

**Paradise Found?
The Emergence of Social Capital, Place Attachment,
and Civic Engagement after Disaster**

Timothy J. Haney*
Mount Royal University

Email: thaney@mtroyal.ca

Social science research on disaster-affected communities uses social capital to explain a variety of post-disaster outcomes. A promising recent line of inquiry looks at how disasters generate new forms of social capital, and reinvigorate place-based social networks and place attachment. Using survey data collected from 407 Calgary residents affected by the catastrophic 2013 Southern Alberta Flood, as well as interview data from 40 residents, this article examines factors that contributed to residents' expansion of their social networks during the disaster, and the impact of expanded social networks on residents' post-disaster place attachment and civic engagement. Findings reveal that people most affected by the flood, i.e., those who experienced house flooding and longer evacuations, were most likely to make new contacts during the disaster and immediately after it. However, results also indicate that these new forms of social capital did not translate into greater place attachment, even though they did engender some post-flood civic engagement. Overall, inundation, evacuation, and displacement are predictive of lesser post-disaster place attachment. The article concludes by discussing the relevance of the findings for theory and disaster scholarship.

Keywords: Disaster; social capital; emergence; civic engagement; place attachment; Canada.

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Nearly two decades ago, social capital emerged as a core concept and a buzzword in social science research. Inspired by Putnam's (2000) groundbreaking work *Bowling Alone* about the recent decline of traditional forms of social capital, social scientists began theorizing on social capital and investigating the myriad ways it affects such life outcomes as employment, physical and mental health, educational attainment, and crime. Disaster sociologists, in particular, have long been concerned with emergent phenomena, or norms, behaviors, and institutions, that arise during a catastrophic event or as a direct response to it. These researchers contend that pre-existing stocks of social capital help to shield at-risk individuals from the most pernicious effects of a disaster. Aldrich (2012), in his groundbreaking work *Building Resilience*, argues that social capital is the most important resource that an individual, family, or community can mobilize in a disaster because it helps people access required resources not readily available through more formal or organizational channels. Such findings led journalist Rebecca Solnit to dub the post-disaster community “a paradise built in hell” in her 2010 book *A Paradise Built in Hell: The Extraordinary Communities that Arise in Disaster*, in which she examines five historical disasters which, she argues, bring people together, provide opportunities for crafting a better future, and allow for self-exploration. In short, amidst destruction, there remains the possibility for a stronger community—a paradise of sorts. The goal of this article is to examine this claim through a scholarly lens by troubling and deconstructing this paradise.

Recently, research has often focused on how disasters alter pre-existing forms of social capital. Rather than assuming that individuals accumulate social capital in pre-disaster times, and use it to neutralize the most dire material and emotional consequences when a catastrophic event occurs, much recent work views social capital as temporally and spatially complex. It stands to reason that social networks vacillate, shift, and change almost continually, as do resources embedded in those networks. People make new acquaintances, invest new resources in existing relationships, and sever some existing ties over the life-course, including during a disaster and immediately after it. As a result, the following questions arise. During a disaster, do the affected individuals engender new social relationships, and do these new ties persist beyond the acute emergency phase? Does a disaster encourage renewed participation in neighborhood or community affairs? Do a disaster and the disaster-generated social networks alter the attachment they feel to place? This article addresses these questions, examining how individuals create and reinvigorate their social networks after a catastrophic event using a unique survey data set collected from Calgary residents who survived the devastating and costly 2013 Southern Alberta Flood. The findings are particularly useful as research in the field increasingly explores

how disaster-affected communities exhibit and foster resilience, strengthening themselves in the face of future catastrophic events (Comfort and Boin 2010; Gotham and Campanella 2013).

LITERATURE REVIEW

In recent years, scholarship focusing on disaster has increasingly analyzed the role of social capital, particularly in helping people to access needed resources during and after a catastrophic event. Although social theorists do not always agree on a definition of social capital (see Bourdieu 1983; Haynes and Hernandez 2008; Paxton 1999; Portes 1998), definitions usually coalesce around socially embedded resources that can be utilized during a time of need, including relationships of trust and mutual obligations. Although many of these ties are individual, many arise out of formal organizations such as workplaces or community associations (Small 2009), with Kendra and Wachtendorf (2003) finding that “organisations provide the infrastructure for a community’s resilience, in that organizational resources, networks, and overall capacity are what make coordinated community-wide response possible” (p. 48).

In the disaster context, many analyses of social capital understand it as one potential resource that residents utilize during their evacuations and displacements. But, not all social capital is created equal. For instance, differences exist between bonding forms of social capital (inward-oriented networks of similar people), bridging social capital (outward-oriented networks of different people), locally situated social capital, trans-local forms of social capital, and linking forms of social capital (relationships with those who hold power). The literature shows that each of these carries particular strengths, weaknesses, and efficacies, both during normal times and during disasters (Aldrich and Meyer 2015; Cai 2017; Elliott, Haney, and Sams-Abiodun 2010; Hawkins and Maurer 2010; Litt 2008).

