

**Responding to Natural Disasters:  
Examining Identity and Prosociality in the Context of a Major Earthquake**

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## Abstract

How does a major natural disaster relate to individuals' orientation toward society? We collected repeated cross-sectional surveys before ( $n = 644$ ) and after the 2010 Chile earthquake ( $n = 1,389$ ) to examine levels of national identity, prosocial values, helping motivations, and prosocial behaviors in the context of such a calamitous societal event. Our research questions, derived from the literature on helping in times of crisis, considered how natural disasters may implicate identity and prosociality, as well as how identity, prosocial values, and motivations are linked to prosocial action after a disaster. Higher levels of national identity, helping motivations, and disaster-related helping were found after the earthquake, suggesting that in the aftermath of a disaster, people unite under a common national identity and are motivated to take action related to disaster relief. National identity and prosocial values were closely linked to helping after the earthquake, but specific helping motivations rarely predicted prosocial behaviors. Additionally, proximity to the epicenter was related to higher levels of national identity and participation in reconstruction efforts. These findings contribute to our understanding of people's responses to natural disasters and suggest ways of encouraging prosocial behavior in the aftermath of unexpected tragic events.

## **Responding to Natural Disasters:**

### **Examining Identity and Prosociality in the Context of a Major Earthquake**

The 8.8 magnitude earthquake and accompanying tsunami that hit Pelluhue, Chile, on Saturday, February 27, 2010 caught people unaware after a long summer vacation. The earthquake plunged Chile into national tragedy, and the president of Chile, Michelle Bachelet, declared a “state of catastrophe”; the disaster claimed more than 525 lives (Subsecretaría del Interior de Chile, 2011). Undoubtedly, this tragedy affected countless Chileans. A particularly moving photograph of the aftermath shows, in the rubble and wreckage of what used to be his hometown, a ragged man standing in a pile of rubbish, proudly raising a Chilean flag. His gesture represents one important, yet understudied, potential outcome of a disaster: changes to how people identify with their society.

Few events represent such an acute societal change as a major disaster. The experience of a natural disaster such as an earthquake can be both traumatic to the individual and disruptive to social structures. General day-to-day activities, as well as government and community operations and procedures, are usually compromised (Oliver-Smith, 1996). Research on the impact of disasters on people’s perceptions and behaviors finds it to be profound. For example, images of destruction such as ruined buildings increase people’s perceptions of threat, leading them to more strongly support their social ingroups (Vail III, Arndt, Motyl, & Pyszczynski, 2012). People are also often inspired to take action to help people in need. Research on the consequences of the 9/11 terrorist attacks in the United States, for example, found wide-ranging societal increases in prosocial behavior and community involvement in their aftermath (e.g., Penner, Brannick, Webb, & Connell, 2005; Schuster et al., 2001; Steffen & Fothergill, 2009).

Psychological research on disasters has largely focused on the consequences of human-caused disasters. However, increased attention to how people respond to *natural* disasters can help us understand national identity and helping motivations in the aftermath of these disasters, as well as how people choose to help others affected by the disaster. Using data collected before and after a major earthquake, and guided by social identity models of how people respond to disasters, we aim to advance the literature by examining national identity, prosocial values, helping motivations, and prosocial behaviors in the context of a large-scale natural disaster. In addition, we examine how proximity of individuals to a disaster's epicenter may be related to identity and prosocial responses.

### **Social-Psychological Responses to Natural Disasters**

Several social-psychological theories, such as terror management theory (Greenberg, Solomon, & Pyszczynski, 1997; Rosenblatt, Greenberg, Solomon, Pyszczynski, & Lyon, 1989) and models of motivated social cognition (Jost, Glaser, Kruglanski, & Sulloway, 2003), suggest that threatening events, including disasters, can lead to stronger identification with one's group and stronger endorsement of social values (Andrighetto, Baldissarri, Lattanzio, Loughan, & Volpato, 2014; Kemmelmeier, Broadus, & Padilla, 2008; Lambert, Schott, & Scherer, 2011). However, research exploring the influence of disasters on identity, motivations, and behaviors has primarily focused on human-caused disasters, such as acts of terrorism. There are important differences between human-caused and natural disasters, including people's perceptions of who or what is responsible for the disaster. For example, people perceived to be less responsible for a disaster are more likely to be deemed worthy of help (Marjanovic, Greenglass, Struthers, & Faye, 2009). Research has also found that people are more willing to donate to relief of natural

disasters compared to human-caused disasters (Zagefka, Noor, Brown, De Moura, & Hopthrow, 2011).

In addition to being relatively rare compared to research on human-caused disasters, research on the effect of a natural disaster on individuals has tended to be conducted either in the laboratory, through the use of hypothetical scenarios, or by examining trends in identity or behavior only after a disaster has occurred (e.g., Levine & Thompson, 2004; Steffen & Fothergill, 2009). Because of their unforeseen nature, studies that assess psychological change from before to after a natural disaster are scarce. However, some researchers have managed to do so when a disaster happened to occur during a longitudinal study that was already underway (e.g., Sibley & Bulbulia, 2012). Some of the psychological research on disasters is also clinical in nature, and explores the ways in which disasters affect mental health and contribute to the development of resiliency (e.g., Bonanno, Brewin, Kaniasty, & La Greca, 2010; Steffen & Fothergill, 2009). However, on occasion the literature on coping after a disaster has focused on helping behavior as a strategy to ameliorate both individual and collective psychological distress after a threat.

In the current study we wanted to use data collected both before and after an earthquake to examine whether people more strongly identified with their country after the event. The extended social identity model of how people respond to disasters suggests that people form a shared social identity with others also affected by the disaster, and this shared identity can motivate people to want to help others, and may increase engagement in prosocial actions (Drury, Brown, González, & Miranda, 2016).

### **Helping After Natural Disasters**

Helping can be an effective vehicle for reducing feelings of threat (e.g., Brown & Smart, 1991). Threats to self and society have been shown to lead to increases in such prosocial acts as helping among children (Jonas et al., 2008), donating to ingroup charities (Jonas, Schimel, Greenberg, & Pyszczynski, 2002), and offering food to a homeless person (Gailliot, Stillman, Schmeichel, Maner, & Plant, 2008). Moreover, following the 9/11 terrorist attacks in the United States, helping others resulted in reduced disaster-oriented distress (Wayment, 2004).

