was an issue - particularly with this disaster we struck –there was no accommodation … so we ended up actually compromising and sending people into accommodation where there were limited sanitary provision or running water or stuff but they went into it knowing that.

However, this manager went on to state that none of the staff that were sent to Christchurch had received additional occupational health and safety training other than that covering their workplace normal day to day activities.

The thematic analysis identified an expressed concern regarding the difficulties of managing staff in an emergency some distance from their home base:

...was the logistics of travel – travel was disrupted as well – we had some people going across on the ferry doing everything they could to get there – so our immediate response was predominately from South Island based staff – because of travel …we struggled with getting people out of the North Island into the South Island because that was what everyone was trying to do…

The analysis identified a distinction between what could be termed proximal and distal emergency management. The terms are defined in this way: Proximal emergency management is that which is undertaken to address an emergency in the location of the emergency management specialists. Distal emergency management is that which is undertaken to address an emergency that occurs outside of the immediate locale of those planning for an event. In this paper these terms were used in reference to second responders only. There was no evidence that

any scenario planning had been undertaken addressing the distal management of second responders.

Human resource management and the care of second responders

The second near-core theme pertained to the role of human resource management in caring for second responders. The importance of appropriate use of human resources was identified early in the data analysis process:

One of the big lessons our first round was manpower planning – call it HR call it whatever you like – actually managing the manpower that you are deploying and putting on standby… the first one [earthquake] most of it I did myself and it was very stressful.

The interviewees spoke of how, in hindsight, some of the more obvious challenges were the most unanticipated, for example, ensuring the provision of safe food, water and accommodation. Semi-structured probing questions resulted in the interviewees acknowledging that this was a situation where prior scenario planning would have been an advantage. Some of the early secondary responders did not have access to motel or hotel accommodation as one manager stated:

In the case of the February event we had to provide them with tents and sleeping bags

One comment summarising the accommodation situation was:

It wasn't typically in our approved accommodation – because they [hotels] had suffered damage...so only those properties that had been assessed as being safe were used... this did not mean that some of them did not have sanitary issues like having to go next door to use a toilet because the toilet in this particular room doesn't work.

As the aftershocks continued, the practicalities of keeping employees in the field became of concern for those in Wellington. Not only was it stressful for the staff who were deployed to Christchurch, it was also stressful for those who remained in Wellington. It was imperative that services provided in the Wellington region did not suffer. Accordingly, all interviewees spoke of how staff that remained in Wellington were sometimes stretched beyond capacity. This was one area where prior scenario planning could have assisted in establishing rotation schedules and support structures to meet the needs of staff in both Christchurch and Wellington. In some

instances it was as basic as ensuring that there was enough resources remaining in Wellington, for example:

...if they had a water main burst up here or something similar and a vital bit of equipment they needed was sitting down in Christchurch and then there is water gushing and we can't repair it… or a truck with specialist equipment is sitting in Christchurch doing nothing yet it is needed here urgently.

However, this concern was not confined to physical resources. Human resources were also factored into the planning equation. The rotation of staff and ensuring that staff were not left in the Christchurch region for unnecessarily long periods of time became an issue for managers. This included ensuring that they did receive adequate rest breaks. A summarised comment from a public sector manager was:

...someone is [at work] at 6 a.m.… …and is driven on adrenaline and sometimes they were not getting back until 8 -9 at night and they were doing that all week –I guess we could have managed that better either by putting more people down there or making sure people took appropriate breaks.

For some groups of second responders, their normal day to day employment did not require the standard of safety equipment that was essential for the Christchurch situation. Therefore, the appropriate equipment had to be procured with some urgency. It was recognised that these are the type of challenges that can be planned for in advance. While every emergency is different and often it is not possible to stipulate solutions, it is possible to have contingencies in place. The expressed view was that developing such policies and plans would lead to improved responses in the future.

There was also a very real concern that it would be difficult to evacuate people if they did get hurt. Transportation routes in and out of the city were overloaded or were damaged. Christchurch hospitals had been damaged in the quakes and were operating under considerable pressure. The main thrust of the commentary was as follows:

Just key things about doing assessments before you go on to a site – because of the nature of the broken ground ...do that initial hazard assessment report and then be aware that everywhere is a hazard down there at the moment... then there is the biological hazard so not to put themselves in harm's way ... if they get

themselves into trouble help is not going to be that easy to get to them.

The interviewees spoke of the reliance on prior OSH training (in business as usual situations) to ensure the safety of staff in Christchurch and that this was not acceptable. It was stated by all the participants that there needed to be specialised OSH training developed for these circumstances. Furthermore, the situation in Christchurch was unstable and the lack established HR policies and practices did constrain the recovery actions. One public sector HR professional described it as follows:

…because you know everyone was all over the place.... probably the reason was because there was no prior planning – there were no guidelines – there was no best practice that had been developed – everyone from the [deleted] down to the people on the ground were really just working on doing what we needed to do - just to get through

The lack of planning was attributed directly to the limited involvement the HR discipline has had with emergency management in the past. All the interviewees spoke of the need to take the lessons that were learned during the Christchurch emergency and incorporate them into HR planning for the future.

Conclusions and Recommendations

As Johnston et al. (2012) stated, there is a lack of empirical data and theoretically based research on disaster recovery in New Zealand. They went on to state that one reason proffered for this has been the absence of significant disasters in the more recent past. Accordingly, this exploratory study contributes to the empirical literature by providing a heightened understanding of the challenges confronting a group of second responders during the Christchurch emergencies.

The current study was situated in the Wellington region. Consequently, it is acknowledged that further research is required before the results are able to be generalised to a wider population. However, the indications are that the findings are able to provide a foundation for further research. Specifically, the study provides a basis for discussion as to the importance of strong second responder networks for effective recovery after a major emergency. Therefore, it is recommended that the relevant legislation informing the emergency management, OSH and the HR disciplines be reviewed,

with the aim of incorporating provisions for second responders.

In addition, as suggested by E. Lagadec (2009), there is a need to identify the complex network of stakeholders who have a legitimate claim to take part in the planning, response or recovery efforts. The findings of this study suggest that the professional disciplines, who have not had a role in emergency management in the past, are included in emergency management planning and preparedness in the future. For example, McNally (2012) identified a role for HR professionals within the emergency management framework. Therefore, it is recommended that there is a concerted effort to identify additional professional disciplines and include them as part of the emergency management network without delay.

The need for second responders to be deployed to the Christchurch region added an additional set of complexities to the leadership role. As Paton et al. (1998) argued, there is a need to develop inter-organisational networks and the organisational structure, systems and management capabilities are needed for a comprehensive, integrated emergency management system. This has implications for emergency management leadership. It is recommended that a new concept is introduced to the emergency management discipline: the concept of proximal-distal planning and responding. The current research shows that there are substantial challenges associated with the response to an emergency that has a distal perspective, particularly when involving second responders. Therefore, this should be incorporated into the emergency management and leadership training processes. While these interviews were conducted in the Wellington region, the proximal/distal concept could be applicable both nationally and internationally.

The findings identified the view that the September earthquake was the "practice run that nobody wanted". However, it did lead to a better quality response in February 2012. Thus, it can be assumed that still further learning occurred subsequent to the February earthquake. Consequently, it is recommended the lessons learnt during this time are not lost and a proactive effort is made to incorporate them into emergency management planning in the future. This finding supports the assertion of E. Lagadec (2009, p. 139) who wrote, "Create a network, keep working with one another, so you can keep learning, keep enriching your experience across borders and sectors."

Accordingly, it is recommended that the different agencies, organizations, professional bodies and local and central government departments act to address the identified gaps, specifically with regard to the role of second responders. This includes establishing relationships, identifying the available resources, and undertake scenario planning, exercises and training.

Finally, it is recommended that further research is undertaken to more fully explore the themes identified in the current research, with respect to the deployment of second responders; specifically, further research that more fully explores the challenges and solutions confronting different professional networks from around New Zealand. It is imperative that the lessons learned, not only during the Christchurch emergencies, but subsequent to them, are documented and become an integral part of the emergency management discipline's future action plans.

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Spirituality, gratitude, hope and post-traumatic growth among the survivors of the 2010 eruption of Mount Merapi in Java, Indonesia

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Abstract

The province of Yogyakarta, located in the island of Java, is one of the areas in Indonesia which is vulnerable to natural disasters. This study focuses on Post Traumatic Growth (PTG) referring to the positive aspects of people's experience, specifically during the course of the Mount Merapi eruption disaster in 2010. Some literatures suggest that aside from affecting negative emotional experiences, traumatic experiences also provide personal growth, such as positive changes in behaviour, better relationships with others, a more positive outlook and a greater appreciation of life. The purpose of this study was to understand the role of spirituality, gratitude and hope in predicting PTG. The participants of this study were 60 survivors who were living in temporary houses. There were four instruments administered in the study: (1) Post Trauma Growth Scale, (2) Spirituality Scale, (3) Gratitude Scale, (4) Hope scale. Following the administration of these instruments individually, the participants were also interviewed for qualitative data collection. The results of the multiple regression analysis showed that spirituality was the only significant predictor of PTG (F = 11,671, p< .01). The adjusted R square determinant coefficient of 0.107 indicated that the effective contribution of spirituality to PTG is 10.7%. The qualitative data indicated that spirituality—through prayer, belief in God, wisdom, compassion, and patience— transformed distress experiences into a more positive impetus towards growth.

Keywords: *Post-Traumatic Stress Disorder, Post-Traumatic Growth, positive psychology, Yogyakarta-Indonesia*

Indonesia consists of thousands of islands and is located in a geologically unstable area influenced by the collision of three huge tectonic plates: Eurasian, India-Australian and Pacific plates. This makes Indonesia home to numerous active volcanoes and the effects of frequent tectonic earthquakes. In addition, the country lies between two oceans, Pacific and Indian, and between two continents, Australian and Asian.

One of the most regular natural disasters occurring in Indonesia is volcanic eruption. On October-November 2010 the Mt Merapi which is situated in Yogyakarta and Central Java erupted. The eruption was considered as one of the most devastating since the year 1870. Thirty two villages, with a total population of more than 70,000 people, had to be evacuated. According to official statistical data summarised in Putro (2012), the death toll reached 242 people in the Yogyakarta Special Province and 97 in Central Java. In contrast, the Sleman District Health Office stated that the death toll reached 277 people.

According to Putro (2012), The Indonesian National Board for Disaster Management (BNPB) also released statistics for the total number of displaced people by affected areas: in Central Java there were 224,250 displaced people and in Yogyakarta Special Region there were 54,153 people. BNPB recorded there were 2636 houses damaged, including 156 houses with major damage and 632 with minor damage. The total number of damaged houses in Sleman, Yogyakarta Special Region was 3424. In the affected areas of Central Java, there were a total of 3705 houses which were mildly to severely damaged .

This research focused on the psychological aspects of disaster, especially Post-Traumatic Stress Disorder (PTSD) experienced by the survivors. PTSD is a condition caused by emotional distress that occurs after a person was exposed to a traumatic event and results in feelings of total helplessness or fear (Durand

& Barlow, 2003). However, recent studies have observed the positive aspects of disaster. Some of these studies have investigated a positive aspect of trauma, referred to as Post-Traumatic Growth (PTG). The current study was aimed to examine several factors that influenced the Post-Traumatic Growth in the survivors of the Mount Merapi eruption, namely their spirituality, gratitude and hope. Our preliminary study found that survivors varied in how they responded to disasters. Many of them were distressed following the eruption. Several months later, they became quite different people in terms of their religiosity, social relationships, and views on the future.

Post-traumatic growth refers to a positive psychological change as a result of the struggle of an individual in the face of traumatic events in one life (Taku, Calhoun, Tedeschi, Gil-Rivas, Kilmer, & Cann, 2007). Although the term Post-traumatic Growth is still fairly new, the idea has actually existed for a long time. Many other terms have been used to describe post-traumatic growth, such as: positive psychological changes (Yalom & Lieberman, 1991); perceived benefits or construing benefits (Calhoun & Tedeschi, 1991; McMillen, Zuravin, & Rideout, 1995); stress-related growth (Park, Cohen, & Murch, 1996); positive by-products (McMillen, Howard, Nower & Chung, 2001); discovery of meaning (Bower, Kemeny, Taylor, & Fahey, 1998); and positive emotions (Folkman & Moskowitz, 2000).