Because of the differing definitions and types of social capital, this paper will focus specifically on three specific measures of social capital, though will not focus specifically on the types (bonding vs. bridging, and so on). First, it will look at emergent forms of social capital – potential network ties that arose during the flood itself. Second, it will analyze post-disaster place attachment, and shine a lens on the ways place attachment shifted and changed – and for whom it did – during and after the flood, following literature suggesting that place attachment is an important indicator of local social capital (Lochner, Kawachi, and Kennedy 1999; Scannell and Gifford 2010). And, third the paper focuses on post-disaster civic engagement; which residents engaged themselves in their community after experiencing a catastrophic flood, and in what ways? All of these manifestations of social capital draw upon the associational, rather than the trust-based, dimensions of the concept (Paxton 1999). Before proceeding, the following three subsections review relevant

literature on these three dimensions of social capital and what we know about their role in disaster.

Emergent Network Ties

From the field's inception, emergent phenomena, dynamics, and institutions that stem from disasters have been a prevalent feature in the study of disaster (Drabek and McEntire 2003). Often they have been used to understand the emergence of pro-social behavior (Dynes 2006; Rodriguez 2006; Scanlon and Helsloot 2014) or formal organizations (Murphy 2007; Tierney and Trainor 2004) during a crisis. The research also focuses on the ability of disasters to erode stocks of local social capital. This is true following rapid-onset technological disasters such as oil spills (Picou, Marshall, and Gill 2004; Ritchie 2012), as well as slower-onset events such as chronic community contamination (Bell 2016). Yet, disasters and crises of this sort provide fertile ground for emergent network ties since "emergent phenomena are most likely to occur when demands are not met by existing organizations" (Drabek and McEntire 2003:98).

A number of studies, many of them recent, focus on how disasters enhance the size and propinquity of residents' social networks. One example is work by Hilfinger Messias, Barrington, and Lacy (2012), who find that the social networks of Latino survivors of Hurricane Katrina were understandably strained by overwhelming demands, but interestingly, new networks emerged to deal with these demands, "based primarily on shared nationality, language, and a sense of collective commitments" (p. 102). Work by Hawkins and Maurer (2010) demonstrates how situations of need, material interests, and instrumental goals brought neighborhood residents together who "who would be friendly, but who wouldn't necessarily work together on a regular day" (p. 1787). And as residents evacuated, "they were introduced to new ideas, people and ways of life" which they carried with them into the recovery (p. 1789).

Research also indicates that organizations can help in connecting residents of loosely-affiliated, heterogeneous neighborhoods, who would otherwise struggle to generate collective action in the aftermath of a disaster (Storr and Haeffele-Balch 2012). Tierney and Trainor (2004:164) point out that disasters are most often characterized by emergent norms, rather than routinized and institutionalized ones. Along with new network ties, disasters give rise to new sets of expectations and roles. Kendra and Wachtendorf's (2016) study demonstrates how citizen responders mobilized during the September 11 attack, simultaneously coordinating their activities, making and breaking rules, and working together nearly seamlessly to facilitate the waterborne evacuation of lower Manhattan. Like much of the research in the area, their study reveals citizens' ability to coordinate efforts during the tense crisis period of the disaster, which "contradicts the misconception that people are too stunned to react and will sit around passively and wait for assistance" (Kendra and Wachtendorf 2016:18).

Post-Disaster Place Attachment

Attachment to place has most often been studied as a factor facilitating disaster preparedness (DeYoung and Peters 2016; Mishra, Mazumdar, and Suar 2010), but has also recently been applied to the post-disaster context. Researchers have long known that experiencing a disaster alters the sense of attachment that residents feel toward the places they live, with Tierney and Oliver-Smith (2012) arguing that “disaster impacts can drastically alter the physical and natural world and can damage the sense of attachment to place in ways that make social recovery difficult” (p. 130). It can do this, they argue, by making livelihoods and subsistence more difficult, altering the natural environment, removing familiar landmarks or, quite naturally, disrupting local social networks. Just as often as disaster can degrade existing attachments to place, it can also motivate recovery and give birth to new or intensified feelings of attachment. As Chamlee-Wright and Storr (2009) demonstrate, the recovery activities of New Orleans’ Lower 9th Ward residents were motivated by their connection to the place, which undoubtedly involved a desire to rekindle neighborhood social networks and institutions. Such studies usually envisage place attachment as a person’s attachment to their neighborhood, although Hidalgo and Hernandez (2001) note that neighborhood attachment is normally weaker than house or city attachment (see also Raymond, Brown, and Weber 2010). Additionally, Brown, Perkins, and Brown (2003) find that place attachment is highest for homeowners, long-term residents, and non-white residents. Therefore, any study looking at how social capital emerges and morphs during a disaster would be wise to take into account how the sense of place helps to explain these changing network dynamics. Yet, as Lewicka (2011) notes in reviewing the place attachment literature, new work should focus not only on people and their relationships to places, but also on place attachment as a fluid and dynamic sentiment, an objective that this article tackles by analyzing how a catastrophic event alters and reinvigorates place attachment.

At the same time, researchers find the importance of place for residents returning and rebuilding from disasters, such as wildfires (Cox and Perry 2011), contend that experiencing an environmental disaster can strengthen place attachment (Burley et al. 2007) and argue that helping residents reconnect to place can assuage much of the disorientation that affected people experience, and both pre-existing place attachment and also newly forged connections to place can encourage children’s resilience and recovery (Scannell et al. 2016). Compelling work by Silver and Grek-Martin (2015) after the 2011 Goderich, Ontario tornado demonstrates how local social capital intersects with place attachment, as shared experiences of recovery, community volunteerism, and experiences of social cohesion coalesced to renew residents’ sense of place.

