



Do Social Norms Affect Support for Earthquake-Strengthening Legislation? Comparing the Effects of Descriptive and Injunctive Norms

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Abstract

Social norms have been successfully applied in health promotion and environmental conservation, but their potential for encouraging natural hazard preparation is relatively untested. This research extends the focus theory of normative conduct to natural hazards and cognitive-behavioral outcomes by examining whether focusing individuals on descriptive and injunctive norms increases their support for earthquake-strengthening legislation in a seismically active city: Wellington, New Zealand. In a large community sample ($N = 690$), the injunctive norm condition increased support for the legislation compared with the control, whereas the descriptive norm condition did not. In contrast, the descriptive norm condition raised judgments of the feasibility of the strengthening work compared with the control, whereas the injunctive norm condition did not. These findings support previous research demonstrating the differing effects of descriptive and injunctive forms of normative information, and suggest that using both in the same communication is the best strategy for enhancing support for earthquake-strengthening legislation.

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Research has advanced our understanding of risk perception, showing, for example, that whether or not people prepare for natural hazards such as earthquakes is in part driven by their perceptions of those hazards (see, for example, Eiser et al., 2012; Joffe, Rossetto, & Adams, 2013; Uprety & Poudel, 2012). Many theories from psychology have been used to increase preparedness efforts among individuals, to reduce their risk and increase their ability to cope with hazard consequences, including some developed from the widely used theory of planned behavior (TPB; Ajzen, 1991; for a review, see Ejeta, Ardalan, & Paton, 2015).

However, several social psychological concepts are still relatively untested in regard to disaster preparation. One such concept is that of social norms, which have been demonstrated to be effective in areas such as health promotion (e.g., Borsari & Carey, 2003; Neighbors et al., 2011; Park & Smith, 2007) and environmental conservation (e.g., Cialdini, 2003; Goldstein, Griskevicius, & Cialdini, 2007; Schultz, Nolan, Cialdini, Goldstein, & Griskevicius, 2007). To the best of our knowledge, no previous study has directly applied the leading theory of norms, the focus theory of normative conduct (Cialdini, 2012; Cialdini, Kallgren, & Reno, 1991; Cialdini, Reno, & Kallgren, 1990; Kallgren, Reno, & Cialdini, 2000) to disaster preparation. By applying social norms to earthquake preparation, we seek to examine the potential of this theory within natural hazards research, and the application of normative messages within disaster risk communication and preparedness education. This investigation starts with a brief review of the relevant literature.

Disaster Risk Communication

There is no straightforward link between information and disaster preparation, with a large number of factors, such as the type and format of messages, affecting the success of the communication (Paton & Johnston, 2001). For example, Ballantyne, Paton, Johnston, Kozuch, and Daly (2000) found that volcano risk information *decreased* concern about that risk in nearly a third of the sample. Information about a risk alone is therefore not necessarily enough to motivate disaster preparation; this behavior can be affected by a range of factors, such as beliefs about preparation. Risk perception is a less significant factor in preparation than beliefs such as self-efficacy (whether people think they are able to take the action; McClure, Spittal, Fischer, &

Charleston, 2015) and response efficacy (whether they think the action will help to address the risk; Terpstra & Lindell, 2013). Although many people see earthquake preparation as their personal responsibility (Arlkatti, Lindell, & Prater, 2007), people also believe that their city should prepare in ways such as strengthening vulnerable buildings (Flynn, Slovic, Mertz, & Carlisle, 1999). Furthermore, Wood et al. (2012) advocate for the communication of actions that can be taken to address a risk, rather than focusing on the risk itself.

Researchers have also distinguished two types of actions to increase the chances of surviving an earthquake: those to help survive and recover after the event such as storing water (survival actions), and those to limit damage during the event such as securing fixtures and strengthening buildings (mitigation actions; Russell, Goltz, & Bourque, 1995; but see Lindell, Arlikatti, & Prater, 2009). Most preparation messages focus on actions to help recovery rather than preventive actions to mitigate damage (Solberg, Rossetto, & Joffe, 2010). Importantly, the motivation for these actions can differ; a tendency for low risk-taking predicted preparations to survive after an earthquake, whereas locus of control (whether outcomes can be controlled by individuals or are external to them) predicted preventive actions to reduce earthquake damage (Spittal, McClure, Siegert, & Walkey, 2008). Although it is important to encourage steps to help recovery, such as creating an emergency kit and keeping it handy, research into increasing mitigation actions should provide substantial benefits for earthquake survival and reduced damage. For example, Sanquini, Thapaliya, and Wood (2016) created communications to increase support for earthquake-resistant construction and strengthening in the Kathmandu valley in Nepal (see also Sanquini, Thapaliya, Wood, Baiocchi, & Hilley, 2016). Given the high earthquake risk in the region, this type of mitigation can reduce damage and save lives.

The Role of Normative Information for Support of Earthquake-Strengthening Legislation

Most communications about earthquake risk focus on either encouraging survival actions, such as storing emergency food and water, or conveying the probability of seismic events (e.g., getthru.govt.nz; ready.gov/earthquakes). The introduction of new legislation on earthquake-prone buildings provided an opportunity to target mitigation actions as well as to test the effects of normative information.