The literature mentioned above has suggested that traumatic experience may not necessarily lead to negative impacts on a person. Traumatic events may assist a person to learn things and develop new competencies which he or she previously did not have. The events may also encourage a person to have a better individual and social life, ultimately bringing him/ her to grow and change in a positive way to become a better person. Thus, PTG is a subjective perception and evaluation of a particular traumatic event. The PTG construct, however, has been a subject of debate. Hobfoll, Hall, Canetti-Nisim, Galea, Johnson, and Palmieri (2007) reviewed a number of literatures which suggested that there were no clear evidence that PTG had any positive or negative impact on psychological well-being. Zoellner and Maercker (2006) found that there were no consistent effects on the relationship between PTG and psychological well-being following trauma experiences. From a meta-analysis of 77 cross-sectional studies, Helgeson, Reynolds and Tomich (2006) found that PTG related to lower depression, but at the same time it also corelated with negative effects

such as greater avoidance and intrusive thoughts which was often found in PTSD symptoms. Despite this criticism, the current study focuses primarily on the factors influencing PTG. More importantly, it provides a contextual understanding of PTG in a Javanese culture.

Urbayatun (2012) reviewed literature addressing some of the factors that influenced post-traumatic growth such as: level of stressors; social support; coping through deep contemplation to understand events; coping by way of acceptance; as well as spiritual / religious coping or through beliefs (beliefs). Besides factors of age and gender, post-traumatic growth was also correlated with a variable of wisdom. Other literature found that spirituality (Kimhi, Eshel, Zysberg & Hantman, 2010), gratitude (Vernon, Dillon & Steiner, 2009) and hope (Jenmori, 2006) served as important factors affecting PTG. In a study conducted by Kimhi et al (2010), it was found that one can achieve post-traumatic growth by looking for something that can be used as a means to endure difficult times.

Some studies have also shown that spirituality and religiosity play an important role in the efforts of confronting a painful (traumatic) event and dealing with physical illness (Koenig, 1998). Meanwhile Bert (2011) suggested that religious and spiritual beliefs were very valuable for people wanting to make significant impacts in their own lives. Spirituality and religion can become the basis of one's philosophy of life and the strength they need to cope and deal with environmental pressures, as well as provide them with guidance and assistance in their efforts to comprehend each and every painful and traumatic event (Koenig, 1998; Bert, 2011). Therefore, religion and spirituality can help an individual to live on and go through life. Gall, Kristjansson, Charbonneau, and Florack (2009) concluded that spirituality and religiosity gave an individual guidance on how to behave and assess a situation, what action should be taken, as well as decide what coping strategy will be used to address the situation.

Gratitude was another variable pertinent to post-traumatic growth, considering its role in increasing life satisfaction and well-being. Gratitude has been able to encourage positive actions which allowed people to strengthen their personal character. Wood, Joseph and Linley (2007) argued that gratitude facilitated positive coping and reduced stress and therefore strengthened a person's personality. Gratitude not only can make people feel happy at the present time but also provides people with happiness in later periods

of life (Emmons & McCullough, 2003). Gratitude was instrumental in reducing any negative aspects within oneself (Nelson, 2009). McCullough, Kimeldorf and Cohen (2002) found that people who were grateful tend to be more optimistic, have hope and happiness, and have low levels of depression and anxiety. Gratitude also negatively correlated with narcissistic behaviour and anger (McCullough et al., 2002).

In regard to trauma, gratitude is beneficial in the process of growth following any experience of crisis or trauma. With gratitude, a person will tend to have a high pro-social behaviour and will tend to create good relationships with others, which in turn will increase their appreciation of life as well as the people around them (Nelson, 2009). People with forgiveness and gratefulness tend to have higher subjectivity than those without (Toussaint & Friedman, 2009). According to Vernon, et al, (2009) people who experience traumatic events and then develop gratitude, will later show no PTSD symptoms. Some studies suggested that gratitude was positively related to life satisfaction, well-being and social functioning (Wood, Joseph & Maltby, 2008), and the perception of social support (Wood, Maltby, Gillett, Linley, & Joseph, 2008). In addition, people who have high tendencies of gratefulness would experience low levels of stress and depression (Wood, Maltby & Gillett et al., 2008).

In addition to gratitude, hope was another important factor in the process of post-traumatic growth. According to Jenmorri (2006), hope has often been associated with health and growth. According to some theories, hope was very important in the changing process of an individual and their collective life. Hope comes at the same time with the advent of suffering (Pilkington, 1999). Hope emerges in a suffering condition which facilitates individuals to interpret the condition in a positive way (Frankl, 1959). Snyder, Ilardi, Cheavens, Michael, Yamhure and Sympson (2000) stated that hope consists of two major interrelated components: agency and pathway. Agency relates to the ability to find alternatives to achieve a particular goal. Pathway describes how individuals are able to develop a rational method to achieve the goal.

Although people usually focus on a particular method but they should anticipate the ineffectiveness of the main method and find the possibility to use a different method. This is so that people can still maintain hopeful thinking. A number of studies found that individuals with high hope usually produce more alternative methods when

he or she are facing obstacles in achieving goals (Irving, Snyder, & Crowson, 1998). Snyder, Harris, Anderson, Holleran, Irving, and Sigman et al. (1991) suggested that an individual must have a consistent motivation to keep moving forward, following a particular method to achieve the stated goals.

Self-determination and the sense of purpose to keep moving toward the goal epitomises agency. An individual who has agency often expressed self-affirmation statements such as "I'm sure I could" and "I can achieve this" (Irving, et al., 1998). When experiencing barriers to achieve goals, individuals who have agency tend to be motivated to find alternative methods to achieve it (Irving et al., 1998). From the literature outlined above, it can be hypothesized that spirituality, gratitude and hope are good predictors for post-traumatic growth among survivors of the Merapi eruptions.

Method

The current study was situated in the Sleman district of Yogyakarta, Special province of Indonesia. Living in what is known as the centre of Javanese culture, the people of Yogyakarta are mostly Moslems but also practice Javanese traditions derived from Hindu and Buddhist traditions. Aside from practising Islamic daily prayers, they still believe in certain spirits which influence human life. The most well-known Javanese values often used as a coping strategy in dealing with hardship include *sabar* (patience) *syukur* (gratitude) and *nrimo* (acceptance). These cultural values are syncretic of Islamic and Hindu traditions.

The current study was conducted at temporary housing for Merapi disaster survivors located in the village of Glagaharjo, Cangkringan Sub-District, Sleman District, Special Province of Yogyakarta. The village of the survivors which was located around five kilometres from the temporary housing was destroyed during the Merapi eruption in November 2010. The survivors lost some of their family members, houses, cattle and farms. They were then living in scattered shelters for several months before moving to the temporary housing, waiting for more permanent houses to be built by the local government. They had lived in the temporary housing for about 8 months when the research was conducted. The total number of the participants was 90 Moslem people. All were married with ages ranging from 18 to 55 years old. Educational backgrounds were quite diverse with most participants mostly attending a high school education. Most of the participants were farmers
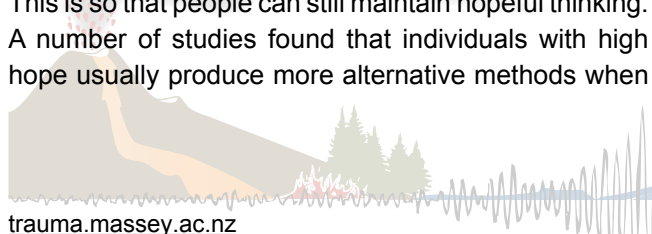
or workers at the sand collection sites. Only few were government officials, teachers and traders.

Members of the research team visited the participants' houses and administered four instruments to each individual: Post Traumatic Growth (PTG) Scale, Spirituality Scale, Gratitude Scale and Hope Scale. The PTG Scale used in this study follows the structure developed by Urbayatun (2012) based on the Tedeschi concept of PTG which consists of five indicators, namely: relationships with others; emergence of new opportunities; stronger personality; increased spirituality and religiosity; and increased respect for life (Tedeschi, 1999). The PTG scale consists of 20 items with a Cronbach's alpha reliability coefficient of 0.877. The Spirituality Scale was an adaptation of the ASP Spirituality Scale (Bussing, Ostermann, & Matthiessen, 2007), which comprises of 25 items with a Cronbach's alpha reliability coefficient of 0.908. The Gratitude scale follows the modified version developed by Vanesa and Uyun (2008), based on the concept of Al Jauziyah, which consists of 24 items with a Cronbach's alpha reliability coefficient of 0.881. The Hope Scale was an adaptation of the scale developed by Riyono (2010), which consists of 10 items with an alpha reliability coefficient of 0.813.

Following the administration of the research instruments, the participants were also interviewed for qualitative data collection, using open-ended interviews. The questions revolved around their experiences during the eruptions, their understanding of the disaster and how they coped with it.

Results

Quantitative data analysis used a simple regression analysis to see the influence of three predictors; spirituality, gratitude and hope to post-traumatic growth as the criterion. The results of the analysis are presented in table 1 and table 2.

Table 1 and Table 2 show that of the three predictors tested in this study, only spirituality influenced the criterion of PTG, with an F value of 11.671 (p <0.01). The coefficient of determination adjusted R-square of 0.107 indicates that the effective contribution of spirituality to the criterion was 10.7%. This showed that 89.3% of the variable PTG was influenced by other variables. Based on the calculations presented in the table above, the regression equation model of Post Traumatic Growth could be obtained as follows:

$$Y = 26.429 + 0.402 (X1).$$

Table 1
Model Summary

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Change Statistics | | | | |
					R Square Change	F Change	df1	df2	Sig. F Change
1	.342a	.117	.107	6.89683	.117	11.671	1	88	.001
2	.374b	.140	.120	6.84744	.022	2.274	1	87	.135
3	.384c	.147	.118	6.85622	.008	.777	1	86	.380

a. Predictors: (Constant), Spirituality
b. Predictors: (Constant), Spirituality, Gratitude
c. Predictors: (Constant), Spirituality, Gratitude, Hope

Table 2
Model coefficients for PTG as a dependent variable

| Model | | Unstandardized Coefficients | | Standardized Coefficients | | |
		B	Std. Error	Beta	t	Sig.
1	(Constant)	26.429	6.650		3.974	.000
	Spirituality	.402	.118	.342	3.416	.001
2	(Constant)	14.214	10.450		1.360	.177
	Spirituality	.288	.139	.245	2.071	.041
	Gratitude	.251	.166	.179	1.508	.135
3	(Constant)	8.656	12.216		.709	.481
	Spirituality	.254	.145	.216	1.754	.083
	Gratitude	.260	.167	.185	1.556	.123
	Hope	.181	.206	.092	.882	.380

The qualitative data gave a more detailed description of the five indicators of PTG experienced by the survivors, namely relationships with others, emergence of new opportunities, stronger personality, increased spirituality and religiosity and increased respect for life. Although the changes experienced by each of the participants were at different levels, positive changes were evident.

During the post eruption phase, survivors experienced a change in the way they relate to their family and neighbours. They became more respectful to their spouse, more open, and willing to forgive when making any mistakes. The feeling of togetherness and harmony (*rukun*) with their neighbours was strengthened. They learned how to respect each other and to have mutual

compassion. This indicated a better quality relationship and harmonious living (*rukun*) according to Javanese cultural values. One participant stated:

Previously people lived in areas which were quite distant from one another, but now we live close to each other. This makes our relationship closer. We live a harmonious (rukun) life in this temporary housing.

The second change related to how they saw new chances, opportunities and ideas after the eruption. This included acquiring a new competence or improving existing skills. Most participants in this study outlined how the disaster forced them to think how to deal with the difficult situation. They stated that they generated a lot of new ideas which were previously unimagined. NG, one of the participants, narrated:

I am now more creative... I have a lot of ideas. I have a plan to cultivate most of the land affected by the eruption. It will become a pilot project.

The next change perceived by participants was related to a stronger sense of self. They believed that they were able to work harder, be optimistic, have a sense of patience and to be able to eliminate hopelessness. For example, participant GN disclosed that the eruption changed his character from a lazy person to a hard worker.

The last change experienced by the participants was related with their religious and spiritual life. The change included a stronger belief in God and the increased performance of religious rituals. WG, one participant, used the term inner life (*batiniah*) to describe the change in his spiritual life. He said that although his life had not returned to normal, he felt that his inner life was peaceful because he believed that everything was from God.

The participants' performance of religious ritual was indicated by the fact that they were able to consistently perform their daily prayers. Some participants always performed a congregational prayer in the mosque. Participant WG narrated:

Compared to before the eruption, I am now consistently going to the mosque to perform the daily prayers five times a day. I also often read the Quran right now, trying to remember some short verses.

For participant GN, the Merapi eruption had changed his religious life dramatically. He disclosed that before the eruption, he had ignored his Islamic religion. Only sometimes he performed the daily prayers. He was mostly focused on the worldly matters and sometimes

consumed alcohol, which is forbidden according to the Islamic religion. He stated that, "After the eruption my religious life changed one hundred and eighty degrees." He also stated that, "I am grateful to God, because of the eruption I am able to return to the path of God. I have a strong belief in God."

Although the degree of change is different from one participant to the other, the change of religious life was observable. According to an anecdotal account from one of the religious leaders, the number of people going to the mosque to perform congregational prayers was increasing. People living in the temporary shelters who had never performed daily prayers before eruption were very active after the eruption. They also enthusiastically attended weekly religious gatherings to listen to religious talks.