Social-psychological research on the impact of disasters has considered how people and communities can change in the aftermath of disasters with regard to the provision of help (Staub & Vollhardt, 2008; Vollhardt, 2009; Yum & Schenck-Hamlin, 2005) and social support (Drury et al., 2016; Kaniasty & Norris, 1995a). Because a natural disaster has the potential to elicit a shared identity, it may foster a willingness to help fellow ingroup members who are affected by the disaster (Drury et al., 2016). Indeed, Drury and colleagues analyzed the role of emergent social identity (i.e., identifying with other survivors) in how much social support people provided to survivors in the aftermath of the 2010 Chile earthquake. Sharing a common experience of surviving the earthquake appears to have triggered a process that ultimately fostered collective efficacy and provisions of social support to survivors. Moreover, level of identification with others affected by the disaster moderated the effects of observed social support on provided support. Similar research on the effect of flooding on social identity and provisions of social support find comparable effects of how disasters influence individuals and communities (Ntonis, Drury, Amlôt, Rubin, & Williams, 2018). In the current study, we set out to examine whether the threat from the earthquake in Chile may have been related to people's national identity, prosocial values, helping motivations, and general donation behaviors and participation in reconstruction after the earthquake.

What would motivate people to help after a disaster? Recent evidence suggesting that people with a higher sense of shared identity are more likely to behave prosocially (e.g., Drury et al., 2016; Karkatsoulis, Michalopoulos, & Moustakatou, 2005) also indicates that this might be mediated by specific helping motivations, particularly social motivations such as believing that close others are also helping (Lai, Ren, Wu, & Hung, 2013). Past research has also suggested that social emotions such as empathy and sympathy may be linked to helping after disasters (Marjanovic, Struthers, & Greenglass, 2012; Russel & Mentzel, 1990). We aim to extend the literature by considering people's specific helping motivations in the wake of a natural disaster. Research based on the functional approach to helping behavior suggests that different people can engage in the same behavior for different reasons and to serve different functions (Katz, 1960; Smith, Bruner, & White, 1956; Snyder & Cantor, 1998). For example, people may help after a disaster because of their general prosocial or altruistic values (e.g., Russel & Mentzel, 1990), which motivates them to help others regardless of potential benefits to themselves.

However, a person might engage in the same helping behavior out of a number of other motivations (i.e., such as those identified for volunteerism, Clary et al., 1998; Omoto and Snyder, 1995; Wymer, 1997). These could include wanting to explore a potential career ("career" motivation), wanting to make a difference in people's lives because of religious values ("religious" motivation), wanting to feel better about oneself ("self-enhancement" motivation), wanting to reduce feelings of guilt through volunteering ("self-protective" motivation), and wanting to volunteer because those around you are volunteering ("social" motivation). Given that a natural disaster may activate a number of helping motivations, we examined whether each of these potential motivations for helping (i.e., prosocial values; career, religious, self-

enhancement, self-protective, and social helping motivations) were stronger after the earthquake, as well as the ability of each of them to predict prosocial behavior after the earthquake.

### **The Role of Proximity to a Disaster**

Finally, how a disaster relates to identity and prosociality may be related to the individual's proximity to the disaster. Proximity can be construed in both physical and psychological terms. For example, people who find themselves at closer physical proximity to a disaster epicenter may engage in more helping behaviors than people who are further away (Beyerlein & Sikkink, 2008). In addition, approximations of the effect of psychological proximity on helping have also been examined in the lab. Levine and Thompson (2004) manipulated the salience of British or European group membership among British students, and then presented the students with imaginary disasters in either Europe or South America. When primed with a European identity, as opposed to a British identity, students showed an increased willingness to help in response to European disasters, but not to South American disasters. Similarly, Irish students cited national identity as one base from which decisions about help giving were made, and expressed a preference toward helping fellow Irish citizens before giving help to those abroad (Stevenson & Manning, 2010), and students in New Zealand preferred helping their own ingroup members before giving help to others (Dalton, Madden, Chamberlain, Carr, & Lyons, 2008). Additionally, people who feel stronger place attachment to their home or nation (e.g., Lewicka, 2011) may be more likely to take action in response to a disaster (Scannell & Gifford, 2017; Tagliacozzo, 2015).

In the current work, we were interested in examining the linkages between identity concerns (i.e., which may be implicated by psychological distance), prosocial values, helping motivations, and prosocial behaviors and a person's actual physical proximity to a disaster. Why



might physical proximity be important to consider? Visible destruction can be extremely threatening to people (Ahern, Galea, Resnick, & Vlahov, 2004; Schlenger et al., 2002), and it has been found that people living closer to disasters engage in more activities that foster support and bolster self-esteem. For example, living closer to the World Trade Center was found to increase individuals' likelihood of volunteering following the terrorist attacks of 9/11 in the United States (Beyerlein & Sikkink, 2008; Schuster et al., 2001). In addition, Zagefka (2018) has recently provided experimental and non-experimental evidence confirming that physical proximity plays a significant role in influencing helping behaviors. The reason behind this is that it activates counterfactual thoughts, such that under different circumstances donors could have been victims of the event, could have suffered a loss due to this event, or could have been affected negatively by it.

### **Current Research**

Thus, in the current research we examine the potential importance of physical proximity to the earthquake's epicenter on people's responses to the earthquake. The earthquake struck about two miles off the Chilean coast near Pelluhue and was felt strongly in six Chilean regions: Valparaíso, Santiago Metropolitana, O'Higgins, Maule, Biobío, and Araucanía. We considered proximity between the regions and the earthquake epicenter when examining the impact of the earthquake, expecting that those closer to the epicenter would have stronger identification with Chile, higher levels of prosocial values and motivations, and more frequent prosocial behavior.