The focus theory of normative conduct (Cialdini, 2012; Cialdini et al., 1991; see also Cialdini, 2007; Cialdini et al., 1990) distinguishes between *descriptive* and *injunctive* forms of normative information that can influence

behavior when brought into focus. Descriptive social norms convey information about the prevalence of behaviors among members of a social group, providing a cognitive shortcut that helps individuals make accurate, efficient decisions. When many similar others behave in a certain way in a certain situation, then people infer that this behavior is likely to be beneficial (Goldstein et al., 2007), even though they often are unaware of this influence (Nolan, Schultz, Cialdini, Goldstein, & Griskevicius, 2008). For example, Goldstein et al. (2007) increased the number of hotel patrons who reused their towels by informing them that a majority (almost 75%) of other guests did this (see also Schultz, Khazian, & Zaleski, 2008; Terrier & Marfaing, 2015). Descriptive norm effects have influenced other environmental behaviors such as using sustainable transport (Kormos, Gifford, & Brown, 2015) and buying eco-friendly products (Demarque, Charalambides, Hilton, & Waroquier, 2015).

In contrast, injunctive social norms convey whether a social group approves of a behavior, providing information that helps individuals gain and maintain social approval. Injunctive norms imply either the reward of social approval for aligning with one's group or the punishment of social disapproval for failing to do so. For example, Cialdini et al. (2006) used injunctive norms to reduce the theft of petrified wood from an American National Park, in the form of a sign asking visitors to not remove any from the park. Visitors removed less wood when they saw the sign conveying that theft was not an approved behavior.

Although the effects of descriptive and injunctive social norms are discrete (e.g., Park & Smith, 2007), both forms of normative information are often used in conjunction to address an issue called the boomerang effect, where participants' behavior converges on the norm regardless of whether this is a positive or negative change. For example, Schultz et al. (2007) provided households with feedback on their energy use, compared with the average in their neighborhood. Energy use decreased within the households above the average but slightly *increased* in those below the average. When Schultz and colleagues paired the descriptive norm with an injunctive norm (a smiley face for those below average and a frowny face for those above), energy reductions in those households above the average further increased, and the boomerang effect in the households below the average disappeared.

Social norms are used both to reduce maladaptive behaviors such as excessive alcohol consumption (e.g., Neighbors et al., 2010) and to increase adaptive behaviors such as organ donation (e.g., Park & Smith, 2007) and pro-environmental decisions (e.g., Hamann, Reese, Seewald, & Loeschinger, 2015). By communicating social norms, researchers have successfully applied this concept to real-world issues. However, Cialdini (2007) argued that norms are still underestimated and underutilized.

The focus theory of normative conduct has been mainly used to explain and predict behaviors related to health promotion and environmentally wasteful or damaging activities (for reviews, see Borsari & Carey, 2003; Cialdini, 2012). We extend the application of the theory in two new directions. First, there is a recognized lack of utilization of social norms in natural hazards research (Solberg et al., 2010). Although some research has examined the role of social cues and observation of behavior on earthquake preparation (e.g., Sanquini, Thapaliya, & Wood, 2016; Sanquini, Thapaliya, Wood, et al., 2016; Wood et al., 2012), past research has not specifically applied social norms to this domain. We therefore extend the theory to earthquake preparation.

Second, applications of the theory have focused on behaviors such as littering (Cialdini et al., 1990) and reusing towels (Goldstein et al., 2007) that are low impact and tangible. Little if any research has examined whether focusing individuals' attention on social norms about a large-scale behavior (e.g., legislated building strengthening) can affect people's *judgments* about that behavior. We thus extend the theory to cognitive-behavioral outcomes by examining the extent to which focusing individuals' attention on normative information about the behavior of others regarding earthquake-strengthening legislation increases their support for the legislation. We did this by communicating the current rate of strengthening work being done under the legislation (descriptive norm) and community approval of the legislation (injunctive norm) to influence judgments of that legislation. These extensions of the focus theory of normative conduct into natural hazards and cognitive-behavioral outcomes merit investigation given the potential benefit to governments attempting to pass legislation to enhance public safety.

Research Context

Aotearoa New Zealand (NZ) is located on the boundary of the Pacific and Australian tectonic plates, which means it is relatively seismically active and therefore provides a suitable population for earthquake research. An earthquake struck near the city of Christchurch in 2011, causing billions of dollars of damage and claiming 185 lives. This led to a sharp increase in conversation about preparation, particularly around building resilience. Subsequent earthquakes in Cook Strait (2013) and Kaikoura (2016) have kept this issue in the public mind.

Despite the 2011 earthquake, scientists see Christchurch as a lower long-term risk than the capital city, Wellington, where a potentially fatal earthquake is expected every 120 years (N. Smith, 2015). Although there is common knowledge of Wellington's earthquake risk (Khan, Crozier, &

Kennedy, 2012), many Wellington buildings are still earthquake-prone and the death toll of the 2011 Christchurch earthquake might have been 1,500 had the earthquake struck Wellington (Anonymous, 2011). Following the destruction in Christchurch, the NZ Government set out to enhance nationwide legislation for building standards in an effort to reduce similar destruction in the future. This legislation classifies earthquake-prone buildings as those that are less than one third of the seismic strength of new buildings (N. Smith, 2015).