The qualitative data suggested that spirituality also played an essential resource in coping with the disaster. Spirituality provided a powerful energy to deal with the distress and get back to a normal life. Participant WG clearly stated that it was because of the power from God that made him able to endure this situation: "There is no power except the power of God... Everything is from God." Most of the people who were interviewed believed that life is from God. Human beings must accept whatever occurs in this world. They believe that the disaster was part of the power of God. They percieved that the Merapi eruption was a warning and a test from God. It must be accepted with patience and gratitude. They were grateful especially because they were still alive, although they had no more belongings and many had lost family members. They became respectful to whatever they had at that time and this motivated them to have a strongly spiritual approach to life.

The power of spirituality also provided the participants with feelings of security and protection. NG, a participant who became the last person to have left an area heavily affected by volcanic ashes and mud, stated that if it was not by the protection from God he could have died. When he recollected this experience, his belief in God became stronger.

Discussion

After experiencing disaster or trauma, an individual can feel sad and can often feel hopeless. However, it is also not uncommon that, following the coping process, an individual will have an optimistic attitude to continue their life. This will bring a positive change to an individual.

Changes that may occur include the emergence of optimism, respect for life, better attitudes toward others and also a better spiritual life (Linley & Joseph, 2004).

This study showed that of the three variables that supposedly predicted any post-traumatic growth, it was only spirituality which had a significant role. It is consistent with the idea suggested by some literatures that spirituality is an important variable which is much needed by those who are experiencing a painful event as a source of strength to revive and live life as usual or to live a better life than before (Peres, Almeida, Nasello, & Koenig, 2007; Koenig, 1998; Bert, 2011). The role of spirituality can be understood in the context of spiritual development. Subandi (2009) found that a negative life event or suffering constitutes a significant event that results in a marked change in the participants' lives. For the participants, experiences of suffering became meaningful enough to allow them to assess their past lives and at the same time reorganize their present lives. Spirituality has provided a powerful resource for participants to interpret suffering as an instrument for reviewing the way of life.

Early literature of the psychology of religion discussed the important role of suffering in enhancing religious growth. Clark (1958) stated that, although most psychologists of religion tend to neglect the experience of suffering as the subject of study, all major religions have taken human suffering into account. For the Biblical writers, for example, suffering was connected with growth because "in many places and in many ways the praise of suffering is sung" (Clark, 1958, p.171). According to Buddhist tradition, all existence is suffering: "...birth is suffering; old age is suffering; illness is suffering; death is suffering; grief, lamentation, pain, affliction and despair are suffering..." (Schumann, 1973, p. 29). Among the Shi'a Moslems, the tradition of injuring their own body as a form of physical suffering becomes an important religious ritual to commemorate the martyrdom of Hasan, the grandson of the Prophet Muhammad.

There are also some evidences in the history of religions of the high proportion of saints and prophets who experienced suffering and crises before they attained a higher level of mystical and spiritual life. In the Buddhist tradition, it is stated that before achieving enlightenment and becoming a Buddha, Siddhartha Gautama experienced suffering due to an existential crisis (Schumann, 1973). In the Christian tradition, the experience of Saul of Tarsus becoming Paul the Apostle was also precipitated by the experience of suffering

(Thouless, 1958). In the Islamic tradition, one example of the relationship between suffering and spiritual life is the event of the Prophet Muhammad's ascension *(Mi'raj)* to the Divine Throne, which occurred shortly after the death of his wife and his uncle (Nasr, 1989).

From the perspective of spiritual and religious development, the qualitative data of this study suggested that most participants have had a middling level of religiosity. Although they were Moslem, they did not practice their religion fully. Some participants had even ignored their religion and conducted unlawful behaviour such as drinking alcohol. The Merapi eruption was an important turning point for them. During the eruption they experienced traumatic experiences such as losing their family members, houses and lands. They understood the disaster as a reminder or warning from God and at the same time they also believed that it was the power of God who saved them from the disaster. After experiencing a difficult life in the shelter, then in a temporary housing, participants came to realize that they had no feeling of gratitude about the grace of God. Therefore, it was important for them to return to God and practice their religion correctly. This type of religious coping was very common among the people in Yogyakarta in the face of hardship.

In a study among earthquake survivors of the 2006 earthquake in Bantul, Yogyakarta, Urbayatun (2011) found that most of the survivors employed Islamic religious coping by practicing *dhikr* (remembrance of God), *sholat* (daily prayer), *sabar* (patient) *tawakkal* (surrender) and *syukur* (gratitude). Zaumseil, Scharz, von Vacano, Sullivan and Prawitasari Hadiyono (2014) criticized the concept of religious coping such as what has been found by Urbayatun (2011) as being "… artificially separated from the local and sociocultural context…" (p. 95). They suggested a more cultural, contextual and historical approach to religious coping. Despite this criticism, studies into coping strategies following the 2006 Bantul, Yogyakarta earthquake (see Zaumseil et al. 2014) had already identified a number of coping strategies such as: *nrimo* (acceptance); *pasrah* (surrender); *syukur* (gratitude); *usaha* (effort); and *sabar* (patience). Similarly, participants in this study also employed many different religious coping strategies, such as exhibiting the attitude of *sabar* (patience), *syukur* (gratitude), *nrimo* (acceptance) and performing religious rituals: daily prayer; congregational prayer; reading the Quran; and attending religious talks. This indicates that Javanese people use similar religious coping strategies,

not only in dealing with disasters but also in dealing with life's hardship in general.

The results of this study indicated that the variables of gratitude and hope did not have a significant effect on post-traumatic growth when analyzed together with spirituality, but when analyzed separately, gratitude had a significant correlation ($r = 0.312$, $p < 0.01$). This was probably due to the high correlation between gratitude and spirituality ($r = 0.543$, $p < 0.01$). It can be concluded that the concept of gratitude is included in the concept of spirituality. In other words, the concept of spirituality involves the concept of gratitude. On the other hand, there was no significant correlation between hope and post-traumatic growth ($r = 0.172$, $p > 0.05$). In sum, the effective contribution of spirituality to post trauma growth can be considered small, at only 10.7% while 89.3% was predicted from many other variables.

The weakness of this study was that it focused on variables of spirituality, gratitude and hope, which originated from an individual. This study did not look at the wider social perspective. There would have been a communal life that had significant influences on those going through post-traumatic growth. Social support was not included in this study as an influencing variable. It is very common that during the time of disaster, survivors receive assistance from various parties in the forms of physical, financial, social and psychological aids. Such aids can help survivors to be able to bounce back and live a normal life. Prati and Pietrantoni (2009) conducted a meta-analysis study on factors that influence the emergence of PTG in survivors of traumatic experiences. Of the 103 studies that were analyzed, they showed that the variables of religious coping and positive thinking provided the greatest effect on post-traumatic growth. Meanwhile, social support, support-seeking coping, spirituality and optimism had a moderate effect. Acceptance had the smallest role in predicting post-traumatic growth. In line with Prati and Pietrantoni (2009), Urbayatun (2012) found PTG in the survivors of earthquake in Bantul, which was located in the Southern area of Yogyakarta, was heavily influenced by social support. In this study, social support served as a moderator between stress caused by disaster-coping strategy and PTG. It is recommended that any similar research in the future should include not only personal factors but also social factors such as social support.

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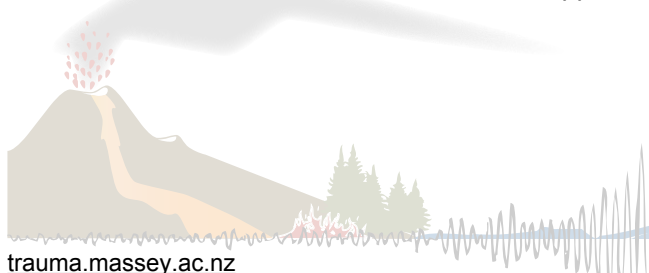
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Reporting on the Seminar - Risk Interpretation and Action (RIA): Decision Making Under Conditions of Uncertainty

The World Social Science (WSS) fellows on Risk Interpretation and Action (RIA) include the core writing team of this report (alphabetical after leads): Emma E. H. Doyle[1], Shabana Khan[2], Carolina Adler[3], Ryan C. Alaniz[4], Simone Athayde[5], Kuan-Hui Elaine Lin[6], Wendy Saunders[7], Todd Schenk[8], Fabiola Sosa-Rodriguez[9], and Victoria Sword-Daniels[10], which has been written on behalf of the wider group that attended the seminar (in alphabetical order): Olayinka Akanle[11], Marie-Ange Baudoin[12], Chiung Ting Chang[13], Karianne De Bruin[14], Riyanti Djalante[15], Christine Eriksen[16], Hsiang-Chieh Lee[17], Jyoti Mishra[18], Victor O. Okorie[19], David R Olanya[20], Goda Perlaviciute[21], Naxhelli Ruiz-Rivera[22], Suzanne Vallance[23], Xinlu Xie[24], Lun Yin[25].

The organisers and scientists that also attended the RIA Fellows seminar included (in alphabetical order): Sarah Beaven[26], Charles Ebikeme[27], Richard Eiser[28], David Johnston[29], Christine Kenney[30], Tony Liu[31], Douglas Paton[32], Sarah Schweizer[33], Vivi Stavrou[34].

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Abstract

The paper reports on the World Social Science (WSS) Fellows seminar on Risk Interpretation and Action (RIA), undertaken in New Zealand in December, 2013. This seminar was coordinated by the WSS Fellows program of the International Social Science Council (ISSC), the RIA working group of the Integrated Research on Disaster Risk (IRDR) program, the IRDR International Center of Excellence Taipei, the International START Secretariat and the Royal Society of New Zealand. Twenty-five early career researchers from around the world were selected to review the RIA framework under the theme of 'decision-making under conditions of uncertainty', and develop novel theoretical approaches to respond to and improve this framework. Six working groups emerged during the seminar: 1. the assessment of water-related risks in megacities; 2. rethinking risk communication; 3. the embodiment of uncertainty; 4. communication in resettlement and reconstruction phases; 5. the integration of indigenous knowledge in disaster risk reduction; and 6. multi-scale policy implementation for natural hazard risk reduction. This article documents the seminar and initial outcomes from the six groups organized; and concludes with the collective views of the participants on the RIA framework.

Keywords: *interpretation, action, decision making, uncertainty, communication, interdisciplinary, workshop*

The International Social Science Council (ISSC) World Social Science Fellows Programme aims to "create the next generation of social science leaders. Those who can ask the questions that matter — and answer them" (World Social Science, 2014). Seminars bring Fellows together to identify pressing research questions related to global challenges, design *innovative interdisciplinary research strategies*, and form international research collaborations to enhance their careers. The Risk Interpretation and Action (RIA) seminar was the third seminar in the series, and was hosted by Massey University in Wellington, Te Rūnanga o Ngāi Tahu (the tribal council of the Māori iwi Ngāi Tahu[1]), and the University of Canterbury in Christchurch, New Zealand.

The RIA seminar[2] was co-sponsored by: the Integrated Research on Disaster Risk (IRDR) programme[3]; the IRDR International Center of Excellence, Taipei[4]; the International START Secretariat[5]; and the Royal Society of New Zealand[6]. The Integrated Research on Disaster Risk (IRDR) research programme is a global initiative that seeks to address the challenges brought about by natural hazards, mitigate their impacts, and improve related policy-making mechanisms[7]. The IRDR has four working groups, which bring together diverse disciplines to conceptualize new approaches to Disaster Risk Reduction (DRR). One of these working groups is focused on Risk Interpretation and Action[8], and the December 2013 RIA seminar was explicitly held to explore the key themes of the framework established by this working group in 2012.