By considering the rapid societal change that results from a major earthquake, we will be better able to understand how people's national identities, prosocial values, helping motivations, and prosocial behaviors may be affected. Additionally, we will have a better sense of how identity, values, and motivations are related to helping after a natural disaster. Specifically, we

set out to examine three research questions. First, were national identity, prosocial values, helping motivations, and prosocial behaviors stronger and more frequent after the earthquake, compared to before the earthquake? Second, how did national identity, prosocial values, and helping motivations relate to prosocial behavior after the earthquake? Third, did proximity to the earthquake relate to national identity, prosocial values, helping motivations, and prosocial behaviors after the earthquake?

## Method

### Participants

In 2009, the pre-earthquake sample of 644 participants consisted solely of Santiago citizens from all 34 municipalities of Santiago. The sampling method was random, probabilistic (by block, home, and participant), and stratified (by socioeconomic group, gender, and age). Based on the 2002 census forecast for the year 2009, these 644 participants comprised a representative sample of the 3.9 million citizens of Greater Santiago (Instituto Nacional de Estadísticas & Comisión Económica para América Latina y el Caribe, 2002).<sup>1</sup>

In 2010, to expand on the area sampled in 2009, the post-earthquake sample was extended to include participants from five other cities, for a total of six cities in five regions: Santiago (in Santiago Metropolitana), Viña del Mar (in Valparaíso), Concepción and Talcahuano

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<sup>1</sup> The sample size of this survey fit with an international standard of important representative surveys, such as ISSP (International Social Survey Programme) or WVS (World Value Survey). In general, these kinds of studies consider a multistage random sample selection and sample size estimation maximum variability, 95% of confidence (or above) and a sampling error of 2-4% (ISSP Research Group, 2013).

(in Biobío), Antofagasta (in Antofagasta), and Temuco (in Araucanía). Participants were sampled by applying a Kish random selection table (Kish, 1949). The sampling method was random, probabilistic (by city, block, home, and participant), and stratified by socioeconomic group in each city. Based on the 2002 census forecast for the year 2009, these 1,389 participants constituted a representative sample of the 5.1 million citizens of the six cities sampled (Instituto Nacional de Estadísticas & Comisión Económica para América Latina y el Caribe, 2002). Furthermore, we weighted the samples to better approximate nationally representative demographics. The weights considered four factors to guarantee an accurate representation of the population: gender (male and female), socioeconomic status (low, middle-low, middle-high, and high), age (18-24, 25-34, 35-49, 50-64 years old) and cities (capital and provinces).

Surveys were delivered by and conducted through a professional provider. The provider handled the design of the data collection, handling of the surveys, and consolidating of the data. Trained survey collectors associated with the professional provider collected the data via face-to-face surveys. Participants were randomly selected both before and after the earthquake, and it is technically possible some of the participants were randomly selected both before and after.

### **Measures**

The following measures were administered.<sup>2</sup> The mean, standard deviation, and Cronbach's alpha coefficient for each measure before and after the earthquake are reported in Table 1.

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<sup>2</sup> The present data were part of a larger data collection effort that included other conceptual dimensions not considered in this article; measures reported here were the measures most relevant to the present research questions. Complete survey materials and measures, as well as the data from the analyses included in this paper, can be accessed at <https://osf.io/hekvm/>.

**National identity.** Four items were used to assess participants' sense of national Chilean identity (translated and adapted to Spanish; Ellemers, Kortekaas, & Ouwerkerk, 1999; Leach et al., 2008). Participants indicated their agreement with each item, such as, "being Chilean is an important part of my personality" on a 5-point Likert scale (1 = "I totally disagree," 5 = "I totally agree"). For each participant, responses to the four items were averaged to form a national Chilean identity score.

**Prosocial values.** Four items assessing prosocial values were constructed for the purpose of this study. Participants had to rate how important four values were for them, such as "sharing what you have with others" and "helping others" using a 5-point scale (1 = "Not important," 5 = "Extremely important"). Responses to these four items were averaged to form a composite score for prosocial values.

**Motivations to help.** Ten questions were used to assess participants' motivations to conduct volunteer work. This measure consisted of five subscales, each assessing a distinct motivation for helping: career (e.g., "volunteering has allowed me to learn things through direct and concrete experience"), religious (although not part of the original Clary et al. 1998 Volunteer Functions Inventory, the inventory is sometimes adapted by adding items about religious and spiritual values; e.g., "being a volunteer is a part of my religious and spiritual values"), self-enhancement (e.g., "being a volunteer makes me feel good about myself"), self-protective (e.g., "by helping others, I help myself"), and social (e.g., "many of the people I know share the interest for volunteer work"). Participants indicated their agreement with the statements on a 5-point Likert scale (used before the earthquake: 1 = "not important at all," 5 = "extremely important"; after the earthquake: 1 = "I totally disagree," 5 = "I totally agree").

Each subscale had two items. The mean of each pair of items was used to assess the level of a specific helping motivation. For example, a participant's responses to the two statements, "volunteer work makes me feel important" and "volunteer work makes me feel good about myself," were averaged to form a single self-enhancement score. The sample size before the earthquake was 548 participants; after the earthquake the number was 104 participants. This difference is due to the fact that before the earthquake, the motivation to help measure was completed by all participants who indicated having helped at least one person who was not a family member or relative. After the earthquake, by design the focus of attention was narrowed specifically to volunteers (i.e., people who do not receive money in exchange of their continuous work) in charitable or non-government organizations that help others and used the same items to assess motivation to help just among those participants. This resulted in the different sample sizes before and after the earthquake.

**Prosocial behavior.** Participants were asked a number of questions about their frequency of help giving. These questions were developed by González, Cortés, Lay, Valencia, and Castillo (2010). Before the earthquake, the four questions were directed toward general prosocial behaviors, such as "give money to people in the streets." Participants indicated the frequency of helping using a 5-point scale (1 = "Never or almost never", 5 = "Almost always or always"). After the earthquake, these questions were complemented by three disaster-oriented questions, such as "participated directly in the reconstruction activities." Participants answered these questions by indicating yes or no. The disaster-oriented questions were not included in the surveys before the earthquake as there was no way of anticipating the earthquake.

