

# Indicators of Social Resilience to Climate Change

An Annotated Bibliography

Prepared for the Oregon Climate Health Program

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## Author's Note

### General Approach

I approached this work from both the bottom up and top down, looking at influential literature from social psychology and sociology on the health benefits of social support and social networks (i.e., bottom up), and the more recent disaster literature that is beginning to emphasize the importance of social capital, social cohesion, and social resilience in the face of climate change and other catastrophes (i.e., top down).

Many other non-academic sources were useful including non-refereed articles and reports and websites dedicated to a specific project or organization. Part of my process involved reviewing themes and indicators that other organizations have deemed important and useful in their work and going back to confirm their relevance and study in the literature.

### Key Themes

**Measurement is difficult.** Several general themes emerged in the literature that many if not all authors addressed. The first is related to the measurement of social capital, social cohesion, and social resilience in general. Nearly every author specifically states that measuring these concepts is difficult, and that most research examines each via proxy or proxies. How exactly to measure social capital, cohesion, and resilience is also a point of contention—many authors speak to the better utility of quantitative data (e.g., one can draw comparisons, measurement is systematic) but also draw attention to the value of rich qualitative data. Brown and Westaway (2011) state that there has been a shift away from the belief that adaptive capacity, resilience, and well-being can be measured objectively by a set of quantifiable indicators, and toward an understanding that these concepts comprise subjective, relational, and objective aspects. In my opinion, this calls for a blend of quantitative and qualitative measurement.

Also related to measurement, Aldrich and Meyer (2014) note that more research is needed to understand how to weight indicators of social capital and social cohesion and determine their relative influence on resilience. For example, more research is needed on whether involvement in volunteer associations is more or less important to the overall picture of resilience compared to the number, type, and depth of an individual's social networks. Does one account for a bigger piece of resilience than the other? That is still unknown. Similarly, others suggest more research is needed on how social resources interact with other forms of capital (e.g., economic, physical infrastructure) to influence community resilience. In other words, resilience is not just the sum of a set of characteristics, but rather a complex set of linkages and relationships across systems (Aldrich & Meyer, 2014; Brown & Westaway, 2011). Some work has begun in this realm (e.g., Cagney et al., 2016), and others have studied the interactive effects of social support/social networks and economic resources on other health outcomes like child mortality (Adams et al., 2002).

Finally, in relation to measurement, most authors conceptualize resilience as a *process* instead of an end-state (e.g., Acosta et al., 2017; Cagney et al., 2016; Cox & Hamlen, 2015; Cutter et al., 2008; Kresge Foundation, 2015; Brown & Westaway, 2011). Although not stated explicitly in any of the works I read, I would surmise that this may contribute at least in part to the difficulty with measurement.

**Extrapolate individual data to community level.** Aldrich and Meyer (2014) and Lochner, Kawachi, and Kennedy (1999) note that indicators that are measured at the individual level should be examined at the aggregate levels of neighborhood, community, etc. whenever possible to assess the *collective* picture of community resilience. For example, indicators like employment and education are often collected at the individual level, but consider examining these measures at the county, zip code, Census tract, or neighborhood level to get the employment rate and education level of the community.

**Urgency of building social resilience.** Much of the literature is based on the influence of social factors in the face of large-scale disasters, many of which are likely related to climate change (e.g., powerful storms and hurricanes, fires, etc.). Several authors raise the point that smaller, more frequent or chronic losses and hazards carry the same if not more negative impact in communities, but we are less likely to hear about them (Cutter et al., 2008). Cutter et al. (2008) distinguish between rapid onset disasters which require an immediate response and slow onset hazards (e.g., temperature change, sea level rise, drought, disease, and famine), which are referred to as “pressures”. Slow onset events allow communities the opportunity to modify existing behaviors and practices to reduce the impact of the hazard, and resilience in the face of slow onset events is different than in the face of rapid onset events. Building on both is essential.