The RIA Framework

The RIA working group of the IRDR aims to improve our understanding of how individuals and groups make decisions when confronted with risk (IRDR, 2012), by integrating a range of academic disciplines to address key unanswered questions relating to:

1   See http://ngaitahu.iwi.nz/te-runanga-o-ngai-tahu/ (last accessed 28th March 2014).
2   See www.worldsocialscience.org/activities/world-social-science-fellows-programme/seminars/new-zealand-risk-interpretation-action/ (last accessed 5th Feb 2014).
3   See www.irdrinternational.org/about/ (last accessed 5th Feb 2014).
4   See http://irdr-icoe.sinica.edu.tw/about.html (last accessed 5th Feb 2014).
5   global change SysTem for Analysis, Research, and Training. See http://start.org/ (last accessed 5th Feb 2014).
6   See http://www.royalsociety.org.nz/ (last accessed 5th Feb 2014)
7   See http://www.icsu.org/what-we-do/interdisciplinary-bodies/irdr (last accessed 5th Feb 2014)
8   See http://www.irdrinternational.org/(last accessed 5th Feb 2014)

- *How can risk reduction policies and practices be generalised across hazards or to combinations of hazards, as well as across cultures?*

- *How much emphasis should be placed on risk forecasting versus communication?*

- *Why and when do local citizens' evaluations of risk diverge from scientific forecasts?*

- *How do people's decisions, perhaps due to social norms and perceived or actual constraints on their freedom of choice, diverge from their evaluations of such risks?*

- *Within policy and planning, what priority is given to protection and restoration of existing infrastructure, rather than redesign for greater resilience or prevention?*

(IRDR, 2013, p.12)

A series of RIA workshops and meetings in 2011 led to a position paper by Eiser et al. (2012) that specifies the kind of research that needs to be conducted to address the above questions, and outlines a conceptual framework to understand risk interpretation and responses to natural hazards. The paper brings forth a number of key elements from the study of human behaviour and decision-making, including: 1. the definition of risk; 2. the definition of uncertainty; 3. characterising previous research on risk in interpretation and decision-making; 4. individual decision-making under uncertainty, beyond 'rational choice'; 5. heuristics; 6. decisions from experience; 7. learning; 8. trust in others; and 9. complexity, scale and social context. It concludes that the judgements underlying risk interpretation and action are not merely personal, but also interpersonal, and that while the literature behind these concepts is varied and extensive, it is not well integrated. More research that explores the interactions between human actors, social groups and natural hazards is required (Eiser et al., 2012).

Eiser et al. (2012) caution that much of the research in the social and behavioural sciences has progressed in "rather abstract contexts", and thus it is important to critically examine the paradigms employed by those studies, as they may not incorporate the factors that are crucial and relevant to real-life decision-making. In addition, the authors point out the need to explicitly consider our 'social dependence' upon one another in shaping our physical and social environments, as these

interactions exert an influence on our vulnerability and resilience to natural hazards and disasters.

Since the publication of the RIA framework, a further RIA workshop was held in London in 2013 to discuss unanswered questions in the analysis of risk communication and perception, and the gaps in research, practice and funding. Topics discussed included:

- Can placing learning in the centre of science and policy lead to a paradigm shift for understanding and acting on resilience and transformation?

- What are the practical obstacles to a more flexible and knowledge rich humanitarian and development sector and professional practice?

- How much emphasis should be placed on risk forecasting versus communication?

(RIA, 2013, p.1)

From their working discussions, RIA workshop participants concluded that "there is a real danger of a growing disconnect between the empirical reality of natural hazard exposed populations and the ways in which this is represented by science and so imagined and addressed by policy makers" (RIA, 2013, p. 2). Issues flagged by participants include: a general need to look at multiple risks, to communicate uncertainty in science, and focus on learning rather than the production of information; the lack of integration of local knowledge; need to ensure access of knowledge for those who most need it; urgency to work within local decision-making contexts to target opportunities for learning; and the need to find ways to bring different knowledge sources together.

In conclusion, the participants found that that an integrated, interdisciplinary and multicultural approach to risk requires capacity building and field guidelines for knowledge exchange and engagement with local communities, and that a paradigm shift is necessary to break down the distinction between the processes of knowledge production, policymaking and implementation. They cautioned that this framing must not lose sight of the social structures that determine vulnerability and risk. They also identified a need to develop programmes that build capacity among different actors for integrated approaches to risk, and to document and share experience for advancing social sciences research and practice. The outcomes of the London workshop provided insights to the RIA seminar

on ways of sharing and integrating different disciplinary and cultural perspectives while working towards a common goal. The concluding remarks also highlight the benefits of initiatives like the RIA seminar as fora for enabling emergent learning.

The 2013 RIA Seminar Process

The goal of the RIA seminar, held in December 2013 in New Zealand, was to explore "if and how the RIA-IRDR conceptual framework for response to natural hazards can be integrated across disciplines and cultural contexts" (ISSC, 2013, p. 1). Twenty five early career research scientists from various disciplines, including psychology, sociology, economics, geography, public policy and planning, anthropology, political science, law, and environmental and geological sciences, were selected through a competitive application process to participate in the seminar.

The seminar was facilitated by leaders in the field of risk interpretation and action, including David Johnston (Massey University/Institute of Geological and Nuclear Science and IRDR), Christine Kenney (Edith Cowan University and Massey University), Richard Eiser (Sheffield University), and Douglas Paton (University of Tasmania), together with representatives and coordinators from the sponsoring organisations, including Tony Liu (International Centre of Excellence Taipei), Charles Ebikeme (ISSC), Vivi Stavrou (ISSC), and Sarah Schweizer (START).

The first three days of the seminar featured a series of lectures related to various aspects of the RIA framework, which were presented by two of the framework's core authors, Eiser and Paton, and indigenous researcher Kenney. Five-minute presentations from each fellow, describing their work and how it relates to the RIA framework, were interspersed between the lectures. This phase was followed by a collective group discussion to identify the key issues that emerged from the lectures and introductions. After taking time to reflect on these issues, a series of working groups were formed with a focus on addressing the issues and developing research agendas and future work plans. From then on, the structure and scope of the seminar were largely left open to allow the fellows to self-organise.

The exception to self-organisation was a two-day visit to Christchurch, New Zealand, which included a unique opportunity for the fellows to be welcomed on to the Rēhua Marae (Ngāi Tahu) and discuss the role of Māori

community leadership and disaster recovery in Ōtautaki Christchurch since the earthquake sequence that started in 2010. The visit provided a valuable opportunity to step back from the theory discussed in the first three days and reflect on real world aspects of risk interpretation and action, including the social and cultural contexts of disaster recovery in New Zealand.

Time was made available in Christchurch for group work to continue. Each group also presented their working ideas to the lecturers and their peers for feedback, guidance and advice. Participants could join more than one group to engage in various topic discussions relevant and of interest to them. Each group was asked to develop a summary of their mission statement, research agenda, future research plans and planned research outputs by the end of the week. The seminar concluded on day seven with a facilitated feedback session on the processes undertaken throughout the week, the collective themes emerging from all groups, and the nature of undertaking interdisciplinary and multicultural research.

Outcomes of the 2013 RIA Seminar: Working Groups

The six working groups that emerged from this seminar developed specific research agendas based on their reflections on the RIA framework. These research agendas have a number of overlapping and interconnecting principles to address the issues linking risk interpretation and action (see Figure 1). Although these research agendas do not include all

of the topics that could be addressed or stimulated by the RIA framework, the outcomes below do reflect the thinking, knowledge exchange, and learning processes that took place among the fellows during the seminar, and the emergent themes that they view as critical, unaddressed in the current literature, and/or that link to their own research.

Assessing Water-Related Risks in Megacities in Developing Countries Under the RIA Framework –Authored by F.S. Sosa-Rodríguez, X. Xie, S. Khan and O. Akanle

Rapidly increasing growth of cities from developing countries has reshaped the urban world (Ezcurra and Mazari-Hiriart 1996). Megacities in the developing world are particularly exposed to varied water-related risks that endanger people´s lives and the operation of these urban settlements. This group aims to understand both current and future water-related risks in megacities from the developing world, and to identify the main factors that determine stakeholders' perceptions, interpretations and actions by using the RIA framework. To meet this objective four case studies (Mexico City, Mexico; Beijing, China; New Delhi, India; and Lagos, Nigeria) have been identified in order to study their commonalities and differences in terms of their urbanisation characteristics, the water-related risks they face, the current water management practices to address water-related risks, and the main factors that determine the way policy makers identify, interpret and act to cope with water-related risks. The group also aims to answer the following questions: What does building resilience means for megacities? How useful could the RIA Framework be in building urban resilience? What are the common current and future water-related risks for megacities? What are the governmental responses to cope with these risks? How do factors identified by the RIA Framework influence water management decisions? Finally, what are the new challenges for water management in megacities? We also ask whether the findings can further guide the RIA Framework.
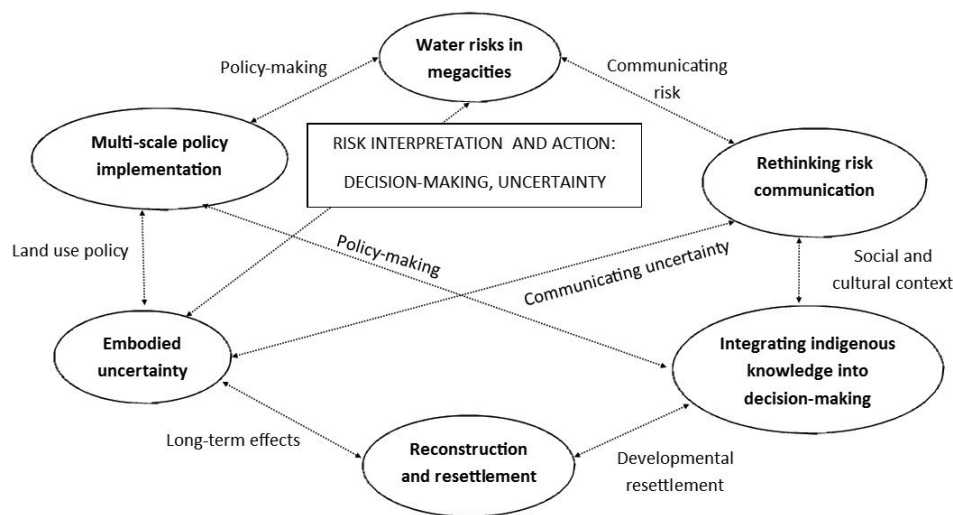

Figure 1. The six working groups of the ISSC IRDR WSS RIA Fellows, as formed in December 2013, and their interconnected principles.

Rethinking Risk communication: Problems and Solutions - Authored by C. T. Chang, E. E. H. Doyle, S. Khan, J. Mishra, D.R Olanya, G. Perlaviciute, F. S. Sosa-Rodriguez, and X. Xie

Communication of uncertainty has gained salience in climate change literature, however, it has remained a less addressed issue in the studies of natural hazards and disaster responses. It is noted that research on communications in the latter field is often focused on warning, prevention and recovery, and has not attended to issues relating to communication in-depth particularly during disaster response when it is most crucial for saving lives (Hale, Dulek, & Hale, 2005). Further, more research has focused on the communication (information flow) among the responders (Chen, Sharman, Chakravarti, Rao, & Upadhyaya, 2008; Netten & van Someren, 2011) from different agencies rather than between responders and the public, including affected individuals in particular. Scientists, on the other hand, are mostly driven to publish in scientific and professional journals of limited audience, and frequently have little interest and/or incentives for communicating their findings to non-scientists (Tribbia & Moser 2008).

Lipshitz, Klein and Carroll (2006) argued that to understand a dynamic situation, laboratory studies for research in decision making are not suitable, rather how information is communicated and how decisions are made in real scenarios must be studied. It is often assumed in practice that if people are given "sufficient" information, they will make the "right" decisions. However, people may interpret risk information differently than had been expected by information providers, and consequently respond to those risks in unexpected ways. Although Eiser et al. (2012) talk about communication in the RIA framework, the framework doesn't place adequate emphasis on communication for its role in mediating risk interpretation and action. It rather sees it as a means to achieve an outcome wherein risk interpretation and action inform risk communication and public engagement. This group is exploring the role of communication and highlights its significance not just as a means to an outcome, but also as a factor influencing both risk interpretation and action along with various other factors discussed in the RIA framework.

This group also aims to identify key barriers in effective risk communication and ways to overcome these barriers. Communication is effective when people are able to adequately realise the risks and respond to them appropriately. The ultimate goal of this research group is to develop an integrated conceptual framework of risk communication, to be used by scientists (for the future research of this topic and for their role as information providers) as well as by practitioners (mainly for their role as information providers). The group will also test this framework for various types of risks and for cross-cultural communication.

Embodied Uncertainty, Part 1: The Concept of Embodied Uncertainty – Authored by C. Eriksen, V. Sword-Daniels, E.E. H. Doyle, R. Alaniz, C. Adler, T. Schenk, and S. Vallance

The RIA framework calls for further research to understand how past experiences, feelings, values, beliefs, social norms and individual and community characteristics, may shape risk interpretation and decision-making under conditions of uncertainty (Eiser et al., 2012). This group coined the term *embodied uncertainty* to move beyond the conventional understanding of uncertainty as a measurable metric to one that frames it as a lived experience that embraces complexity (Stirling, 2010). This term moves us towards an acceptance of uncertainty rather than attempting to reduce it to controllable conditions. Embodied uncertainty is distinguished from 'objective' uncertainty by being located within the bodies of individual people (Kavanagh & Broom, 1998; Mol, 2004). The group defines the embodiment of uncertainty as relating to the subconscious internalisation, subjective interpretation, and ways of making personal meaning out of uncertainty related to risk. It is built upon the notion that uncertainty is a holistic product of many factors, both shared and individual (Elliott & Pais, 2006; Epstein, 1994; Feldman, 2004; Kavanagh & Broom, 1998; Loewenstein, Weber, Christopher & Welch, 2001; Patt & Dessai, 2005; Taddei, 2012; Van Asselt, 2000).

