Clarifying why people take fewer damage mitigation actions than survival actions: How important is cost?

EQC Research Project 08-560

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Technical abstract

Previous research has shown that people carry out more survival actions (like getting a medical kit) than damage mitigation actions (like strengthening a house) to prepare for earthquakes. There is little research on explanations for this pattern; but one suggested explanation is that mitigation actions cost more than survival actions. This project examines this issue with households and businesses, and examines participants' completion of a sample of twelve mitigation and survival actions, their estimate of the costs of those actions, and their attributions for why they have not carried out the actions. Damage mitigation actions were divided into actions mitigating damage to the building and actions mitigating damage to contents. Households completed fewer mitigation actions than survival actions, and businesses completed fewer structural mitigation actions than contents damage mitigation actions and survival actions. Participants also completed fewer actions they rated as more expensive than less expensive actions. With households there is a modest but significant relationship between the perceived cost of four of the twelve actions and the probability of carrying out the actions. With companies there is no such relationship. Businesses were invited to set goals of actions to complete three months later. Again cost did not have a significant relation to either the actions that they selected to complete or to the actual completion of the actions. On the attributions measure, for both households and businesses, the perceived cost of the actions was only the 4^{th}, 5^{th} or 7^{th} most common attribution for not completing the actions (depending on the sample and the type of action). Attributions more frequent than costs for both samples were: 1. haven't thought about it; 2. not a priority, and 3. the belief that it would make no difference. There were small differences in these attributions for different type of actions. Participants indicated that in relation to the immediate effects of earthquakes they thought more about injury than business damage and losses but in relation to long-term effects they think equally about both types of loss. Overall, these results suggest that the cost of preparation actions is one factor hindering preparedness actions, particularly for households, but that several other factors are more important.

Laypersons' abstract

Previous research shows that people who prepare for earthquakes carry out more survival actions (like getting a medical kit) than damage mitigation actions (like strengthening a house). There is little research that explains this difference, but one suggestion is that it's because mitigation actions cost more than survival actions. This project examines this issue with households and businesses, and examines how much participants report completing eight mitigation actions and four survival actions, their estimate of the costs of the actions, and their attributions (explanations) for why they have not carried out the actions. Damage mitigation actions included actions that mitigate damage to the building (e.g., check foundations) and actions mitigating damage to contents (e.g., attach bookcases). Households completed fewer mitigation actions than survival actions, and businesses completed fewer completed structural mitigation actions than contents damage mitigation actions and survival actions. Participants also completed fewer actions they rated as more expensive than less expensive actions. With households there is also a relationship between the perceived cost of 4 of the 12 actions and the probability of carrying out the actions. With companies there is no such relationship. Businesses were invited to set goals of actions to complete 3 months later. Again the cost of the action did not relate to either their choice of actions to complete or the actual completion of the actions. On the attributions measure, for both households and businesses, the perceived cost of the actions was not among the most frequent attributions for failing to complete the actions. More frequent attributions were: I haven't thought about it; It's not a priority, and the belief that it would make no difference. There were small differences in these attributions for different type of actions. Participants indicated that in relation to the immediate effects of earthquakes they thought more about injury than business damage and losses but in relation to long-term effects they think equally about both types of loss. The results suggest that the cost of preparation actions is one factor hindering preparedness actions, particularly for households, but that several other factors are more important.

Introduction

Two types of preparedness

Actions taken to prepare for earthquakes can be grouped into two classes: survival actions that assist the survival of persons after a disaster (e.g. purchasing a medical kit, food and water, battery radio, etc.) and actions that mitigate damage in a hazard (e.g., fixing a house to its foundations, attaching bookcases to the wall, and fastening computers) (Russell, Goltz, & Bourque, 1995; Spittal, Walkey, McClure, Siegert, 2006).

A large proportion of the deaths and damage in earthquakes results from a failure to take adequate mitigation actions (Russell et al., 1995). However, recent research shows that both internationally and locally (New Zealand), individuals and businesses undertake significantly fewer actions to mitigate damage than survival preparedness actions. Despite the importance of mitigation actions in saving lives and minimising property damage, they are far less likely to be performed than survival actions (Russell et al., 1995; Yoshida & Delye, 2006). This issue is particularly relevant for the resilience of small businesses (McClure, Fischer, Hunt, & Charleson., 2007; Webb, Tierney, & Dhalhamer, 2000). The difference in the level of undertaking survival and mitigation actions may occur partly because mitigation actions are perceived as having a higher cost (Webb et al., 2000). However, this difference in performance of the actions applies even with mitigation actions that are low in cost, such as fitting computer restraints (McClure et al., 2007). In the 1989 Loma Prieta (San Francisco) earthquake, the strongest predictor of business resilience was whether businesses had undertaken mitigation actions and in particular whether companies had used computer restraints or back-ups, which involves a relatively minor cost (Yoshida & Delye, 2006).

As several researchers have pointed out (e.g., Russell et al. 1995; Yoshida & Delye, 2006), there is a need for research to clarify why people undertake fewer voluntary mitigation actions, and a need for interventions that specifically target mitigation actions (Dahlhamer & D'Souza, 1997; Heller, Alexander, Gatz, Knight, & Rose, 2005; Lindell, & Perry, 2000; Smith,

1993). Given the major role of mitigation actions in reducing harm and damage and enhancing business resilience, it is important to address this issue and to clarify why people undertake fewer damage mitigation actions. Many risk communications are ineffective or may even reduce citizens' impression of the need to take personal action (Paton & Johnston, 2001). Some risk communications focus more on survival actions than damage mitigation, but it is likely that other factors play a key role in lower levels of mitigation actions, particularly for businesses, which normally expend considerable resources responding to factors such as competition and to other risks that affect long term company resilience. Spittal, McClure, Siegert and Walkey (2008) showed that people's adoption of mitigation actions and survival actions reflected different factors. People's risk perceptions predicted their carrying out survival actions whereas the possession of an internal locus of control (the belief that internal factors like hard work and ability lead to desired outcomes) predicted their taking mitigation actions. The current research focuses on this important issue of why people undertake significantly fewer mitigation actions.

In response to this issue, this project has two parts. First, it seeks to clarify reasons why people undertake mitigation actions less than survival actions. It systematically assesses explanations for this difference in the form of people's judgments of their own preparations on a set of rating scales. The explanations were drawn from ad hoc explanations given by a sample of Wellington businesses and citizens to explain their own preparations (or lack thereof) with regard to either a survival action (purchasing water supplies) or a mitigation action (fitting computer restraints) (McClure, et al. 2007). These explanations include: the perceived lower cost of survival actions, whether survival actions are seen as having value for a wider range of potential hazards than mitigating actions, and whether survival actions are more familiar than mitigating actions. A related factor identified in other research is that mitigation factors are seen as taking more time to execute than survival factors (Webb et al., 2000).

The second component of the research assesses the 'lower cost' explanation of the higher level of completion of survival actions; it tests whether people's preference for taking a survival

actions rather than mitigating actions relates to the perceived cost of the actions. There seem to have been no experimental studies on these issues. This relationship was examined with a sample of 200 households and 105 businesses.

Research objectives

The research therefore had two objectives:

Objective 1: To test different explanations of why people take fewer mitigating actions than survival actions. Specifically, The objective is to examine a sample of Wellington citizens and businesses to obtain their ratings of explanations (attributions) for why they do not take a number of damage-mitigation actions and survival actions. This objective was achieved by a questionnaire that presented a list of reasons for not taking preparedness actions, drawn from ad hoc explanations given by business in McClure et al.'s (2007) research and from theories and research on explanations for failing to prepare. In McClure et al.'s (2007) project, these explanations were given for two selected actions: obtaining water supplies and fitting computer restraints. In contrast, in the current project, participants' explanations were obtained for a more extensive sample of survival and mitigation actions taken from Spittal et al.'s (2006) Earthquake Readiness Scale. The choice of actions was guided by Paton and Johnston's (2008) factor analysis of a modified version of this scale.

Objective 2: To test experimentally whether the lower adoption of mitigation actions is related to their perceived greater cost, as suggested by Webb et al. (2000) and claimed by a number of participants in the research by McClure et al. (2007). Specifically, the project assessed whether the cost of specified mitigating actions and survival actions predicts the probability that households and businesses report having undertaken the different actions. In the case of businesses, we examined whether perceived cost also related to the type of actions chosen to be completed three months later.

The questionnaire also tested whether people focus on the immediate consequences of earthquakes rather than the long-term consequences, and whether this variable relates to the respondents' views on the relative importance of mitigation versus survival actions. Specifically, this research examined whether people's perception of the greater importance of survival actions relates to their focus on the immediate consequences of an earthquakes, at the expense of long term consequences concerning business resilience and survival. The project received ethics approval from the VUW Human Ethics Committee on 13 October 2008.

The Households study

Method

Participants

The participants were 200 persons recruited in different areas of central Wellington, including downtown areas and the airport, which serves the whole Wellington region. To ensure that the sample was more representative of the larger Wellington region, 30 participants were also recruited from the Porirua Shopping Centre.

Questionnaire: A. Preparation actions, attributions and cost estimates:

The preparation items were taken from Spittal et al.'s (2006) Earthquake Readiness Scale, which distinguishes two classes of actions: Actions that mitigate damage during an earthquake and actions that facilitate survival after an earthquake. We decided that the research scope of the current project would permit us to examine 12 of these actions and the attributions for each action

In determining which of these items from the ERS to use in the current study, we took account of Paton and Johnston's (2008) adapted and extended version of the ERS. Their factor analysis rendered 5 main factors plus a 6th factor dealing solely with the use of fire extinguishers. The six factors are:

1. Emergency kit items – [NB. These actions are not performed only for earthquakes]
2. Physical security of house
3. Household emergency planning.

4. Securing household fittings and fixtures.

5. Fire extinguishing

6. Repair tools [response resources]

Whereas the ERS groups the damage mitigation items in a single factor, Paton and Johnston's classification divides this broader factor into two more specific factors: Physical security of house [Factor 2] and Securing household fittings and fixtures [Factor 4]. For the current study we decided to employ this distinction between the two types of damage mitigation items and use four items from each of these two subscales (Physical security of house, Securing household fittings and fixtures).

For actions that enhance survival, we decided to take account of Paton and Johnston's distinction between Emergency kit items [Factor 1] and Household emergency planning [Factor 3]. It is noteworthy that whereas survival actions that serve a range of hazards load on Paton and Johnston's Factor 1, obtaining water, which is particularly important for earthquake preparedness, loads on their Factor 3. Based on this framework the 12 items in the current study were as follows:

Mitigation 1: Actions that mitigate damage to buildings and harm to persons and contents. [Spittal et al. mitigation subscale; Paton & Johnston, factor 2. Physical security of house]

1. Did you get a builder or engineer to check that your house will withstand a major earthquake?

2. Have you taken specific steps to increase the earthquake resistance of your home?

3. Have you ensured that your hot water cylinder is secured and fastened?

4. Have you ensured that the foundations of your house are sound enough to withstand an earthquake?

Mitigation 2: Actions that mitigate damage to contents. [Spittal et al. mitigation subscale; Paton & Johnston, factor 4. Securing household fittings and fixtures.]

5. Have you fastened tall furniture to the wall?

6. Have you secured objects in your home that could fall over in an earthquake e.g. computer, vases?

7. Have you ensured that heavy objects are stored on the floor?

8. Have you securely fastened cupboards with latches?

Survival: Actions that enhance survival. [Spittal et al. survival subscale; Paton and Johnston, Factor 1: Emergency kit items and factor 3: Household emergency planning.

9. Have you stored water for survival? [Paton & Johnston factor 3]

10. Have you arranged a place to meet after an earthquake? [Paton & Johnston factor 3]

11. Have you obtained supplies of canned food? [Paton & Johnston factor 1]

12. Have you obtained items for a first aid kit that would be useful after an earthquake? [Paton & Johnston factor 1]

In the questionnaire, the different types of actions were mixed, with an action that mitigates damage to buildings and harm to persons followed by an action that mitigates damage to contents, followed by an action that enhances survival, etc.

Attributions and cost estimates

The attributions for not doing the actions were based on unstructured explanations generated by Wellington businesses in McClure et al.'s (2007) project, and on other research on attributions for failing to prepare. These include relative cost, perceived priorities, and the perceived necessity or value of the action for risk reduction. Where needed, the attributions were adapted so they were consistent with each of the 12 actions. An option was also given for participants to put an open-ended attribution in addition to the eight specified attributions.

Firstly, a pilot involved the administration of 20 questionnaires in the Wellington central business district (CBD), made it clear that the attribution "haven't thought about it" needed to be added to the original list as many respondents stated this as their main reason for not completing some of the preparedness actions. The pilot also demonstrated that the attribution "the Earthquake Commission will pay" was redundant; therefore, this attribution was removed. The first item and the attributions for that item are shown below; the full questionnaire is shown in Appendix 1.

