Community amenity, social connectedness and resilience: the informal response to the 2010/11 Christchurch earthquakes.

Karen Banwell*, Simon Kingham

Department of Geography, University of Canterbury, New Zealand[1]*
* Corresponding author: Karen.banwell@pg.canterbury.ac.nz

Abstract
The characteristics of the local environment such as access to community amenity and facilities and their impact on health and wellbeing have been well researched. The question is can local amenity confer similar benefits to help facilitate community resilience? Research following the Christchurch, New Zealand February 22nd 2011 earthquake has shown that socially connected communities were able to respond and adapt with collective action. The informal community response was important in supporting residents until infrastructure and more formal structures could be put in place. This research provides support to the importance of social connectedness prior to a disaster to help foster community resilience. It discusses the role of local infrastructure such as shops, local pubs and community amenity in providing gathering places for people to meet and interact and share information. It shows that geographically defined communities with central meeting places were able to use social connections and from this collective action as support. Resilience is a by-product of having good social connections and community amenity helps to facilitate those connections.

Keywords: community resilience, disaster, social connectedness, the third place, local infrastructure.

1. Introduction

Social capital is increasingly identified as an important component of the response and recovery from a disaster [1]. Others highlight the role of social organisation and the adaptive capacities of communities as part of hazard management [2]. Early research on the Christchurch 2010/2011 earthquakes in Aotearoa/ New Zealand all reflect the findings of the international literature for community response [3], the psychological impact on individuals [4], role of grassroots organisations [5], and community psychology [5, 6].

Community resilience generally refers to the ability of an area or neighbourhood to respond and manage through collective action until formal infrastructure and institutions are restored [7]. What is meant by community resilience may never be fully defined as all disasters are different and so may require a different response, although there is a broad consensus that community resilience relies on the collective action of a community to solve problems and adapt to the circumstances [8,9]. Others describe social capital as an asset to be called on in a crisis [10], and in aiding the first part of a community response to an emergency [11].

The importance of local residents supporting the local response despite not being officially trained or part of official organisations [12], and other research has shown them to be integral to the response helping neighbours in the immediate time after and during the recovery phase [3, 13]. Neighbourhoods with strong social cohesion [14] or social capital [1] have been shown to respond collectively. A model of community resilience emphases community participation to be important along with social trust and social support [15] from context where social capital and health affect [16] and how social networks can be positive for health [17], community mental health [18], and access to employment [19]. The level of collective efficacy and social cohesion has also been shown to affect health outcomes across a neighbourhood, although there is some debate about the underlying cause [20]. Social connectedness through social networks is central to a resilient community [21] especially within local neighbourhoods.

The character and quality of these social networks can be influenced by the neighbourhood in which people live through access to natural space, walkability and proximity to facilities. The role of the built environment is well researched and in particular how the characteristics of the urban landscape can influence the development of social capital. The local characteristics of neighbourhood directly influencing health include access to services and amenities, and opportunities for neighbourhood participation [22, 23]. Early authors of social capital [24, 25] all discuss the importance of local amenity and venues as bringing people together for building social capital. The richness or lack of neighbourhood amenity such as recreational sites and access to shops, as well as resident perceptions and reputation are all related to the health outcomes of residents [23].

Given the ongoing debate about the importance of social capital, it is important to attempt to

decipher the potential confluence of the impact of local access to amenity and services on resilience. The Christchurch earthquake presents a unique opportunity to examine the important elements that enabled and activated neighbourhood or communities to respond. This paper explores what characteristics of the local environment such as access to amenity and facilities helped resident's social connectedness that then helped to facilitate the response and recovery from the earthquake.