Embodied uncertainty is framed as a verb not a noun. It is constantly enacted. People make patterns out of chaos. It is the lived experience of both known and unknown uncertainty. Embodied uncertainty is not passive. Uncertainty is embodied, for example, in human subjectivity and everyday life. There is embodied uncertainty through the aggregation and production of knowledge, in institutional structures, in decision-making, in communication processes, in evaluation and assessment processes (e.g. Adler & Hirsch Hadorn, In Press). Uncertainty is furthermore individually embodied and intertwined with our social identities. Embodied uncertainty also becomes embedded into

broader societal processes, which then shape how uncertainties are embodied by others at different levels, as it frames how they perceive and engage with, for example, risk. The embodied is the subconscious and the embedded is the conscious short-term. They are both dialectical in nature. Consciously embedded norms can become embodied subconsciously over time within longer timeframes. These concepts are currently being explored further in a conceptual paper and other ongoing collaborations.

Embodied Uncertainty, Part 2: Integrating Knowledge for Collective Risk Management - from Technical Rationality to Procedural Credibility and Legitimacy – Authored by T. Schenk, C. Adler, S. Vallance, R. Alaniz, E.E. H. Doyle, C. Eriksen, and V. Sword-Daniels

Decision-making that is wise, fair and effective must find ways of incorporating diverse forms of knowledge and recognising persistent, embodied uncertainty. Knowledge is co-produced and imperfect, yet we need to use tangible heuristics and models to support collective decisions for effective risk management (Tversky & Kahneman, 1974; Walker et al., 2003). The challenge is that integrating and assessing multiple forms of knowledge (including traditional ecological knowledge, TEK) is difficult, contested and inconsistent (Adler & Hirsch Hadorn, 2014; Beck, Borie, Chilvers, Esguerra, Heubach, & Hulme et al., 2014). In response, this group calls for the use of different epistemic standards that are salient, legitimate and credible to all stakeholders when processing knowledge and making decisions in the face of uncertainty. That is, for a shift in focus from a singular *technically rational* to a plural and *procedurally valid* approach, as exemplified in the concept of adaptive governance (see Brunner & Lynch, 2010).

The litmus test for assessing the procedural validity rests on a revision of epistemic standards that rejects a *one size fits all* prescription of which tools are best. This group argues instead, that different tools will be more or less appropriate in different contexts depending on the problem in question, values at stake and degrees of nuanced uncertainty, ambiguity and ignorance that are considered (see Stirling, 2010). This group collaboration seeks to elaborate and learn from various tools and practical approaches for managing multiple and diverse knowledge systems and translating knowledge into action, while accommodating uncertainty in different contexts. Tools and approaches are situated along

two axes: The degree of complexity involved, and the relative heterogeneity among the various stakeholders. Heterogeneity may depend on the number of actors and stakeholders, inter- and intra-group diversity, and cohesion of interests. Complexity may depend on the number of moving pieces and dynamism, including urgency, knowledge and understanding. This group collaboration aims at supporting a turn from decision-making that is built on the notion of scientific rationality to one that incorporates multiple sources of knowledge and accepts uncertainty, in addition to exploring how this can be operationalised in practice.

Communication Influences on Decision Making in Disaster Recovery and Reconstruction: Implications for the RIA Framework – Authored by K-H. E. Lin, S. Khan, D.R Olanya, S. Vallance, and R. Alaniz

The RIA working group has been developed with the intention of analysing and improving our understanding of how people, both decision-makers and ordinary citizens, make decisions, individually and collectively, in the face of risk (McBean, 2012). RIA has asked some critical questions, which highlight the reflection and critical turn of the international disaster research communities: stepping from pursuing big sciences to strategically emphasising the practical needs for a deeper understanding about the interfaces and interconnectedness among various parties of scientists, practitioners and policy makers regarding disaster reduction. However, to answer the questions or to formulate the ways to approach the questions is still challenging. Pelling (2013) stated that perspectives from social theory, psychology and learning theory all look into the interfaces but the independency of the whom has led to a number of discontinuities in the analysis of risk communication and perception, and gaps in research and practices. He proceeded to propose two overarching concerns to settle those questions: the scope of communication among science, policy and practice communities, and the vested interests in each group and the norms and values that shape dialogues. In its latest release, the RIA framework provides a critical overview of the theories on the relationships between risk interpretation and action (Eiser et al., 2012). The framework pushes forward, from the psychological perspective, to a theoretical boundary about risk interpretation beyond rational choice and broadens the scope of attention on complexity, interpersonal dynamism and social context that implicitly influence or alter personal risk interpretation and action. However,

this framework is inclined to focus on the personal and individual mechanisms that frame these processes, and seems to lack sufficient discussions on the interactions among the individual and collective levels, as risks are interpreted and lead to certain decision-making and actions.

This group aims to fill this gap by investigating a critical but dynamic element – communication; and further put the discourse in the less-studied field of disaster reconstruction and resettlement. Communication, as discussed here, focuses on the dialogue among individuals, communities, organisations and governments in the reconstruction and resettlement phases after disasters. It is embedded in the broader political, social, and cultural context of the respective country or region (Lin, Tsai & Chang, 2011; Marx et al., 2007; Morton, Rabinovich, Marshall & Bretschneider, 2011; Russill and Nyssa, 2009; Vogel, Moser, Kasperson & Dabelk, 2007). Our research highlights interactions across social and temporal scales with an explicit aim to focus on the individual and collective level interactions, especially the communication among various parties, along with norms and values inherent in the dialogues, and the cultural, institutional and legislative settings that support the processes. As a nature of its internationality, this group includes scholars from Taiwan, India, Uganda, Honduras, and the Philippines to look at case studies in these countries regarding the natural disaster reconstruction and recovery. The internationality of the project allows critical comparison among the countries to address how the communication has been produced, evolved or even hindered in the national social and political contexts, and how certain (non-) communication processes influence policy making and result in post-disaster recovery and reconstruction practices.

The Role of Indigenous Peoples and Indigenous Knowledge in Disaster Risk Reduction and Climate Change Adaptation – Authored by S. Athayde, M-A. Baudoin, V. Okorie, L. Yin and S. Lambert[9]

In a world facing increased uncertainty and risk from hazards and climate change, Indigenous Peoples are among the most vulnerable groups. Nevertheless, Indigenous communities around the world hold relevant knowledge to be applied in disaster risk reduction (DRR) and climate change adaptation (CCA) research, initiatives and policies. There is widespread recognition

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that Indigenous Knowledge systems (IK) are vital components of environmental management, biodiversity conservation and sustainability (Gadgil, Berkes and Folke, 1993; Berkes, Colding and Folke, 2000; Posey and Balick 2006; Heckenberger, Russel, Toney and Schmidt, 2007; Maffi and Woodley, 2010; Schwartzman et al., 2013). According to Mercer, Kelmen, Taranis and Suchet-Pearson (2010), there has also been increased recognition of the importance of IK systems for coping with and adapting to environmental hazards and disasters (see also Cronin, Gaylord, Charley, Alloway, Wallez and Esau, 2004, Cronin, Petterson, Taylor and Biliki, 2004; Dekens, 2007a, 2007b; Shaw, Uly and Baumwoll, 2008). Nonetheless, practical and conceptual articulations or bridges between Indigenous peoples, scientists, politicians and society at large in knowledge production, sharing and integration are often poorly developed (Mercer et al., 2010, Raymond et al., 2010, Bohensky and Maru 2011). The gap between policy-makers, scientists, practitioners and indigenous peoples is large: it reflects a lack of effective communication and coordination among these actors, related to misunderstanding, power imbalances and essential differences in epistemological orientations (Agrawal 2002). Approaching risk interpretation and action in different contexts and across diverse cultures deserves further synthesis and evaluation. This group's research will review, analyse and aid the integration of IK into DRR and CCA.

This group proposes to develop a multi-scale and multi-actor framework drawing from literature review as well as from experiences and challenges faced by indigenous peoples in China, New Zealand, Brazil, and Nigeria. Such a framework should be flexible and respectful of local knowledge, practices, values, beliefs and approaches to risk, reflecting the specificities and dynamics that are flourishing among, and within, Indigenous communities (see Shaw et al., 2008 for a compilation of best practices and experiences on DRR in the Asia-Pacific region). Connecting, fostering exchange of ideas and experience, and facilitating training among representatives of indigenous communities who face natural, industrial and climate change-related hazards is also a main goal of this collaborative work. The project will research the nuances of *risk perception* and *risk interpretation* among Indigenous communities in different countries and contexts, as well as their creative responses or *risk action*. While researching these issues, it is important to step away from scientific knowledge conceptualizations of risks, in order to embrace the fact

that risk might be interpreted and enacted differently across Indigenous communities, and the fact that their subsequent responses and strategic adoptions may enable better risk actions for other communities (Shaw et al., 2008, Mercer 2010, Mercer et al., 2010).

Multi-Scale Policy Implementation for Natural Hazard Risk Reduction – Authored by W. Saunders, H-C. Lee, N. R. Rivera, and K. de Bruin

One of the key dimensions of any process of Risk Interpretation and Action relates to how disaster risk reduction policies are designed and implemented in different national settings. The objective of this project is to improve the understanding of the multi-scale policy implementation for natural hazard risk reduction in four countries, as a key dimension of risk interpretation and action at the political level. The focus of the project is an international comparison between New Zealand, Mexico, Norway, and Taiwan. While these countries represent the collaboration formed at the RIA seminar, they are also susceptible to similar natural hazards, in particular floods, landslides, earthquakes, and climate change. They represent countries within the geographical locations of Australasia, Latin America, Europe, and Asia, with a diversity of political systems and institutional strengths and weaknesses. The methodology is a comparative design content analysis (based on Krippendorff, 2013) of published emergency plans and land use plans at the national, regional, and local levels. The methodology of assessing plans is underpinned by similar research undertaken by: Berke, Smith and Lyles (2012); Berke and Godschalk, (2009); Ericksen, Berke, Crawford and Dixon (2003); and Lyles, Berke and Smith (2012). Issues such as uncertainty, knowledge communication and learning from previous lessons are also included when analysing the plans. Identifiable opportunities, barriers and lessons that can be learned will be presented, with a critical reflection of the possible improvements to the policy making process on each of the analysed contexts.

The theoretical framework for the project is taken from legal geography. According to Clark (1989), the geographies of law have been progressively addressing diverse dimensions between space and law. Firstly, they addressed: the spatial consequences of formal regulatory instruments such as laws, rules and programmes; the spatial ideologies underneath the formulation of these instruments, for example environmental conservation, economic freedom, social justice and property; and how the categories contained within the legal framework naturalized social and political inequalities (Blomley, 2002; Sivak, 2013). Recently, there have been several studies that address how these ideological components have different effects on the type of spatial policy that is implemented (e.g. including definitions of contentious or blurred concepts such as *resilience*, *public good* or even *vulnerability*) or even the type of institutional capacities and regulatory environments that are generated around those principles (e.g. levels of decentralisation, public participation or law enforcement) (Sterett, 2013). There is also an emerging field of empirical studies about policy implementation, particularly regarding the scalar interactions in decision making, law enforcement and social action (e.g. Osofsky, 2007). This background supports this enquiry on the nature of emergency management systems and risk reduction policies.

The use of these conceptual approaches in this project complements the RIA framework by particularly focusing on the structural dimension of social action, by exploring how the different state agents create and implement multi-scale disaster risk reduction policies in different countries. Follow-up studies will include case studies of plan implementations, which include local capability assessment (see for example Saunders, Beban, & Coomer, 2014). This research supports the RIA framework by providing an empirical study of risk interpretation through policy to implementation as well as posing questions for future research including: 1. How are DRR policies implemented at the local level, including land use changes, emergency management and civil protection?; 2. What are the opportunities and barriers for improving implementation of policy at multiple levels?; and 3. What can be learned from how different countries are implementing DRR policies?

Conclusions: Full Group Reflections on the RIA Framework

These working groups are only starting to frame their research and collective writing. However, a set of preliminary observations have already emerged, based on the work conducted during and after the seminar, including the following:

One, the starting point for the seminar was a largely individual psychological perspective on risk interpretation and action, and fellows quickly noted that risks are framed and only have meaning within socio-cultural systems, which involve particular, context-specific, ways

of processing information. The interpretation of risks is inherently subjective, based on many factors, thus heterogeneity, complexity, and plurality in perspectives must be adequately structured and embraced. Interpretations, actions and responses to risk are built on local values and norms, and depend on disciplinary frameworks.

Two, the effective communication of risks fits into various policy domains, with the goal of effectively informing individual decision-making. There is thus a key role for researchers to understand how to interpret, conceptualise, communicate, and act upon risk and how emergency managers can improve communication about these risks. That said, there is a continual need to shift from *risk communication* to *risk engagement*, with a new appreciation for the need to actively engage stakeholders in the generation of, and sharing of, information being communicated to them.