**The “dark side” of social cohesion.** An interesting theme emerged related to the “dark side” of social cohesion (Acosta et al., 2017; Aldrich & Meyer, 2014; Chan et al., 2006; Kramer & Hogue, 2009; Schiefer & Van der Noll, 2017; Ungar, 2011). This is the notion that sometimes strong social cohesion can lead to the exclusion of others that the group sees as being on the outside. For example, Aldrich and Meyer (2014) cite evidence that many communities with high levels of neighborhood social cohesion (measured by proxy via voter turnout) successfully lobbied against the placement of FEMA trailers in their neighborhoods after Katrina. Similarly, Chan et al. (2006) discuss how high social capital does not imply high social cohesion. For example, in a community that is ethnically diverse, ethnically-similar subgroup members may cling together and have high levels of social capital amongst themselves, however if there is no crossover between ethnic subgroups the larger community cannot be considered socially cohesive. Kramer and Hogue (2009) elude to this too, and state that social capital may actually be inversely associated with racial equity. Schiefer and Van der Noll (2017) state that some groups use the term social cohesion against of backdrop of returning to traditional values and nationalism, but a truly cohesive society requires mutual tolerance between diverse groups

The potential for the exclusion of other groups at the hands of highly cohesive communities is part of the reason why fundamental values of equity and social inclusion are vital to the development of social/community resilience (Acosta et al., 2017; Kresge Foundation, 2015; Schiefer & Van der Noll, 2017). Not all authors agree on this point, however (i.e., Chan et al., 2006).

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- 1) Acosta, J., Chandra, A., & Madrigano, J. (2017). *An agenda to advance integrative resilience research and practice: Key themes from a resilience roundtable*. Retrieved from RAND Corporation website: [https://www.rand.org/pubs/research\\_reports/RR1683.html](https://www.rand.org/pubs/research_reports/RR1683.html)

*This report is a product of a June 2016 roundtable discussion of community resilience involving researchers, practitioners, and policymakers. Individual and community resilience are defined separately.*

Individual resilience is defined as “the process of, capacity for, or outcome of adapting well in the face of adversity, trauma, tragedy, threats, or significant sources of stress,” (p. vi) whereas community resilience conceptualized as “...the sustained ability of a community to prepare for, withstand, and recover from adversity” (p. 3).

Resilience is recognized as being somewhat dependent upon culture and context, however several factors that promote individual resilience are common across cultures and operate at multiple ecological levels. These include, for example, genetic indicators, personality traits, stable home environment, supportive relationships, safe neighborhoods, and access to recreational facilities and health services.

The concept of community resilience is an expansion of positive individual development and is understood as a process that emerges from interactions between systems. Community resilience is influenced by various forms of capital including human, social, physical, and financial capital, which all require strengthening in order to create optimal resilience:

- Human capital is enhanced by physical/mental health and social well-being of the community;
- Social capital (e.g., social networks and connectedness) can be increased through participatory decision-making, increased self-sufficiency, education of the public, and partnerships between governmental and nongovernmental organizations;
- Physical capital (i.e., infrastructure) can promote resilience by facilitating residents’ access to essential services and creating spaces where people can gather and interact;
- Financial capital refers to the socioeconomic conditions of the community.

One important critique of the conceptualization of resilience is that it does not always consider historical and structural inequalities that shape the development of well-being and therefore impact resilience capacity. Incorporating principles of social justice into resilience work and leveraging resilience-building actions so that they address social inequality/inequity are crucial (e.g., creating policies around climate change adaptation that are fair across all neighborhoods).

The report notes resilience measurement is still an emergent area and continues to evolve. There are challenges inherent to bringing together robust metrics that consider stressors at multiple ecological levels. Roundtable members emphasized the need for resilience research to occur across disciplines and incorporate new streams of data (e.g., social media and community data).

Roundtable participants recommend three tasks to advance resilience work and research: 1) Develop a taxonomy of stressors that reflect various impacts over time (i.e., temporary stressor and long term stressor) and ecological level (i.e., individual, family, community); 2) Collect longitudinal data from

individuals and communities to support complex systems modeling; and 3) Collect qualitative data via narratives, storytelling, and digital media to increase understanding of acute and chronic stress.

2) Adams, A. M., Madhavan, S., & Simon, D. (2002). Women's social networks and child survival in Mali. *Social Science & Medicine*, 54, 165-178.

*This article summarizes a study of the associations between women's social networks and child mortality among families living in Mali.*

Child mortality is influenced by socioeconomic determinants including caregiver attributes (e.g., mother's education, attitudes and beliefs about health, and health practices), household factors (e.g., food availability and resources for health care), and broader community-level characteristics (e.g., political climate and health systems). In other words, child health is dependent upon complex social mechanisms.