The place attachment literature also shows us some of the ways that social capital can be *janus-faced*; that is, what are some of the negative externalities of strong, locally situated social networks and attachment to place? Elliott et al. (2010) find that neighborhoods

affected by Hurricane Katrina with high levels of place attachment and strong, locally-based, bonding forms of social capital (i.e., homophilous networks of like-minded individuals) served as a barrier to prompt evacuation, to residents' ability to secure needed resources, and to eventual return. By comparison, more well-heeled neighborhoods, even with less connection to place, were able to return and rebuild sooner. Strong attachment to place sometimes does fail to facilitate people's mobilization for post-disaster collective action (Mukherji 2014). Bonaiuto et al. (2016) find that strongly attached individuals, although they perceive disaster risk, take risks less seriously and are less willing to move away from risky areas following a disaster. Although this motivation to return and rebuild might be viewed as resilience by some, it may also serve as an impediment to strategically relocating people and property from at-risk area, or what Koslov (2016) calls "managed retreat." As Lee and Blanchard (2012) reveal, place attachment also sets up residents for higher levels of post-disaster trauma, as those who are most attached to place also have the most to lose when that place is disrupted or destroyed. They find that the residents with the strongest community attachment experienced the most negative psychological impacts in the aftermath of the BP oil spill, which again demonstrates that place-based social capital can serve as a source of vulnerability.

Post-Disaster Civic Engagement

Research indicates that community problems, such as poverty or crime, often trigger residents' civic engagement (Small 2004), which forms the "building blocks" (Putnam 2000:19) of social capital. For many residents, the community association or neighborhood association serves as a primary locus of civic engagement, and an important place for creating and maintaining social capital (Ruef and Kwon 2016). This is particularly true in Canada; Calgary, for instance, maintains more than 150 community associations and the city employs Neighbourhood Partnership Coordinators, who work with these associations to build membership and develop programming (City of Calgary 2018).

What is particularly salient about local and neighborhood-level forms of post-disaster civic engagement during recovery? A small corpus of literature reveals that the social ties forged during a disaster can help residents resist the imposition of top-down recovery plans, and encourage grassroots solutions to community problems, such as earthquake risks (Fois and Forino 2014), food deserts (Kato, Passidomo, and Harvey 2014), and crime (Lemieux 2014). Aldrich (2011b) argues that, following a catastrophe a "neighborhood's reservoirs of social capital may be essential engines of recovery... Areas with less trust, fewer norms of reciprocity, and irregular citizen interaction may be unable to overcome collective action problems, and hence are forced to rely on government intervention for assistance" (p. 59). This post-disaster civic engagement can be personally empowering and can spawn shared social identity and work as a source of collective strength, dynamics that very much emerge out of disaster (Drury and Winter 2003). This emergent sense of unity can also produce

altruistic and helping behavior, including risk taking to help strangers, as Drury, Cocking, and Reicher (2009) found in the context of the 2005 London bombings. In this light, it is crucial to understand how residents of disaster-affected neighborhoods build and nurture new forms of social capital amidst ongoing recovery, and channel these newly formed ties into civic engagement and collective action.

With that said, evidence suggests that local social capital sometimes fails to help residents to address post-disaster community problems; those problems and their attendant resolutions are far more dependent upon the structural conditions of the neighborhood (Wickes et al. 2015). And, being more socially involved can be both a boon and a burden; Weil, Lee, and Shihadeh (2012) find that more socially involved people encountered more stress during Hurricane Katrina, but that these local network ties also allowed them to “snap back” from their stressful experiences more quickly. Civic engagement can also lead to cases of Not In My Backyard activism (often called NIMBYism), such as the example Aldrich and Crook (2008) provide of local residents resisting the placement of FEMA trailers close to their properties. In these cases, a “strong civil society [can be] a double-edged sword.”

Given this literature, the following analyses seek to understand which residents of disaster-affected neighborhoods build and nurture new forms of social capital amidst ongoing recovery, for which residents’ attachment to place is strengthened, and how residents successfully channel these newly formed ties and reinvigorated place attachment into civic engagement and collective action. The resultant analysis fills the existing gaps in two main ways. First, it deservedly treats residents’ social connectedness as both spatially and temporally complex. Secondly, and more importantly, it focuses specifically on the ways that social networks, place attachment, and civic engagement emerge, change, and grow following a flood disaster.

THE FLOOD

In June 2013, the normally-arid Canadian province of Alberta experienced record-breaking rainfall of up to 8 inches within 36 hours, which caused the Bow and the Elbow, two of the province’s largest rivers, to overtop their banks. This triggered unprecedented catastrophic flooding in Southern Alberta, where 32 states of local emergency were declared, and the Canadian Armed Forces were deployed to help evacuate 175,000 people in numerous communities. The City of Calgary, the epicenter of the flood, witnessed one of the largest urban evacuations in the nation’s history, with more than 75,000 residents evacuated, and more than 10,000 of those residents flooded (Gandia 2013). The Insurance Bureau of Canada subsequently dubbed the flood the costliest Canadian disaster (CBC 2013).