**Chilean regions.** In order to examine the effects of physical proximity to the earthquake epicenter on national identity, prosocial values, helping motivations, and prosocial behaviors,

participants from the five administrative regions that were considered in the sample after the earthquake were reorganized into three constructed regions. The three regions, in order of ascending distance from the earthquake epicenter, included Biobío and Araucanía, Santiago Metropolitana and Valparaíso, and Antofagasta. The regions were created based on the proximity of the cities to the earthquake epicenter, and on the proximity of the cities to each other. These areas actually represent six cities in five Chilean administrative regions: Concepción (Biobío), Talcahuano (Biobío), Temuco (Araucanía), Santiago (Santiago Metropolitana), Viña del Mar (Valparaíso), and Antofagasta (Antofagasta).

### **Procedure**

Face-to-face surveys were conducted in the homes of 2,033 participants, who were men and women aged 18-64, from all socioeconomic groups. Surveys were conducted upon receiving written and spoken consent; participation was voluntary and participation was not incentivized. Surveys were conducted before the earthquake between July 13 and August 24, 2009, and after the earthquake between September 4 and October 6, 2010.

In this study we used a repeated cross-sectional design, which measures the aggregate effects on a variable across two or more related samples (Penner & Fritzsche, 1993; Yee & Niemeier, 1996). Although the surveys were not longitudinal (that is, with repeated measures on the same participants), all measures considered here were the same in both surveys (with the exception of the three items asking participants about their responses to the earthquake). Thus, we examined how the earthquake related to Chileans' identity, prosocial values, helping

motivations, and prosocial behaviors by comparing aggregated measure levels from before the earthquake with aggregated measure levels from after the earthquake.<sup>3</sup>

## Results

Using survey data collected both before and after the earthquake, we examined the key research questions exploring how the earthquake was related to national identity, prosocial values, helping motivations, and prosocial behaviors. We discuss each research question in the order of their presentation in the introduction. We first focus on identity, prosocial values, helping motivations, and prosocial behavior, comparing levels before and after the earthquake. We follow these analyses by evaluating whether identity, prosocial values, and helping motivations were linked to prosocial behaviors after the earthquake. Finally, we conclude by testing how proximity to the disaster epicenter related to identity, prosocial values, helping motivations, and prosocial behavior. Correlations between all of the measures before and after the earthquake can be found in Table 2.

### **Were levels of national identity, prosocial values, helping motivations, and prosocial behavior different after the earthquake?**

We first explored how national identity, prosocial values, helping motivations, and prosocial behavior differed from before the earthquake to after it. Compared to Chileans surveyed before the earthquake, those surveyed after the earthquake more strongly endorsed their national Chilean identity ( $t(2021) = 5.83, p < .001, d = .28$ ); however, there was no reliable difference in prosocial values ( $t(2023) = 0.94, p = .34, d = .05$ ). When comparing only the post-earthquake Santiago sample to the pre-earthquake sample, the findings were nearly identical:

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<sup>3</sup> The data collection before the earthquake was planned as a single study with one time point.

Therefore, a new sample had to be contacted and surveyed after the earthquake.

national Chilean identity was stronger afterward ( $t(1692) = 4.88, p < .001, d = .24$ ), but there was no reliable difference in prosocial values ( $t(1694) = 1.06, p = .29, d = .05$ ).

Compared to Chileans surveyed before the earthquake, those surveyed after the earthquake more strongly endorsed most of the helping motivations as well, though comparisons between before and after the earthquake were not always significant. Religious motivations ( $t(650) = 2.07, p = .04, d = .22$ ), self-enhancement motivations ( $t(650) = 2.90, p = .004, d = .31$ ), self-protective motivations ( $t(649) = 4.68, p < .001, d = .50$ ), and social motivations ( $t(649) = 4.16, p < .001, d = .47$ ) were all significantly higher after the earthquake, with career motivations showing no significant difference before and after the earthquake ( $t(650) = 1.16, p = .24, d = .12$ ). Trends were similar when comparing only the post-earthquake Santiago sample to the pre-earthquake sample. Self-enhancement motivations ( $t(620) = 2.66, p = .008, d = .33$ ), self-protective motivations ( $t(618) = 4.32, p < .001, d = .59$ ), and social motivations ( $t(618) = 3.52, p < .001, d = .45$ ) were all still significantly higher after the earthquake. However, religious motivations ( $t(620) = 1.32, p = .19, d = .16$ ) and career motivations ( $t(620) = 1.82, p = .07, d = .21$ ) were not significantly higher after the earthquake.

Before investigating whether prosocial behaviors were more or less common after the earthquake, we explored how distinct the prosocial behaviors were from one another. We first conducted a factor analysis (promax rotation) with the four general donation items captured before the earthquake, and another factor analysis (promax rotation) with the four general donation items and the three disaster-related helping items after the earthquake. Results consistently suggested that the three general donation items of donating to people in the street, donating to charities, and donating to national collections represented a single factor (which we call “general money donation”), as did donating money and clothes specifically to aid those



affected by the earthquake (which we call “donating after the earthquake”). There was mixed evidence that the single items of donating money after disasters generally, and helping with the reconstruction after the earthquake specifically, were closely related to the other two factors, and thus we treated these two items as separate.

Examining the money donations, general money donation behavior was lower after the earthquake, ( $t(2029) = 4.35, p < .001, d = -.20$ ); however, donating money after disasters in general was higher ( $t(2030) = 6.81, p < .001, d = .32$ ). When comparing only the post-earthquake Santiago sample to the pre-earthquake sample, general money donation behavior was again lower after the earthquake, ( $t(1699) = 4.37, p < .001, d = -.22$ ); however, donating money after disasters in general was higher ( $t(1699) = 6.42, p < .001, d = .32$ ). Overall, evidence suggests national identity was stronger after the earthquake, and even though there was minimal difference in prosocial values before the earthquake compared to after, many of the specific helping motivations were stronger after the earthquake. Specifically, self-protective and social helping motivations were the strongest after the earthquake. Furthermore, although general money donation behavior was less common after the earthquake compared to before, donating to causes focused on addressing the aftermath of disasters was more common after the earthquake.