2. Context - Canterbury Christchurch Earthquakes

Aotearoa/New Zealand has a history of earthquakes straddling two geological plate boundaries [26]. On September 4th 2010, a 7.1 earthquake hit greater Christchurch, Aotearoa/New Zealand, followed on 22nd February 2011 by the most damaging earthquake with the highest ever recorded peak ground shaking [27]. The earthquake was shallow and centred directly under the city, 185 died and 6,000 people were injured. It had a dramatic impact on the people of Canterbury. As the February aftershock sequence was diminishing two large earthquakes sequences occurred on 13 June 2011 and six months later 23 December. Overall the earthquake sequence lasted more than 16 months with over 13500 aftershocks recorded – 60 above 4 M_W [28]. The duration and number of shocks has left residents with ongoing stress and many struggling with health and insurance issues. A distinct feature of these earthquakes which has caused stress is the strong aftershocks occurring well into the recovery phase, bringing residents back to the beginning of the recovery cycle again [29].

Over 90% of homes were damaged and 17,000 have had to be replaced. This has caused mass movement of people across the city. Between 2010 and June 2011 following the third earthquake sequence the resident population decreased by nearly 9,000; about 2.5% of the population. School enrolments also dropped by about 3500, with a further 4500 having moved schools [30]. There was a collective community-wide processing of loss adjustment and grief [31]. Liquefaction (a phenomenon in which the strength and stiffness of a soil is reduced by earthquake shaking which can undermine buildings resulting in major damage) was widespread across the central city into the north and south and most notably to most of the eastern suburbs. Following large aftershocks, silt resulting from liquefaction had to be cleared from homes and streets. Over one million tonnes of silt has been removed lowering land levels leaving parts of the city at greater flood risk. Rock fall and landslips occurred on the Port Hills.

3. Method

This research aims to gain a better understanding of how neighbourhood and social connectedness through access to community public amenity can help to facilitate community resilience. It was carried out in three parts. Firstly, to identify general suburb responses, informal interviews were carried out with researchers, local political figures, community leaders and recovery advisors from government and health agencies. Newly completed research and reports on Christchurch in the intervening three years were reviewed. Secondly, in-depth interviews with 20 key informants, all of who were involved in the early response phase across the city were carried out. Thirdly, qualitative semi-structured interviews were done with 40 community participants from four Christchurch suburbs. Participants were found through local contacts and door knocking followed by snowballing. Interviews were completed between June 2014 and October 2015. Information was sought on participant's earthquake experiences, of the neighbourhood response, and how they now perceive and use their neighbourhoods.

The four suburbs were selected by completing a review of the Christchurch City Council community profiles developed in 2006 and reviewed and updated post-earthquake in 2011/2012 to support local recovery processes. Measures include core demographics, social networks, pre- and post-earthquake issues and loosely mapped the social capital of aggregated Census Area Units. Although the methodology is subjective it provides a useful comparative exercise. Areas were excluded to avoid resident fatigue where there has been significant residential change from the earthquakes or where significant research had been done over the past three years. The selected suburbs are representative of different living environments. Three have similar deprivation ratings but with different urban forms, residential zoning categories and demographics. They have different levels of access to facilities and services including green space. The fourth suburb has one of the highest deprivation measures in Christchurch, is zoned at a higher density and post-earthquake has experienced closure of their local primary school.

4. Results

All Greater Christchurch residents were affected to some extent. Initially Civil Defence was focused on recovering people and then bodies from under the collapsed office buildings and Victorian facades in the central city. With no services, water electricity or sewerage across large parts of the city people had to tend to their own needs. Thousands left damaged homes, most employment ceased and schools closed for many weeks. Between the earthquake and when lifeline infrastructure was restored, family, friends and especially neighbours were crucial. Like other studies [3], these research participants were clear that pre-existing community connectedness was important in helping people to manage and adapt to the difficult conditions.

Most talked about living on the street and craving the company of others. One participant referred to that time "*as the blanket that covered us all*". Not only were people physically displaced but also ontologically displaced, the normal rhythms of their lives had changed. Those residents not injured or in mourning and still in their homes found themselves with time – time to be with their neighbours, time to help out neighbours, to provide food or shelter, or dig silt from local schools or homes across the city. Different neighbourhoods within suburbs required different levels of response, the greater the damage the greater the need for collective effort.