1. Did you get a builder or engineer to check that your house will withstand a major earthquake?
○ Yes
○ No - because of the cost
○ No - because of time limitations (too busy)
○ No - because this action is only useful for earthquakes and not other hazards
○ No - because it was rather obvious that there wasn't a risk
○ No - because it's not a top priority
○ No - because I don't think it would make much difference if an earthquake happens
○ No - because I don't take lots of precautions for things that might go wrong
○ No - because I haven't thought about it
○ No - because of some other reason: (describe)

The attributions were followed by the cost estimate question, which asked how much they thought this action would cost, and gave 10 cost categories ranging from $20 to $10,000. In the pilot test, "nil cost" was found to be necessary and was added to the perceived cost scale for the main study (under each action question).The question asked 'How much do you think this action would cost?' followed by the values: Nil, $20, $40, $60, $80, $100, $150, $200, $500, $1,000, $5,000, $10,000+, and the instruction to circle one.

Section B: Immediate versus long-term Effects

The four questions in Section B assessed whether people took a short- or long-term perspective on the effects of earthquakes for both life and injury damages and losses. In other words, when people think about the possible effects of an earthquake for their household, do they think about the immediate or long term effects for life and injury damage, losses. There was one question for each of the four options. Thus Question 1 asked: Do you think about the immediate consequences for life, injury, etc? (i.e., the first day or so); Question 2 asked: Do you think about the immediate consequences for damage, losses, etc? Each of these four questions was followed by three options: not at all, a moderate amount, a lot. The full set of questions is shown in Appendix 1.

These questions were followed by a question asking about the relative importance of taking survival versus mitigation actions directly. Participants were presented with a question if they feel overall that it is more important to take actions to enhance survival after an earthquake

e.g. get water supplies or more important to take actions to reduce damage in an earthquake e.g. strengthen buildings. Participants responded on a 5 point Likert scale where the anchor points were defined by the two type of actions (enhance survival, mitigate damage); the midpoint was 'Equally important'; under the scale was a 'don't know' option, which participants could circle if appropriate.

Section C:

Questions in Section C obtained demographic data, including number of adults in the household, number of children in the household, age, sex, and an income question: If you don't mind, please indicate your individual income? This had income bands specified as: $0 - $25,000, $25,001 - $50,000, $50,001 - $75,000, $75,001+. This scale was followed by an open ended question for any comments on the questionnaire.

The instructions at the beginning of the questionnaire read as follows:

Dear Wellington citizen

Wellington is an earthquake risk zone and earthquakes pose a real risk to citizens. A local earthquake could lead to citizens suffering real harm or losing their home and possessions. However you can greatly reduce the chance of harm by preparing and taking actions that can reduce harm to your home and family. Many of us, however, do not prepare for earthquakes. The Earthquake Commission is funding this research on the possible reasons why some people don't prepare. The questionnaire only takes about 5 minutes to do. We really appreciate your doing it. The questionnaire is anonymous.

Procedure

Five locations in the Wellington region were selected for data collection: the Wellington airport terminal, two park areas in the Wellington central business district, and two supermarkets in central Porirua.

Wellington airport and CBD

Permission was obtained to give out the questionnaire at Wellington airport departure lounge, which as a regional airport provides a pool of participants from most areas of Wellington. In both the Wellington airport area (106 participants) and the CBD park areas (63 participants), collection procedures were similar. Participants who were sitting in the area were approached and the researcher explained the research and invited them to participate. The researcher asked potential participants if they *owned their own home* in the Wellington region. If participants answered affirmatively the researcher stated that they were conducting some research, funded by the Earthquake Commission, on household earthquake preparedness and asked if they were willing to participate. They were told that participation involved filling out a brief questionnaire that would take around seven minutes to complete. Participants were given a small confectionary reward to thank them for completing the survey and were asked if they had any problems or questions or would like a debrief sheet.

Porirua

Because the airport sample had fewer participants from lower Socioeconomic status areas, an additional sample of 30 participants was obtained from Porirua, which has a large proportion of households in lower decile income ranges. The collection areas were outside two supermarkets (Pak ‘n Save and Countdown) in central Porirua. The researcher stood outside the main entrance of the supermarkets and approached all passers by as they were entering the supermarket. The explanation of the research outline and procedure was the same as in the other locations, and participants were invited to participate for a small confectionary reward. Only adults were asked to participate and a maximum of three surveys was completed at any one time to prevent congestion and problems for shoppers.

Many participants struggled with the scale on question 5, and a large number of participants left the questions asking about “costs” blank. The demographic data are shown in Table 1.

Table 1: **Demographic data for households**

Number in household	Frequency of adults	Frequency of children
0	-	120
1	38	21
2	112	33
3	30	8
4	10	5
5	6	0
6	2	0
No Response	6	17

Age of participant	Frequency
Under 20	3
20 - 29	12
30 - 39	26
40 - 49	61
50 - 59	43
Over 60	55
No Response	4

Sex of participant	Frequency
Male	65
Female	92
No Response	47

Income of participant	Frequency
$0 - $25,000	27
$25,001 - $50,000	42
$50,001 - $75,000	47
Over $75,001	67
No Response	21

Results

1. Do people report more survival actions than mitigation actions?

The reported frequencies for each of the 12 actions are shown in Table 2, and the totals for each of the three types of actions are shown in Figure 1.

Table 2: **Frequencies for yes responses, and frequencies, for yes responses grouped into three action groups. (Households)**

Grouped Actions	Individual actions	Frequency	Mean no. of each action type
Actions that mitigate harm to building structure, persons and content	1. Builder /engineer check	53	77.2
	4. Resistance of home	45	
	7. Secure hot water cylinder	125	
	10. Foundations sound	86	
Actions that mitigate harm to contents (and people?)	2. Fastened tall furniture	60	79.7
	5. Secured objects	53	
	8. Heavy objects on floor	136	
	11. Secured cupboards	70	
Actions that enhance survival	3. Organised meeting place	95	144.5
	6. Stored water	157	
	9. Stored canned food	160	
	12. Obtained first aid kit	166	

* Numbers by the individual actions correspond to the item number on the questionnaire

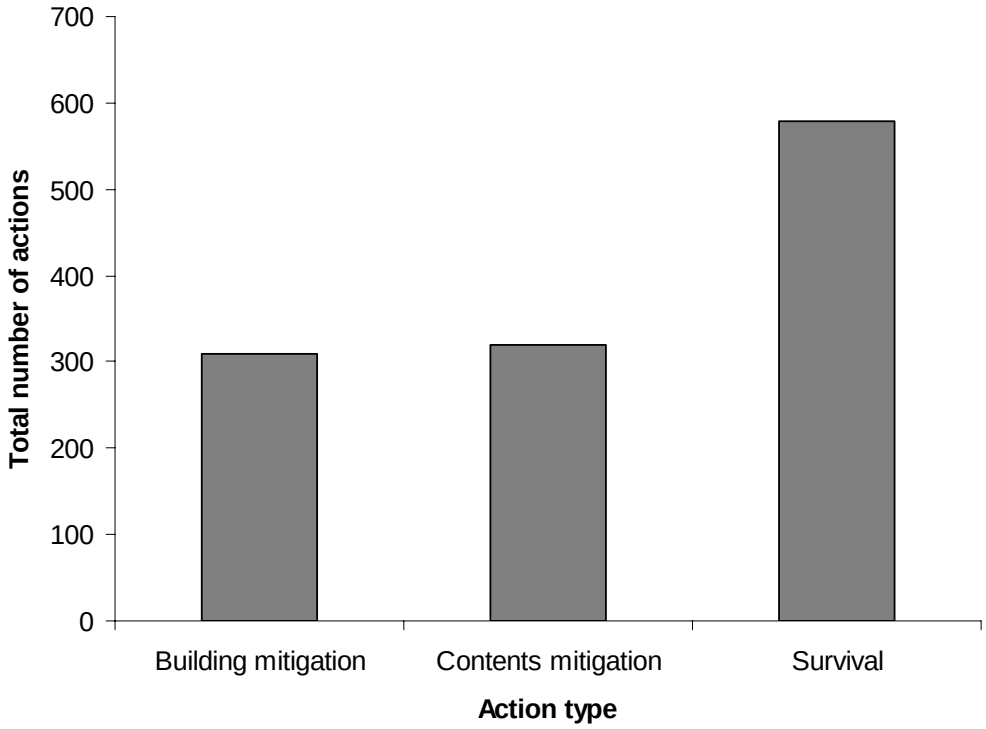


Figure 1: **Total number of preparedness actions for three types of action (Households)**

To test whether people reported have done more survival actions than mitigation actions, the total number of actions for each of the three types of actions was divided by the sample size to calculate appropriate confidence intervals. For example, for building damage mitigation actions, the total number of actions was 309 and the number of participants was 209, so 309/209 = 1.51. Thus the average participant completed approximately 1.5 building mitigation actions. The results for the three types of actions are shown in Table 3 below. The confidence intervals show that neither the building or contents variables overlap with the survival variable. Thus, the average number of building and contents damage mitigation actions are both different from the average number of survival actions but do not differ from each other, indicating that people carried out more survival actions than both types of mitigation actions.

Table 3. **Confidence internals for the three types of actions (Households)**

Mean estimation Number of observations = 204

	Mean	Std. Error	95% Confidence Interval	
Building mitigation	1.51	.08	1.35	1.67
Contents mitigation	1.56	.08	1.41	1.72
Survival	2.83	.08	2.67	2.30

2. What are participants' estimates of the costs of the 12 actions?

Participants' estimates of the cost of each of the 12 actions are shown in Table 4. The mean and median estimated cost are given.

Table 4. **Descriptive statistics for estimated cost of the 12 preparedness actions (households)**

	N	Median $
Builder/engineer check	168	200
Fastened tall furniture	167	60
Organised meeting place	132	0
Resistance of home	129	1000
Secured objects	135	40
Stored water	131	20
Secured hot water cylinder	114	60
Heavy objects on floor	108	0
Stored canned food	124	60
Foundations sound	110	500
Secured cupboards	110	80
Obtained first aid kit	117	60

3. Do people's estimates of the cost of the actions relate to their performance of the actions?

We examined the probability that respondents performed the listed activity as a function of their belief in the expected cost. We log transformed the cost variable to ensure it had an approximately linear distance between unit changes, i.e., an increase in 1 unit at the low end of the scale (0 to $20) is approximately equivalent to a 1 unit change at the top end of the scale ($5,000 to $10,000). As the outcome is a dichotomous variable (yes or no), we then performed a logistic regression to determine if perceived cost had a significant relation to the performance of each of the actions. This analysis produces the odds ratio for each action occurring as a function of the perceived cost of the action. The odds ratio is a measure of the odds of success in one group relative to that in the other. An odds ratio of 1.0 implies that the odds of success are equal in both groups, whereas a value of 1.2 can be interpreted as the odds of success in one group being 20% higher than the odds of success in the other group.

As shown in Table 5, there was a significant relationship between perceived cost and performance of these actions for 4 of the 12 items (Table 5) indicating a relation between perceived cost and the likelihood that participants had performed the action. These four actions were all mitigation actions; and two of these were actions that mitigate damage to buildings, and two were actions that mitigate damage to contents**.** Another mitigation action, storing heavy objects on the floor, was marginally significant. For the other 7 actions, including all four survival actions, there was no relationship between the perceived cost of the actions and the performance of the actions. The actions whose performance related to the perceived cost of the action tended to have a higher perceived cost (M = $647) than the actions where this relationship was absent (M = $447).

***Table 5*. Which actions show a relation between performance of the actions and cost? (Households).** The odds ratio and *p* value for this relationship from the logistic regression are given. Actions where performance of the action has a significant relation with cost are in bold.

Action	N	Odds Ratio (95% CI)	P
Builder/engineer check	**168**	**0.59 (0.46 to 0.76)**	**< 0.001**
Fastened tall furniture	**167**	**0.80 (0.65 to 0.99)**	**0.041**
Organised meeting place	132	1.03 (0.82 to 1.30)	0.780
Resistance of home	129	0.94 (0.82 to 1.08)	0.389
Secured objects	135	0.96 (0.78 to 1.17)	0.670
Stored water	131	0.93 (0.76 to 1.15)	0.521
Secured hot water cylinder	114	0.91 (0.75 to 1.11)	0.361
Heavy objects on floor	108	0.79 (0.62 to 1.01)	0.062
Stored canned food	124	1.06 (0.77 to 1.46)	0.734
Strengthened foundations	**110**	**0.82 (0.71 to 0.95)**	**0.009**
Secured cupboards	**110**	**0.75 (0.56 to 1.00)**	**0.048**
Obtained first-aid kit	117	0.83 (0.50 to 1.39)	0.482

4. Attributions for not doing the actions

The attributions for not completing the individual actions are shown in Table 6, and the total attributions, percentage of attributions, and ranking of attributions for each type of actions are shown in Tables 7-8. These tables show that, despite some variation across the specific actions (Table 6), cost is only the 4th highest attribution for actions to mitigate damage to buildings and the 7th highest attribution for actions to mitigate damage to contents and survival actions (Table 8).