Data and Methods

Data used in the following analyses are derived from a survey of 407 Calgary residents living in the city's twenty-six flooded and/or evacuated neighborhoods. In May 2014, a team of research assistants and I randomly selected 1,500 households from these twenty-six neighborhoods, in proportion to each neighborhood's population. We first numbered each block within each neighborhood, then numbered each house or apartment, including all four sides of each block, and used a random number generator to select the required number of households for each block. For example, if we needed 50 households from a twenty-five block neighborhood, we randomly selected two households per block. Thus, each household in the neighborhood had an equal chance of being included into the final sample of 1,500 households, and each neighborhood was proportionally represented.

After completing the sampling, we mailed out a survey along with an information sheet and an envelope with return postage to each selected household. We also included a form for potential respondents who wanted to claim a \$25 gift card to RONA, a Canadian-owned home improvement chain, for their participation. The survey contained over a hundred items, including demographics, household information, and questions about the evacuation, the participants' use of their social networks during the disaster, and their future plans for returning and rebuilding. Ninety-six envelopes came back marked "return to sender", which is very common in disaster-affected areas (Haney and Elliott 2013), where residents are no longer living in the house, where houses are slated for demolition, or construction is underway. Obviously, it is possible that more envelopes were delivered to vacant homes or apartments, but never officially returned to sender via Canada Post. A few surveys were returned as undeliverable in May 2016, two years after the initial mailing. Therefore, my assumption that 1,404 households received the surveys is a high-end estimate.

In June 2014, the research team began visiting the sampled households on foot, asking residents to complete the surveys, which increased the response rate substantially. On-the-ground data collection finished in late September 2014, generating 407 surveys with a 25.5 percent response rate, calculated using the American Association of Public Opinion Research online calculator (American Association of Public Opinion Research—AAPOR 2016). Using the City of Calgary's "Community Profiles" data (City of Calgary 2015), derived from the 2011 Canadian census, I calculated the descriptive statistics for the residents of the twenty-six sampled neighborhoods. The final sample is largely representative of the selected neighborhoods' population, but the comparisons between the sample and the population are telling. For instance, the study under-sampled residents with a university degree, as only 62.13 percent of the sample had a Bachelor's degree compared to 66.43 percent of the population. Additionally, the study oversampled women, who represented 64.68 percent of the sample compared to 50.04 percent of the population. Finally, the study oversampled higher-income residents: the sample median income was \$100,000 - \$109,999 compared to the population median income of \$83,645. The

overrepresentation of higher-earning residents is in line with the oversampling of the economically privileged in previous disaster research, which Haney and Elliott (2013) explain by the higher probability of wealthier residents returning to their homes after a disaster and, therefore, a higher probability of them being recruited as participants.

The logistic regression models that follow regress several dependent variables (discussed in more detail below) on a host of independent variables. All the models use demographic variables, including age (and age-squared), race (white/non-white), gender, marital status, parenthood, and educational attainment (Bachelor's degree or higher). They also use an ordinal variable for household income, with each category representing a \$10,000 increment: the categories range from \$0-\$9,999 (coded as 0) to above \$200,000 (coded as 20). Since only 86 percent of the sample provided a valid answer about their income, I have imputed the income variable using Stata's multiple imputation command "impute". To measure community connectedness before the disaster, the models include the variables for home ownership (yes/no), years lived in the current home, number of neighbors known by name, community engagement in the neighborhood before the flood, and the sense of neighborhood attachment before the flood. To measure flood experience, the models include the variables for participants' home flooding (yes/no), their evacuation experience (yes/no), and the length of evacuation in days (with those who never evacuated coded as "0").

The article also utilizes qualitative data gleaned from 40 in-depth interviews with 40 affected residents, which took place in the fall of 2015, approximately two years after the flood, and a year after the survey wrapped up. Each interview lasted about 90 minutes, and the participants were offered a \$50 gift card. Participant names have been changed to pseudonyms to ensure confidentiality.

FINDINGS

Emergent Network Ties

Research is increasingly interested in establishing whether social capital emerges during a disaster and immediately after it, and in identifying who benefits from new networks and under what circumstances. The following two models explore these questions. The first model asks the participants whether they made new contacts during the flood, and, if they did, whether they kept in touch after the flood.

Table 1 results indicate that the most important predictors of disaster-generated social capital are related to the material and experiential effects of the flood. In fact, experiencing home flooding, being asked to evacuate, and the length of evacuation are the *only* significant predictors of both dependent variables, except neighborhood engagement before the flood. Experiencing home flooding increases the odds of meeting a new network contact by a factor of almost five, which is close to the impact of evacuation experience

(odds ratio 4.270). Similarly, each day spent in evacuation or displacement increases the odds of meeting a new network contact by about half a percent. These findings imply that the situations of need rather than particular personal characteristics generate new network contacts. People who experienced the most adversity during the flood were the most likely to make new contacts during the disaster, and to stay in touch with them in the year following the flood. It is also important that certain variables in these models are *not* significant. First, the number of neighbors known by name is not significant, which suggests that the situation of need rather than one's openness to new social relationships is conducive to the emergence of social capital. It appears as though people formed new stocks of social capital based upon situational need, not because certain participants are more gregarious and more inclined to create new social capital. Secondly, gender, marital status, parenthood, age, and educational attainment, and income are similarly non-significant, as is income.