What drove the informal response were social connections. Residents used their connections to garner help, often through pre-existing or social media networks. By Friday 25th February (four days after the earthquake) the volunteer relief effort was emerging. Very well reported in the media was the Student Volunteer Army. With the Christchurch's University of Canterbury closed about 2500 students, connected through social media, assembled to remove liquefaction silt from roads, parks and around homes. Similarly, the Farmy Army (created by the Federated Farmers) came with diggers and farm equipment to remove silt. Less well reported but an excellent example of the activation of well-established structures were the immediate opening and use of marae (Maori meeting place) as welfare centres. Marae fed many 1000's across the city and Maori Wardens arrived from marae all over Aotearoa/New Zealand. The wardens knocked on doors, and helped provide food in the more deprived and badly affected eastern parts of the city. Marae are skilled in housing and feeding large groups of people within days usually for tangi (funerals) or cultural events.

The Student Army and the Farmy Army were initially turned away by civil defence. The top-down nature of Civil Defence management structures were unable to deal with the volume of requests to help. These organisations initiated their own response activities. Many of those interviewed spoke of how friends and family also spontaneously returned from within New Zealand and Australia. They too sought direction from Civil Defence without success and so joined the larger volunteer efforts. Spontaneous welfare centres also emerged as people saw a gap where formal welfare was absent. One key informant spoke of how she accidentally set up a welfare centre in a quiet coastal suburb. Here she, with the aid of others who came to help, fed up to 3000 people a day. Weeks later they realised people were not coming for food but for company.

Key informants involved in suburb responses noted that many individuals could not cope. They stressed that vulnerability occurred in both deprived and affluent neighbourhoods, describing how individuals managed in different ways. Within suburbs with poor community amenity supportive networks were seen as a result of individual leadership and long held neighbourhood friendships - "*yes leadership lay with Mary as she has lived in this street a long time*". Generally, however, these suburbs exhibited little collective action. Key informants spoke of how relatively deprived inner city suburbs that were relatively undamaged have smaller older homes with verandas and so people tend to live more on the street. Residents still needed to connect. Many from these inner city suburbs went to their local church for meals. Some may have needed food but many said they went because they needed to connect with others.

One theme that emerged across all interviews was the importance of knowing where you live. Well-defined neighbourhood boundaries or having an identifiable community was important - "*you have to know the boundaries of where you live so you can belong to that place*". Another said "*I could ring and ask for help for my community because I know the area I am asking for*" and "*when people are geographically bound they tend to do things more within their community*". One key informant, who organised door knocking to check on the vulnerable was very clear about the importance of having a community hub or known boundaries. She provided many examples of suburbs or larger neighbourhoods without a hub or centre nor a functioning residents group and where residents waited for help. Key informants were very direct about the importance of knowing where your suburb begins or ends or more importantly having a centre of shops or a node of supermarket, a school or an active church. A school principal interviewed discussed the need to know the school community boundaries. He said "*I am a stronger believer in community now much more than I used to be, especially physical ones*".

A woman who helped drive collective action said of her geographically defined neighbourhood, "*I knew a few people before the earthquake now I probably know 300 and I am not alone, I have always wanted to live in a village and I have found one, it denotes some old fashioned values really, a church, a pub and a school - we have them all and we did well*". The key informant who set up the welfare centre in the east said "*it's hard for people to engage with each other when you don't have a meeting place to come together, I mean Aranui* [a more socially deprived suburb in east Christchurch] *has a core, a library and playing fields and shops and schools where you can yak. Here is only the petrol station, how do you have a chat at a petrol station?*" She continued with "*I really worry about the suburbs with a lack of a hub as it makes it so hard for communities to connect well*".

Disasters accentuate a community in many ways, and many of those interviewed expressed a desire for, but recognised the challenge of, maintaining that new awareness and

understanding of community. They referred to the latent goodwill that is moderated in normal everyday life. Most recognised the role of meeting places in their lives, many used the term "*bumping places*". Post-earthquake, community facilities were demolished or unusable as were parks and natural spaces due to rock fall or sewage contamination from broken pipes. There were few places to meet. Interviewees talked about the loss of community facilities for neighbourhood activities and social interaction making it difficult for some, such as the elderly. Older participants spoke of the hole in their lives having no places to go. Many said they lost connections to others and two talked of this perhaps contributing to the early death of their parents, their loss of routine, loss of connecting with others, and of the connectedness as support.