Table 6: **Total attributions for all 12 preparedness actions (households)**

	Cost	Too busy	Co-benefits	Not needed	Not priority	No difference	Take risks	Not thought	Other
Builder/engineer check	17	11	3	21	17	26	8	66	24
Fastened tall furniture	5	8	0	48	34	9	18	27	19
Organised meeting place	2	3	1	21	10	13	13	40	21
Resistance of home	24	10	2	19	24	19	12	51	30
Secured objects	2	20	3	10	50	22	17	37	18
Stored water	0	6	2	0	15	2	7	13	8
Secured hot water cylinder	4	2	1	7	11	0	5	19	34
Heavy objects on floor	1	5	0	6	9	3	7	29	9
Stored canned food	2	2	1	0	11	1	3	18	7
Foundations sound	11	7	0	19	11	8	7	49	20
Secured cupboards	7	9	4	2	35	11	8	52	16
Obtained first aid kit	3	3	1	0	6	1	6	17	6

Table 7: **Percentage of attributions for 3 different types of actions (excluding 'other' attributions) (Households)**

%	Cost	Too busy	Co-benefits	Not needed	Not priority	No difference	Take risks	Not thought
Actions that mitigate harm to building structure, persons and contents	11	6	1	13	13	11	6	38
Actions that mitigate harm to contents [and people]	3	8	1	13	26	9	10	29
Actions that enhance survival	3	6	2	9	19	8	13	39

Table 8: **Ranking of attributions for 3 different types of actions (excluding 'other' attributions) (Households)**

	Cost	Too busy	Co-benefits	Not needed	Not priority	No difference	Take risks	Not thought
Actions that mitigate harm to building structure, persons and contents	4	7	8	2	3	5	6	1
Actions that mitigate harm to contents [and people]	7	6	8	3	2	5	4	1
Actions that enhance survival	7	6	8	4	2	5	3	1

Coding scheme for responses under the 'other' attribution category

The open-ended attributions were compiled and reviewed by researchers. Based on this review and other attribution coding schemes, a set of categories was devised to code the responses. The same categories were used for both households and business data. Where

categories contained very few items, items were moved to the ‘other’ category. Once definitions for each category were agreed on, two researchers independently coded all the responses. There was 80% agreement between the researchers for the households data and 89% agreement between researchers for the business data. Where there was disagreement, the researchers discussed their reasoning behind their choice of category and an agreement was made as to the category to be used. The open-ended attributions are shown in Appendix 4.

5. How much do people think about immediate and long term effects?

The responses for the questions about how much people think about immediate and long-term effects of earthquakes are shown in Figure 2 and 3.

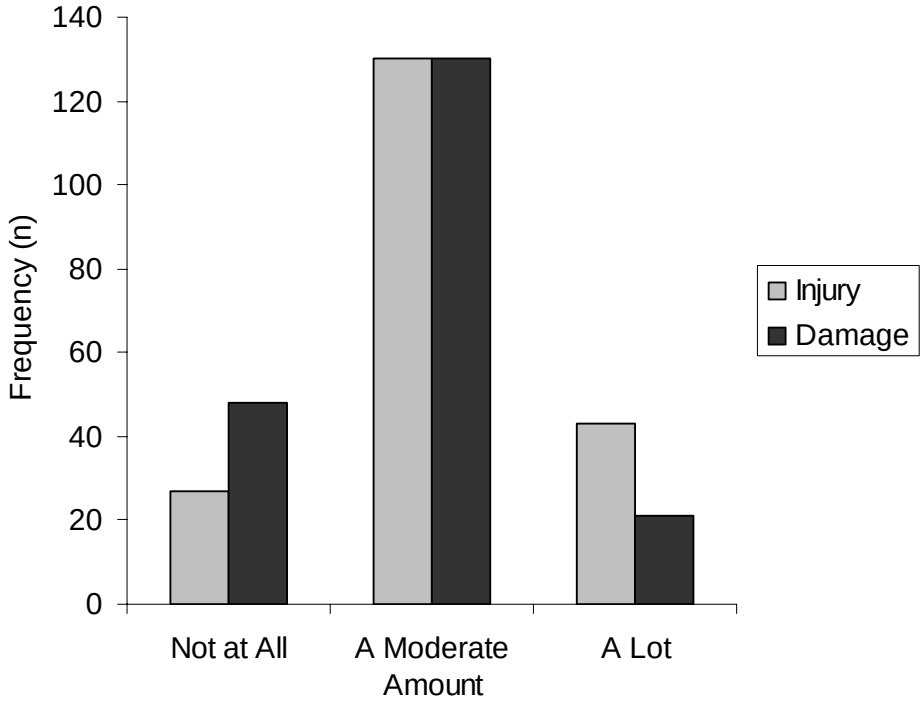


***Figure 2*: How much participants think about immediate effects (injury, damage) (Households)**

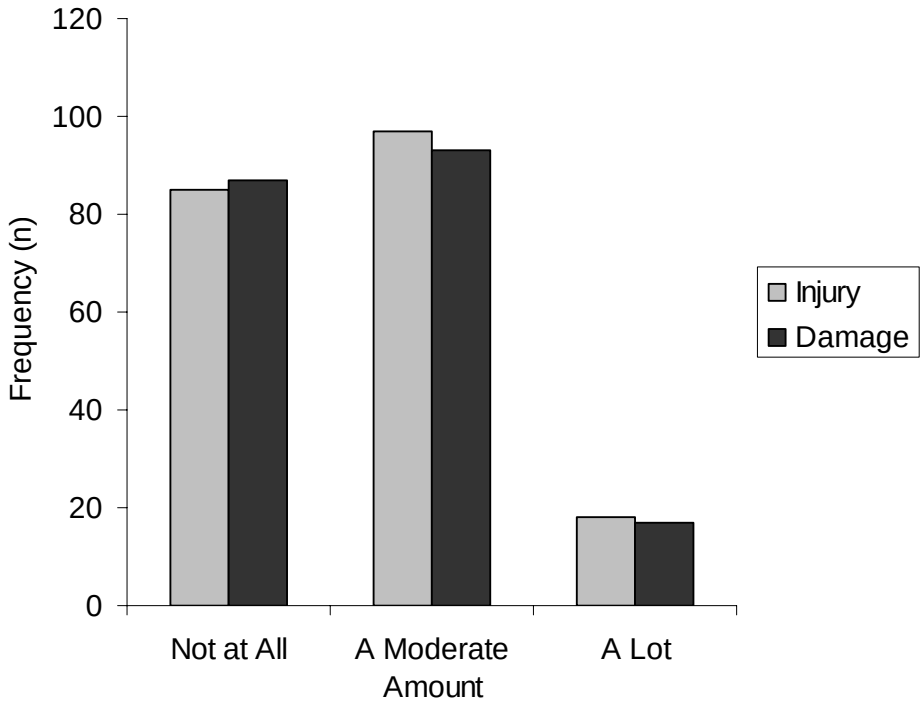


***Figure 3*: How much participants think about long-term effects (injury, damage) (Households)**

A 2(time: immediate, long-term) by 2(loss type: injury, damage) analysis of variance was performed on the responses. People said they thought more about the immediate effects than the long term effects, as shown by a main effect for time, $F(1, 195) = 75.90$, $p<.001$, $\eta = .28$. They also thought more about injury than damage, as shown by a main effect for loss type, $F(1, 195) = 13.18$, $p<.001$, $\eta = .06$. There was also an interaction between time and loss type, $F(1, 195) = 17.33$, $p<.001$, $\eta = .08$, indicating that people thought more about injury ($M = 2.08$) than damage ($M = 1.86$) only with regard to immediate effects and not long term effects ($M = 1.66, 1.64$).

6. Households results summary

Households reported completing more survival actions than both types of mitigation actions. The actions they completed costs less than on average than the actions they did not complete, and there was a significant relationship between the cost of the action and reported completion of the actions for four of the mitigation actions but none of the survival actions. They attributed their not completing the actions to at least three other factors more than the cost of the

action. Participants thought more about the immediate effects of earthquakes then the long term effects and thought more about injury than damage; this is consistent in with people's higher performance of actions seen as helping survival.

The Companies study

The companies study examined the same questions that were examined with households and used a similar questionnaire to that used with households, modified to be suitable for companies. However, in addition, it asked the participating companies to choose a sample of actions from the questionnaire as a goal to accomplish in the next 3 months. Subsequently, we followed up three months later to check how many of these actions had been completed.

Method:

Participants

The participants were 100 companies recruited in different areas of central Wellington, including downtown. The catchment area was localised to the Wellington CBD. Four specific areas within the CBD were chosen to ensure that a range of businesses were targeted. Streets were identified and all businesses on those streets were invited to participate. For each business type, a slightly different criterion was used to determine if they would be invited to participate. For retail stores, if there were numbers of customers in the store we would initially omit them from invitation to participate. For each store we did a return visit to check if they were free and invite them to participate if they were. For all other business types (e.g., commercial, professional services, trades etc.), we would omit them when there was no way to access an employee.

When the researchers approached businesses, they outlined the research and invited them to participate, and a small confectionery reward was offered. Businesses were able to either complete the survey immediately or return questionnaires in the provided postage paid envelope. One hundred and seventy-five businesses indicated they would participate. Contact details were obtained for all business posting the survey back at the time of delivery. Approximately one week

after questionnaire delivery, businesses that had not returned the survey were contacted to encourage completion of the questionnaires. These businesses were then telephoned or visited in person. A total of 105 businesses that received surveys completed and returned the survey. In addition to the confectionery, all respondents were put in the draw for a NZ$50 petrol voucher. All businesses that choose to accept the long-term preparation targets were also entered in a NZ$100 petrol voucher draw.

Three months following the initial data collection, businesses were contacted by telephone in order to determine if their long term target objectives were attained.

Questionnaire: A. Preparation actions, attributions and cost estimates:

The questionnaire for companies was largely similar to that for households, but several of the actions were modified to reflect the fact that some different actions are required for businesses than those required for households (e.g., making a Business continuity plan, securing computers and electronic data). We based the different actions on the Business Emergency Planning guide and discussions with David Dunsheath, (manager of Business Continuance Planning Ltd and Board Member of the NZ Society of Risk Management) and Erica Seville, research Fellow at the University of Canterbury and a specialist in company preparedness for earthquakes and other disasters. The 11 actions were as follows:

A. Mitigation 1: Actions that mitigate damage to buildings and harm persons, contents.

1. Did you get a builder or engineer to check that your building[s] will withstand a major earthquake?

2. Have you taken specific steps to increase the earthquake resistance of your buildings?

3. Have you made a business continuity plan?

B. Mitigation 2: Actions that mitigate damage to contents.

4. Have you fastened tall objects and shelving to walls?

5. Have you secured objects in your buildings that could fall over in an earthquake e.g. stock, goods?

6. Have you ensured that heavy objects are stored on the floor?

7. Have you secured you computer[s] and electronic data for an earthquake?

C: Actions that enhance survival.

8. Have you stored water for survival?

9. Have you arranged a business emergency plan for after an earthquake?

10. Have you obtained supplies of canned food?

11. Have you obtained items for a first aid kit that would be useful after an earthquake?

In addition to these changes, the list of attributions was changed to reflect the data obtained with the households questionnaire. The 'time limitations' and 'not a top priority' items were combined, and the 'because this action is only useful for earthquakes and not other hazards' attribution was deleted, as it gained very few responses with the households questionnaire. An example on actions with the relevant attributions is presented below:

1a Did you get a builder or engineer to check that your building[s] will withstand a major earthquake?
○ Yes
○ No - because of the cost
○ No - because it was rather obvious that there wasn't a risk
○ No - because it's not a top priority / due to time limitations (too busy)
○ No - because I/we don't think it would make much difference if an earthquake happens
○ No - because I/we think an earthquake is unlikely to happen in the immediate future
○ No - because I/we haven't thought about it
○ No - because of some other reason: (describe)

1b. How much do you think this action would cost? Circle one figure:										
Nil	$20	$40	$60	$80	$100	$150	$200	$500	$1,000	$5,000	$10,000+

The questions on how much participants think about the different types of loss was the same as in the households questionnaire, and the scale for the preference for survival versus mitigation actions was deleted, as participants completing the households questionnaire found it confusing.

Section D: Target actions

The final section of the questionnaire listed the same 11 actions in Section B of the questionnaire as possible target actions to complete in the next three months. The instructions read: The actions in Section B are repeated below. Please choose up to 4 actions that you have not yet done and that you would like to do to enhance your preparedness. Put a tick next to the actions that you choose. If you adopt this goal, your task is to do some or all of these 4 actions in the next 3 months. We will follow up in 3 months to see how you have got on. Whether you take up this goal or not, please return this questionnaire to us as soon as you have done it in the enclosed envelope. This was followed by the heading 'Target actions to do in the next 3 months', and the 11 actions, each with a circle to the left for participants to tick.

This section was followed by a page for any comments on the questionnaire.