Table 1. Logistic Regression Models of Emergent Network Ties

Dependent Variable	Met Someone			Kept in Touch		
	<i>b</i>	SE(<i>b</i>)	Exp(<i>b</i>)	<i>b</i>	SE(<i>b</i>)	Exp(<i>b</i>)
Age	-.047	.074	.953	-.037	.086	.963
Age ²	.001	.001	1.001	.000	.001	1.000
White	-.758	.533	.469	-.917	.570	.400
Female	.596	.391	1.81	.521	.456	1.683
Married	-.244	.428	.783	-.182	.505	.833
Parent	.255	.450	1.292	.633	.520	1.884
Bachelor's or Higher	-.388	.395	.678	.044	.469	1.045
Income	-.002	.040	.998	-.050	.047	.952
Homeowner	.009	.536	1.009	-.007	.617	.993
Years at Residence	-.003	.023	.997	.008	.027	1.008
# Neighbours Known	.014	.012	1.014	.017	.013	1.017
Active in N'Hood, Pre-Flood	.913**	.396	2.493	1.155**	.455	3.173
Attach to N'Hood, Pre-Flood	.266	.451	1.304	-.011	.520	.989
N'Hood Excellent	-.463	.464	.629	-.728	.530	.483
Flooded	1.511***	.385	4.533	1.236***	.462	3.441
Asked to Evacuate	1.451**	.640	4.270	1.470*	.775	4.349
# Days Evacuated	.005*	1.745	1.005	.005*	.003	1.004
Constant	-.234	1.745	.096	-2.470	1.999	.084
χ^2		68.52***			49.13***	
df		17			17	
% Correct		32.43			30.71	
Cox & Snell R ²		.171			.126	
Nagelkerke R ²		.301			.265	
Valid N		366			365	

*** p<0.01, ** p<0.05, * p<0.1

The importance of the situation of need for the creation of social capital is also evident in the interviews. Dave explains that the experience of displacement has brought him closer to his neighbors, and introduced him to several new neighbors. Since one of his friends owned land in the rural area, his neighbors:

“all moved out the the acreage with the trailers and fifth-wheels and then they had like a little, I call it a refugee camp, so there's that they stayed there for about three months, so they all chipped in and bought a trampoline and a big swimming pool (laughing), took turns babysitting the kids and you know and cooking dinner and

all that kind of stuff. So it's kinda more like a commune for (laughing) three months of camping I guess it what you'd call it there. So it got them a lot closer I guess and and in their neighbourhood as well, but I mean it gave us a chance to kinda meet them.”

According to Jackie, who found herself needing to outrun the flood waters in order to escape her home, the flood served as a lynchpin event that catalyzed neighborhood-based social capital in ways that non-disaster times never could, and brought to Calgary volunteers who had experienced disaster and loss themselves:

“I met more of my neighbors than I have met in the many – thirty years – that I have lived there, right? I am closer to them and we were able to help our neighbors... We met people at the corner of our street that came down from ... the place that had the forest fires a few years ago [Slave Lake, Alberta, which is a nine-hour drive from Calgary]... And they came in and they had lost their house in the forest fires so they came to help. She said, “I am glad my house went the way it did,” she said, “because it was over, done and it was devastating and I moved on.” She said, “You guys are going to be reliving this flood for years.” They had come all the way down to help.”

According to Leila, a 48-year old resident whose home catastrophically flooded and most of whose possessions “just went in the [trash] pile,” many of the new contacts transformed into durable ties that persisted even two years after the flood:

“[We met] lots and lots and lots [of people]. We probably had about two hundred and fifty people through the house through the cleanup that we had. And lots of people that you see now, you know, maybe you see them at the little coffee shop in the neighbourhood and stuff like that, and you know they were there to help and stuff like that, and a lot closer relationship with like, neighbours, and you know, meeting the newer people that were further down the street and stuff like that.”

Place Attachment

How did the flood impact the residents’ views about the livability of their neighborhoods? Table 2 models the residents’ feelings about their neighborhoods a year after the disaster, using one of the previous dependent variables, meeting a new network contact, as a predictor. The first model presents a logistic regression measuring whether the residents felt attached to their neighborhoods one year after the flood, while the second model presents a logistic regression measuring whether the residents considered their post-flood neighborhood an “excellent” place to live.

Table 2. Logistic Regression Models of Post-Disaster Place Attachment

Dependent Variable	Attached to N'Hood, Post-Flood			N'Hood is Excellent, Post-Flood		
	<i>b</i>	SE(<i>b</i>)	Exp(<i>b</i>)	<i>b</i>	SE(<i>b</i>)	Exp(<i>b</i>)
Age	.084	.063	1.088	.048	.065	1.049
Age ²	-.001	.001	.999	-.001	.001	.999
White	-1.034*	.580	.356	-.423	.586	.655
Female	.455	.341	1.576	.030	.342	1.030
Married	-.541	.404	.582	-.208	.399	.812
Parent	-.315	.433	.730	-.227	.422	.797
Bachelor's or Higher	-.196	.367	.822	-.021	.372	.979
Income	.044	.037	1.045	.046	.037	1.047
Homeowner	.368	.449	1.444	-.205	.459	.814
Years at Residence	.011	.022	1.011	.041*	.023	1.042
# Neighbours Known	-.001	.016	.999	-.000	.014	.999
Active in N'Hood, Pre-Flood	.264	.450	1.303	-.189	.425	.827
Attach to N'Hood, Pre-Flood	3.041***	.359	20.932	.854**	.363	2.349
N'Hood Excellent	1.542***	.358	4.672	3.602***	.391	36.661
Flooded	.380	.477	1.462	-.987**	.432	.373
Asked to Evacuate	-.811**	.396	.444	-.664	.406	.515
# Days Evacuated	-.001	.004	.999	-.000	.003	.999
Met Someone	.041	.522	1.042	.071	.481	1.073
Constant	-2.88**	1.438	.056	-2.494*	1.515	.083
χ^2		192.58***			187.29***	
df		18			18	
% Correct		62.65			65.60	
Cox & Snell R ²		.410			.401	
Nagelkerke R ²		.579			.564	
Valid N		365			365	