Women's social resources may serve to protect their health and well-being and that of their children, particularly when material resources are scarce. For example, a woman from a household with limited material resources may still be able to access support beyond her household due to her position in the local social hierarchy. In developing countries, where access to services is limited, a mother's ability to command social resources may protect their children's health and increase the chances of survival.

The study assessed women's social networks and child survival in a comparison between two ethnic groups in Mali—the Bamanan and Fulbe. Bamanan and Fulbe cultures are distinct in terms of the expectations for group members' independence and cultural norms relative to cooperation and asking for help. Data about women's social networks was primarily collected via surveys where women were asked to report the number of people in their network, the type of support received from each person (i.e., material, practical, cognitive, and emotional), and the closeness of each relationship. Researchers also collected data via ethnographic observation of women and their networks and through in-depth interviews regarding life history.

Findings indicated that Bamanan women had larger social networks comprised mostly of family members from marriage. Women in the Fulbe culture reported smaller networks made up of members of their birth family and neighbors living in the same village. Social network characteristics impacted the odds of child survival for women in both groups but in different ways. For the Bamanan, women with a larger proportion of network members living in their household had lower odds of child death. Among the Fulbe—for whom economic and health resources are extremely scarce—the size of their emotional, cognitive, and practical social networks was significantly associated with decreased risk of child death.

The authors conclude that their research suggests social support may be a valuable resource for those without other resources like income, adequate health infrastructure, and government support in times of stress or crisis.

- 3) Aldrich, D. P. (2011). The power of people: Social capital's role in recovery from the 1995 Kobe earthquake. *Natural Hazards*, 56, 595-611.

*This article reports findings from a study of disaster recovery in neighborhoods following the 1995 earthquake and fires in Kobe, Japan. The Kobe "mega disaster" involved a strong earthquake (7.4 on Richter scale) that caused more than 200 fires to break out in a densely populated area, killing 6,400 and injuring 15,000. The author examined the influence of various factors on recovery between different neighborhoods, with an emphasis on social factors that were related to faster recovery.*

Social networks are important resources that provide network members the opportunity to develop trust and social capital. Trust and social capital are also associated with the speed at which individuals and communities recover after a crisis or disaster. Social connections act as informal "insurance" that can be tapped for information, resources, and logistic guidance following a disaster. More connected communities and those that are politically active are better prepared to mobilize and obtain resources from authorities. Residents who are more connected with each other are more invested in staying in the neighborhood despite hardships and more likely to work together to in recovery efforts. Other evidence suggests connections between disaster recovery including the extent of physical damage caused by the event, population density in affected areas, socioeconomic status of residents, and income inequality.

The effects of social networks, trust, and social capital on residents' health and well-being were apparent immediately during and after the Kobe disaster. First responders were very slow to mobilize, so neighbors and residents were often first on the scene pulling people out of the rubble to safety after the earthquake. In response to the fires, some residents self-organized into civilian fire-fighting corps and attempted to put out the fires. After the disaster, some neighborhoods developed civic organizations to coordinate recovery efforts, neighborhood activities, and strategize around long-term planning.

To isolate the impact of social capital on neighborhood recovery, the author compared two similar neighborhoods with different amounts of social capital. Measuring social capital is difficult and complex, therefore the author used a proximal indicator of the number of non-profit organizations (NPOs) per capita per neighborhood. Recovery speed was measured via population growth.

Social capital was significantly related to the speed of recovery, even after controlling for confounding factors like economic status, public assistance usage, physical damage, socioeconomic inequality, and geographic conditions. The neighborhood with more social capital (i.e., Mano) quickly organized citizen fire brigades during the disaster while residents in the neighborhood with less social capital (i.e., Mikura) "stood helplessly as flames consumed their businesses and homes" (p. 600). After the disaster, Mano residents created a neighborhood organization, established a private company for community development efforts, built a community center, ran a daycare, organized collecting signatures for more public housing, and lobbied government for special housing for more vulnerable residents. In stark contrast, Mikura residents created one neighborhood organization and nothing more. When resident support was required to schedule free debris removal, the Mikura neighborhood was unable to coordinate a signature collection.

Overall, the speed of recovery (measured by population growth) was much faster in the neighborhood with more social capital (measured by the number of NPOs per capita). Other indicators of social capital

(i.e., percentage of homes owned versus rented, and percentage of long-time residents) were also related to stronger recovery. The author concludes that social capital was important in the immediate aftermath the disaster (e.g., citizen-led fire brigades) and in the long-term speed of recovery (i.e., population growth).