Attached to the questionnaire was a sheet listing the same 11 actions listed in Section D for participants to keep a record of the actions they had chosen to do [if any] in the next three months. It was headed 'Increasing earthquake resilience plan' followed by the Instruction: Please keep this sheet for your own records and action. Tick up to 4 of the actions that are going to try and do in the next 3 months i.e. by May 30 2009 (please tick the same actions that you ticked on the questionnaire section D). This was followed by the 11 actions followed by a line: Who is going to execute this and a space for a name to be inserted. The full questionnaire is shown in Appendix 2. The demographic data are shown in Table 9 and 10.

Table 9: **Demographic data: business size by number of employees**

Number of employees	Frequency
1 - 4	36
5 - 20	53
21 - 50	10
51 - 100	5
> 100	4

Table 10: **Demographic data: business type**

Business type	Frequency
Retail	37
Trades	16
Professional Services	18
Government and non-government organisations	15
Hospitalities	6
Other	11

Results

1. Do people do more survival actions than mitigation actions?

The frequencies for each of the 12 actions are shown in Table 11, and the totals for each of the three types of actions are shown in Figure 4.

Table 11: **Frequencies for yes responses, and frequencies for yes responses grouped into three action groups. (Businesses)**

Grouped Actions	Individual actions	Freq.	Frequency for grouped actions	Mean for type of action
Actions that mitigate harm to building structure, persons and content	1. Builder /engineer check	24	122	30.5
	4. Resistance of buildings	15		
	7. Business continuity plan	30		
	10. Secure computers	53		
Actions that mitigate harm to contents (and people)	2. Fastened tall objects	63	185	61.7
	5. Secured objects	40		
	8. Heavy objects on floor	82		
Actions that enhance survival	6. Stored water	52	219	54.7
	9. Stored canned food	34		
	11. Obtained first aid kit	82		

* Numbers by the individual actions correspond to the item number on the questionnaire

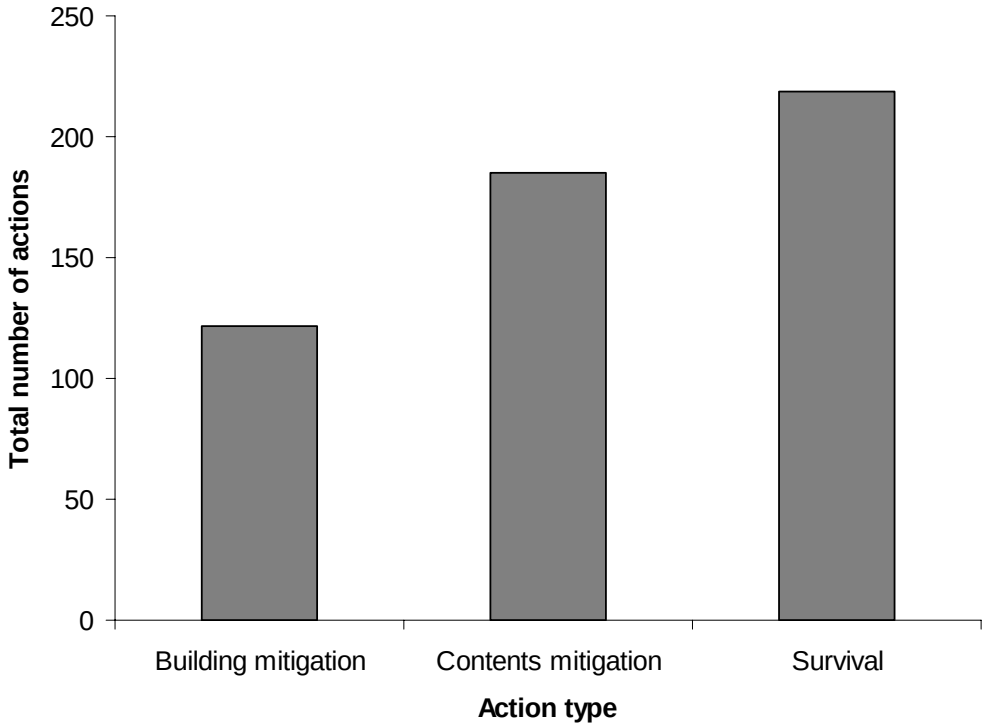


Figure 4: **Total number of preparedness actions for three types of action (Businesses)**

To test whether companies reported having done more survival actions than mitigation actions, as with households, the total number of actions for each of the three types of actions was divided by the sample size to calculate the average number of activities undertaken. The results for the three types of actions are shown in Table 12 below. The confidence intervals show that in contrast with the households data, the building mitigation variable does not overlap with either the contents mitigation variable or the survival variable. Thus, the number of actions to mitigate building damage is different from both the number of actions to mitigate contents damage and the number of survival actions which do not differ from each other.

Table 12. **Confidence intervals for the three types of actions (Businesses)**

Mean estimation Number of observations = 105

	Mean	Std. Error	95% Confidence Interval	
Building mitigation	1.16	.10	0.96	1.35
Contents mitigation	1.76	.10	1.57	1.95
Survival	2.08	.13	1.81	2.35

2. What are participants' estimates of the costs of the 12 actions?

Participants' estimates (median) of the cost of each of the 12 actions are shown in Table 13.

Table 13. **Descriptive statistics for estimated cost of 11 preparedness actions (Businesses)**

	N	Median $
Builder/engineer check	67	1000
Fastened tall objects and shelving	60	200
Emergency plan	66	10
Resistance of buildings	48	10000
Secured objects	51	200
Stored water	65	30
Business continuity plan	48	100
Heavy objects on floor	44	0
Stored canned Food	60	80
Secured computers and electronic data	53	150
Obtained first aid kit	53	100

3. Do estimates of the cost of the actions relate to the performance of the actions?

We examined the probability that respondents performed each action as a function of their belief in the expected cost of the action. We log transformed the cost variable in a similar way to that used in the households sample.

There was week evidence of a relationship for 2 of the 11 items, securing computers (p = .10, and first aid (p = .056), indicating a weak relation between the perceived cost and performance of these actions. Unlike the households data, only one of these two actions (securing computers) was a mitigation action; the other, obtaining an appropriate first aid kit, is a survival action**.** For the other 9 actions, there was no evidence of a relationship between the perceived cost of the actions and the performance of the actions.

4. Attributions for not completing the actions.

The attributions for not completing the individual actions are shown in Table 14, and the percentage of attributions, and ranking of attributions for each type of actions are shown in Tables 15 and 16. These tables show that, despite some variation across the specific actions (Table 14), cost is only the 4^{th} or 5^{th} highest attribution for each of the three types of actions (Table 16).

Table 14: **Total attributions for all 11 preparedness actions (Businesses)**

	Cost	Not needed	Not priority	No difference	Low risk	Not thought	Other
Builder/engineer check	5	4	2	6	0	19	56
Fastened tall objects and shelving	2	7	7	4	0	15	16
Emergency plan	3	2	11	6	0	28	5
Resistance of buildings	5	4	4	6	0	10	67
Secured objects	5	13	9	10	2	13	19
Stored water	0	5	5	6	2	28	14
Business continuity plan	6	1	14	3	0	46	9
Heavy objects on floor	2	7	0	0	1	5	9
Stored canned Food	6	4	11	3	0	37	20
Secured computers and electronic data	3	3	5	10	0	28	5
Obtained first aid kit	4	1	2	2	1	12	6

Table 15: **Percentage of attributions for each type of action (excluding 'other' attributions). (Businesses)**

%	Cost	Not needed	Not priority	No difference	Low risk	Not thought	Total n=
Actions that mitigate harm to building structure, persons and contents	10	6	14	14	0	56	n= 184
Actions that mitigate harm to contents [and people]	9	26	16	13	3	32	n= 102
Actions that enhance survival	7	7	16	9	2	59	n= 179

Table 16: **Ranking of attributions for each type of action (excluding 'other' attributions) (Businesses)**

	Cost	Not needed	Not priority	No difference	Low risk	Not thought
Actions that mitigate harm to building structure, persons and contents	4	5	2=	2=	6	1
Actions that mitigate harm to contents [and people]	5	2	3	4	6	1
Actions that enhance survival	4	5	2	3	6	1

5. How much do people think about immediate and long term effects?

The responses for the questions about how much people think about immediate and long-term effects of earthquakes are shown in Figure 5 and 6.

Figure 5: **How much participants think about immediate effects (injury, damage) (Businesses)**

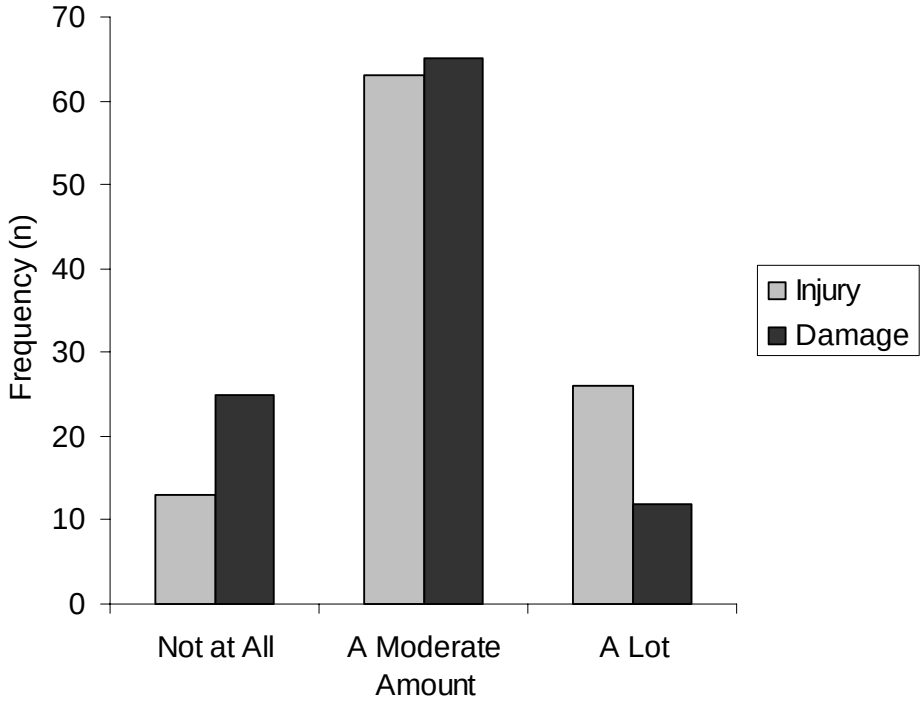
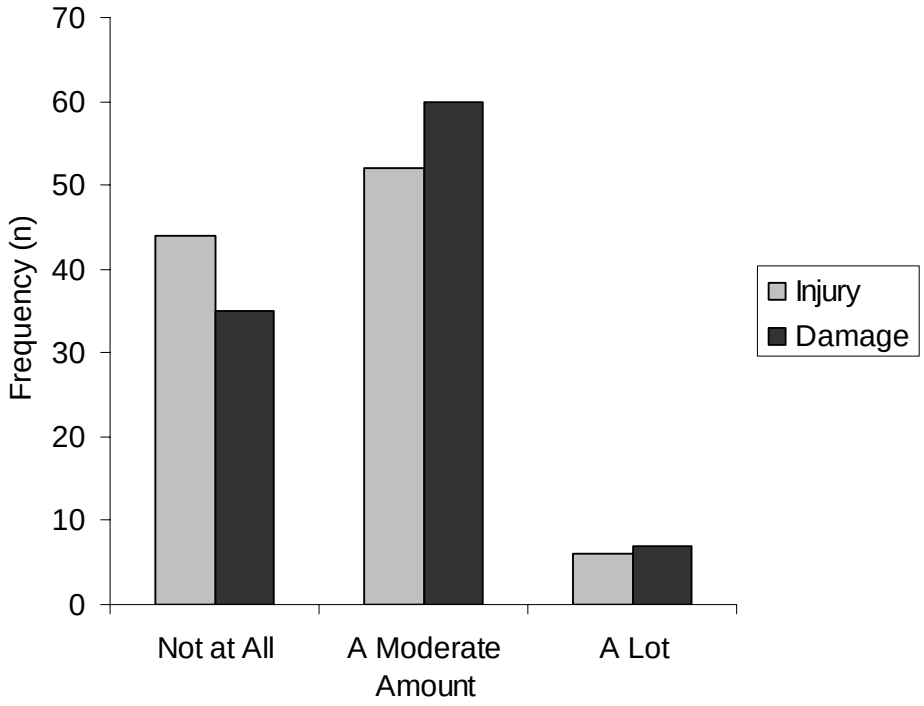


Figure 6: **How much participants think about long-term effects (injury, damage) (Businesses)**



A 2(time: immediate, long-term) by 2(loss type: injury, damage) analysis of variance was performed on the responses. Respondents said they thought more about the immediate effects than the long term effects, as shown by a main effect for time, $F(1, 101) = 40.20$, $p<.001$, $\eta = .29$. Overall they did not think more about injury than damage, as there was no main effect for loss type, $F(1, 101) = 2.77$, *ns*. However, there was an interaction between time and loss type, $F(1, 101) = 22.40$, $p<.001$, $\eta = .18$, indicating that people thought more about injury ($M = 2.12$) than damage ($M = 1.87$) with regard to immediate effects, whereas with regard to long term effects there was the opposite trend to think more about damage ($M = 1.72$) than injury ($M = 1.62$).