*** p<0.01, ** p<0.05, * p<0.1

Table 2 reveals that having one's residence flood did not affect people's attachment to their neighborhoods, but it did negatively affect their perceptions of their neighborhoods' quality of life. In other words, the flood did not affect the residents' emotional attachment to place, but it did affect their purportedly objective views of neighborhood livability. In fact, those who had been asked to evacuate were only half as likely to feel attached to their neighborhoods (odds ratio 0.444). This finding may be explained by the fact that the evacuation experience forced the residents to consider their neighborhoods' and homes' vulnerability to future flooding, and prompted them to question their future residence in the affected neighborhoods.

Unsurprisingly, the two strongest predictors of post-flood place attachment and post-flood perceptions of livability are the pre-flood place attachment and pre-flood perceptions of livability. Nonetheless, the findings suggest that a more adverse flood experience, specifically home flooding and evacuation, adversely affected the respondents' place attachment and perceptions of livability, even controlling for pre-disaster place attachment and perceptions of livability. Therefore, we can conclude with some certainty that confronting residence-associated risks, and bearing flood-related financial costs exert a downward effect on residents' perceptions of their neighborhoods.

As with Table 1, the non-significant variables are interesting. In particular, having emergent ties, i.e., making new contacts during the disaster, is not a significant predictor of either place attachment or livability perceptions. This finding suggests that, contrary to Solnit's (2010) optimistic portrayal, post-disaster neighborhoods are not necessarily "paradises built in hell." Rather, disaster erodes residents' assessments of their milieus,

regardless of their expanded social networks. But, similar to Elliott et al.'s (2010) research on post-Katrina New Orleans, the current study reveals some of the “limits to social capital.”

On the one hand, for many interview participants the flood reignited not only their community connectedness, but also their civic and neighborhood pride. According to Leila,

“[the neighborhood] is a lot closer, there are a lot more people who know each other and they are more caring, and there is a huge sense of pride in the community in how it pulled together and came out of the flood, I would say that for sure”.

This was especially important for her as a resident of Bowness, the second lowest-income neighborhood of the 26 neighborhoods affected by the flood, where there are:

“an awful lot [of people] that live on the outer edges of society that live in Bowness, that were able to come and participate and help their neighbours and gave them a great sense of help and that they were part of the bigger picture and stuff. I think it gave a huge sense of community that way that everyone belonged, everyone pulled together, everyone got dirty together. There was no status differences.”

For Leila, the flood helped to erase social class cleavages that mattered during non-disaster times, as everyone in the neighborhood had a role to play in the response and recovery.

At the same time, for several participants, conflicts with neighbors arose after the flood, either due to the competition for scarce resources, such as recovery money, or due to the construction noise and debris. According to Roxanne,

“it is really just immediate neighbours that is having issues just because of the whole boundaries and building disruption. I would say I know several people on the street right now who are having issues with their immediate neighbour. There are even a couple of lawsuits on the go, you know?”

Roxanne felt that the conflicts had eroded her neighborhood attachment, which is consistent with Picou et al.'s (2004) “corrosive community” thesis about technological disasters. However, it should be noted that such observations as Roxanne's were an exception rather than a prevalent pattern in the qualitative data.

Post-Disaster Civic Engagement

Table 3 presents the results of logistic regression models measuring post-disaster civic engagement. The first model asked the participants whether they spoke with their neighbors more after the flood than before. The second model looks at whether participants had attended any community or neighborhood meetings since the flood. This second dimension

is particularly important, as previous research has found that the ability to connect with pre-existing organizational networks is a key factor in community resilience (Norris et al. 2008). The third model asked the participants whether they considered themselves active in their community or neighborhood after the flood.