With this loss of usual meeting spaces where people could congregate, spaces were used in creative and innovative ways. Some residents associations and enterprising community groups initiated and negotiated the use of disused homes or old prefabricated buildings as community meeting spaces. Parks were also places to meet for daily connections, even if just recognising others. Parks that followed natural features such as a river or hill, rather than a green square, were preferred. Active connectedness occurred across some suburbs. The vicar of a suburb bounded by hills and wetland that lost their pub and community buildings, arranged a BYO pub (bring your own - so as not to have to negotiate an alcohol licence). These Friday gatherings were a place to meet and chat. Participants from two of the four suburbs without a centre revealed their desire for meeting spaces and places especially as a pub or a café that remained open later in the day. Most interviewed talked of needing places to talk. Gathering places became important and helped with personal recovery and have been a vital mechanism for sharing information and communicating ways of how to manage across neighbourhoods and workplaces. Helpers noticed people coming to gathering places not so much for food as for talk. As one said "*places were important for interaction and fun and for getting information and an important by-product of this was problem solving*".

5. Discussion and conclusion

Resilience is something that is often discussed as something to work toward, in the context of disaster preparedness and now with greater recognition of the importance of social capital. Communities that are socially well connected prior to the earthquakes responded well post disaster. Therefore, pre-existing community development programmes were important in more deprived suburbs.

What has been found in this study reflects previous research [3, 32] that demonstrates pre-existing social connectedness was important for supporting and enabling a community to respond.

Key informants and participants discussed aspects of their neighbourhood's action that fits bridging and bonding social capital, as described by others [33]. Having resources was seen as essential and having social connections aided with knowing who had specific skills and scarce resources. This knowing helped to facilitate and activate support locally or across the city. The link between social connections and networks aiding resiliency and reducing vulnerability to a disaster is well documented [34], as is the role of the collective response and gaining access to essential resources [35]. Key informants also spoke of linking capital and the importance of knowing or having connections within formal structures. These linking connections or knowing the system enabled informants to specifically call for resources such as portable toilets and water where sewerage and water lines were broken.

Individual participants noted vulnerability occurred across neighbourhoods in both deprived and affluent neighbourhoods. Some from deprived neighbourhoods showed individual and collective effort in providing support to people in need: some of the most able were among the least affluent. Researchers argue vulnerability and vulnerable people are different [36]. Many residents interviewed from the more deprived parts of Christchurch could be labelled as vulnerable; their response indicated that their vulnerability was mitigated by access to social contact and aided through community development processes and existing social relations and community groups. The focus should be on local residents [12] or community-based organisations [36] to enable collective effort within communities. This study, like others [5, 13] shows that established community organisations played a role in the response and were able to focus on the special or unique needs of a particular community.

The Student Volunteer Army, the Farmy Army and Marae are good examples of the informal or spontaneous making substantial contributions by recruiting volunteers, door knocking, distributing food and digging liquefaction silt from homes. The Student army was formed immediately post-quake through social networks, while the Farmy Army used existing lists of expertise and resources usually used to manage extreme weather events such as snow and flood in rural parts of Canterbury. Spontaneous Maori leadership was an integral part of the response for badly hit suburbs, and has been described elsewhere [37, 38]. Ngai Tahu (local Maori iwi or tribe of Te Waipounamu, the South Island) led the Maori response and used their pre-existing knowledge and infrastructure [39]. Welfare centres were set up in the marae as shelters and to house Maori wardens who came from all over Aotearoa/New Zealand to help. The coordinated and collaborative response and use of marae ensured substantial support for the damaged city areas. This community-based response was part of the unplanned and yet latent adaptive capacity

that became available. Helping ensured resourcing and assistance was of immense benefit and reflects the strategies for disaster risk reduction as outlined in the Hyogo Framework for Action.