Given that these earthquake-prone buildings “have about 10 to 20 times the risk of serious damage or collapse when compared to a new building” (mbie.govt.nz, as cited in Wellington City Council, n.d.), strengthening them is an important step for reducing loss in future seismic events. The legislation was still being debated in 2016, so this research was designed to have direct relevance for creating communications aimed at increasing support for structural work that would reduce loss but could incur a significant cost on taxpayers (Forbes, 2016).

Excluding priority buildings (e.g., schools and hospitals), a total of 5,300 public buildings in Wellington are subject to the strengthening requirements in the legislation (H. Moselen, personal communication, September 18, 2015). Of the 5,300 that had been assessed at the time of this study, 703 were found to be below 34% of the new building standard and therefore deemed earthquake prone (Wellington City Council, 2015).

The Current Study

To date, there is a dearth of research examining the effect of social norms on earthquake perceptions and preparedness. One interview study with NZ participants identified a perceived norm of “unpreparedness,” despite a generally shared belief that preparing is a positive behavior (Becker, Paton, Johnston, & Ronan, 2014). McIvor and Paton (2007) found a positive relationship between subjective norms (similar to injunctive norms) and earthquake preparation, although this relationship operated by increasing perceptions of the efficacy of preparation behaviors, which in turn led to greater intentions to prepare. McIvor and Paton argued that more active communication strategies ought to be explored, including social influences. Their findings suggest that norms can influence earthquake preparation, but to our knowledge, no study has experimentally assessed the effects of different social norms on earthquake judgments or preparation. Given the relative cost-effectiveness of using norm messages to encourage desirable behavior such as support of earthquake-strengthening legislation, this strategy could add a new tool to risk communication about natural hazards.

The present study addresses this issue by applying the key concepts of descriptive and injunctive norms from the focus theory of normative conduct (Cialdini et al., 1991). We presented to participants a passage conveying details of the proposed earthquake legislation, as well as one of four norm messages: a descriptive norm, an injunctive norm, a combination of the two, and a control that matched the other conditions for length but had no norm information. Participants made a range of judgments about the legislation, including the extent to which they support it, how feasible they perceive the work to be, and whether they think the risk of earthquakes justifies the cost of strengthening compared with other risks.

While we do not have baseline behavioral information for our sample, and so the boomerang effect described above could not be identified, descriptive and injunctive norms are often used together because they target different types of motivation: motivation to comply with a useful behavior in the former case and motivation to comply with an approved behavior in the latter (Hamann et al., 2015). So, although it is useful to see which type of norm is more effective, it is also logical to use both norms in conjunction to test whether their combined effect exceeds their individual effects. We hypothesized that providing participants with descriptive or injunctive norms would increase their support for the earthquake-strengthening legislation and lower their risk tolerance compared with the control condition providing no norm information. Based on Kallgren et al.'s (2000) claim that injunctive norms are effective across more behaviors and contexts than descriptive norms, we expected support for the legislation to be higher in the injunctive (than descriptive) norm condition. We also predicted that the combined condition, containing the two aligned norms, would lead to the highest legislation support compared with the other conditions due to a summative effect of the different motivational mechanisms (Hamann et al., 2015).

Method

Design

This study used a between-groups experimental design that presented each participant with one of four experimental conditions (descriptive norm, injunctive norm, both norms, and control with no norm information).

Participants

Participants were recruited through posts on public Facebook groups directed to Wellington and Palmerston North audiences, using a self-selected sampling

method. Furthermore, the lead researcher shared the link on her personal Facebook account. Consent was obtained by the participant deciding to continue with the survey after having been provided with a full information sheet and the lead researcher's contact details for any questions. This research collected data from residents of Palmerston North, a city in NZ with a similar objective earthquake risk to Wellington but lower perceived risk (McClure, Johnston, Henrich, Milfont, & Becker, 2015), to test whether those differential risk perceptions influenced norm effects. An initial analysis found that participant location and norm condition did not interact, so subsequent analyses combined Wellington and Palmerston North data to increase sample size and therefore power. All descriptive and inferential statistics reported here refer to this combined sample.

In all, 1,180 participants commenced the survey. Of those, 16 were excluded for being below the required age of 18, 285 were excluded for failing one or both of the manipulation check questions, and 152 were excluded for not completing a majority of the questions. A further 37 participants from neither the Wellington nor Palmerston North regions were excluded. This resulted in usable data from 690 participants, consisting of 553 females, 113 males, and 24 participants who either did not report their gender or reported a nonbinary identity. The age of participants ranged from 18 to 62 years old, with a mean of 26.71 years ($SD = 9.40$). Length of time lived in their current city ranged from a week to 63 years, with a mean of 12.37 years ($SD = 11.65$).