#### **What predicted helping after the earthquake?<sup>4</sup>**

We next examined the factors most closely linked to helping after the earthquake. First, national identity and prosocial values were entered into models predicting each of the four

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<sup>4</sup> These analyses were also conducted first by using the full sample after the earthquake, and then subsequently with the subset of the sample after the earthquake from Santiago only. There were, again, minimal differences in results, so the results described here use the full sample. The analyses using the Santiago-only sample after the earthquake can be found in the appendix.

helping measures after the earthquake. National identity and prosocial values were both consistent predictors of helping, whether the helping behaviors were related to the earthquake or more general (Table 3). Both national identity and prosocial values predicted general money donations (i.e., donating money to people in the streets, donating spare change to charities, and donating money for national collections), as well as donating money to help with disasters in general. Furthermore, both national identity and prosocial values predicted donating goods and money after the earthquake. However, only prosocial values, not national identity, predicted participation in the reconstruction efforts. Effect sizes suggested that prosocial values were more closely related to most of the prosocial behaviors after the earthquake, though national identity was more closely related to donating money toward disaster relief in general.

Although national identity and values were consistent predictors of helping after the earthquake, specific helping motivations were rarely related to helping after the earthquake (Table 4). Helping motivations were entered into their own regression model given the significant reduction in the sample size for the motivation measures compared to the sample size for the identity and values measures. Religious motivations were only a marginal predictor of general money donations after the earthquake. A lower sample size when testing these relationships may have limited our ability to reliably determine statistical significance. Overall, despite differences in helping motivations from before to after the earthquake, helping motivations were largely unrelated to actions aimed at helping people after the earthquake.

#### **Did proximity to the earthquake relate to national identity, prosocial values, helping motivations, and prosocial behaviors after the earthquake?**

Finally, we considered how proximity to the earthquake related to national identity, prosocial values, helping motivations, and prosocial behavior after the earthquake across three

large urban areas in Chile. Cities were divided into three regions<sup>5</sup>: Biobío and Araucanía (Concepción, Talcahuano, and Temuco;  $n = 162$ ), Santiago Metropolitana and Valparaíso ( $n = 1,165$ ), and Antofagasta ( $n = 61$ ). The first region contained the cities most closely situated to the earthquake epicenter, the third contained the city the farthest away, and the second region contained two cities in between. Results from one-way ANCOVAs, which controlled for socioeconomic status given income differences across regions, showed that proximity to the earthquake epicenter was related to identity, prosocial values, and prosocial behaviors after the earthquake (Table 5). Participants closest to the epicenter reported the strongest national Chilean identity compared to the other two regions, and the strongest prosocial values compared to the farthest region. Participants close to the epicenter and from the middle region also reported stronger prosocial values compared to individuals from the farthest region from the epicenter.

There were no significant differences between regions regarding specific helping motivations. However, we raise caution as to the interpretability of this findings given the small sample sizes for helping motivations across the three regions. Regarding prosocial behavior, participants in the farthest region were more likely to have donated money after disasters in general compared to both the middle and closest regions. Individuals in the farthest region were also most likely to have donated goods and money to help with recovery from the earthquake specifically. However, participants in the closest region were most likely to have actively participated in the reconstruction. Effect sizes for significant models suggested that proximity

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<sup>5</sup> Similar analyses using, first, kilometer distance from earthquake epicenter and, next, rank orders of the original five areas in which participants lived provided similar results. For simplicity, we report the analyses using three regions, but these additional sets of analyses can be found in the Appendix.

effects were small to small-to-medium in size according to traditional guidelines (Cohen, 1992), and similar to the effect sizes observed in the other analyses.

### **Discussion**

To better understand how individuals experience societal change, we examined people's sense of national identity, prosocial values, helping motivations, and prosocial behaviors in the context of a natural disaster. Using unique data captured before and after the 2010 Chile earthquake, we compared identity, values, motivations, and behavior before and after the earthquake. We also examined whether identity, values, and motivations were related to prosocial behavior after the earthquake. Compared to before the earthquake, those surveyed after the earthquake more strongly endorsed their national Chilean identity, exhibited higher levels of motivations to help, and engaged in more prosocial behavior directly related to the earthquake. However, donations not related to the earthquake or disasters more generally were lower in 2010 than in 2009. Furthermore, national identity and prosocial values both uniquely and consistently predicted prosocial behavior after the earthquake. Thus, it appears that both those naturally disposed to value helping others, more generally, and those more strongly identified with their nation (independent of their prosocial values), were the ones who provided aid after the disaster. Finally, people more proximately located to the earthquake epicenter were more likely to have stronger national identity, prosocial values, and were more likely to have participated in the reconstruction efforts. Meanwhile, people further from the epicenter were more likely to have donated goods and money to help with the earthquake specifically. The main strength of our study is its ecological validity and design. These data are distinct because they are captured at the individual level, and they reflect the identity, values, motivations, and behaviors of two different

samples of individuals before and after an actual disaster, making this a valuable contribution to the literature.

### **Basic and Applied Implications of the Present Findings**

Over the past 30 years, there has been a marked increase in natural disasters (Guha-Sapir, Hargitt, & Hoyois, 2004), with some of the more destructive recent examples including the earthquake and tsunami in Japan, the earthquake in Haiti, and hurricanes in New Orleans, Houston, and the Caribbean. Natural disasters can be highly disruptive to political and social systems, such as when Hurricane Katrina brought to light inadequacies of the American governmental response (Napier, Mandisodza, Andersen, & Jost, 2007). Climate scientists warn that global climate change could contribute to increases in both the frequency and the magnitude of future natural disasters (Intergovernmental Panel on Climate Change, 2014; van Aalst, 2006). Chile experienced a series of earthquakes more recently that resulted in the deaths of 6 people and the displacement of almost a million citizens (Chile earthquakes 2014 LIVE; Ford & Ahmed, 2014). Therefore, it is increasingly important that psychologists develop a better understanding of how natural disasters may affect people and communities.

Our findings build on existing social-psychological and theoretical work on the consequences of natural disasters (e.g., Drury et al., 2016; Ntonis et al., 2018) by examining an actual disaster and surveying people who were directly affected by it. For example, our research speaks to Drury et al. (2016) by finding that a specific form of social identity, national Chilean identity, is closely linked to helping in the aftermath of a disaster. Thus, both identifying with others generally (e.g., Drury et al., 2016), and a specific form of identity within a bounded geographic region, are important social identity processes that can contribute to disaster relief efforts. Future research should examine how governments and nongovernmental organizations

can leverage people's increased identification with their fellow citizens, and their willingness to help others in the wake of a disaster, to solicit the types of prosocial behavior from people that improve community resiliency, allowing for more effective responding to disasters in the future (e.g., Ntonis et al., 2018).