5.1 Needing to help
Out of necessity participants shared food, water and energy sources in the first days with neighbours. Later, after essential infrastructure was restored, participants shared information and stories to help with solving problems on insurance, employment and personal issues. For places with strong community development processes in place, residents were able to mobilise community activities for neighbourhoods to connect. Most participants with the interruption to school and employment had time; they described their need to participate in the early response and then recovery efforts. Resourcefulness gained from collective action has been identified as an important component of resilience [40]. Those who participated in the response with food and then the clean-up of silt discussed at length the good feelings of participating and having time to provide to others. This sense of good will and helping was consistent with reward and good feeling as described from volunteering and helping others [41, 42]. Helping others helped them to feel less helpless and to have some sense of control of their lives. Most interviewed talked of the latent good will within their neighbourhoods following the earthquake and of their desire to maintain the sense of spirit and connections.

With the vast devastation across the city external support and government formal welfare structures could not meet many residents' needs for shelter, food and water. Other researchers found that the more disadvantaged neighbourhoods had less capacity to respond [12] [43] although this study found leadership within streets where neighbours and community leaders supported some of the most deprived. Those suburbs with a lack of community or local infrastructure made it difficult to organise or distribute support, these also tended to have an urban form dominated by car use, wide streets, no centre and connector roads as boundaries. A key strategy identified in the international literature is the leading role played by residents in disaster response [32]. The Canterbury Christchurch earthquakes have instigated a shift in local civil defence planning now with a greater focus on community led solutions and welfare teams.

Community gatherings and neighbourhood events emerged where there was need through unprompted leadership by one or a group. In these suburbs a community response was illicited, to mobilise and show leadership and to collectively organise. Having a centre provided residents with a geographic understanding of where they live. Spatial developments of the urban environment has been shown to influence

social networks and with that the ability of a community to respond [21]. Suburbs that showed collective effort were those defined by geography whether hills, sea or rivers and with a community infrastructure that supports social connections, third places like a school, a pub or shops. Participants used the term bumping or gathering places.

5.2 Community amenity / local infrastructure
Third places are public spaces that are accessible to residents are well integrated into daily life and with underlying personal importance [44]. Neighbourhood or local infrastructure such as shops, cafes, pubs, local libraries, pools and recreational spaces can all be third places. School gates may also be third places for parents and can be vital to deprived neighbourhoods by delivering two roles: one functional through physical community use, while two, also offering a social function [45]. Urban designers discuss how physical features can shape the social interactions, some negative [24] but increasingly for positive effect making quality places to live [45] including now for help to enhance resilience. Chance encounters can help to facilitate neighbourhood sociability and to induce more intimate social connections among neighbours [46]. These relationships become especially important when a disaster occurs. Participants without access to a third place such as cafés or a pub described their desire for these and others discussed the importance of public spaces like parks.

5.3. Resilience
People well embedded in their neighbourhoods through having young or school aged children, or other relational groups or just having lived in their suburbs for a long time provided positive stories of helping. They all described themselves as well connected. This study would suggest that resilience is not an action, but a process or by-product of strong well connected neighbourhoods and communities. Those suburbs or neighbourhoods that were connected, where people knew who had the resources or skills did well. They were able to respond collectively and in the early response it was spatial based. Local residents are a valuable resource as part of the clean-up and providing support to the vulnerable. As part of the civil defence framework enabling and supporting residents to participate in response and recovery actions is important to helping to rebuild community life. Resilience can be strengthened through many of these processes but having places to connect is important.

Reframing the policy context of how urban environments should be developed would benefit from a direction where more traditional values of smaller groupings, of villages within the larger urban environment and where there is clear delineation of spatial communities anchored by community infrastructure become key. Building resilience into urban landscapes should be

foundational to the growth and development of urban environments. The observable influence that is consistent within the literature is that better connected neighbourhoods enable more connections and meeting places and this is valuable when disaster strikes[1]. For those neighbourhoods where residents are less able or where resources are limited then greater community support is required through community development processes [47].