Materials

The study adapted the questionnaire on judgments about earthquake legislation used in Vinnell, McClure, and Milfont (2017) by adding normative information to a scenario about earthquake-prone buildings. Four versions of the scenario presented the same background details of the earthquake legislation (e.g., number and types of buildings affected, and the time frame for strengthening) and stated that 703 buildings were deemed earthquake-prone. For the manipulation, we then presented information about the legislation in four different ways, varying the type and presence of normative information:

Descriptive norm: "Currently, Wellingtonians are strengthening an average of 72 earthquake-prone buildings a year to at least this standard, which means that at least 80% of these buildings will be strengthened within the 15-year time frame if this rate continues";

Injunctive norm: "In a recent survey, 76% of Wellingtonians said they support this legislation requiring the strengthening of earthquake-prone buildings";

Combined norm: The descriptive norm message followed by the injunctive norm message;

Control: “The chance of these buildings collapsing or sustaining serious damage in an earthquake is about 10 to 20 times that of a new building at the same location.”

All participants, regardless of location, read one of these four passages referring to Wellington buildings and using Wellington norms. For the descriptive norm, the strengthening rate was calculated by comparing two versions of the list of earthquake-prone buildings (Wellington City Council, 2015) and averaging the number of buildings that were removed from the list over a 4-month period in 2015. The percentage of buildings that would be strengthened in the time frame of the legislation was derived from this strengthening rate. The injunctive norm represented the number of responses of five or higher on a 7-point scale to the question on support for the legislation in Vinnell et al. (2017). A Wellington City Council (n.d.) pamphlet on earthquake-prone buildings provided the information for the control condition. The norm message was printed in bold to increase its salience.

Participants were randomly allocated to one of these four experimental scenarios (descriptive, injunctive, combined, or control). To encourage participants to read the scenario thoroughly, the online survey prevented them from moving on to the next page until a minute had elapsed. Manipulation check questions with two response options then tested if the participant had read and remembered the key information. Two of the following five questions were presented, depending on the condition:

“How many buildings a year on average are being strengthened in Wellington?” (0-100 or 100+);

“At this rate, how many buildings will be strengthened within the time frame?” (0%-50% or 50%+);

“How many buildings in Wellington are currently classified as earthquake prone?” (0-1000 or 1000+);

“How many Wellingtonians in the previous survey supported the legislation?” (0%-50% or 50%+);

“How many times more likely is an earthquake-prone building to collapse?” (10-20 times or 20+ times).

These were followed by a question asking where the participant lived and 12 questions regarding earthquakes, which used 7-point scales with differing anchor labels.

Knowledge. Question 1 asked, “Before reading the above information, how much did you already know about this legislation?” with responses anchored by 1 (*nothing*) and 7 (*a lot*), and 4 (*some*) as the midpoint.

Support. Question 2 asked, “Overall, how much do you support this legislation?” with responses anchored by 1 (*not at all*) and 7 (*completely*), and 4 (*partly*) as the midpoint.

Feasibility. Question 3 asked, “How possible do you think it is to strengthen all 703 of these earthquake-prone buildings in Wellington?” with responses anchored by 1 (*impossible*) and 7 (*very possible*), and 4 (*unsure*) as the midpoint.

Comparative Risk 1. Question 4 asked, “Do you think 34% of the current building code is an appropriate standard compared to legislation on other risks (e.g., Vehicle Warrant of Fitness)?” with responses anchored by 1 (*not firm enough*) and 7 (*too firm*), and 4 (*about right*) as the midpoint.

Comparative Risk 2. Question 5 asked, “Do you think the expense of this strengthening work is justified, given the risk of earthquakes compared to other risks (e.g., traffic accidents)?” with responses anchored by 1 (*fully justified*) and 7 (*excessive*), and 4 (*about right*) as the midpoint.

Concern. Question 6 asked, “How concerned are you about the danger of earthquakes where you live?” For participants who previously reported that they lived in either Wellington or Palmerston North, the question specified their respective city. Question 7 asked, “How concerned are you about the issue of earthquake-prone buildings in Wellington?” Both concern questions used a 7-point scale with responses anchored by 1 (*not at all*) and 7 (*extremely*), and 4 (*moderately*) as the midpoint.

Efficacy. Question 8 asked, “How effective do you think strengthening buildings will be in reducing damage and injury in a large earthquake?” This question used the same response scale as the concern questions.

Experience and preparation. Question 9 asked, “How much experience do you have of earthquakes?” Question 10 asked, “How much preparation have you made for the event of a large earthquake (e.g., secured fixtures such as TVs and bookshelves)?” Both questions used a 7-point scale with responses anchored by 1 (*none*) and 7 (*a lot*), and 4 (*some*) as the midpoint.

Interpersonal descriptive and injunctive norms. Questions 11 and 12 assessed interpersonal norms, which refer to how individuals perceive the relevant behavior of those in their close social network (i.e., interpersonal relationships) rather than presenting information. The first of these two questions measured descriptive norms and read, “How much preparation have your family/friends made for a large earthquake?” Participants responded to the same scale as for Questions 9 and 10. The second of these two questions assessed injunctive norms and read, “How often do your family/friends tell you that you should prepare for a large earthquake?” This question used a 7-point scale with responses anchored by 1 (*never*) and 7 (*a lot*), and 4 (*sometimes*) as the midpoint.