Three, risks must be explored collectively as well as individually, including responses to these risks chosen via processes that incorporate information from various sources (i.e. communities, organisations, and individuals), accounting for different concerns, goals, and perspectives. It is important to recognise that advancing research on risk interpretation and action must involve multi- and trans-disciplinary research and action, as well as to consider diverse socio-cultural contexts. It is also vital to account for the multiple actors involved and scales inherent to risks, the interdependence between them, and the issue of cascading risks as impacted communities become more exposed to a range of future risks.

The collective group plans to revisit these three topics and others. We will assess the interconnectivity of our topics and relationship to RIA related activities, through a follow on collaborative exercise in 18 months. The goal is to ensure the longevity of the working relationships established between this group of 25 fellows over the longer term.

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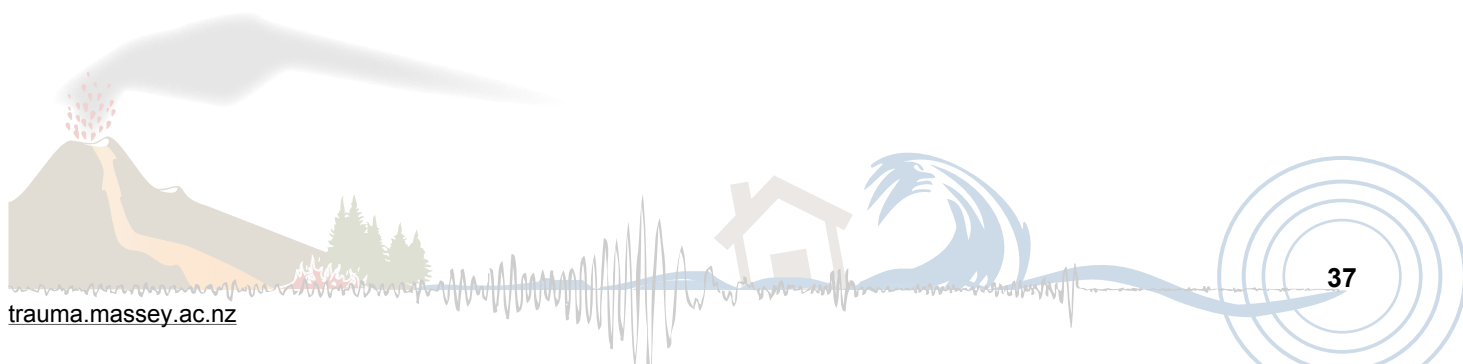
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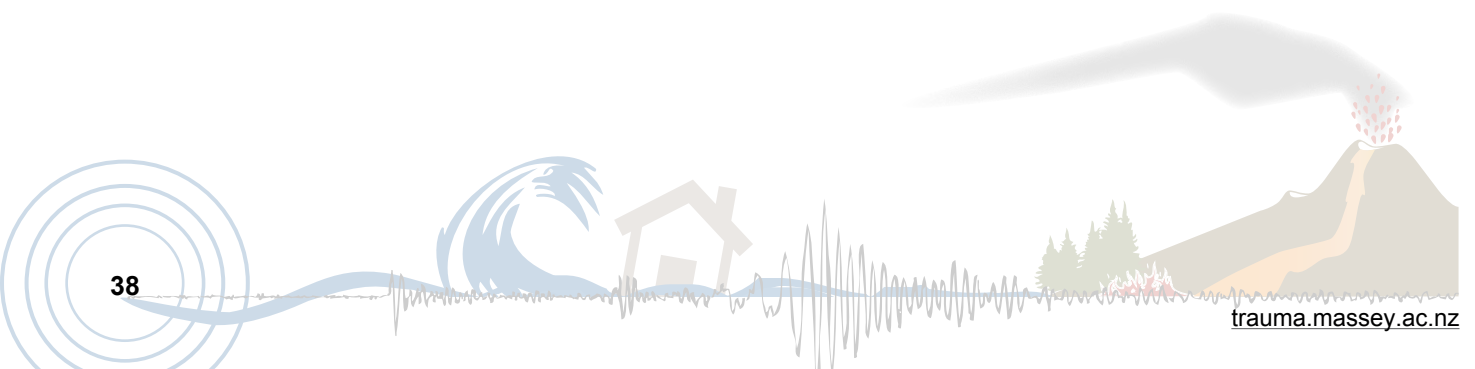
Indigenous Peoples and urban disaster: Māori responses to the 2010-12 Christchurch earthquakes

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Abstract

Indigenous Peoples retain traditional coping strategies for disasters despite the marginalisation of many Indigenous communities. This article describes the response of Māori to the Christchurch earthquakes of 2010 and 2012 through analyses of available statistical data and reports, and interviews done three months and one year after the most damaging event. A significant difference between Māori and 'mainstream' New Zealand was the greater mobility enacted by Māori throughout this period, with organisations having roles beyond their traditional catchments throughout the disaster, including important support for non-Māori. Informed engagement with Indigenous communities, acknowledging their internal diversity and culturally nuanced support networks, would enable more efficient disaster responses in many countries.

Indigenous Peoples are increasingly urbanised (Del Popolo, Oyarce, Ribotta, & Jorge, 2007; UNHRP, 2007; UNHSP, 2010), altering their exposure to environmental hazards and challenging disaster management approaches for individuals and collectives. Over 80 percent of Māori, the Indigenous People of New Zealand, now reside in urban areas (Ministry of Social Development, 2010). New Zealand has significant geological and hydro-meteorological hazards and the experiences of how urban Māori respond to ensuing disasters provides important insights into 21st century disaster risk reduction for Indigenous societies.

Christchurch, the second largest city in New Zealand with a population of 400,000, experienced a series of earthquakes beginning on September 4th, 2010, with a magnitude (M) 7.1 event that resulted in no deaths but saw significant damage to many buildings (Stevenson et al., 2011). A smaller (M6.2) but more damaging earthquake on February 22nd, 2011, killed 185 people and caused widespread destruction in the CBD and to thousands of residential properties (Canterbury Earthquakes Royal Commission, 2011). Thousands of aftershocks, more than 50 of them stronger than M5.0 (Bannister & Gledhill, 2012) kept residents under stress and hampered the recovery. Christchurch contains a relatively large population of Māori (see Table 1) including the majority of Māori in the Canterbury region and the South Island.

For a better appreciation of the effects of the disaster on Māori it is perhaps more useful to understand that significant communities of Māori reside in the Eastern suburbs which suffered significant damage from liquefaction and the loss of services including retail, medical centres, sports and cultural facilities. Initial 'red/orange zoning' of damaged land and properties fell disproportionately in these suburbs.

An important characteristic of Māori society is the distinction between those who have genealogical links to a location or territory, and those who do

Table 1.
Total Residents and Māori in Christchurch City and Neighbouring Districts (from Statistics New Zealand, 2012, 2014b[1])

Area	Total			Māori		
	2001	2006	2013	2001	2006	2013
Hurunui District	9,885	10,476	11,529	516	594	804
Waimakariri District	36,903	42,834	49,989	2,430	2,856	3,570
Christchurch City	324,057	348,435	341,469	22,533	25,725	27,768
Selwyn District	27,291	33,645	44,595	1,572	2,010	3,039

1   Statistics NZ cautions the interpretation of ethnic data as people can and do identify with different ethnic groups over time. Methodology, questionnaire design, classifications and coding practices have also changed over time, meaning some data is not consistent between 2001, 2006 and 2013
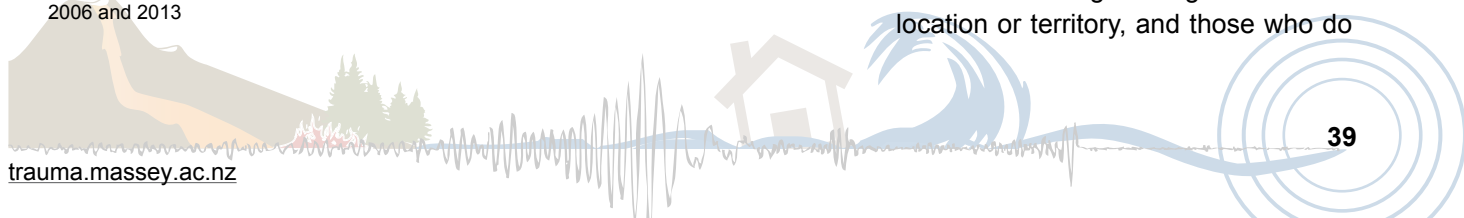
not. The first group are considered to have traditional authority and claims to ownership as *mana whenua*; through Treaty of Waitangi settlement processes these tribal authorities are formally acknowledged and included in relevant national and local government processes (Waitangi Tribunal, 2013). Māori who do not trace their descent to local tribes often maintain their identity and engagement with their own tribe and are collectively known as *ngā maata waka* or *ngā taura here* and may outnumber *mana whenua* in urban areas. Ngāi Tahu is the local tribe for Christchurch, indeed for much of the South Island; their tribal authority is Te Runanga o Ngai Tahu (TRoNT)[1] and tribal members make up about 40 per cent of Māori resident in the city. Figure 1 shows that relative population sizes for the main areas impacted by the disaster.
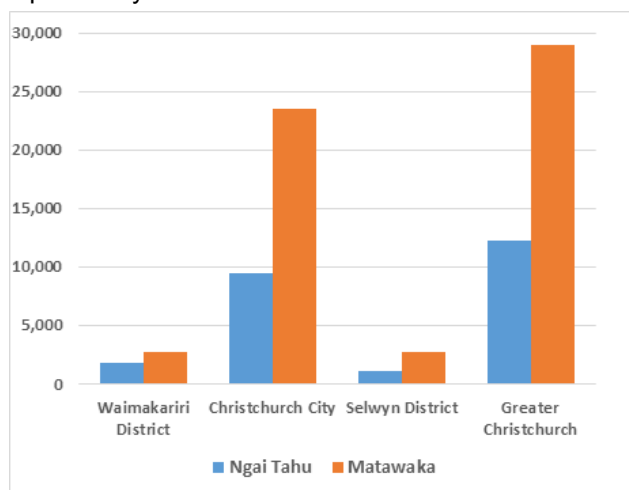

Figure 1. Ngāi Tahu and Ngā Maata Waka/Taura Here communities (from Statistics New Zealand, 2014a)

Those Maori who do not trace their ancestry to the Christchurch area are primarily from the North Island and will have their own tribal networks and practices with their subtle differences. There are also significant numbers of Maori who do not know their tribal affiliation, further complicating a uniform approach in disaster management for Māori. Several formal organisations represent non-Ngai Tahu in Christchurch and the wider Canterbury region, including Te Runanga o Taura Here, Te Runanga o Ngā Maata Waka (Te Runanga o Nga Maata Waka, 2013), and the Māori Community Leaders forum. While personal, social and professional interactions take place between all these groups, and between them and Ngai Tahu, *mana whenua* status will have implications for, *inter alia*, disaster management in New Zealand.

1   At June 2011 the total equity held by TRoNT was NZ$591m (Te Runanga o Ngai Tahu, 2012).

Literature Review

That disasters impact differently on different groups is well-known (Cutter, 2010; Wisner, Blaikie, Cannon, & Davis, 2004). Indigenous communities often highly vulnerable despite the ancient wisdom they hold on environmental risks and hazards (Ellemor, 2005; Howitt, Havnen, & Veland, 2012; Lambert, Athayde, Yin, Baudoin, & Okorie, 2014; McAdoo, Moore, & Baumwoll, 2009). These insights are now included in international fora such as the United Nations Fourth Session on the Global Platform for Disaster Risk Reduction (UNISDR, 2013) which noted that "Organizations increasingly seek systematic evidence based methods for risk-informed decision-making, drawing on scientific analysis and tested Indigenous Knowledge" (p.13). Indigenous Knowledge (IK) is a body of knowledges maintained by Indigenous Peoples that is "poly-rhetorical, contextually-based, and rooted in a specific place and time" (Louis, 2007, p.134). While IK is increasingly recognised in environmental and resource management, it remains marginalised and struggles for acceptance and ethical engagement.

Shaw, Sharma, and Takeuchi (2009b) classified IK in disaster risk reduction according to four socio-ecological systems and their hazards: mountains (geological and hydro-meteorological hazards); coasts (tsunamis, storm surges, erosion); water management (drought risk); river basins (floods and erosion), They labelled a fifth area as the role of housing in coping with diverse disasters (Shaw, Sharma, & Takeuchi, 2009a). Illustrating with examples from across the Asia-Pacific region, their case studies reported on how IK contributes to scientific and engineering understanding, and state and private responses including the communication of research and knowledge across cultural borders.