6. Acknowledgements

References

1. Aldrich, D.P., *Building resilience: Social capital in post-disaster recovery*. 2012, Chicago: University of Chicago Press.
2. Tierney, K., *The social roots of risk: Producing disasters, promoting resilience*. 2014: Stanford University Press.
3. Thornley, L., et al., *Building Community Resilience*. 2013.
4. Dorahy, M.J. and L. Kannis-Dymand, *Psychological Distress Following the 2010 Christchurch Earthquake: A Community Assessment of Two Differentially Affected Suburbs*. Journal of Loss and Trauma, 2011. **17**(3): p. 203-217.
5. Cretney, R.M. and J. Gaillard, *Local responses to disaster: the value of community led post disaster response action in a resilience framework*. Disaster Prevention and Management: An International Journal, 2016. **25**(1).
6. Gawith, E., C. Mutch, and D. Dr Jay Marlowe, *The on-going psychological toll from the Canterbury earthquakes: Stories from one community*. Disaster Prevention and Management, 2013. **22**(5): p. 395-404.
7. Magis, K., *Community resilience: An indicator of social sustainability*. Society and Natural Resources, 2010. **23**(5): p. 401-416.
8. Gunderson, L., *Ecological and human community resilience in response to natural disasters*. Ecology and Society, 2010. **15**(2): p. 18.
9. Norris, F., et al., *Community Resilience as a Metaphor, Theory, Set of Capacities, and Strategy for Disaster Readiness*. American Journal of Community Psychology, 2008. **41**(1-2): p. 127-150.
10. Woolcock, M. and D. Narayan, *Social capital: Implications for development theory, research, and policy*. The world bank research observer, 2000. **15**(2): p. 225-249.
11. Dynes, R.R., *Social Capital Dealing with Community Emergencies*. URI: http://hdl.handle.net/10945/25095, 2006.
12. Thornley, L., et al., *Building community resilience: learning from the Canterbury earthquakes*. Kotuitui: New Zealand Journal of Social Sciences Online, 2015. **10**(1): p. 23-35.
13. Vallance, S. and S. Carlton, *First to respond, last to leave: Communities' roles and resilience across the '4Rs'*. International Journal of Disaster Risk Reduction, 2015. **14**: p. 27-36.
14. Townshend, I., et al., *Social cohesion and resilience across communities that have experienced a disaster*. Natural Hazards, 2015. **76**(2): p. 913-938.
15. Paton, D., Johnston, D, *Disaster Resilience: An Integrated Approach*. 2006, Springfield ,IL.: Charles C. Thomas,
16. Kawachi, I., S. Subramanian, and D. Kim, *Social capital and health*. 2008: Springer.
17. Berkman, L.F., et al., *From social integration to health: Durkheim in the new millennium*. Social Science & Medicine, 2000. **51**(6): p. 843-857.
18. Evans, G.W., *The built environment and mental health*. Journal of Urban Health, 2003. **80**(4): p. 536-555.
19. Portes, A., *Social capital: Its origins and applications in modern sociology*. LESSER, Eric L. Knowledge and Social Capital. Boston: Butterworth-Heinemann, 2000: p. 43-67.
20. Altschuler, A., C.P. Somkin, and N.E. Adler, *Local services and amenities, neighborhood social capital, and health*. Social Science & Medicine, 2004. **59**(6): p. 1219-1229.
21. Carpenter, A., *Social ties, space, and resilience: Literature review of community resilience to disasters and constituent social and built environment factors*. 2013, Federal Reserve Bank of Atlanta.
22. Woolever, C., *A contextual approach to neighbourhood attachment*. Urban Studies, 1992. **29**(1): p. 99-116.
23. Ellaway, A. and S. Macintyre, *Does where you live predict health related behaviours?: a case study in Glasgow*. Health Bulletin, 1996. **54**(6): p. 443-446.
24. Coleman, J.S., *Social capital in the creation of human capital*. American journal of sociology, 1988: p. S95-S120.
25. Putnam, R.D., *Bowling alone: The collapse and revival of American community*. 2000: Simon and Schuster.
26. Glavovic, B., W. Saunders, and J. Becker, *Land-use planning for natural hazards in New Zealand: the setting, barriers,'burning issues' and priority actions*. Natural hazards, 2010. **54**(3): p. 679-706.
27. Bradley, B.A. and M. Cubrinovski, *Near-source strong ground motions observed in the 22 February 2011 Christchurch earthquake*. Seismological Research Letters, 2011. **82**(6): p. 853-865.