Community identity. Two further questions did not relate directly to earthquakes but assessed participants’ connection to Wellington. Question 13 asked, “Do you have many family members and/or close friends currently living in Wellington?” and used the same anchor labels as Questions 9 and 10. The final question was the Inclusion of Community in Self (ICS) Scale (Mashek, Cannaday, & Tangney, 2007), which requires the selection from seven pairs of circles with varying overlap, representing the overlap of a person’s self and community identities. It asked, “Circle the pair which best describes your connection with the community where you live (S = Self, C = community).” As with the question regarding concern about earthquakes, “where you live” was replaced with “in Wellington” or “in Palmerston North” as appropriate.

Further questions assessed demographic information, including age, gender, how long they had lived in their current city, and for those who did not live in Wellington if they ever had and for how long.

Table 1 shows the correlations between the six dependent variables. The questions about the comparative risk of different hazards are conceptually related and were correlated ($r = .31, p < .01$), so we averaged these items to create a comparative risk variable. Furthermore, the two questions about concern appeared to be measuring similar judgments, as the items showed a strong correlation ($r = .58, p < .01$), so we averaged these to create a general concern variable.

The limited length of the survey meant that other established scales could not be included to test construct validity. However, the questions had been pilot tested and used in three previous studies that employed an intercept survey method, with the researcher having the opportunity to discuss interpretation with the participants. During follow-up discussions, few participants (less than 1%) expressed any concerns with comprehending the questions. Most of these concerns were related to the potential ambiguity of

Table 1. Correlations Between Dependent Variables.

	Support	Feasibility	CR 1	CR 2	Concern EQ	Concern EQP
Support	—	.28	-.19	-.21	.16	.27
Feasibility		—	-.10	-.14	.15	.20
CR 1			—	.31	-.12	-.18
CR 2				—	-.12	-.26
Concern EQ					—	.58
Concern EQP						—

Note. Support refers to the single item assessing support for the legislation. Feasibility refers to the single item assessing judgments of the feasibility of the strengthening work. CR 1 refers to the Comparative Risk 1 variable assessing appropriateness of the building standard. CR 2 refers to the Comparative Risk 2 variable assessing justification of the cost. Concern EQ refers to general concern about earthquakes in the participant's city. Concern EQP refers to the participant's concern about earthquake-prone buildings in Wellington. All variables answered on 7-point scales.

All correlations are statistically significant at the $p < .01$ level.

the question about earthquake experience. All discussions suggested that participants had understood the questions correctly. Therefore, while this survey relies on single-item measures, they had been thoroughly field tested and appear to measure the intended judgments.

Procedure

The survey could be completed on any Internet-enabled device. We presented general information about the purpose of the research and the task at the start of the survey, and presented a debriefing explaining the goals of the research at the end of the survey. Upon completion, participants could follow a link to a separate survey and enter a draw for an NZ\$80 grocery voucher by providing a name and email address. This identifying information could not be matched to their questionnaires. This study was granted ethical approval by Victoria University of Wellington's School of Psychology Human Ethics Committee (March 23, 2016; Reference No. 0000020938).

Analyses

The data met the assumptions of MANOVA, so norm effects were tested using a one-way multivariate ANOVA, given the significant correlations between the dependent variables. A MANOVA allowed the testing of treatment effects while taking into account the intercorrelated nature of the

Table 2. Mean Scores for Key Dependent Variables for Each Condition With Standard Deviations Below in Parentheses.

Variable	Experimental condition			
	Descriptive	Injunctive	Combined	Control
Legislation support	5.72 (1.37)	5.92 (1.19)	5.95 (1.24)	5.55 (1.20)
Feasibility	4.92 (1.32)	4.66 (1.34)	5.06 (1.30)	4.54 (1.45)
Comparative risk	2.77 (1.13)	2.95 (1.15)	2.96 (1.21)	2.91 (1.16)
Concern	4.58 (1.22)	4.49 (1.26)	4.51 (1.30)	4.60 (1.25)

Note. Comparative risk refers to the average of the CR 1 and CR 2 variables. Concern refers to the average of general and earthquake-specific concern variables. All variables answered on 7-point scales. CR = comparative risk.

dependent variables. A priori planned comparisons were not made. Instead, post hoc Tukey tests with a Bonferroni correction compared the means between groups to limit the family-wise error rate.

Results

Participants numbered 172 in the descriptive norm condition, 170 in the injunctive norm condition, 185 in the combined norms condition, and 163 in the control condition. There were no differences between participants in the experimental conditions on any of the demographic variables.