Our findings also implicate more general models concerning threatening events and social relations (e.g., terror management theory and models of motivated social cognition; Greenberg et al., 1997; Jost et al., 2003). We found, first, that the helping motivations with the largest positive differences before and after the earthquake included self-protective and social motivations, which makes sense in the context of a random disaster such as an earthquake. Suffering due to the earthquake was palpable and people likely struggled to explain why some people were affected and not others. People might have felt guilty for being lucky compared to the many who suffered, and therefore they might have been more motivated to help in part to avoid the resulting negative feelings. They may have also felt a sense of social obligation or responsibility to help others in need by seeing other relevant to them engaging in helping behaviors (e.g., Drury et al., 2016). Wayment (2004) found that survivor guilt and grief were the only disaster-focused distress reactions that predicted helping behaviors in the aftermath of the 9/11 terrorist attacks in the United States. Self-oriented motivations, such as self-protective motivation, and social motivations may further help people cope with the chaos and the threats to self and society they are witnessing.

Interestingly, however, we did not find that self-oriented or social helping motivations were related to prosocial behavior after the disaster. Some previous research points to the role of helping motivations as predictors of long-term helping during national tragedies (Piferi, Jobe, & Jones, 2006). Although we did not find much evidence that specific motivations were linked to

helping after the earthquake, the analyses examining specific helping motivations also involved smaller sample sizes (see Limitations below). Future research should continue to explore predictors of helping both in the immediate aftermath of a natural disaster and long-term helping responses. Seemingly more important to understanding who helps after a natural disaster, we found that levels of national Chilean identity were higher after than before the earthquake, and national identity was often linked to helping after the earthquake. A stronger sense of national identity, and awareness of and adherence to a social identity, may have also provided a source of self-esteem and protection against perceived threat to self and society. Moreover, our findings that self-protective and social motivations had the largest positive differences from before to after the earthquake are interesting in light of the similar pattern we observed for national identity. Because national identity involves considerations of both self and social group, it is possible that the higher levels of these motivations also reflect group processes. Prosocial values, on the other hand, were also linked to all of the prosocial behaviors in the expected direction.

One question that follows, and that should be addressed in future basic experimental research, is whether systematic interventions aimed at boosting national identity, such as through laboratory inductions or vignettes, can be sufficiently strong to mirror effects resulting from natural exposure to threats. It is uncertain whether these laboratory manipulations can elicit a strong increase in national identity that last a meaningful amount of time and lead to future helping when a disaster does strike. It would be of great value to understand the mechanisms influencing identity change, in addition to how it may encourage helping of one's fellow citizens after a natural disaster as well as protect the individual from perceived threats to self and society. Relatedly, it's possible that strengthening national identity versus strengthening other types of group identity (e.g., shared survivor identity; Drury et al., 2016) could facilitate these positive

outcomes in different ways. Using experimental methods to better understand the mechanisms of different types of identity change, and their consequences, would be valuable both theoretically and practically.

In addition, we found that levels of everyday prosocial behaviors varied according to proximity to the disaster, with donating money when disaster occur and donating goods or money in response to the earthquake being more likely further from the earthquake epicenter, and participating in the reconstruction more likely for those who lived closer to the epicenter. Despite being further away, people in Santiago reported giving more money when disasters occur than did people in Biobío, even after controlling for socioeconomic status. The 8.8 magnitude earthquake was strong enough to be felt in Santiago (about 8.0 magnitude), which may have elicited threat and concern similar to what happened in the south of Chile. Further, it might be that the amount of televised and publicized attention to the earthquake was larger in Santiago than in the smaller cities, which could have affected perceptions of help needed despite being further away. Future research should directly examine whether physical and psychological proximity to natural disasters, not just human-caused disasters (e.g., Beyerlein & Sikkink, 2008), in addition to the amount of time viewing media coverage of the disaster (e.g., Ahern et al., 2004), influence prosocial behaviors following these events. However, when taken together, the present findings suggest that it may be possible that psychological proximity (i.e., as indicated by national identity), rather than physical proximity, may have a stronger effect on people's responses to natural disasters.

### **Limitations**

The first limitation regards the sample sizes of the helping motivation items in 2010 ( $n = 103$ ). Despite the overall sample sizes being sufficiently large (2009  $n = 644$ , 2010  $n = 1,389$ ),



the low sample size when measuring specific helping motivations must be noted because of its resultant lack of statistical power. In the future, better care should be taken to ensure similar sample sizes of repeated cross-sectional samples. A second limitation to this data is that during the time between our surveys before and after the earthquake, there was a tragic mining accident in Chile. This event was the result of human error, not natural disaster, but likely also affected national identity. This example highlights a more general limitation in the data, which is the fact that the differences between findings before and after the earthquake are conflated with time, as any number of events may have influenced potential shifts in Chilean identity, prosocial values, helping motivations, and prosocial behaviors. Future research should consider covariates and events that may also be occurring during the time of the disaster they are studying, to better control for alternate hypotheses. However, given our focus on the area around the earthquake, and given that we found increases in donation behavior relevant to the earthquake, there is reason to believe these effects relate to the earthquake.

Finally, one other limitation of this study is that the initial survey, conducted before the earthquake, was not planned in advance to be a longitudinal study using repeated measures on the same sample of participants. Therefore, it was not possible to survey the same participants before and after the earthquake. The result, as is the case with repeated cross-sectional designs, is that we have been able to examine average changes and investigate trends between groups, but we cannot attribute the changes and trends we observed to changes at the individual level. Natural disasters are typically unforeseen events, as was the case with the 2010 earthquake in Chile, therefore researchers' ability to design studies to collect data from specific people both before and after experiencing disasters is constrained.