Table 3. Logistic Regression Models of Post-Disaster Civic Engagement

Dependent Variable	Speak More			Meetings			Active		
	<i>b</i>	SE(<i>b</i>)	Exp(<i>b</i>)	<i>b</i>	SE(<i>b</i>)	Exp(<i>b</i>)	<i>b</i>	SE(<i>b</i>)	Exp(<i>b</i>)
Age	.096	.067	1.101	-.047	.065	.954	.056	.057	1.058
Age ²	-.001	.001	.999	.001	.001	1.001	-.001	.001	.999
White	.686	.524	1.987	1.235*	.688	3.44	.066	.447	1.068
Female	.302	.295	1.353	.019	.313	1.020	-.119	.275	.888
Married	.229	.348	1.257	.336	.377	1.399	.380	.309	1.462
Parent	.170	.357	1.186	-.076	.382	.927	-.310	.349	.734
Bachelor's or Higher	.775**	.334	2.170	.388	.340	1.475	-.006	.286	.994
Income	.026	.030	1.026	.003	.033	1.003	-.079***	.030	.924
Homeowner	-.648	.397	.523	.086	.470	1.098	.439	.370	1.551
Years at Residence	-.020	.020	.980	-.005	.020	.995	-.022	.018	.978
# Neighbours Known	-.011	.012	.989	.018	.012	1.019	.013	.012	1.013
Active in N'Hood	.038	.350	1.039	1.595***	.328	4.927	3.622***	.501	37.431
Attach to N'Hood, Pre-Flood	-1.092***	.400	.335	-.488	.433	.614	-.385	.374	.681
N'Hood Excellent, Pre-Flood	-.079	.448	.924	-.146	.503	.864	-.908**	.405	.403
Flooded	1.537***	.348	4.651	1.299***	.366	3.667	1.256***	.373	3.511
Asked to Evacuate	.204	.342	1.226	.257	.365	1.293	.080	.308	1.083
# Days Evacuated	.001	.002	1.001	.001	.003	1.001	-.003	.003	.997
Met Someone	.395	.396	1.485	.974**	.409	2.648	-.109	.424	.897
Attach to N'Hood, Post-Flood	1.117**	.444	3.056	.706	.487	2.027	.766*	.405	2.152
N'Hood Excellent, Post-Flood	.285	.425	1.331	.400	.483	1.492	.426	.393	1.532
Constant	-5.335***	1.582	.005	-3.934**	1.614	.019	-1.182	1.289	.307
χ^2		71.61***			115.46***			133.35***	
df		20			20			20	
% Correct		38.33			38.82			47.17	
Cox & Snell R ²		.178			.271			.306	
Nagelkerke R ²		.263			.394			.408	
Valid N		365			365			365	

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

The results of the first model demonstrate that people with a Bachelor's degree or higher are more than twice as likely to speak more with their neighbors as those without a Bachelor's degree (odds ratio 2.170). However, even when controlling for education as well as for gender and other pertinent demographics, home flooding is still one of the strongest effects in the model. The residents whose homes flooded are nearly five times as likely to speak more with their neighbors as those whose homes did not flood (odds ratio 4.651), even controlling for pre-disaster civic engagement and the number of neighbors known. While it appears that first-hand flood experience and greater material losses are associated with reinvigorated neighborhood networks, neither evacuation experience nor the length of evacuation is a significant predictor of increased contact with neighbors. The model further reveals that post-flood neighborhood attachment is related to the frequency of neighborly interactions, even controlling for pre-flood neighborhood attachment.

The results of the second model largely mirror those of the first model: people whose homes flooded are four times as likely to attend neighborhood meetings as those whose homes did not flood (odds ratio 3.667). It is notable, however, that pre-disaster civic engagement also matters: people who were active community members before the flood are about five times as likely to attend neighborhood meetings as those who were inactive. Overall, the models suggest that direct flood experience correlates positively with

enhanced civic engagement, even when controlling for salient demographic and socioeconomic predictors as well as for pre-disaster civic engagement. Consistent with theses advanced in popular-press works such as Solnit's (2010), the analyses reveal that disasters catalyze civic engagement that lasts at least a year after a catastrophic event. However, rather than arguing that this civic engagement results from collective effervescence or a newly discovered place attachment, the analyses reveal the importance of material need and direct flood losses for prompting post-disaster civic engagement.

The results of the third model demonstrate the income effect: higher incomes are related to lower odds of being active in one's neighborhood affairs. Once again, this finding suggests that material necessity serves as an impetus for post-disaster civic engagement: while wealthy residents can often fund their own recovery, lower-income residents must cooperate in their quest for government support and resources. Similar to Elliott et al.'s (2010) conclusions, these findings reinforce the idea that "inequalities in social capital increase noticeably over the course of a disaster...leaving the social safety nets of less-advantaged residents increasingly frayed and ineffective over time" (p. 643).

Unsurprisingly, the strongest predictor of post-disaster neighborhood activity is pre-disaster neighborhood activity: people who described their pre-disaster activity as high were 37 times more likely to maintain high post-disaster activity. This suggests a degree of "state dependence" (Halaby 2004:536) of civic engagement, or a scenario in which those most engaged in their communities before the disaster are likely to remain the most engaged after the disaster. Nevertheless, disaster does induce changes in civic engagement: for instance, those whose homes flooded were 3.5 times more likely to be active in their post-disaster communities, even when controlling for pre-disaster levels of activity.

One of the study participants, Scott, a teacher residing in the city's Douglasdale neighborhood, spent more than \$200,000 out of pocket on repairing his home. At the same time, he found himself engaging more actively in neighborhood meetings and events. Scott's participation in civic and community affairs grew out of his recognition that proper structural mitigation activities were not taking place even two years after the flood:

"I am on a committee and we are lobbying. I want to be vocal about it, and that is why I am talking with you [the researcher]...I am going to keep talking to people and keep actively participating in a proper mitigation strategy so that the damn thing can get at least under control."

Similarly, the flood experience reignited Kristopher's desire to play an active part in his community, encouraging him to collaborate with numerous community members to incorporate a Flood Task Force into their existing community association:

"And so we got together to decide you know we're gonna pull together and figure out what we can do about this at the same time the community association wanted

to have a group of people to evaluate what should be done. So that worked out well. So we kind of joined forces with the community association and that order—well almost from the very beginning our little group has been a part of the [neighborhood] community association.”