The author offers some recommendations for leveraging social capital to strengthen recovery. Specifically, given the finding that social connections were important to long-term recovery in Kobe, disaster-recovery policies that break up communities by placing people in temporary housing outside their neighborhoods should be revisited. In fact, these policies may slow the pace of recovery—the news media in Japan reported over 120 deaths among people living in isolation after the disaster that they termed “lonely deaths.” Instead, the author recommends grouping disaster survivors from the same neighborhood together in temporary housing.

4) Aldrich, D. P., & Meyer, M. A. (2014). Social capital and community resilience. *American Behavioral Scientist*, 59(2), 254-269.

*This article is a review of research and literature on the topic of social capital and social networks and their role in disaster recovery and survival.*

Anthropogenic (i.e., man-made) causes of climate change are predicted to increase the occurrence of disasters (e.g., tropical storms, earthquakes, tsunamis) and hazards that will become more intense over time (e.g., rising sea levels, storms, droughts, and floods). These events disrupt communities and social systems. It is difficult to create policies to plan for and address these risks because there are limited solutions and their mitigation requires the involvement of multiple stakeholders. Most policy responses to disaster risks center on strengthening physical infrastructure (i.e., the built environment), however funding is dependent on political cycles and not necessity.

Strengthening the social infrastructure is an alternative approach to mitigating disaster risk that can not only help prevent large-scale devastation but can also influence the recovery process. Enhancing the social infrastructure involves building social capital, which can increase community resilience to hazards and disasters. Building social capital in a community is critical because neighbors are often the “first responders” during times of disaster, checking on the well-being of others nearby and providing assistance.

Social capital is difficult to measure; therefore, scholars have often focused on economic or demographic factors that are associated with the concept. As a result, practitioners have underutilized social cohesion and social networks in disaster planning and management.

Social capital can be and has been assessed in a number of ways via a variety of indicators, including community members’ attitudes and beliefs (e.g., trust for others including neighbors and leadership) and community members’ behaviors (e.g., leaving doors unlocked, volunteering, membership in associations, knowing the neighbors, donations to charity or blood banks, and depth of social connections).

Three 2010 studies of social capital agreed upon the following in their measurement frameworks: participation in nonprofit, religious, and civic/political organizations, the number of registered voters,

and voter participation. Other indicators of social capital that were assessed in these studies included: business and professional associations, owner-occupied units, Census response rates, recreational organizations, migration rates, creative class employment, population residing in state in which they were born, ratio of two-parent households, and crime rates.

With so many potential, known indicators of social capital, the question more about how to weight the variety of indicators within quantitative measures. More research is needed to understand the importance of each indicator relative to the next, and how these factors might interact with one another.

More research is also needed on the different forms of social capital (i.e., bonding, bridging, and linking) and their relative importance to disaster mitigation. For example, families represent “bonding” social capital (i.e., connections among individuals that are emotionally close), which is central to resilience because family members commonly serve as the first providers of assistance. “Bridging” social capital is found among acquaintances or loosely-connected friends that span across social groups like class or race. Bridging social capital provides opportunities to access a wider variety of resources and more information that may assist in long-term recovery. Both bonding and bridging social capital seem to be important and interact with each other. For example, a poor, majority African American community in the Lower Ninth Ward successfully relied upon bonding social capital to survive Hurricane Katrina (e.g., family as first responders, etc.). However, this community received less support in the year following the disaster such as shelter assistance—this was due to a lack of social ties outside their affected area (i.e., no bridging capital). In this case, bonding social capital was critical to survival and during the immediate aftermath, but bridging social capital would have supported long-term recovery via increased access to information and supplies from other communities and economic strata. “Linking” social capital describes connections between community members and those in power, which are also critical to long-term recovery and rebuilding efforts.

There is a potential “dark side” of social cohesion, in that disasters may motivate some communities with high social cohesion to become more closely knit and closed off to groups they perceive as “outsiders.” For example, after Hurricane Katrina, a study of social cohesion in communities provided evidence of a significant association between high voter before the storm (indicating high social cohesion) and resistance to the placement of FEMA trailers. In other words, communities that were high in social cohesion before the disaster banded together and successfully lobbied to resist helping others outside their community.