28. Cubrinovski, M., et al., *Geotechnical aspects of the 22 February 2011 Christchurch earthquake.* Bulletin of the New Zealand Society for Earthquake Engineering, 2011. **44**(4): p. 205-226.
29. Gluckman, P. and K.F.F. FRS, *The psychosocial consequences of the Canterbury earthquakes: A briefing paper.* New Zealand: Office of the Prime Minister's Science Advisory Committee Publishing, 2011.
30. Love, T., *Population movement after natural disasters: a literature review and assessment of Christchurch data.* Sapere Research Group, 2011.
31. Gawith, L., *How communities in Christchurch have been coping with their earthquake.* New Zealand Journal of Psychology, 2011. **40**(4): p. 121.
32. Bach, R., et al. *Policy challenges in supporting community resilience.* in *London Workshop of the Multinational Community Resilience Policy Group.* 2010.
33. Nakagawa, Y. and R. Shaw, *Social capital: A missing link to disaster recovery.* International Journal of Mass Emergencies and Disasters, 2004. **22**(1): p. 5-34.
34. Cutter, S.L., B.J. Boruff, and W.L. Shirley, *Social vulnerability to environmental hazards*.* Social science quarterly, 2003. **84**(2): p. 242-261.
35. Paton, D.E., J.M. Violanti, and L.M. Smith, *Promoting capabilities to manage posttraumatic stress: Perspectives on resilience.* 2003: Charles C Thomas Publisher.
36. Fjord, L., *Making and unmaking "Vulnerable Persons": How disasters expose and sustain structural inequalities.* Anthropology News, 2010. **51**(7): p. 13-15.
37. Lambert, S.J., *Impacts on Māori of the Ōtautahi/Christchurch earthquakes.* 2013.
38. Kenney, C.M. and S. Phibbs, *A Māori Love Story: Community-led disaster management in response to the Ōtautahi (Christchurch) earthquakes as a framework for action.* International Journal of Disaster Risk Reduction, 2015. **14**: p. 46-55.
39. Kenney, C.M., *Community-led disaster risk management: A Māori response to Ōtautahi (Christchurch) earthquakes.* Australasian Journal of Disaster and Trauma Studies, 2015. **19**(1).
40. Hewitt, K., *Environmental disasters in social context: toward a preventive and precautionary approach.* Natural Hazards, 2013. **66**(1): p. 3-14.
41. Chang, W.-C., *Social capital and subjective happiness in Taiwan.* International Journal of Social Economics, 2009. **36**(8): p. 844-868.
42. Borgonovi, F., *Doing well by doing good. The relationship between formal volunteering and self-reported health and happiness.* Social science & medicine, 2008. **66**(11): p. 2321-2334.
43. Mamula-Seadon, L., K. Selway, and D. Paton, *Exploring resilience: Learning from Christchurch communities.* TEPHRA, 2012. **23**(November 2012): p. 5-7.
44. Oldenburg, R. and D. Brissett, *The third place.* Qualitative Sociology, 1982. **5**(4): p. 265-284.
45. Hickman, P., *"Third places" and social interaction in deprived neighbourhoods in Great Britain.* Journal of Housing and the Built Environment, 2013. **28**(2): p. 221-236.
46. Carpiano, R.M. and P.W. Hystad, *"Sense of community belonging" in health surveys: What social capital is it measuring?* Health & place, 2011. **17**(2): p. 606-617.
47. Yasui, E., *Community Vulnerability and Capacity in Post-disaster Recovery: The cases of Mano and Mikura neighbourhoods in the wake of the 1995 Kobe earthquake.* 2007, University of British Columbia.