Participants reported a relatively low level of knowledge about the legislation, $M = 2.31$, $SD = 1.53$; significantly below the midpoint: $t(688) = 28.91$, $p < .01$, $d = 2.20$. Reports of preparation covered the full range, with the mean ($M = 3.10$, $SD = 1.65$) significantly below the midpoint, $t(679) = 14.22$, $p < .01$, $d = 1.09$, whereas reported earthquake experience ($M = 4.49$, $SD = 1.50$) was slightly above the midpoint, $t(683) = 8.55$, $p < .01$, $d = .65$. Table 2 presents the means for each of the four target variables assessing risk tolerance and judgments.

Tests of Hypotheses

To test the predictions about norm effects, a one-way MANOVA compared mean scores of the key dependent variables in Table 2 between the four

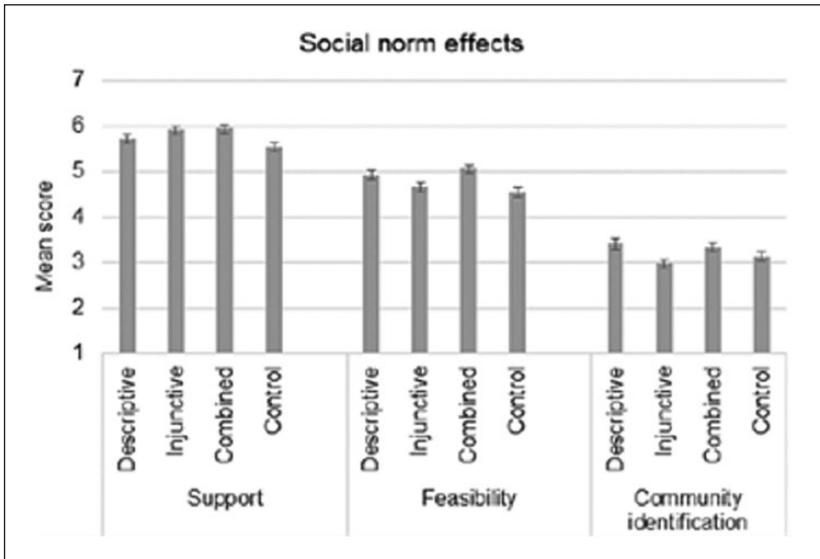


Figure 1. Effect of social norms on three dependent variables: support for the legislation, feasibility judgments, and community identification.

experimental conditions. The overall MANOVA was significant, $F(12, 1788.82) = 2.71, p = .001$, Wilks's $\Lambda = .95$, $\eta_p^2 = .016$. This demonstrates that overall the norm manipulation did have an effect on the dependent variables while taking into account the intercorrelations between those dependent variables. Significant treatment effects on a number of dependent variables are reported below.

Support for the legislation. There was a significant effect of norms on support for the legislation across the conditions, $F(3, 679) = 3.85, p = .01$, $\eta_p^2 = .017$ (see Figure 1). Although this is a small overall effect (suggesting that the norm manipulation contributed $\sim 2\%$ of the variance in support), there were significant differences between individual conditions. Post hoc tests of Tukey's Honestly Significant Difference (HSD) showed that, as predicted, the combined norms led to significantly higher support ($M = 5.95, SD = 1.24$) than did the control information ($M = 5.55, SD = 1.22, p = .01$), although they did not lead to higher support than either of the individual norm conditions (descriptive: $M = 5.72, SD = 1.37, p = .28$; injunctive: $M = 5.92, SD = 1.19, p = .99$). Furthermore, the injunctive norm also produced higher support than the control condition ($p = .04$), whereas the descriptive norm did not ($p = .61$). That the

combined and injunctive norm conditions led to greater support than the control condition suggests that an injunctive norm expressing approval of the legislation is more effective at increasing support than the message about the rate of strengthening work (descriptive norm). Contrary to predictions, however, the combined condition did not lead to significantly higher support for the legislation than the individual norm conditions, indicating there was no summative effect of the two types of norm.

Feasibility of earthquake strengthening. Norms also affected judgments of the feasibility of earthquake strengthening, $F(3, 679) = 5.11, p = .002, \eta_p^2 = .022$ (see Figure 1). Again, this is a small overall effect, but there were differences between individual conditions. As predicted, participants judged feasibility higher when presented with the combined norms ($M = 5.06, SD = 1.30$) than the control condition ($M = 4.54, SD = 1.45, p = .003$), and marginally higher when presented with the descriptive norm alone ($M = 4.92, SD = 1.32$) than the control condition ($p = .055$). They also judged feasibility higher with the combined norm than the injunctive norm ($M = 4.66, SD = 1.34, p = .034$) but no higher than the descriptive norm ($p = .80$), suggesting that the descriptive norm is the more effective of the two norm types for enhancing judgments of the feasibility of earthquake strengthening. As with the finding for support for the legislation, the combined condition did not demonstrate a summative effect of significantly higher judgments of feasibility than the descriptive norm alone.

There were no norm effects for either comparative risk, $F(3, 679) = 1.35, p = .40, \eta_p^2 < .004$, or earthquake concern, $F(3, 679) = .26, p = .85, \eta_p^2 = .001$. Further exploratory analyses used one-way univariate ANOVAs to test norm effects on participant variables that might logically be affected by this information.