6. What actions did businesses choose for 3 month follow-up and what did they do??

The actions that businesses chose as targets are shown in Table 17. They chose significantly more survival actions than actions to mitigate damage to contents and buildings. The actions completed at the 3 month follow-up are also shown in Table 17. Companies reported completing out 19% of the target actions to mitigate building damage, 46% of the target actions to mitigate damage to contents, and 23% of the target survival actions. Logistic regressions determined whether the estimated cost of the actions at time 1 predicted whether they had done the actions 3 months later at Time 2. This analysis accounted for whether they had already the actions at time 1. The results showed there was no relation between the estimated cost of the actions at time 1 and completion of the actions at time 2.

Table 17: **Target actions: estimated cost, frequencies as target and completion rates. (Businesses)**

Grouped Actions	Individual actions	Mean estimated cost	Freq. target	Freq. completed	Completion rate (%)
Actions that mitigate harm to building structure, persons and content	Builder/engineer check	$2591	5	0	0.0
	Resistance of buildings	$8064	2	1	50.0
	Business continuity plan	$1094	34	5	14.7
	Secured computers	$1221	21	6	28.6
Mean for group		$3117	15.50	3.00	19.3
Actions that mitigate harm to contents (and people)	Fastened tall objects and shelving	$665	18	9	50.0
	Secured objects	$855	18	6	33.3
	Heavy objects on floor	$109	12	7	58.3
Mean for group		$547	16.00	7.33	45.8
Actions that enhance survival	Emergency plan	$427	38	7	18.4
	Stored water	$308	30	7	23.3
	Stored canned food	$369	40	6	15.0
	Obtained first aid kit	$320	26	11	42.3
Mean for group		$355	33.50	7.75	23.1

8. Results summary: businesses

Businesses reported completing more survival actions and content damage mitigation actions than building damage mitigation actions. The actions they completed cost less than on average than the actions they did not complete, but there was not was a significant relationship between the cost of the action and reported completion of the actions for any of the individual actions.

Businesses attributed their not completing the actions to at least three other factors more than the cost of the action. Businesses also thought more about injury than damage in relation to the immediate effects of earthquakes and thought more about damage in relation to the long term effects. This pattern is consistent in with people's higher performance of actions seen as helping survival.

Discussion

1. Frequency of different types of preparedness actions

The results show that as predicted, the number of preparedness actions carried out by businesses and households differ for different types of actions. At Time 1, both households and businesses reported having carried out more survival actions than actions mitigating building damage. The two participant groups differ however on the third class of actions, actions mitigating damage to contents. Households report carrying out approximately 80% more survival actions than actions mitigating damage to contents [as well as actions mitigating damage to buildings]. In contrast, for businesses, actions mitigating damage to contents are as frequent as survival actions and both of these classes of actions are carried out more frequently than actions mitigating damage to buildings.

This result supports the view that preparedness differs across different classes of action, and also shows the value of Paton and Johnston's (2008) division of Spittal et al.'s (2008) single category for damage mitigating actions into two sub-groups: actions mitigating damage to building structure and actions mitigating damage to content, such as securing bookcase, shelving, etc. In the present results, this distinction is particularly pertinent for businesses, as actions mitigating damage with contents are grouped by frequency with survival actions rather than with actions mitigating damage to buildings. This difference between households and businesses on actions mitigating damage to contents may reflect health and safety regulations that apply to businesses more than to households.

2. The relation between estimated cost and performance actions at Time 1

The relation between the performance of the actions and their perceived cost is not a simple linear one. There was a general relationship between the perceived cost of actions and probability of completing the actions, in that fewer participants in both groups had carried out the more expensive actions such as increasing the earthquake resistance of the building and ensuring the foundations were sound. For households, there was also a significant relationship between the perceived cost of 4 of the 12 actions and the probability that they had performed the action. All of these 4 actions were actions that would mitigate damage to either contents or buildings. There was no evidence of a relationship with perceived cost for survival actions. This suggests that for at least some actions mitigating damage, cost is a consideration affecting households' actions. For businesses, however, there is no such relationship, except for a marginal relationship for two actions: securing computers and getting appropriate first aid. This suggests that for businesses, cost is not the primary consideration constraining earthquake preparedness.

This interpretation is supported by the participants' attributions for their not completing some or all of the actions. For both households and businesses, across all types of action, cost was not among the three most frequent attributions for failing to prepare, being out-ranked by not having thought about it, the belief that action would not make a difference (Fatalism), and the action not being a priority. In addition, for households, although cost was the 4th most frequent attribution for actions that mitigate harm to building, it was the 7th most frequent attribution for actions that mitigate harm to contents and actions that enhance survival. This finding supports the view that cost is not a primary deterrent to these two types of actions, most of which are relatively inexpensive.

3. Relation of estimated cost to actions chosen to do by time 2 and completion rate at time 2.

There was also no evidence of a relationship between the perceived cost of the actions at time 1 and the choice of target actions selected by companies do by Time 2, three months later. There was also no evidence of a relationship between the cost of the actions and the probability

that the same actions were actually completed by companies at Time 2. For this analysis, due to the unwillingness of companies to enter this second phase of the project, the sample size became quite small, so the lack of a relationship between perceived cost and carrying out the actions may reflect the relatively small sample size and the low frequency of the actions that were undertaken.

In another respect the results do suggest a relationship between the cost of actions and the choice of which actions to aim to complete. These findings suggest that cost may play a role in companies choosing actions to complete - at least in a short time frame. Companies selected more survival actions as target actions at Time 1 (average cost, $355) than either group of contents damage mitigation actions (average cost, $542) or building damage mitigation actions (average cost, $3117), and at follow-up at Time 2, they had carried out slightly more of these actions. However, as a proportion of the target actions chosen, the completion rate shows a higher proportion for actions that mitigate damage to contents (46%) than for survival actions (23%) which was only a little higher than the building damage mitigation actions (19%).

One limitation of the findings is that the project only permitted a relatively short time frame for the actions – three months. It is possible that with a longer time frame, companies might choose to do more building damage mitigation actions and might complete more of these actions. In addition, the research was performed during a fairly severe economic recession, and many companies stressed to the researchers that they were struggling to survive immediate and pressing financial pressures and that preparing for earthquakes was not a primary concern. It is possible that in a more benign economic climate, different results might be obtained. However, it should be noted that despite minimal immediate benefit from participating in the project, companies did report completing 65 actions to prepare for earthquakes.

4. Do people think more about immediate and long term effects for life and damage.

Participants indicated that they thought more about the immediate effects of earthquakes than the long term effects. This may partly explain why they carry out more survival actions than actions mitigating damage to content and actions mitigating damage to buildings, even

though actions mitigating damage to buildings have direct consequences for survival in an earthquake. Participants also indicated that in relation to the immediate effects of earthquakes they thought more about injury than business damage and losses whereas in relation to long-term effects, they think equally about both types of loss or in the case of businesses, more about the damage. This suggests that households and businesses need to be encouraged to think about the long-term consequences of earthquakes, as this time perspective may increase their performance of actions to mitigate damage to their buildings, which in turn can enhance their survival as well as their business resilience.

Conclusions and policy implications

This research clarifies the possible reasons for people taking fewer actions to mitigate damage from earthquakes than actions to get survival aids such as water and a medical kit. In particular, the project examined the relation between the perceived cost of the actions and participants' performance of the actions. Although participants did report undertaking fewer actions that are costly, for many actions, survival actions in particular, the performance of the actions did not relate to the perceived cost of the actions. People's attributions suggest that although cost is one factor in not acting, other factors play a greater role: either they haven't thought about it or it is not a priority or they think it would make no difference. The findings on people's thinking in regard to earthquakes show that people think more about the immediate consequences of earthquakes than the long term consequences and they think about outcomes for life and injury more than damage and business loss.

Nonetheless, at a time of economic recession when other priorities loom much larger for most companies, businesses in this small study reported carrying out 65 actions to be better prepared for earthquakes in a short time frame, despite having minimal added incentives. Many companies also indicated strong interest in the results of the survey – in some cases to see if they had done better than others in carrying out their plans. This indicates that some people and companies can be motivated to take some actions even with minimal incentives and in difficult

economic times. Very few of these actions, however, included substantial actions to mitigating damage to buildings, and these actions are likely to affect the survival not only of the company but the persons in the buildings in a major earthquake.

One implication of these findings is that endeavours to get people to take actions to mitigate damage from low frequency events like earthquakes remain strongly dependent on legislation requiring buildings to be a minimal strength. At a time of prolonged economic recession (2009), when the building of new homes is at a low level, the building trade at least might welcome a strengthening of both legislative requirements and government incentives, analogous to the increase in government support for increased insulation in homes (2009).
A second implication is that from the point of view of households and businesses, the cost of actions is not the primary deterrent to actions. Policies to get people to think about the specific actions they need to take can be effective, but incentives may be required to overcome the fact that many people see preparing for earthquakes as a lower priority than other actions. Education is required to get people to overcome their fatalism and realise that these actions are likely to make a difference. Many households and companies indicated that this research project was provoking and made them think about this issue and in some cases take action. This suggests that policies that involve engagement with homes and businesses may be more effective than costly news media blitzes.

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Appendix 1. The households questionnaire

TE WHARE WĀNANGA O TE ŪPOKO O TE IKA A MĀUI
VICTORIA
UNIVERSITY OF WELLINGTON

22 November 2008

Households Preparedness Questionnaire.

Dear Wellington citizen

Wellington is an earthquake risk zone and earthquakes pose a real risk to citizens. A local earthquake could lead to citizens suffering real harm or losing their home and possessions. However you can greatly reduce the chance of harm by preparing and taking actions that can reduce harm to your home and family

Many of us, however, do not prepare for earthquakes. The Earthquake Commission is funding this research on the possible reasons why some people don't prepare. The questionnaire only takes about 5 minutes to do. We really appreciate your doing it. The questionnaire is anonymous.

Thanks for your participation. If you have any queries regarding the project, do contact us.
Assoc. Prof John McClure, Dr. Ronald Fischer, Dr Matthew Spittal, ***School of Psychology***
Assoc. Prof. Andrew Charleson, ***School of Architecture*** (Contact details on accompanying sheet).

Section A. Please indicate if you performed the 12 actions below. If you haven't done the action, pick **up to three** of the following explanations that best explain why you didn't do so, and tick the circle next to these explanations.

1. Did you get a builder or engineer to check that your house will withstand a major earthquake?
○ Yes
○ No - because of the cost
○ No - because of time limitations (too busy)
○ No - because this action is only useful for earthquakes and not other hazards
○ No - because it was rather obvious that there wasn't a risk
○ No - because it's not a top priority
○ No - because I don't think it would make much difference if an earthquake happens
○ No - because I don't take lots of precautions for things that might go wrong
○ No - because I haven't thought about it
○ No - because of some other reason: (describe)
How much do you think this action would cost? Circle one figure:
Nil $20 $40 $60 $80 $100 $150 $200 $500 $1,000 $5,000 $10,000+

2. Have you fastened tall furniture to the wall?
○ Yes
○ No - because of the cost
○ No - because of time limitations (it takes too long)
○ No - because this action is only useful for earthquakes and not other hazards
○ No - because I have no tall furniture
○ No - because it's not a top priority
○ No - because I don't think it would make much difference if an earthquake happens
○ No - because I don't take lots of precautions for things that might go wrong
○ No - because I haven't thought about it
○ No - because of some other reason: (describe)
How much do you think this action would cost? Circle one figure:
Nil $20 $40 $60 $80 $100 $150 $200 $500 $1,000 $5,000 $10,000+

3. Have you arranged a place to meet after an earthquake?
○ Yes
○ No - because of the cost
○ No - because of time limitations (too busy)
○ No - because this action is only useful for earthquakes and not other hazards
○ No - because I do not have a family, etc.
○ No - because it's not a top priority
○ No - because I don't think it would make much difference if an earthquake happens
○ No - because I don't take lots of precautions for things that might go wrong
○ No - because I haven't thought about it
○ No - because of some other reason: (describe)
How much do you think this action would cost? Circle one figure:
Nil $20 $40 $60 $80 $100 $150 $200 $500 $1,000 $5,000 $10,000+

4. Have you taken specific steps to increase the earthquake resistance of your home?
○ Yes (describe)
○ No - because of the cost
○ No - because of time limitations (too busy)
○ No - because this action is only useful for earthquakes and not other hazards
○ No - because it was rather obvious that there wasn't a risk
○ No - because it's not a top priority
○ No - because I don't think it would make much difference if an earthquake happens
○ No - because I don't take lots of precautions for things that might go wrong
○ No - because I haven't thought about it
○ No - because of some other reason: (describe)
How much do you think this action would cost? Circle one figure:
Nil $20 $40 $60 $80 $100 $150 $200 $500 $1,000 $5,000 $10,000+