The authors of this article propose several recommendations for increasing social capital in communities including time-banking programs where community members earn currency local merchants in exchange for working in a communal garden for an hour. This type of program may not only motivate residents who otherwise may not have volunteered, but also connects them with others while volunteering, and connects them to local merchants, creating a “virtuous cycle” (p. 262). Other recommendations include community events, neighborhood groups, and community meetings. The authors also recommend paying deliberate and careful attention to the layout of the built environment with plenty of spaces to increase social interactions (e.g., coffee shops, libraries, bookstores, bars, hair salons, and public squares).

- 5) Berkman, L. F. (2000). Social support, social networks, social cohesion, and health. *Social Work in Health Care*, 31(2), 3-14.

*This article describes research from the early 1980s to 2000 on the relationship between health and social conditions including social support and social networks. During this time, epidemiologists began to develop the idea that close, personal relationships and connections to one's community protect people's health.*

A number of studies indicate that social conditions influence “host resistance” or “non-specific resistance” to disease and other health hazards. For example, the decline in population rates of tuberculosis many years ago was due not only to advances against the bacteria itself but also to reductions in physical stress and improvements to the environment, nutrition, and other social conditions. A longitudinal study of recovery among heart attack patients found that patients who did not have emotional support their overall health was significantly influenced by the presence of emotional support (i.e., having *someone* they could rely upon, no matter who the person was). Patients who did not have a source of emotional support were 2 to 3 times more likely to die after a heart attack even when other factors were statistically controlled.

Different relationships and social networks provide different types of support including intimate (e.g., family, friends), instrumental (e.g., physician, lawyer, bus driver), and extended community (e.g., grocery store clerk one sees every week).

The author is one of the original creators of an index of social support/social networks called the social network index (SNI), which is measured via four domains: 1) Marital status, 2) Contacts with friends and relatives, 3) Religious affiliation and membership, and 4) Membership in voluntary organizations. In a study of over 6,000 residents in Alameda County, CA, they found that lower SNI scores (i.e., fewest social connections) were associated with higher mortality.

At the community level, high levels of social capital are found among more socially integrated and cohesive societies. Social capital is defined by social scientists as the aggregate level of trust between citizens and norms of reciprocity.

- 6) Biedrzycki, P. A., & Koltun, R. (2012). Integration of social determinants of community preparedness and resiliency in 21<sup>st</sup> century emergency management planning. *Homeland Security and Affairs*, 8 (Article 14). Retrieved from <https://www.hsaj.org/articles/228>.

*This article is focused on recognizing the importance of “social determinants of community preparedness and resiliency” (p. 1) within the context of emergency management.*

FEMA's recent “Whole Community Approach to Emergency Management” (2011), enacted under President Obama, includes a commitment to engaging diverse stakeholders in community preparedness processes. FEMA's new initiative provides the opportunity for more community-focused work in emergency management, however most traditional emergency preparedness models do not consider underlying social conditions and dynamics related to population health and community resiliency (i.e., public social cohesiveness, health equity, economic conditions, and political capital).

Variations in social conditions and dynamics can have significant impacts on population health in general, and are a critical factor in a community resilience in the face of emergency. These variations are not random—rather they are the result of widespread inequities in the distribution of wealth, resources, and opportunity. This inequity is magnified by catastrophic events.

Social determinants of emergency preparedness and resilience are a function of (1) the socio-economic status of a community (e.g., mean income, percent savings, education level, and unemployment rates); (2) environmental infrastructure (e.g., housing availability, crime rates, and geographic location); and (3) “intangible but nevertheless important community attributes” including the degree of social cohesion, “predominance of family/neighborhood structure”, and level of community engagement (p. 2).

There are several recent examples of catastrophic events that highlight the importance of considering social determinants of emergency preparedness and resilience:

*Hurricane Katrina (2005)*: Residents from impoverished neighborhoods (e.g., 9<sup>th</sup> Ward) were less likely to evacuate prior to landfall, which was at first blamed on individual irresponsibility. Later, authorities recognized that there was no planning or infrastructure in place to help evacuate these residents. More meaningful and authentic community engagement with these communities, along with advanced consideration of the social determinants of their resilience and preparedness could have resulted in different outcomes.

*H1N1 Pandemic (2009)*: One strategy authorities implemented to stop the spread of the disease was to close public schools and group childcare. This was a serious problem for many families who relied upon free and reduced breakfast/lunch programs for their children and who could not afford individual childcare. Many parents lost income because they had to stay home from work to care for their children. The severity of the disease also disproportionately impacted communities of color, who are already more likely to experience chronic diseases, unequal access to healthcare, low vaccination rates, and inadequate educational outreach and communication.