A 2013 UN conference on Disaster Risk Reduction in Geneva drew attention to worldwide efforts to adopt the Hyogo Framework for Action 2005-2015 (HFA) and promote the strategy of 'Building the Resilience of Nations and Communities to Disasters'. A side event called "Engaging Indigenous People in Disaster Risk Reduction" (UNISDR, 2013, p.50) discussed how Indigenous communities might contribute to local, national, and global disaster risk reduction practices, stressing the *necessity* for Indigenous Peoples to have a voice in order to reduce disaster risk and vulnerability. Imposing centralised solutions to local problems threaten a community's capacity to initiate risk reduction and save lives. Risks may include some that are unique

to Indigenous communities – exacerbated colonisation and ongoing marginalisation – but also includes contexts common with other, non-Indigenous, communities.

Recommendations for the new Hyogo Framework for Action (HFA2) (the 2015 culmination of the UN programme) included: 1. recognition and better use of Indigenous perspectives and knowledge by incorporating these in HFA2; 2. support for the creation of regional Indigenous networks to give voice to Indigenous advocates for disaster risk reduction; 3. advocacy, through respective National Platforms, for 'a seat at the table' and for the inclusion of Indigenous knowledge in national disaster risk reduction planning; and 4. provision of opportunities for Indigenous participation in regional and international forums.

In this nascent (and eclectic) discourse, historical colonisation and ongoing oppression are themselves framed as 'disasters' (Stewart-Harawira, 2005), an approach that can if not diminish at least risk diluting our focus on the risks and responses to specific contemporary environmental hazards and their subsequent disasters. While IK has a fundamental role in identifying, assessing and living with environmental hazards and their consequent disasters, many generations of discrimination and marginalisation have fragmented and denigrated this knowledge. Urbanisation of Indigenous communities further removes vulnerable communities to necessary insights and access to relevant knowledge.

Research on the response and role of Indigenous collectives in disaster management aligns itself with community focused research (Shaw, 2012) but IK has been slow to 'infiltrate' disaster management (McAdoo, et al., 2009). Kirmayer, Dandeneau, Marshall, Phillips, and Williamson (2012) presented four North American case studies of Indigenous mental health through disasters and by "a focus on resilience [shift] attention from vulnerability and pathology toward the analysis of resources, strengths and positive outcomes" (p. 399). While their socio-ecological insights are fundamental, ongoing marginalisation remains a source of vulnerability to Indigenous communities. Some of the research discourse has blurred *resilience* with simple (but not simplistic) *endurance* (Lambert, Mark-Shadbolt, Ataria, & Black, 2012), and while the latter may precede the former, understanding and improving the ability of Indigenous communities to absorb the worse effects of a disaster and not just endure but consequently *flourish*

should be the ultimate aim of disaster risk reduction strategies.

Few publications have appeared on the Māori experiences of the Canterbury earthquakes. A Master's thesis by Rae (2013) compared post-disaster planning for Indigenous Peoples in Taiwan and Ōtautahi. The experience of Taiwanese Indigenous society after a 7.3M earthquake on September 21, 1991, saw a more participatory approach evolve through the Taiwanese recovery. However this is not as formal as TRoNT's stakeholder role in the rebuild enacted through the 2011 Canterbury Earthquake Recovery Act. But while Ngāi Tahu have acquired considerable experience around the resourcing and skills needed in disaster response as well as benefitting from their extensive property portfolio, a role for those Māori who cannot claim 'local' status does not feature in formal planning other than through ad hoc community representation.

Māori are not often directly represented in the many reports on the disaster, being present by proxy through either geographical characteristics where the Eastern suburbs are acknowledged as being the location for many Māori in Christchurch, or socio-economically with Māori being disproportionately represented within poorer communities. Two studies on the Eastern suburbs highlight the difficulties poorer neighbourhoods have in recovering from large-scale disaster. Gilbert and Elley (2013) in a study commissioned by Te Runanga o Ngā Maata Waka surveyed households on the periphery of three red zones in the Eastern suburbs, finding property damage, the loss of amenities, and growing crime and antisocial behaviour were common concerns, with those on lower incomes were more likely to have a negative view of the future. Yanicki (2013) compared Aranui (one of the poorer of the Eastern suburbs, and over 20 per cent Māori) with Sumner, a comparatively wealthy suburb, and found that Aranui was able to quickly activate existing support organisations and networks but that once Sumner residents had established support networks, these networks were better resourced and of broader scope than its poorer near-neighbour.

Thornly, Ball, Signal, Lawson-Te Aho, and Rawson (2013) investigated the 'psychological resilience' of communities 15-17 months after the February 2011 event through case studies that included marae; Māori participants spoke of the sense of community and the importance of cultural practices. Despite this, the series of *Wellbeing* surveys by the Canterbury Earthquake Recovery Authority (CERA) (Canterbury

Earthquake Recovery Authority, 2013; 2012) show an alarming pattern of Māori suffering some of the worse effects on well-being of the 2011-12 earthquakes. For example, those less likely to rate their overall quality of life positively included 63 per cent of the 100 Māori respondents (CERA, 2013, p. 20), up from 56 per cent in the first survey (CERA, 2012, p. 13).

Paton, Johnston, Mamula-Seadon, and Kenney (2014) continued the somewhat flattering treatment of a Māori response. Looking specifically at the 2009 Victoria, Australia, bushfires and the 2011 Christchurch earthquakes, their section on 'Māori perspectives on recovery' began by under-stating the percentage of Māori in the city and drew solely on Ministerial and iwi authority reports (i.e., from TRoNT). I examined Māori resilience in a forthcoming book chapter (Lambert, forthcoming) but point out here that *recovery* to this disaster for Māori and other residents will be a very drawn out process, with worsening psycho-social effects for many now taking place three years after the 22-2-11 event (Conway, 2014). Cooper-Cabell (2013, p. 27) argued that the country's "pervasive neo-liberal perspective" has hampered the provision of the necessary support for individual and community recovery from the Christchurch disaster. Their article contributed important baseline data on Māori to better gauge their recovery over time and in particular drew attention to the risks of embedded disparities between local and non-local Māori.

Methods

The current article presents an overview of statistical data alongside selected quotes from Māori impacted by the disaster. Although statistical data on Māori has often been limited (Statistics New Zealand, 2002), government sources on school enrolment and beneficiaries enable an analysis of short-to-medium term movements of Māori. Various reports and presentations have been gleaned for information relevant to the Māori response including reports on localities such as the badly affected Eastern suburbs (home to many Māori), the Ministry of Māori Development (Te Puni Kokiri/TPK), and the annual reports of the local tribal authority. Integration of 2006 census data on tribal affiliations of Christchurch Māori and Earthquake Commission (EQC) post-disaster zoning decisions is also presented.

This article also presents insights from a series of semi-structured interviews. Twelve individuals were interviewed six months after the worst event of February

22, 2011, including first responders, *marae* managers and Māori within the CBD at the time of the earthquake. A further 16 interviews (of different participants) took place 12-14 months after the February 2011 event and included four participants who had left Christchurch for Brisbane, Australia(Lambert et al., 2012). Selected quotes are embedded around the statistical and other data to provide context and insight from the personal stories of Māori who experienced the worst disaster in New Zealand for three generations.

Results

Immediate Impacts

While the February 2011 event was the most significant for most residents, it is important to note that for some, one of the many other earthquakes may have been the most frightening event. The extended seismic event began at 4:35 a.m. on September 4th, 2010 when most residents were in bed. One participant stated:

> [I] grabbed the cot and pulled it over to the bed and we just sort of rode it out, 30 seconds or whatever it was. Felt like a f***ing eternity! Shocks kept coming, I tried to get out of the house, the doors were jammed so I kicked the front door open, basically to get out.

While there was significant damage to buildings and infrastructure, there were no fatalities from this event. However, at 12:51 pm on February 22nd, 2011 (lunch hour on a Tuesday) a 6.3M earthquake brought extensive devastation to the city. A participants stated:

> I was in the Carlton hotel and it was falling down all around me … a building that actually falls apart, it's way more scary than just being in an earthquake where nothing falls down.

While most Māori had been reunited with family by nightfall, many were traumatised and some (including first responders) did not know of the safety of tamariki, whānau, or friends for many hours (Lambert et al., 2012). This is illustrated by the interview excerpt:

> When I looked at it, my house was unsafe, there was glass everywhere … All I wanted to do was create a safe place.

All interviewees spoke of the sense of community that quickly developed across the city. Neighbours were talking and helping out, often for the first time, hosting each other, allowing the use showers and toilets,

helping with repairs, childcare, sharing food, water and information, as described by one participant:

> *Around that time everyone's like 'Oh how's your fellas house?' I suppose you have something to talk about. And just people doing with what they've got and getting on with it, you know, surviving! Seeing them all down there with their water bottles and 'Come and have a sausage', you know, 'free sausage, come on!'*

Short and Medium Term Movements

Of course, many immediate impacts were not distributed according to ethnicity. But Māori ethnicity does correlate to political, economic, social and cultural frameworks (Durie, 2005) and ethnicity is a significant factor influencing the impacts and responses to disasters (Cutter, 2010). Many residents were forced to flee the city in the first few days after February 22nd but accurately quantifying these movements is difficult. Interviewees talked about leaving the family home for varying periods or permanently, with some arranging for children to live away from the city with extended family. A useful indicator is the change in school enrolments between 2010 and 2011 (see Figure 2) which shows this change in roll by ethnic group, with 3-5 times the number of Māori children leaving Christchurch in the days following the February event compared to Pākehā.
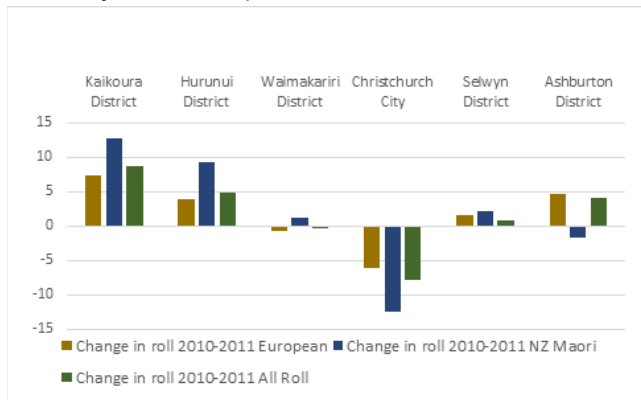

Figure 2. Per cent change in the number enrolled aged 5 to 10 years by district 2010-2011, and by ethnicity (from Newell 2012). Districts are in order from north to south.

This data indicates a stronger outward movement by young Māori families compared to Pākehā in response to the disaster. There is tendency to move northwards. An exception is the Selwyn District which is to the immediate south of Christchurch city (and has since become one of the fastest growing district in New Zealand, see Stewart and Gates, 2013).

Data on beneficiary movements shows a net loss of beneficiaries, both Māori and non-Māori, immediately following the February earthquake. While this exodus

was followed by an overall return of beneficiaries to the region within three months (see Figure 3), this return was not shown by Māori beneficiaries (see Figure 4).
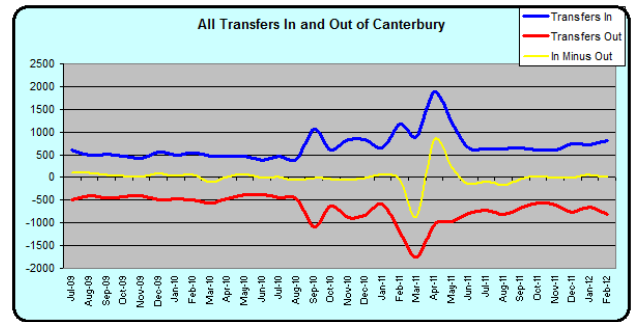

Figure 3. Total beneficiary transfers in and out of Canterbury (July 2009-February 2012) (from Ministry of Social Development, 2012)
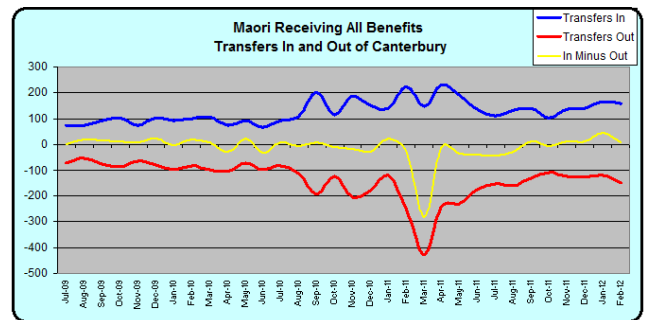

Figure 4. Māori transfers for all benefits (July 2009 - February 2012) (from Ministry of Social Development, 2012)

Financial assistance was available for people wanting to leave the city, with Air New Zealand offering $50 flights. However difficulties remained, as described in the following interview excerpt:

> *[T]hey were happy to give you all this money to help you relocate, to get out of town … but the girls had already gone by that stage. And then there was no help to get them back, so you know it was like 'Oh'. That didn't work so well.*
>
> *Interviewer: So you were looking for a bit more follow up?*
>
> *Well for us it would've been handy for the return trip but yeah, it was a bit, I don't know, one way ticket…*

Aftershocks caused serious distress and disruption and contributed to outward migration although it is difficult to isolate the earthquakes as the sole cause of this movement. Estimates of overall Christchurch resident movements from other studies (Newell, 2012; Price, 2011) ranged from 2.0 to 3.5 per cent. Statistics New Zealand (2012c) estimated 16,600 residents left the city in the two years to June 2012. If the city average of 7.3 per cent of this group are Māori then as many as 1,200

Māori may have left Christchurch. Given the impacts on the Eastern suburbs, coupled with a propensity to move for economic opportunities (Sin & Stillman, 2005), the number could be several hundred more. In the post-disaster context, this mobility has implications for the support of Māori families, particularly children, and the provision of general and specialist health and counselling services. One participant stated:

Māori are used to the last minute evacuation when it comes to tangi [funeral], book a ticket, pack a bag, ring your boss, you can be gone anywhere up to a week!