Community identification. Norms affected reports of community identification, $F(3, 675) = 6.40, p = .02, \eta_p^2 = .015$ (see Figure 1). Although identification did not differ between the injunctive ($M = 2.98, SD = 1.18$) and control conditions ($M = 3.14, SD = 1.32, p = .88$), it was significantly lower among participants presented with the injunctive norm than the descriptive norm ($M = 3.41, SD = 1.59, p = .03$) and marginally lower than the combination of both norms ($M = 3.33, SD = 1.38, p = .06$). Interestingly, the injunctive norm message led to lower community identification than the conditions with descriptive norms, suggesting that normative information conveying social approval of the legislation backfires regarding identification with one's community. Neither interpersonal descriptive norms, $F(3, 677) = 1.65, p = .17, \eta_p^2 = .007$, nor interpersonal injunctive norms, $F(3, 678) = 1.15, p = .33, \eta_p^2 = .005$, were affected by the social norm manipulation.

Discussion

This study extended the use of social norms within the focus theory of normative conduct (Cialdini, 2012) by applying them experimentally to a natural hazard and to cognitive-behavioral outcomes. The findings demonstrate clear and discrete effects of both descriptive and injunctive forms of normative information about a range of earthquake-related judgments: support for the earthquake-strengthening legislation, feasibility of strengthening in the time frame, and community identification. Although the observed effects are small in statistical terms, they are practically significant. The combination of descriptive and injunctive norms led to higher support for the legislation and judgments of the feasibility of the strengthening work than did the control message, although the injunctive norm also lowered community identification compared with the descriptive norm.

The effects of the descriptive versus injunctive norms differed across the various measures, with the injunctive norm increasing support for the legislation whereas the descriptive norm increased judgments of the feasibility of the strengthening work and community identification. The combined results thus support the differentiation of the two forms of normative information made in the focus theory of normative conduct. Contrary to predictions, there was no summative effect, as the combined norms condition did not produce significantly higher judgments than the conditions with only descriptive or injunctive normative information. However, given that the combined norms condition equaled the most effective norm type for each judgment and considering the differing effects of the two types of norm observed, the results suggest that using both social norms is still the most effective strategy for enhancing earthquake-related judgments. Risk communicators can influence a larger range of earthquake-related judgments by presenting aligned descriptive and injunctive normative information in the same message.

That the norm messages failed to affect comparative risk judgments or earthquake concern is worth noting. It is possible that previously known information or previously held opinions exerted more influence on these judgments than did social norms (Goldstein et al., 2007). Participants would possibly have had less previous information to use when deciding whether to support the legislation (with which most people were relatively unfamiliar) than when comparing the well-known risk of earthquakes with that of other well-known risks such as traffic accidents. Similarly, given Wellington's known earthquake risk (Khan et al., 2012), it is likely that participants had already formed an opinion about how much that risk concerned them.

Although the social norms did not affect all judgments, the significant effects that did occur demonstrate that the types of outcomes examined in

future norms research can be expanded. The focus theory of normative conduct proposes that salient norms presented close to the time of a behavior affect that behavior (Cialdini et al., 1991), and the theory has been applied to behaviors that are tangible and specific (Cialdini, 2012). Extending the application of this theory, the present findings also show that social norms can affect complex judgments (whether to support significant legislation) and judgments of the behavior referred to in the norm (the feasibility of achieving the presented behavior). We expand on these implications in the following section.

It is important to note, however, that the differences between the norm conditions and the risk information (control) condition support the point that risk information alone does not necessarily affect behavior. To illustrate, the TPB (Ajzen, 1991) outlines attitudes, subjective norms, and perceived behavioral control as the key predictors of behavioral intention, which goes beyond simple information about why and how to perform a given behavior. Although the effects of norms on judgments observed here suggest the importance of the normative component in the TPB, there are other predictors of behavior not examined in the present study. At the same time, the different effects of the two types of norms support the suggestion of many researchers (see Armitage & Conner, 2001, for a meta-analytic review) that this normative component in the TPB should be expanded beyond its original focus on subjective norms to incorporate the now well-established differentiation between descriptive and injunctive forms of normative information (see also Manning, 2009).

Implications and Applications

By extending the focus theory of normative conduct into natural hazards and cognitive-behavioral outcomes, our findings have theoretical implications and practical applications. The robustness of social norm effects is demonstrated by the diverse domains in which they have been successfully applied, and which now includes earthquake-strengthening legislation. This suggests that these effects might also be extended to other issues in other areas. These findings also demonstrate that social norms can be applied to cognitive-behavioral outcomes. Supporting legislation that has a wide range of potential costs, such as the use of taxes to fund remedial work, is likely more complex than tangible behavior such as choosing to not litter or to reuse a hotel towel (Cialdini et al., 1990; Goldstein et al., 2007). In this research, an injunctive social norm increased the support for the legislation, despite its complexity.

Furthermore, descriptive norms increased judgments of the feasibility of the strengthening work, demonstrating that social norms have effects beyond

influencing the actual behavior they convey. This finding extends the potential applications of social norms from the more usual aim of influencing recipients' tangible and individual-level actions such as environmentally wasteful or damaging activities (Cialdini, 2012) to recipients' *support* for a higher, societal-level action.