5. Have you secured objects in your home that could fall over in an earthquake e.g. computer, vases?
○ Yes
○ No - because of the cost
○ No - because of time limitations (too busy)
○ No - because this action is only useful for earthquakes and not other hazards
○ No - because I have no objects that could fall over
○ No - because it's not a top priority
○ No - because I don't think it would make much difference if an earthquake happens
○ No - because I don't take lots of precautions for things that might go wrong
○ No - because I haven't thought about it
○ No - because of some other reason: (describe)
How much do you think this action would cost? Circle one figure:
Nil $20 $40 $60 $80 $100 $150 $200 $500 $1,000 $5,000 $10,000+

6. Have you stored water for survival?
○ Yes
○ No - because of the cost
○ No - because of time limitations (too busy)
○ No - because this action is only useful for earthquakes and not other hazards
○ No - because it's not necessary for risk reduction
○ No - because it's not a top priority
○ No - because I don't think it would make much difference if an earthquake happens
○ No - because I don't take lots of precautions for things that might go wrong
○ No - because I haven't thought about it
○ No - because of some other reason: (describe)
How much do you think this action would cost? Circle one figure:
Nil $20 $40 $60 $80 $100 $150 $200 $500 $1,000 $5,000 $10,000+

7. Have you ensured that your hot water cylinder is secured and fastened?
○ Yes
○ No - because of the cost
○ No - because of time limitations (too busy)
○ No - because this action is only useful for earthquakes and not other hazards
○ No - because it was rather obvious that there wasn't a risk
○ No - because it's not a top priority
○ No - because I don't think it would make much difference if an earthquake happens
○ No - because I don't take lots of precautions for things that might go wrong
○ No - because I haven't thought about it
○ No - because of some other reason: (describe)
How much do you think this action would cost? Circle one figure:
Nil $20 $40 $60 $80 $100 $150 $200 $500 $1,000 $5,000 $10,000+

8. Have you ensured that heavy objects are stored on the floor?
○ Yes
○ No - because of the cost
○ No - because of time limitations (too busy)
○ No - because this action is only useful for earthquakes and not other hazards
○ No - because I have no heavy objects.
○ No - because it's not a top priority
○ No - because I don't think it would make much difference if an earthquake happens
○ No - because I don't take lots of precautions for things that might go wrong
○ No - because I haven't thought about it
○ No - because of some other reason: (describe)
How much do you think this action would cost? Circle one figure:
Nil $20 $40 $60 $80 $100 $150 $200 $500 $1,000 $5,000 $10,000+

9. Have you obtained supplies of canned food?
○ Yes
○ No - because of the cost
○ No - because of time limitations (too busy)
○ No - because this action is only useful for earthquakes and not other hazards
○ No - because it's not necessary for risk reduction
○ No - because it's not a top priority
○ No - because I don't think it would make much difference if an earthquake happens
○ No - because I don't take lots of precautions for things that might go wrong
○ No - because I haven't thought about it
○ No - because of some other reason: (describe)
How much do you think this action would cost? Circle one figure:
Nil $20 $40 $60 $80 $100 $150 $200 $500 $1,000 $5,000 $10,000+

10. Have you ensured that the foundations of your house are sound enough to withstand an earthquake?
○ Yes (describe)
○ No - because of the cost
○ No - because of time limitations (too busy)
○ No - because this action is only useful for earthquakes and not other hazards
○ No - because they were already sound when buying/moving in
○ No - because it's not a top priority
○ No - because I don't think it would make much difference if an earthquake happens
○ No - because I don't take lots of precautions for things that might go wrong
○ No - because I haven't thought about it
○ No - because of some other reason: (describe)
How much do you think this action would cost? Circle one figure:
Nil $20 $40 $60 $80 $100 $150 $200 $500 $1,000 $5,000 $10,000+

11. Have you securely fastened cupboards with latches?
○ Yes
○ No - because of the cost
○ No - because of time limitations (too busy)
○ No - because this action is only useful for earthquakes and not other hazards
○ No - because I have no cupboards.
○ No - because it's not a top priority
○ No - because I don't think it would make much difference if an earthquake happens
○ No - because I don't take lots of precautions for things that might go wrong
○ No - because I haven't thought about it
○ No - because of some other reason: (describe)
How much do you think this action would cost? Circle one figure:
Nil $20 $40 $60 $80 $100 $150 $200 $500 $1,000 $5,000 $10,000+

12. Have you obtained items for a first aid kit that would be useful after an earthquake?
○ Yes
○ No - because of the cost
○ No - because of time limitations (too busy)
○ No - because this action is only useful for earthquakes and not other hazards
○ No - because it's not necessary for risk reduction
○ No - because it's not a top priority
○ No - because I don't think it would make much difference if an earthquake happens
○ No - because I don't take lots of precautions for things that might go wrong
○ No - because I haven't thought about it
○ No - because of some other reason: (describe)
How much do you think this action would cost? Circle one figure:
Nil $20 $40 $60 $80 $100 $150 $200 $500 $1,000 $5,000 $10,000+

Section B For the following questions, please indicate which answer is closest to your opinion.

When you think about the possible effects of an earthquake on your household,
1. Do you think about the <u>immediate</u> consequences for life, injury, etc? (i.e. the first day or so) ○ Not at all ○ A moderate amount ○ A lot
2. Do you think about the <u>immediate</u> consequences for damage, losses, etc? (i.e. the first day or so) ○ Not at all ○ A moderate amount ○ A lot
3. Do you think about the <u>long–term</u> consequences for life, injury, etc? (i.e. the months or years following) ○ Not at all ○ A moderate amount ○ A lot
4. Do you think about the <u>long–term</u> consequences for damage, losses, etc? (i.e. the months or years following) ○ Not at all ○ A moderate amount ○ A lot

5. Overall do you feel it is more important to [tick one figure]:						
take actions to enhance survival after an earthquake e.g. get water supplies	1	2	3 Equally important	4	5	take actions to reduce damage in an earthquake e.g. strengthen buildings

Or Circle 'don't know', if appropriate

Section C. Other data. These questions are to ensure we have a cross section of the population

Number of adults in the household		**Number of children in the household**	

Please indicate your age and sex
Age: ○ Under 20, ○ 20 – 29, ○ 30 – 39, ○ 40 – 49, ○ 50 – 59, ○ 60+
Sex: ○ Male ○ Female

If you don't mind, please indicate your individual income?
○ $0 - $25,000, ○ $25,001 - $50,000, ○ $50,001 - $75,000, ○ $75,001+

<u>Any comments on the questionnaire?</u>

Appendix 2. The companies questionnaire

TE WHARE WĀNANGA O TE ŪPOKO O TE IKA A MĀUI
VICTORIA
UNIVERSITY OF WELLINGTON

28 February 2009

Company Preparedness Questionnaire.

Dear Manager

Wellington is an earthquake risk zone and earthquakes pose a real risk to citizens. An earthquake could lead to employees suffering real harm or a company losing their building[s] and future business. However, you can greatly reduce the chance of harm by preparing and taking actions that can reduce harm to your business and employees

Many of us, however, do not prepare for earthquakes. This research is being funded by the Earthquake Commission (EQC) to clarify the reasons why many people and businesses don't prepare. We have randomly selected companies to participate. This research is to gain information for the EQC and is not for anyone's financial interest or benefit.

This questionnaire should be completed by you or the person who deals with your business resilience and continuity planning, if you have a person to do this.

This project has two parts:
1. You fill out his questionnaire - you simply tick if you have done 11 actions we list below, and if not you tick the reasons why. This only takes 5 minutes.

2. If you are willing, you choose up to 4 of the listed actions as goals in the next 3 months. Then in 3 months we will check if you have been able to do these.

We really appreciate your doing it. Please put the questionnaire in the attached envelope and return it to us. If you just return this survey to us, you are in a draw to receive a $50 petrol voucher! If you take on the goal of doing some of the actions we list, you are in a draw to receive a second $100 petrol voucher!

The questionnaire is confidential; and once the data from this survey have been matched to the follow-up data at time 2 (in 3 months), we will destroy the information that could identify you.

If you have any queries regarding the project, do contact us
Prof. John McClure, Dr. Ron Fischer, Dr Matthew Spittal, ***School of Psychology***,
Assoc. Prof. Andrew Charleson, ***School of Architecture***
John McClure, Tel. 4636047; Email: john.mcclure@vuw.ac.nz

Section A. These questions are to ensure we have a cross section of businesses

Contact name	
Telephone number	
Type of business	
Number of employees	
Do you own or rent your premises?	

Section B. Please indicate if you performed the 11 actions below. If you haven't done the action, pick **up to three** of the following explanations that best explain why you didn't do so (tick the circle).

1a Did you get a builder or engineer to check that your building[s] will withstand a major earthquake?
○ Yes
○ No - because of the cost
○ No - because it was rather obvious that there wasn't a risk
○ No - because it's not a top priority / due to time limitations (too busy)
○ No - because I/we don't think it would make much difference if an earthquake happens
○ No - because I/we think an earthquake is unlikely to happen in the immediate future
○ No - because I/we haven't thought about it
○ No - because of some other reason: (describe)

1b. How much do you think this action would cost? Circle one figure:										
Nil	$20	$40	$60	$80	$100	$150	$200	$500	$1,000	$5,000	$10,000+

2a. Have you fastened tall objects and shelving to walls?
○ Yes
○ No - because of the cost
○ No - because we have no tall objects and shelving
○ No - because it's not a top priority / due to time limitations (too busy)
○ No - because I/we don't think it would make much difference if an earthquake happens
○ No - because I/we think an earthquake is unlikely to happen in the immediate future
○ No - because I/we haven't thought about it
○ No - because of some other reason: (describe)

2b. How much do you think this action would cost? Circle one figure:										
Nil	$20	$40	$60	$80	$100	$150	$200	$500	$1,000	$5,000	$10,000+

3a. Have you arranged a business emergency plan for employees for an earthquake?
○ Yes
○ No - because of the cost
○ No - because I do not have employees.
○ No - because it's not a top priority / due to time limitations (too busy)
○ No - because I/we don't think it would make much difference if an earthquake happens
○ No - because I/we think an earthquake is unlikely to happen in the immediate future
○ No - because I/we haven't thought about it
○ No - because of some other reason: (describe)

3b. How much do you think this action would cost? Circle one figure:										
Nil	$20	$40	$60	$80	$100	$150	$200	$500	$1,000	$5,000	$10,000+

4a. Have you taken specific steps to increase the earthquake resistance of your building[s]?
○ Yes (describe)
○ No - because of the cost
○ No - because it was rather obvious that there wasn't a risk
○ No - because it's not a top priority / due to time limitations (too busy)
○ No - because I/we don't think it would make much difference if an earthquake happens
○ No - because I/we think an earthquake is unlikely to happen in the immediate future
○ No - because I/we haven't thought about it
○ No - because of some other reason: (describe)

4b. How much do you think this action would cost? Circle one figure:										
Nil	$20	$40	$60	$80	$100	$150	$200	$500	$1,000	$5,000	$10,000+

5a. Have you secured objects in your buildings that could fall over in an earthquake e.g. stock, goods?
○ Yes
○ No - because of the cost
○ No - because we have no objects that could fall over
○ No - because it's not a top priority / due to time limitations (too busy)
○ No - because I/we don't think it would make much difference if an earthquake happens
○ No - because I/we think an earthquake is unlikely to happen in the immediate future
○ No - because I/we haven't thought about it
○ No - because of some other reason: (describe)

5b. How much do you think this action would cost? Circle one figure:										
Nil	$20	$40	$60	$80	$100	$150	$200	$500	$1,000	$5,000	$10,000+

6a. Have you stored water for survival?
○ Yes
○ No - because of the cost
○ No - because it's not necessary for risk reduction
○ No - because it's not a top priority / due to time limitations (too busy)
○ No - because I/we don't think it would make much difference if an earthquake happens
○ No - because I/we think an earthquake is unlikely to happen in the immediate future
○ No - because I/we haven't thought about it
○ No - because of some other reason: (describe)

6b. How much do you think this action would cost? Circle one figure:										
Nil	$20	$40	$60	$80	$100	$150	$200	$500	$1,000	$5,000	$10,000+

7a. Have you made a business continuity plan
○ Yes
○ No - because of the cost
○ No - because it was rather obvious that there wasn't a risk
○ No - because it's not a top priority / due to time limitations (too busy)
○ No - because I/we don't think it would make much difference if an earthquake happens
○ No - because I/we think an earthquake is unlikely to happen in the immediate future
○ No - because I/we haven't thought about it
○ No - because of some other reason: (describe)

7b. How much do you think this action would cost? Circle one figure:										
Nil	$20	$40	$60	$80	$100	$150	$200	$500	$1,000	$5,000	$10,000+