The 'New Normal'

For those who couldn't leave, or chose not to, the *new normal* of life in a shattered city became a daily trial. Services and infrastructure were severely disrupted, some schools were relocated, and demolition and repair activities created noise and delays in moving around the city as transport routes constantly changed in response to road closures. One participant stated:

It annoyed us that the Orbiter bus still hasn't returned to its normal route. And the buses were no longer travelling over the East side which made it difficult for people without transport to get to work and do shopping, especially when you have to travel to the other side of town because all the malls around you are closed due to being so badly damaged.

For badly affected suburbs, and particularly in the Eastern suburbs, concerns were expressed on the marginalisation of response with the comparative limited distribution of portable toilets becoming a cause *cèlébre* (Potangaroa, Wilkinson, Zare, & Steinfort, 2011). Kahi and Borrell (2011) presented on the experiences of the their community in the east, pointing out how many young Māori took on roles of support in this often marginalised community, a fact noted by one of our participants:

I would like to add that my oldest girl surprised me by going out and finding water on the bike, cooking dinner in our makeshift kitchen out the back, boiling water for dishes. She really stepped up in time of a disaster.

The first 'red zone' decisions, identifying land to be removed from residential use, were made in June 2011(Canterbury Earthquake Recovery Authority, 2011). Referring back to the impacts of the earthquakes on neighbourhoods with significant Māori population, merging 2006 census data on iwi in the city and EQC

zoning maps of late 2011/early 2012 (see Canterbury Earthquake Recovery Authority, 2014b) gives an estimate of the impacts on Māori by tribal affiliation (Figure 5). As Māori can often identify with more than one iwi, these data are very general but do show that the participation of Māori in mainstream disaster management is nuanced and not amenable to a simplistic template to account for all Māori.
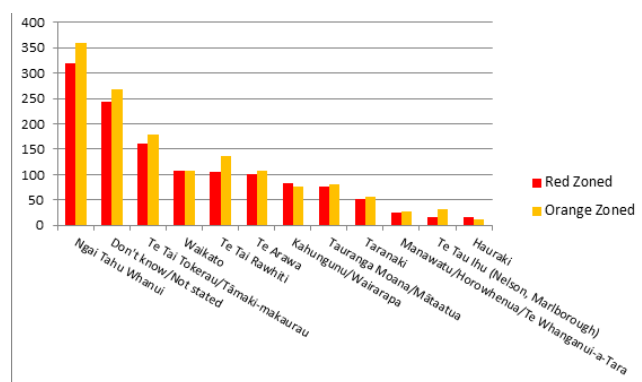

Figure 5. Māori by main tribal affiliation and EQC Zoning (Newell, 2012). Note that the second largest category is Māori who 'don't know' or don't state their tribal affiliations.

Discussion

The Role of Māori Institutions in the Overall Response

Māori cultural practices of hosting and reciprocity (*manaakitanga*) and the bonds of kinship (*whānaungatanga*) were seen by interviewees as contributing to a degree of community resilience. *Marae*, the traditional communal meeting places, have featured in past disaster responses, providing ready-made spaces for dislocated individuals and families (Mutu, 2000; Webber, 2008). All marae that were in a position to take refugees in the Canterbury region were opened with support staff helping complete Red Cross and Work and Income forms on arrival to access emergency cash. *Marae* were supported with essential resources by local tribal authority, TRoNT, who provided petrol, gas, food, water, blankets, and toiletries and a free-phone number for help (Anderson, 2012; Paton et al., 2014), ultimately totalling $953,000 over the 12 month reporting period of the 2012 financial year (Te Runanga o Ngai Tahu, 2012, p.5).

Rehua *marae* (near the badly damaged CBD) operated as an accommodation centre and housed relocated Māori government staff including coordinators for other, North Island, tribal responses (Anderson, 2012). One participant stated:

We got a lot of help from the iwi, Tūhoe, through Rehua marae. They were catching up with whānau, ringing up, 'Are you guys alright? We've got money here.'
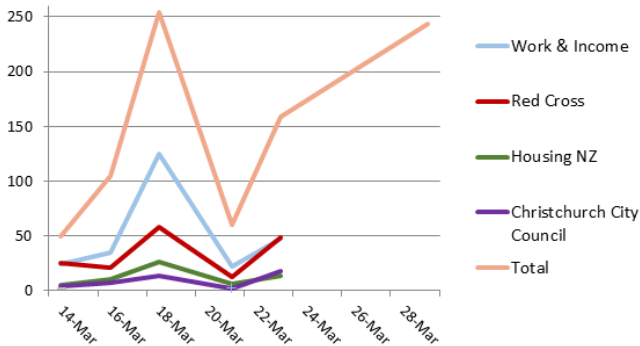

Figure 6. Queries to Ngā Hau e Whā Recovery Assistance Centre (March 14-28, 2011) (from Te Puni Kokiri, 2011). Raw data is drawn specifically from Bulletins 12-17 after which the series seems to have stopped.

Ngā Hau E Whā, a large urban *marae* in the Eastern suburbs, was quickly established as a Recovery Assistance Centre (RAC) and fielded many enquiries (see Figure 6). Rāpaki *marae*, near Lyttleton Harbour, housed up to 60 people from the local community and was included as an accommodation centre for the area (Te Puni Kokiri, 2011b); Takahanga *marae,* in Kaikoura, about 180 km north of the city, experienced an influx of Māori in transit to the North Island (Te Puni Kokiri, 2011a), many from the Eastern suburbs. Many of these had little or no money, sometimes no ID and little clothing (Te Puni Kokiri, 2011a). Te Aitarakihi *marae*, in Timaru, about 165 km south, was also very busy, and *marae* in the Nelson-Tasman district opened their doors to Christchurch residents (Anderson, 2012).

Māori service providers, tribal organisations and the Māori wardens (a pan-tribal organisation of uniformed community workers) brought resources and networks to bear on a 'Māori response' (Lambert & Mark-Shadbolt, 2012; Te Puni Kokiri, 2011c; Te Runanga o Ngai Tahu, 2012; Thornly et al., 2013; Triegaardt, 2011). *Kura* (Māori schools) became important community nodes. This was an extension of their pre-disaster role but a role made more important by the collapse of many support systems. The insights that staff had of family circumstances were vital to ascertaining needs, as described by one participant:

There were four of us who sat at school for one day, and if we couldn't ring them, we'd go and visit them. The people we were a bit more concerned about, we'd

ring not just that once, we rang a few times to see if they needed anything else.

Most participants in this research considered "being Māori" an important aspect of how and why they managed to cope with the earthquakes. However, despite narratives of endurance, the scale and severity of the overall disaster has meant that most residents have been impacted: for Māori, the impacts seem worse than for Pākehā. CERA continue their wellbeing surveys with the proportion of Maori less likely to rate their overall quality of life positively is currently unchanged from the third survey at 63 per cent (Canterbury Earthquake Recovery Authority, 2014a, p.22). Overall, Māori continue to feature across most of the negative indicators: stress; damaged or poor quality housing; loss of access to the natural environment; uncertainty; transport issues; relationship problems; and potential or actual loss of income.

The economic impacts on many Māori households are likely to have been severe as employment opportunities have declined for many. As a direct result of the February earthquake, overall employment in Canterbury fell by 28,200 people or 8.3 per cent, driven by significant decreases in part-time employment, youth employment, female employment, and people employed in retail trade, tourism (Statistics New Zealand, 2012). Women employed in the hospitality, service, and light manufacturing sectors and those Māori hoping to work in the reconstruction of Christchurch are particularly limited by the delayed rebuild.

The recovery and rebuild phases still offer considerable options for Māori with the relevant skills. TRoNT is set to play an important role as a formal stakeholder in future infrastructural, residential, and commercial developments via the Canterbury Earthquake Recovery Act implemented in April 2011. However, recalling the distinction between traditional descent groups and *outsiders*, this legislation does not allow for a formal role for non-local Māori (Rae, 2013). This oversight further emphasises the ongoing marginal status vulnerability of many, and perhaps the majority, of Māori. One participant drew explicit attention to this dichotomy:

I think sometimes it's ok to have an 'ethnicity' response … but [are you] *talking about a 'Māori response' or are you talking about a 'Ngāi Tahu' response? What were you talking about? See I don't know! … once they started asking questions, it was a Ngāi Tahu response. So then I came out and I said 'Well I'll take care of the*

other 70 per cent of the Māori population, so I'll give you a Māori response then!' The earthquake didn't differentiate between who was going to get hurt and who didn't and neither are we so every nationality gets treated the same on a level playing field and Ngāi Tahu have a responsibility to look after their own first and foremost, and so they should. I have a responsibility to help look after every NZ citizen, simple as that.

But the formal and timely inclusion of marae in strategic and tactical decisions in disaster management was lacking, as stated:

Marae don't even feature in [the planning] and yet the marae in my view are the organisations that are more prepared. I just hope that we engage better with the Civil Defence and the city council moving forward. I hope that our voice can be heard somewhere.

Given these layers of complexity to Māori responses to the disaster, it is difficult to argue that Māori culture is somehow sufficient for resilience to disasters. Rather the assumed uniformity about how Māori operate collectively can be turned to disaster response and recovery activities through Māori institutions such as *marae*, the Māori Wardens, tribal authorities and, ultimately, *whānau*. One participant stated:

[Our] organisational skills, knowing your community, knowing who to contact, that's it in a nutshell. Knowing your community, the right people to approach. And yeah, being Māori does help a big way because of what's in here [taps chest], not what's up here [taps head].

This hints at something other than the much vaunted *mātauranga Maori* or Maori knowledge, generally of the so-called natural environment and a field of study dominated by natural scientists (see, e.g., King, Goff, & Skipper, 2007). Rather it is perhaps *mātauranga hapori* or social science that is the discipline more likely to contribute to a better understanding of any Māori resilience. Shaw and others (e.g., Campbell, 2010) acknowledge the gap between what is known by IK and what is successfully applied and implemented. Thus disaster risk reduction (DRR) will always require more than scientific and technological advances and the challenge is that not enough attention has been given to grounded implementation in the context of daily life and the routine work of communities, especially where those communities are Indigenous.

Disaster management must be cognisant of the socio-cultural proximity of Indigenous cultural nodes (such as the institutions of *marae*, *kura*, and *whānau* for Māori) that may be spatially dispersed and often geographically very distant. This distance is seen with North Island *marae* and extended *whanau,* including some living overseas. Indigenous individuals and communities that are not *local* in the cultural sense may be sidelined through the weight of state recognition for contemporary tribal authorities. A one-size-fits-all approach by state agencies may hide or ignore important intra-community differences and exacerbate the effects of disruption and dislocation that follow a large disaster.

The promotion of good governance at all levels, from local to national/international levels, is an essential pre-requisite for effective risk reduction. Given the extensive work required to just maintain New Zealand's general DRR capability, improving the situation for Māori collectives will required the multi-hazard, multi-level and interdisciplinary approach promoted by Indigenous researchers and their supporters from other Indigenous societies.

Conclusions

The Christchurch disaster seriously impacted Maori individuals and communities through the social and spatial characteristics of Maori residency in the city. Although Maori institutions and cultural practices facilitated a culturally-tailored response, which automatically helped non-Māori, many Maori still struggle in the post-disaster landscape. There are risks that a general historical marginalisation of Māori is morphing into a more nuanced structural side-lining of non-local Maori through the dynamics of formal iwi authority engagement by local and national government.

For more efficient responses to future disasters, disaster management needs to be more inclusive through meaningful collaboration with Indigenous communities where they exist. In New Zealand this will require the informed engagement of Māori, mana whenua and ngā taura here/ngā maata waka, who also need to be allowed to participate in the myriad strategic plans for DRR. While an important reaction to any disaster may be to move, the movement of Indigenous individuals or groups will have known pathways according to cultural nodes, networks, and practices. These can, and should, be integrated into disaster management planning and operations, including DRR.

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