To be better prepared to research unforeseen events, we suggest that researchers consider asking participants in the consent form whether they agree to be contacted in the future for potential follow-up studies. Participants would volunteer their contact information if they agreed to be part of future follow-up studies. Examples of research in which opportunity rather than planning provided a chance to study a disaster include Kaniasty and Norris' (1995b) ongoing panel survey of older adults in Kentucky. When the Kentucky floods occurred, Kaniasty and Norris (1995b) seized the opportunity to follow up with their pre-flood samples with post-flood questions. Also, the 2011 earthquake in Christchurch New Zealand occurred between two waves of a longitudinal study conducted in New Zealand by Sibley and Bulbulia (2012), affording them the opportunity to examine levels of religious affiliation and subjective health ratings in the same people before and after the earthquake. Similarly, Li, Li, Decety, and Lee (2013) were studying children's altruistic giving in April 2008, right before an 8.0 magnitude earthquake struck the region of Sichuan, China. The researchers adopted the same procedures as they used before the earthquake, revisited the schools, and were able to longitudinally study the ways in which natural disasters affect children's altruistic giving.

Traumatic events randomly and inevitably happen, and keeping records of participants' contact information, if relevant to the research endeavor, ensures better samples for studies on the effects of unforeseen natural or human-caused disasters. A second suggestion relies on the development of technology. By collaborating with researchers from other disciplines, such as meteorologists, who have the knowledge and equipment to predict with better accuracy where and when a disaster will happen, psychologists may be able to better predict when maintaining contact with study participants will be more likely to lead to adequate study of natural disasters and events.

## **Conclusion**

The earthquake in Chile in 2010 provided an opportunity to examine, from a social-psychological perspective, how people and communities hit by disasters can recoup and recover after such a rapid societal change. Natural disasters worldwide are on the rise, and research is integral to learning how disasters may affect individuals and communities. There is need for a better understanding of prosocial behavior after natural disasters, as well as how it may relate to identity, values, and helping motivations, in order to determine who comes together during times of crises, under what conditions, and providing what kinds of help. In an effort to further this understanding, we derived several research questions based on the literature on identity, prosocial values, helping motivations, and prosocial behavior in times of crisis.

Findings from the present study suggest that in the aftermath of a natural disaster, people come together under a common sense of national identity. Helping motivations were also higher after the earthquake, particularly self-protective and social motivations, which might have helped protect people from the societal chaos and upheaval following the earthquake. Furthermore, proximity to the disaster implicated how strongly people identify with their fellow citizens, their prosocial values, and the types of helping they provided in the aftermath. These findings contribute to both our basic and applied understanding of the social-psychological implications of natural disasters, and how rapid societal change may affect people's identities and actions in the wake of unexpected large-scale events.

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Table 1

*Descriptive statistics for measures before and after the earthquake*

Variables	Before <i>n</i>	After <i>n</i>	Before %	After %	Before $\alpha$	After $\alpha$	Before <i>M</i>	After <i>M</i>	Before <i>SD</i>	After <i>SD</i>
Total sample size	644	1389								
Men	315	683	49	49						
Women	329	706	51	51						
Native Chileans	644	1389	98	99						
Upper SES level	64	130	10	9						
Middle/upper SES level	129	251	20	18						
Middle SES level	161	339	25	24						
Low/middle SES level	225	517	35	37						
Low SES level	64	153	10	11						
National identity	642	1381			.75	.81	4.28	4.50	0.87	0.75
Prosocial values	642	1383			.89	.89	3.89	3.93	0.89	0.88
Helping motivation: career	548	104			.75	.92	4.31	4.42	0.87	0.95
Helping motivation: religious	548	104			.76	.79	3.75	4.03	1.27	1.25
Helping motivation: self-enhancement	548	104			.48	.61	3.98	4.27	0.94	0.90
Helping motivation: self-protective	548	103			.74	.64	3.63	4.22	1.21	0.96
Helping motivation: social	548	103			.72	.78	3.69	4.19	1.14	1.00
General money donation	644	1387			.52	.61	3.56	3.35	0.97	1.03
Donating money when disasters occur	644	1388			-	-	2.94	3.44	1.60	1.51
Donating after the earthquake	-	1389			-	.35	-	0.55	-	0.38
Helping with reconstruction	-	1389			-	-	-	0.08	-	0.27

*Note.* *N* = sample size. % = percentage of total.  $\alpha$  = Cronbach's alpha. *M* = mean. *SD* = standard deviation.

Table 2

Variable	1	2	3	4	5	6	7	8	9	10
1. National identity	--	.26**	.13**	.29**	.21**	.17**	.21**	.24**	.19**	--
	--	(642)	(545)	(545)	(545)	(545)	(545)	(642)	(642)	--
2. Prosocial values	.18**	--	.33**	.42**	.36**	.34**	.37**	.36**	.30**	--
	(1376)	--	(548)	(548)	(548)	(548)	(548)	(644)	(644)	--
3. Helping motivation: career	-.04	.40**	--	.28**	.41**	.30**	.46**	.28**	.22**	--
	(104)	(104)	--	(548)	(548)	(548)	(548)	(548)	(548)	--
4. Helping motivation: religious	.12	.44**	.47**	--	.40**	.33**	.38**	.32**	.32**	--
	(104)	(104)	(104)	--	(548)	(548)	(548)	(548)	(548)	--
5. Helping motivation: self-enhancement	.07	.42**	.66**	.58**	--	.39**	.39**	.16**	.13**	--
	(104)	(104)	(104)	(104)	--	(548)	(548)	(548)	(548)	--
6. Helping motivation: self-protective	.05	.44**	.53**	.56**	.62**	--	.46**	.26**	.31**	--
	(103)	(103)	(103)	(103)	(103)	--	(548)	(548)	(548)	--
7. Helping motivation: social	-.08	.41**	.68**	.53**	.60**	.44**	--	.33**	.36**	--
	(103)	(103)	(103)	(103)	(103)	(103)	--	(548)	(548)	--
8. General money donation	.21**	.25**	.34**	.32**	.34**	.26**	.27**	--	.48**	--
	(1381)	(1383)	(104)	(104)	(104)	(103)	(103)	--	(644)	--
9. Donating money when disasters occur	.19**	.16**	.27**	.13	.26**	.12	.24*	.48**	--	--
	(1381)	(1383)	(104)	(104)	(104)	(103)	(103)	(1388)	--	--
10. Donating after the earthquake	.14**	.17**	.12	.10	.18 <sup>†</sup>	.10	.13	.33**	.47**	--
	(1381)	(1383)	(104)	(104)	(104)	(103)	(103)	(1389)	(1388)	--
11. Helping with the reconstruction	.01	.08**	-.02	-.13	-.08	-.10	-.04	.04	.11**	.15**
	(1381)	(1383)	(104)	(104)	(104)	(103)	(103)	(1389)	(1388)	(1389)

*Correlation coefficients between measures; 2009 correlations are above diagonal, 2010 correlations are below the diagonal*

*Note.*  $n$  in parentheses. <sup>†</sup> $p < .10$ . \* $p < .05$ . \*\* $p < .01$ .