Another strength of this study is the use of a specific and real-world context, which suggests that the findings are likely to have direct applications both to the legislation in NZ and to similar governmental initiatives worldwide. Many building owners may struggle to pay for the work required by the earthquake legislation (Winter, 2016), so it is useful to know how to garner the support of the public. This is especially important if some of the cost of strengthening is laid on ratepayers (Forbes, 2016). This strategy would likely require public support, for which this research has direct benefits. The relatively small effects found here could still have a significant impact on public perception, particularly if a citizen vote were to be held to determine whether a piece of legislation be adopted or not.

Our findings and extension of the focus theory of normative conduct to cognitive-behavioral outcomes will need to be replicated. However, the findings indicate that it is possible to change beliefs and support for ideas (not only behavior) by developing messages that communicate descriptive and injunctive norms. Researchers and communicators could apply this to other real-world problems and other kinds of less tangible, cognitive-behavioral outcomes. For example, making descriptive and injunctive norms salient may increase individuals' support for legislation regarding climate change adaptation (cf. Evans, Milfont, & Lawrence, 2014).

This extension may lead some to conclude that it is appropriate to present the public with false normative information to influence behaviors and other outcomes. We emphasize this is unethical. Only true normative information was used in the present study and in past research (e.g., Cialdini, 2012; Schultz et al., 2007). Normative information might still influence behavior and cognitive-behavioral outcomes when factual descriptive normative information is not supportive of the target behavior (i.e., when only a minority perform the target behavior). In these situations, P. W. Schultz (personal communication, November 16, 2017) recommends using either a dynamic norm (e.g., a small but growing number of people are doing it) or a factual injunctive norm (e.g., most people in our community approve of doing it).

Limitations and Future Directions

This study has some methodological limitations. As discussed in the "Method" section, it is not possible to establish construct validity of the measures.

However, the thorough testing of the measures in face-to-face situations suggests that they were understood as intended. Furthermore, as the items assess judgments about very specific aspects of the earthquake-strengthening legislation, multi-item measures are not feasible. Ideally, future studies exploring these types of judgments will employ longer measures to remove this uncertainty. Other issues such as potential mono-method and mono-operation biases could also be addressed. Further research could include a formal qualitative element and then code responses as an additional measure to the scale items, and use different manipulations such as a pictorial representation of norms or vary the strength of normative information. The use of three norm conditions and the findings that the combined norm condition matched the most effective individual norm condition limits the likelihood of issues related to mono-operation bias such as random sampling error.

Although the experimental method is a strength of this study, as it allowed for control of the norm effects, the sampling method is a possible limitation. Posting the survey online allowed for a large sample size, but it also meant that participants were self-selected, which might affect the generalizability of the results. Participants were relatively young and comprised more females than males. Both age (e.g., Wang, Wu, & Wang, 2009) and gender (e.g., Tarhini, Hone, & Liu, 2014) have been shown to moderate the effect of norms on behavioral intentions, although not in the area of hazards and not consistently. This demographic distribution may limit the generalizability of the study.

Park, Klein, Smith, and Martell (2009) argued that a range of factors influence norm effects, including several that are not examined here. For example, the specificity of the norm referent can influence the effects of norms, although results are inconsistent as to whether specific (Goldstein et al., 2007) or general references (Hamann et al., 2015) are more effective. Other factors that can influence the effects of norms include ethnicity (Walker, Courneya, & Deng, 2006), personal beliefs about the behavior (Crawford & Novak, 2010), and mortality salience (Jonas & Fritsche, 2012). Furthermore, several dispositional traits such as action coping (i.e., problem solving; McIvor & Paton, 2007) and impulsivity (Jacobson, Mortensen, Jacobson, & Cialdini, 2015) can influence the effect of norms. Moreover, personal norms, another type examined by the focus theory of normative conduct (Kallgren et al., 2000), could be examined together with social norms in relation to disaster preparation.

Another potential follow-up to this research would be to further explore the role of issue involvement (Goldstein et al., 2007) by repeating the study with legislation of which participants are less likely to be aware, such as carbon tax. Climate change presents a serious, large-scale issue that has often

been examined in studies of norms, but the associated risks may seem more distant to people in earthquake-prone regions than the risk of earthquakes. Regardless of paradigms used to extend this research, the findings here suggest the potential of norms in areas as yet untested.

Conclusion

Earthquakes pose a serious risk to many cities and countries. Understanding how best to communicate the value of legislation aimed at increasing survival in seismic events is therefore an important endeavor. The social norm effects demonstrated in this study show that the way in which normative information is presented affects judgments about earthquake legislation. The findings of this research support the use of social norms to increase public support of governmental legislation, both within the earthquake domain and potentially in other spheres. The next step is to test those possibilities, so as to continue expanding both knowledge of how norms work and the contexts in which they can be beneficially applied.

Authors' Note

This study was part of a master's thesis written by Lauren J. Vinnell under the supervision of John McClure and Taciano L. Milfont (Vinnell, 2016).

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