Similar to Kristopher, Irene also leveraged her existing social connections to ensure resources for her neighborhood and its community association. Taking advantage of her linking forms of social capital, Irene contacted her city councillor since they “were very very close friends... for a long time” and “did things” for the community members: “because they asked me to or I would ask them to. I would listen to the community and say [to the city councillor]: ‘Okay this is what we want, this is what we need.’” Irene’s particular mode of civic engagement arose specifically out of her pre-disaster political connections, and the resources that they could provide to her neighbors and community.

CONCLUSIONS

Have flood-affected Calgary residents found the “paradise” (Solnit 2010) that disasters are said to produce? Not exactly. On the one hand, a number of flood-affected residents did indeed meet new people during the course of the disaster, keep in touch with them, experience a reinvigorated attachment to their neighborhoods, and become more civically engaged. This is certainly a noteworthy finding. On the other hand, we must also pay attention to *who* experienced this reinvigoration. The quantitative findings demonstrate that it is severity of impact and material need that resulted in the formation of new network ties, with those whose homes flooded and those who evacuated longer being the most likely to do so. Similarly, the results indicate that having one’s home flood translated into increased odds of post-disaster civic engagement, even while controlling for pre-disaster levels of civic engagement. In short, those who were most materially affected by the disaster were the residents who then expanded their social networks and engaged most in the community, presumably for instrumental purposes. By contrast, the findings on place attachment indicate that experiencing flooding and evacuation both work to erode attachment to place, even as they motivate greater civic engagement. By contrast, for those residents less materially affected by the flood, there was less need to experience nor participate in the reinvigoration of community—or what Solnit (2010) calls the post-disaster “paradise.”

We know that social capital serves as an important resource for future community resilience. Pais and Elliott (2008) contend that disaster-affected communities engage in a process of residential churning, whereby some residents leave an affected area, others arrive, and the rest move throughout the metro area in response to hazard-induced changes in property values. The end result is what they call the “treadmill of destruction,” whereby “disaster zones reproduce larger, more socially divided versions of themselves as they

rebuild and await the next major disaster” (p. 1448). But as a community, like Calgary, recovers from one disaster and begins preparing for the next, residents’ accumulated stocks of social capital and the social embeddedness of civic engagement will determine how the community fares next time. As Weil (2010) argues, “communities must find ways to extend participation beyond the euphoric early period of recovery into the period in which more mundane, less popular, and often technical tasks must be accomplished if progress is to continue.” (p. 215). Understanding how social networks are forged, reinvigorated, and reconstituted in the aftermath of disaster will help us draw disaster-affected communities together for instrumental, resilience-building purposes.

Like all research, this study does carry some limitations. Principally, we know that data collection in post-disaster communities is notoriously difficult (Barron Ausbrooks, Barrett, and Martinez-Cosio 2009; Browne and Peek 2014; Henderson et al. 2009; Knack et al. 2006; Phillips 1997, 2014), and requires a “sociological determination” (Haney and Elliott 2013). The sample size of the current study ($n=407$), though large enough to be generalizable and yield significant results, is still quite limited. Additionally, we collected data one year after the flood. Did this new social capital and the reinvigorated forms of civic engagement last? Or, as soon as homes are rebuilt, debris removed, and the milieu is stabilized, do these networks dissipate? Due to the cross-sectional nature of the survey, I cannot be certain. Additionally, the questions about pre-disaster neighborhood quality and attachment to place were asked after the disaster, introducing the possibility of recall bias. Lastly, more specific and directed questions about emergent social capital could be asked in future surveys; what was the context in which people met one another? How often did they interact? Were they connected through a known third party? Why did certain contacts endure and others fade? Future disaster research should uncover how both new and reinvigorated forms of social capital operate across space; to what extent are these network contacts concentrated in respondents’ immediate neighborhoods and to what extent are they dispersed? Further research will have to unpack this issue to answer these questions.

Despite limitations, the findings indicate that disasters provide *some* limited opportunity for affected residents to reinvigorate their social networks. But, can we capitalize on these new and possibly ephemeral forms of social capital? Understanding how affected residents rekindle their existing social networks and generate new ones is of critical importance to building more resilient communities. Results of this study indicate that it is not simply the social capital that residents bring with them into the disaster that matters. Rather, disasters are events that have potential to bring people together who otherwise may not interact. Those forged bonds can strengthen communities and potentially lead to various forms of community engagement, volunteering, and altruism. However, even when social capital is not forged directly by a disaster, there is much that researchers themselves can do to assist in its creation. Both Cai (2017) and Bell (2013) demonstrate how researchers can use novel, participatory methods such as Photovoice to both allow residents to participate in discussions of community problems, and also to build

connections to others in their community. The importance of emergent networks and social dynamics in the aftermath of disaster should not be understated. As Kendra and Wachtendorf (2016) reveal in their study of the response to the September 11 attack people “began to share a sense of what was needed... [and that] handling a disaster is not something that happens apart from the community; it involves everyone” (4). More research should focus on how disaster-affected communities mobilize, nurture their social ties, generate new ones, and prepare themselves for future disasters.

ACKNOWLEDGEMENTS

The author thanks his dedicated team of research assistants (Angela Laughton, Travis Milnes, Morah Mackinnon, Priya Kaila, Grace Ajele, Victoria Stamper, Daran Gray-Scholz, and Isabelle Sinclair) for their hard work on data collection and entry. Gratitude is also due to Kristen Barber for reading an earlier draft of this article and providing guidance, and to Evan Haney and Adam Haney for wisdom and inspiration.

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