8a. Have you ensured that heavy objects are stored on the floor?
○ Yes
○ No - because of the cost
○ No - because I/we have no heavy objects.
○ No - because it's not a top priority / due to time limitations (too busy)
○ No - because I/we don't think it would make much difference if an earthquake happens
○ No - because I/we think an earthquake is unlikely to happen in the immediate future
○ No - because I/we haven't thought about it
○ No - because of some other reason: (describe)

8b. How much do you think this action would cost? Circle one figure:										
Nil	$20	$40	$60	$80	$100	$150	$200	$500	$1,000	$5,000	$10,000+

9a. Have you obtained supplies of canned food?
○ Yes
○ No - because of the cost
○ No - because it's not necessary for risk reduction
○ No - because it's not a top priority / due to time limitations (too busy)
○ No - because I/we don't think it would make much difference if an earthquake happens
○ No - because I/we think an earthquake is unlikely to happen in the immediate future
○ No - because I/we haven't thought about it
○ No - because of some other reason: (describe)

9b. How much do you think this action would cost? Circle one figure:										
Nil	$20	$40	$60	$80	$100	$150	$200	$500	$1,000	$5,000	$10,000+

10a. Have you secured your computer[s] and electronic data for an earthquake?
○ Yes
○ No - because of the cost
○ No - because I/we have no computer[s].
○ No - because it's not a top priority / due to time limitations (too busy)
○ No - because I/we don't think it would make much difference if an earthquake happens
○ No - because I/we think an earthquake is unlikely to happen in the immediate future
○ No - because I/we haven't thought about it
○ No - because of some other reason: (describe)

10b. How much do you think this action would cost? Circle one figure:
Nil $20 $40 $60 $80 $100 $150 $200 $500 $1,000 $5,000 $10,000+

11a. Have you obtained items for a first aid kit that would be useful after an earthquake?
○ Yes
○ No - because of the cost
○ No - because it's not necessary for risk reduction
○ No - because it's not a top priority / due to time limitations (too busy)
○ No - because I/we don't think it would make much difference if an earthquake happens
○ No - because I/we think an earthquake is unlikely to happen in the immediate future
○ No - because I/we haven't thought about it
○ No - because of some other reason: (describe)

11b. How much do you think this action would cost? Circle one figure:
Nil $20 $40 $60 $80 $100 $150 $200 $500 $1,000 $5,000 $10,000+

Section C For the following 4 questions, please tick the answer closest to your opinion
.

When you think about the possible effects of an earthquake on your business:
1. Do you think about the <u>immediate</u> consequences for life, injury, etc? (i.e. the first day or so) (Tick one option) ○ Not at all, ○ A moderate amount, ○ A lot
2. Do you think about the <u>immediate</u> consequences for damage, losses, etc? (the first day or so) (Tick one option) ○ Not at all, ○ A moderate amount, ○ A lot
3. Do you think about the <u>long–term</u> consequences for life, injury, etc? (i.e. the months or years following) (Tick one option) ○ Not at all, ○ A moderate amount, ○ A lot
4. Do you think about the <u>long–term</u> consequences for damage, losses, etc? (i.e. the months or years following) (Tick one option) ○ Not at all, ○ A moderate amount, ○ A lot

Please go to page 6

Section D. The actions in Section B are repeated below. Please choose up to 4 actions that you have not yet done and that you would like to do to enhance your preparedness. Put a tick next to the actions that you choose.

If you adopt this goal, your task is to do some or all of these 4 actions in the next 3 months. We will follow up in 3 months to see how you have got on. Whether you take up this goal or not, please return this questionnaire to us as soon as you have done it in the enclosed envelope.

Target actions to do in the next 3 months

○ 1. Get a builder or engineer to check that your building[s] will withstand a major earthquake

○ 2. Fasten tall objects and shelving to the wall

○ 3. Arrange a business emergency plan for employees for an earthquake

○ 4. Take specific steps to increase the earthquake resistance of your building[s]

○ 5. Secure objects in your buildings that could fall over in an earthquake e.g. stock, goods

○ 6. Store water for survival

○ 7. Make a business continuity plan

○ 8. Ensure that heavy objects are stored on the floor

○ 9. Obtain supplies of canned food

○ 10. Secure your computer[s] and electronic data for an earthquake

○ 11. Obtain items for a first aid kit that would be useful after an earthquake.

Any comments on the questionnaire?

Increasing earthquake resilience plan

[Please keep this sheet for your own records and action]

Tick up to 4 of the actions that are going to try and do in the next 3 months i.e. by **May 30 2009** (please tick the same actions that you ticked on the questionnaire section D).

Target actions to do in the next 3 months
○ 1. Get a builder or engineer to check that your building[s] will withstand a major earthquake
○ 2. Fasten tall objects and shelving to the wall
○ 3. Arrange a business emergency plan for employees for an earthquake
○ 4. Take specific steps to increase the earthquake resistance of your building[s]
○ 5. Secure objects in your buildings that could fall over in an earthquake e.g. stock, goods
○ 6. Store water for survival
○ 7. Make a business continuity plan
○ 8. Ensure that heavy objects are stored on the floor
○ 9. Obtain supplies of canned food
○ 10. Secure your computer[s] and electronic data for an earthquake
○ 11. Obtain items for a first aid kit that would be useful after an earthquake.

Who is going to execute this_____

Appendix 3: The follow-up phone call – what to say

1. Hello, my name Sophia Drysdale/Jacob Emery; I am part of a research team at Victoria University that is funded by the Earthquake Commission. I am calling to follow up on the research you participated in regarding business preparation for earthquakes.

2. You recorded your name and telephone number on the original survey – did agree to complete the preparation actions over the last three months?

3. Even if you haven't done the actions you are still in the draw to win the $100 petrol voucher.

4. Can you remember what actions you were going to aim to complete?

5. IF THEY CAN REMEMBER:

What were they and what actions have you taken?

If you haven't done the actions, it is really useful for us to know why, from your perspective, you didn't get to do these actions.

6. IF THEY CANNOT REMEMBER THE ACTIONS WE TELL THEM WHAT THEY LISTED

Have you done these actions?

If you haven't done the actions it is really useful for us to know why, from your perspective, these actions weren't done.

7. Is there anything further that you would like to add, or would be interested to know?

8. Thank you for taking the time to participate in this research, we will contact you if you happen to win the $100 petrol voucher.

Data collection sheet for the follow-up phone call

1. Can you remember what actions you were going to aim to complete?
○ Yes – go to question 2
○ No – tell them the actions they listed and go to question 3

2. What were they?

3. Of these actions, what have you taken/completed?

4. If you have not completed the actions: why were these actions not completed.

Is there anything further that you would like to add?

Appendix 4: Attributions given by households who stated 'other'

Attribution 1: **It is not practical to make this preparation (9)**

Arranged meeting place (4)

- not practical
- work far away from home and family

Secured objects e.g. vases (1)

- you can't secure everything

Heavy objects on floor (2)

- often not practical e.g., microwave
- Some items in daily use just too inconvenient - but sewing machine

Fastened cupboards with latches (2)

- hassle to use them
- Inconvenience

Attribution 2: **I believe the existing structures are sufficient (101)**

Builder/engineer check home (18)

- In apartment and body corp did this
- Has withstood all earthquakes in Wellington since 1920's
- Strongly built older house will withstand moderate earthquake. Major earthquake no houses survive
- Building code will cover earthquake risk
- Assumed that if building was structurally sound in compliance with Building Act it would be OK and I checked my house was NOT in earthquake prone zone.
- It is only 6 years old and supposed to meet the new standards.
- My partner (engineer) had house built for him so knows how safe it is - the foundations are in rock. Designed to comply with codes - should be safe as possible.
- Because we own a flat in a building that is covered for EQ damage.

Fastened tall furniture to wall (1)

- already built in

Arranged meeting place (6)

- rely on cellphones
- I would be outside with the other body corporate owners
- Both live at home and retired

Increase earthquake resistance of home (19)

- live in apartment and body corp. did this
- think it is strong
- been in same home for 40 years
- feel safe because brick and not on foundations
- Fully repaired and maintained and couldn't be better
- Solidly built - not necessary
- older, very stable house

- Home 10 years old, only one level
- But trust engineer's report that place is safe
- It was built to withstand as much as possible. Do fasten newer large things.
- House meets current codes.
- Because we own a flat in a building that is covered for EQ damage
- The house looks to have been well prepared - I think we will check now!

Secured objects e.g. vases (3)
- have nothing really high up
- Things are well back where they stand

Stored water (1)
- Have header tanks

Hot water cylinder secured (31)
- my partner does that stuff
- body corp. does this
- done by previous owner
- Don't have one - gas

Ensured foundations strong (14)
- live in apartment, body corp. took care of it
- assumed builders knew what they were doing
- it's on concrete slab, so fine
- I thought that NZ houses were supposed to withstand earthquakes?
- Not recently - house complies with building regs - so not an extra check.
- Assumed it would be OK as complies with building code.
- Our flat is in a large apartment building
- Assume house built to earthquake standard.
- Home 10 years old, only one level.

Fastened cupboards with latches (3)
- I don't have children or high cupboards
- They have magnetic fasteners on them presently - but may not be that secure

Attribution 3: **I don't care enough or I am too lazy to make the preparation (21)**
Builder/engineer check home (1)
- Long ago, no one did

Fastened tall furniture to wall (5)
- complacency
- lazy, indifferent
- I have considered it. Gib board is really soft and fastenings come out of the wall.

Arranged meeting place (5)
- not permanent resident
- enthusiasm faded as years go by
- My partner and I work in multi-story buildings - unlikely to exit easily

Increase earthquake resistance of home (1)
- not permanent resident

Secured objects e.g. vases (3)
- Aesthetic reasons.
- If vases etc break in a small earthquake - tough - in a big one it will be least of our worries.

Stored water (3)
- can't be bothered to change it regularly
- had other priorities

Fastened cupboards with latches (1)
- If it's big, things will break inside the cupboards anyway.

Obtained first aid kit (2)
- indifferent attitude
- The flat is not our principle residence

Attribution 4: **I haven't done the preparation but intend to do it (22)**
Fastened tall furniture to wall (7)
- keep thinking about it
- Haven't got on to it and forgotten since reading/hearing about the suggestion
- Procrastinating - know we should do it, just need to make a definite time and DO IT!

Arranged meeting place (4)
- procrastination
- Have not got around to it but I have thought about it.

Secured objects e.g. vases (5)
- Haven't got round to it
- Been meaning to keep forgetting

Stored water (1)
- Keep meaning to get containers

Obtained canned food (2)
- Will do - just have not done it yet.
- Keep meaning to get

Obtained first aid kit (1)
- Have not got around to it.

Attribution 5: **I'm not sure of what to do or how to implement preparations (8)**
Arranged meeting place (1)
- Viable place to meet?

Increase earthquake resistance of home (4)
- And don't know what would be possible (optimal?)
- Have no idea what would be required - what "steps" could I take?

Secured objects e.g. vases (2)
- Some things I have - others are difficult to secure.
- Can't think how

Stored water (1)
- Storage problem

Attribution 6: **I am moved/remodelled recently or will move/remodel soon (15)**
Fastened tall furniture to wall (5)
- We have recently moved house and have not yet attended to it - probably will soon!
- Because we are redecorating

Increase earthquake resistance of home (3)
- planning to remodel in next 5 years
- just moved from UK
- have recently moved so haven't done anything yet

Hot water cylinder secured (2)
- about to move to a new location

Attribution 7: **Preparations completed for another purpose (16)**
Hot water cylinder secured (2)
- instant water outside (no cylinder)

Heavy objects on floor (4)
- Haven't got heavy stuff
- That is where they all are anyway.
- Everything’s on the floor

Obtained canned food (6)
- can access food in house
- keep good supply in house - not in civil defence box
- Not at home much, but pantry is stocked

Fastened cupboards with latches (1)
- built in

Obtained first aid kit (3)
- yes and no. I have a first aid kit in house and in car - not specifically earthquake oriented
- We have first aid kits - what more would be necessary?

Attribution 8: **I haven't thought about or considered this preparation (24)**
Builder/engineer check home (5)
- Never considered it
- haven't thought about it
- Didn't know I should have

Fastened tall furniture to wall (1)
- Never considered it

Arranged meeting place (2)
- kids have left home so not thought about it

Increase earthquake resistance of home (3)
- haven't thought about it

Ensured foundations strong (4)
- Never considered it

Fastened cupboards with latches (3)
- Never considered it

Attribution 9: **Other (3)**
Secured objects e.g. vases (1)
- insurance

Stored water (1)
- for the whole family

Fastened cupboards with latches (1)
- Magnetic clips, quite strong. I wouldn't put latches on my kitchen cupboards for aesthetic reasons.