Table 3

*Regression models examining how national identity and prosocial values related to prosocial behavior after the earthquake*

Predictor	General money donation			Donating money when disasters occur			Donating after the earthquake			Helping with the reconstruction		
	<i>b</i>	<i>SE b</i>	$\beta$	<i>b</i>	<i>SE b</i>	$\beta$	<i>b</i>	<i>SE b</i>	$\beta$	<i>b</i>	<i>SE b</i>	Exp( <i>b</i> )
National identity	.20	.04	.15**	.33	.05	.17**	.06	.01	.11**	-.02	.13	0.98
Prosocial values	.26	.03	.22**	.22	.05	.13**	.07	.01	.15**	.36	.12	1.44**
<i>F (df)/<math>\chi^2</math> (df)</i>	62.14 (2, 1373)**			36.94 (2, 1372)**			30.49 (2, 1373)			8.77 (2)**		
<i>Adjusted R<sup>2</sup>/</i>												
<i>Nagelkerke R<sup>2</sup></i>	.08			.05			.04			.02		

*Note.* †*p* < .10. \**p* < .05. \*\**p* < .01. *SE* = standard error. The model examining helping with the reconstruction was a logistic regression model.

Table 4

*Regression models examining how helping motivations related to prosocial behavior after the earthquake*

Predictor	General money donation			Donating money when disasters occur			Donating after the earthquake			Helping with the reconstruction		
	<i>b</i>	<i>SE b</i>	$\beta$	<i>b</i>	<i>SE b</i>	$\beta$	<i>b</i>	<i>SE b</i>	$\beta$	<i>b</i>	<i>SE b</i>	Exp( <i>b</i> )
Career	.14	.13	.16	.22	.21	.15	-.01	.05	-.03	.22	.39	1.25
Religious	.17	.09	.25 <sup>†</sup>	-.07	.14	-.07	-.01	.04	-.03	-.22	.23	0.81
Self-enhancement	.08	.14	.09	.30	.22	.20	.07	.06	.18	-.07	.38	0.94
Self-protective	.03	.11	.03	-.12	.18	-.08	-.003	.05	-.01	-.15	.32	0.86
Social	-.08	.12	-.09	.12	.19	.09	.02	.05	.06	.01	.35	1.01
<i>F (df)/<math>\chi^2</math>(df)</i>	3.16 (5, 97)*			2.09 (5, 97) <sup>†</sup>			0.65 (5, 97)			2.35 (5)		
<i>Adjusted R<sup>2</sup>/</i>												
<i>Nagelkerke R<sup>2</sup></i>	.10			.05			-.02			.03		

*Note.* <sup>†</sup> $p < .10$ . \* $p < .05$ . \*\* $p < .01$ . *SE* = standard error. The model examining helping with the reconstruction was a logistic regression model.



Table 5

*Analysis of covariance models examining how national identity, prosocial values, helping motivations, and prosocial behaviors varied according to city proximity to the earthquake, controlling for socioeconomic status*

	Biobío and Araucanía (closest)	Santiago and Valparaíso (middle)	Antofagasta (farthest)	Region $F$ ( $df$ )	Partial $\eta^2$
National identity	4.62 (0.06; 186) <sub>a</sub>	4.48 (0.02; 1131) <sub>b</sub>	4.37 (0.09; 66) <sub>b</sub>	3.87 (2, 1379)*	.006
Prosocial values	3.90 (0.06; 186) <sub>a</sub>	3.94 (0.03; 1131) <sub>a</sub>	3.66 (0.11; 66) <sub>b</sub>	3.23 (2, 1379)*	.005
Helping motivation: career	4.02 (0.19; 25)	4.50 (0.11; 81)	4.33 (0.56; 3)	2.35 (2, 105)	.043
Helping motivation: religion	4.10 (0.25; 25)	3.97 (0.14; 81)	4.51 (0.72; 3)	0.35 (2, 105)	.007
Helping motivation: self-esteem	4.12 (0.19; 25)	4.25 (0.10; 81)	4.51 (0.54; 3)	0.35 (2, 105)	.007
Helping motivation: self-protective	4.10 (0.19; 25)	4.25 (0.11; 80)	3.84 (0.56; 3)	0.46 (2, 104)	.009
Helping motivation: social	4.10 (0.20; 25)	4.22 (0.11; 80)	3.67 (0.57; 3)	0.54 (2, 104)	.010
General money donation	3.37 (0.08; 186)	3.33 (0.03; 1136)	3.60 (0.03; 67)	2.22 (2, 1385)	.003
Donating money when disasters occur	3.15 (0.11; 186) <sub>c</sub>	3.44 (0.04; 1135) <sub>b</sub>	3.81 (0.18; 67) <sub>a</sub>	5.62 (2, 1384)**	.008
Donating after the earthquake	0.54 (0.03; 186) <sub>b</sub>	0.55 (0.01; 1136) <sub>b</sub>	0.67 (0.05; 67) <sub>a</sub>	3.60 (2, 1385)*	.005
Helping with the reconstruction	0.15 (0.02; 186) <sub>a</sub>	0.07 (0.01; 1136) <sub>b</sub>	0.05 (0.03; 67) <sub>b</sub>	7.49 (2, 1385)**	.011

*Note.* † $p < .10$ . \* $p < .05$ . \*\* $p < .01$ . Standard error and  $N$  in parentheses. Subscripts indicate significant differences when there is an overall significant  $F$ .