Appendix 5: Attributions given by businesses who stated 'other'

Attribution 1: **It is not practical to make this preparation (32)**

Builder/engineer check buildings (1)

- 26 storey vodafone building

Fastened tall objects to wall (8)

- Shelving not all against wall
- It is not practical. We have fastened to the floor
- Inconvenient as shelving is moved regularly
- Store large bolts of fabric and wouldn't be able to secure to anything

Increase earthquake resistance of buildings (2)

- We are on 22nd floor in 24 storey building

Secured objects e.g. stock (9)

- Impossible to secure books on selves - selves are secure
- Space limitations
- Wouldn't know how to do this practically. I actually think it's impossible
- Inconvenient as it's moved often
- Because we are a retail shop as well. Products have to be picked up.

Stored water (1)

- Storage restriction

Made business continuity plan (1)

- Limited finances to insure against business continuity

Heavy objects on floor (8)

- Not always. Due to the warehouse style of racking for stock we have, all tiles (the heaviest stock) is stored on floor level. Signage where appropriate OSH regulations Health and Safety guidelines
- We do not have enough space
- Many objects have to be stored high because of lack of space and hazard on the floor
- We have some heavy things on display up high which we can move, but we haven't yet

Secured computer and electronic data (2)

- Cost depends on number of computers etc
- We used to but IT resisted and unsecured items

Attribution 2: **I believe the existing structures are sufficient (39)**

Builder/engineer check buildings (13)

- Building construction check by property manager in Hamilton
- It was a new building
- 2005 refurbishment of this building included earthquake solutions
- The building owner Bob Jones has ensured it is safe
- Being a renovated building with apartments on top we knew it would meet council requirements
- We were told that it was when we rented it

- The building has been checked by council and has earthquake rating

Fastened tall objects to wall (3)
- Some tall furniture items are attached, some are not
- Tall shelving is not in an occupied area

Increase earthquake resistance of buildings (7)
- The building location is more than adequate but is reviewed constantly/ I am a builder so know what to look for
- It was strengthened by previous owner
- Because we rent an existing building built under Earthquake Regulations

Secured objects e.g. stock (6)
- Our stock is clothing so wouldn't cause harm
- Not in an occupied area

Stored water (1)
- We live nearby and have water stored at home

Made business continuity plan (2)
- Not in Wellington but elsewhere in NZ
- The company will have procedures for this occurrence

Obtained canned food (7)
- Have dried food
- Have stores of non-perishable food but not canned
- Live nearby and have food stored at home
- Use emergency ration packs due to longer shelf life

Attribution 3: **I don't care enough or I am too lazy to make the preparation (11)**
Builder/engineer check buildings (1)
- We have choose to operate our premises in an old building

Secured objects e.g. stock (2)
- Not life threatening if they did fall over
- Just haven't

Stored water (2)
- Lazy, have talked about it just haven't done it
- Not a legal requirement

Made business continuity plan (2)
- We would close the business
- No, because there are only 2 of us

Obtained canned food (3)
- Water most important priority
- It’s a work place not home

Obtained first aid kit (1)

- Because I'm lazy, talked about it

Attribution 4: **I haven't done the preparation but intend to do it (15)**
Fastened tall objects to wall (2)
- This should be done by a professional
- Haven't got around to it

Arranged business emergency plan (1)
- Work in progress

Increase earthquake resistance of buildings (1)
- Because we are waiting on feedback

Secured objects e.g. stock (1)
- Have taken some actions - could take more

Stored water (5)
- We have the council civil emergency sheet but haven't done the work or got the water/tined food etc
- Not yet! It is currently being undertaken by our committee to purchase/store water
- We haven't got around to doing it

Made business continuity plan (1)
- Partially done

Obtained canned food (3)
- We intended to but haven't yet
- It is on our list of things to do. Looked at civil defence website but found their kits expensive and over featured so putting together our own supplies but without urgency

Secured computer and electronic data (1)
- This has yet to be completed

Attribution 5: **I'm not sure of what to do or how to implement preparations (1)**
Arranged business emergency plan (1)
- Not sure what the proper actions would be

Attribution 6: **Preparations completed for another purpose (16)**
Fastened tall objects to wall (3)
- Part of design which was unrelated to earthquake preparations

Stored water (4)
- We all bring our own water daily
- We have large bottles of water already as water fountain supplies
- We have a water cooler

Heavy objects on floor (1)
- Only by chance not by plan

Obtained canned food (1)

- Some held for natural disasters, not specifically earthquakes
- We sell tinned goods so always have on hand

Secured computer and electronic data (1)
- Done but not in case of earthquake

Obtained first aid kit (6)
- Have comprehensive first aid box but not blankets/hat/?? etc
- We are St Johns and have cupboards full of first aid kits
- We have a first aid kit but it may not be specific to earthquakes and is probably lacking

Attribution 7: **I haven't thought about or considered this preparation (11)**
Builder/engineer check buildings (4)
- I don't know whether or not this was checked
- Wasn't here when shop was renovated

Arranged business emergency plan (1)
- There are only 2 of us it hasn't been discussed

Increase earthquake resistance of buildings (2)
- Don't know

Stored water (1)
- Have water stored at home but haven't thought about storing at work (good point)

Obtained canned food (1)
- Because there is no plan

Attribution 8: **It is not my responsibility to make this preparation (100)**
Builder/engineer check buildings (37)
- Responsibility of building owner / management
- We are only tenants - at the time it was build earthquake requirements were met
- Landlord might know? The owner of shop lives in Auckland, not sure if she has checked?
- Information from council assessments goes direct to owner

Arranged business emergency plan (1)
- The landlord is responsible for it

Increase earthquake resistance of buildings (58)
- We do not own the building and it is condemned
- Not our building and don't know if it complies
- not our building/we do not own building /are tenants/because we rent
- Building is 5 stories, and it's not mine!
- Landlords/property manager/owners responsibility

Made business continuity plan (2)
- I don't own the shop
- Looked after by head office

Obtained canned food (1)

- Individuals responsible for own -they are made aware of this

Secured computer and electronic data (1)

- Taken care of by head office

Attribution 9: **Other (5)**

Arranged business emergency plan (2)

- Signage and training is minimal

Increase earthquake resistance of buildings (1)

- Only lease 1 floor

Obtained canned food (1)

- Just no

Appendix 6: Businesses - Attributions at follow-up

Forgot/ not thought about (9)

- slipped mind
- talked about it then forgot
- Forgot. haven't thought about it

Been busy / not a top priority (17)

- been too busy, distractions
- Haven't got around to it, been busy.
- boss has to do and not a top priority for him. Wants to do more but wants someone else to do it. small business so not many staff or time
- swamped with other things to do
- have been meaning to do it but haven't and need more time - always in catch up mode
- Dropped off the priority list. We are just trying to survive the economic downturn.
- pushed to back burner, have list on outlook and pops up every now and then

Haven't done it yet but intending to (12)

- intending to do it but haven't got around to it
- Hasn't had a chance to meet to discuss. Also new boss
- been meaning to do it - left in draw
- only two in office, need to sit down and sort it out
- Anticipate that continuity plan is a big job. Thinking about it, been meaning to do it. Involves other offices so can't make the decisions.
- We've discussed buying a rope. We are all talk. No specific reason, just haven't done it. Talked about it lots though.

I don't think it would make any difference (4)

- not really much point - will be in same boat as everyone else after earthquake
- all goners in big earthquake so no point in plan, no time to make other plans, all bring own food so okay
- in big earthquake those items will be least of our worries

Not practical to make preparation (10)

- Emergency plan - problems as only one door and complicated to get out
- not practical to secure computers
- have discussed but will have to go through manager in Hamilton and makes it challenging
- Can't do continuity plan as someone else needs to. Don't thin that continuity plan addresses earthquakes particularly. Can't do this, someone else has to.
- Hard to get all people together at same time
- Hard to find big water containers
- in wine shop so bottles bigger problem

Preparation not necessary (2)

- moving soon, computers not an issue as on flat desks and not high up
- only three people so no need for a plan

Costs too great to make preparation (4)

- not secured computers - time and money issue

- Too expensive to do shelves and management wouldn't pay. Having someone who is responsible and show initiative. No one is really willing.
- recession

Still in progress (5)

- Water, canned food in progress
- Conservation (strengthening) plan took a lot of time. Not time to do other actions.
- Working with the landlord to get a builder to check the buildings. Working on actions (continuity plan) with business partner who lives of town.
- I am conscious of needs in this area. Bringing supplies and provisions in but they cost a lot for the items, and first aid kits etc are often over engineered for our needs. So we need to acquire them piecemeal which is cheaper. Do not know why haven't got canned food. Where do we get just the supplies that we want/need so that we don't have to buy the whole kit?
- waiting on unit to arrive, mostly done except we need someone to come in and fix the cabinets

Other (6)

- Target actions are all part of health and safety. All listed target actions have been done already.
- haven't followed up on securing computers and electronic data
- Wasn't sure what to do with plans. Can't decide. Need more information about what/how to prepare/plan.

Appendix 7: Participants: Other comments

Households

- Only relevant if earthquake defined as severe.
- All the adverts seem to scaremonger a bit without supplying solutions - e.g., What is a good place to all meet?
- Frightening to think how ill-prepared we are. It's a wake up call.
- Give us a pamphlet as to why this should be done and what's involved.
- I am a fatalist.
- I do have a "civil defence" container - needs a yearly check, am a bit slack changing water and probably don't have enough. Difficult to find a good storage place. Will take heed from your questionnaire and look at improving situation. Thanks.
- I hope it's useful.
- I'm not prepared at all!
- Interesting!
- It is a good idea to gather this data. Good luck.
- Look forward to seeing results of survey.
- make you think about the possible if an earthquake happened and take action
- Recently moved from UK and need to take more action!
- renting
- Should be better prepared
- Thanks - gives me something to think about
- Thanks for the opportunity to participate in survey and to remind and draw attention to points and the $
- this assumes that people have a lot of disposable income
- This really made me think about actions to strengthen my house (I didn't know this was an issue).
- Thought provoking - really should do something to get prepared in case it does happen.
- Useful and help government to plan and let people think about the issue.
- Useful update
- very good to know what else you can do to prepare

Businesses – initial questionnaire

- All good thought provoking things
- have not thought about some preparations as much as we should have - will try to rectify
- I feel we have taken all the steps we can for this type and size of business
- It is always good to be reminded to be ready
- NFAD have been in to advise and quote for civil defence equipment. At the time the cost was over our budget. It is something we may look into again but at a lesser quantity purchased.
- Our company priority is to get to safety in our assembly area. Objects can fall down, as long as they don't fall on us….All priorities after this revolve around resurrecting normality. …. Our building is not built to withstand a major earthquake, only built to current building code and standard. Our safety is NOT related to the buildings earthquake design it is related to how quick we can get out of it!
- Quite frankly I feel that the building would not stand any reasonable sort of earthquake so consequently I hope like hell when it comes it's not business hours. This is a 6 story building and we are on the ground floor

- Some of these actions are already in place yet always need reviewing. Storing more provisions at work and insure all employees are current with earthquake procedures. Fastening objects is the hardest one for my company as we deal with large amounts of stock/movement so maybe our higher shelving could be reinforced with wall brackets. Risk is lowered by the style of shelving we have.
- strategic planning is due June/July this year - includes continuity plan
- There are only 2 of us in the office, one works at home. I think we should have a Business Continuity Plan but we are so small, it seems less important as if we were a large organisation
- This was an interesting exercise in creating some awareness about possible preparation we can make to prepare ourselves for this scenario some of them seem quite simple
- thought provoking
- Unable to estimate costs for all options given the size of the operation and the number of sites/premises. In almost every case it would be well over $10,000 nationally. We have sites with as little as 5-10 staff but the national office has 2,000 staff spread over 44 floors in 5 buildings
- very easy to follow
- We have already done all the actions

Comments from business participants at follow up

- Are we more or less prepared than others - send results
- currently looking at generators - higher decisions have been made due to this research - thank you
- Don't have a health and safety person which highlights that we don't have the commitment we need. Need to control expenditure so haven't brought a new person on board yet. Times are tough at the moment.
- Felt an earthquake the other day but everything is almost done now. Just two filing cabinets have to be fixed due to a move of people.
- Having a meeting about it this afternoon. Can please have information about the study and its outcomes.
- Hoping we're more organised than others. We have supplies and first aid under each desk and they are always updated.
- I don't like to think about earthquakes
- made me think - will get food now
- Really helpful and good to be reminded. Thank you
- Shelving problems as tiles are really heavy
- Thanks, made me more aware
- valuable and important research - got supplies and data backup
- Want to get canned food. We just haven't got around to it yet.
- We have reactivated the health and safety committee. We met a few times already. Action items that arose: staff awareness training, familiarizing with equipment. Ordered a length of rope as we are at the top of the building. Realised that we didn't have access to the roof, so we are trying to sole this. We realise this is a big risk. Having another health and safety meeting next week. Basic health and safety needs to be looked at especially as we have gas pipelines that may be affected all over Wellington if there is an earthquake.
- We're woefully unprepared.
- Will you follow up again?
- Working on plan for fire after earthquake - need more info
- Would like more info on what to do