*BP Gulf Coast Oil Spill (2010)*: The fishing industry was devastated by the oil spill, which caused many residents to experience long term unemployment. Many of these residents dropped out of high school to take up fishing, and as a result were unskilled and unemployable outside of that trade.

Communities are organisms that have their own sources of informal leadership, ways of communication, and unique sense of identity and purpose. Governments and systems must leverage each community’s unique attributes to come up with strategies to promote community inclusion and engagement around preparedness and resiliency. Successful community engagement and response to catastrophic events is noted anecdotally in communities with community health workers, activists, and organizers who already know the community dynamics and are best situated to implement a response through their established social networks.

- 7) Brown, K., & Westaway, E. (2011). Agency, capacity and resilience to environmental change: Lessons from human development, well-being, and disasters. *Annual Review of Environment and Resources*, 36, 321-342.

*This article is a review of literature related to key concepts in agency, adaptive capacity, human development, and environmental change.*

Human agency is generally conceptualized as the capacity of individuals to act independently and make their own free choices. Agency is a critical factor in determining individual, household, and community capacity to respond to different types of environmental stressors. Emphasizing the important role of agency in overall resilience helps overcome the perception that people are powerless, passive victims of environmental stressors and change.

Adaptive capacity is a source of resilience and adaptedness is characterized by the viability of social and economic activities and the quality of human life: "...adaptability or [the] adaptive capacity of human systems also can be defined as the capacity of any human system from the individual to humankind to increase (or at least maintain) the quality of life of its individual members in a given environment or range of environments" (p. 323). Some authors argue that adaptive capacity and resilience are one and the same—that adaptive capacity reflects the community’s ability to learn and respond to a disturbance.

Others state that resilience results from ordinary adaptive processes rather than extraordinary ones, which one scholar refers to as “ordinary magic” ([Ann S. Masten](#)). Agency and adaptive capacity are influenced by cognitive beliefs that have been shaped by one’s experiences, the perceptions held by the society and the individual, and the structures and circumstances of one’s environment.

Resilience has been used to refer to (1) positive outcomes despite adversity; (2) continued positive or effective functioning in adverse circumstances (e.g., stress resistance and coping); (3) recovery after trauma or severe deprivation; and more recently (4) positive transformation following adversity which leads to positive reorganizations of systems and adaptive functioning.

In human development, resilience is recognized as a dynamic process that results from ongoing transactions between an individual and the environment (see graphic below for key attributes of individuals and the environment that are associated with resilience, from Masten):

<b>Individual differences</b>
Cognitive abilities: IQ scores, attentional skills, executive functioning skills
Self-perceptions of competence, worth, confidence: self-efficacy, self-esteem
Temperament and personality: adaptability, sociability
Self-regulation skills: impulse control, affect and arousal regulation
Positive outlook on life: hopefulness, belief that life has meaning, faith
<b>Relationships</b>
Parenting quality: warmth, structure and monitoring, expectations
Close relationships with competent adults: parents, relatives, mentors
Connections to prosocial and rule-abiding peers (among older children)
<b>Community resources and opportunities</b>
Good schools
Connections to prosocial organizations (such as clubs or religious groups)
Neighborhood quality: public safety, collective supervision, libraries, recreation centers
Quality of social services and health care

Similarly, some scholars emphasize the role of relationships in the conceptualization of resilience and note that resilience is shaped by interactions with other systems like family, school, neighborhood, community, and culture. Resilience is not just the sum of a set of individual characteristics, but rather a complex set of linkages and relationships across systems.

The authors specifically address the measurement of adaptive capacity, resilience, and well-being, stating that there has been a shift toward the understanding that these concepts comprise subjective, relational, and objective aspects. This goes against the notion that they can be measured objectively by a set of quantifiable indicators.

8) Cagney, K. A., Sterrett, D., Benz, J., & Thompson, T. (2016). Social resources and community resilience in the wake of Superstorm Sandy. *PLoS ONE*, 11(8): e0160824.

*This article reports findings from a study of community-level social infrastructure and its impact on people's perceptions of preparedness and recovery after Superstorm Sandy.*

In typical daily life, higher levels of social resources in a community (e.g., social cohesion, informal social control, and social interactions and exchange) are related to lower crime rates, more physical activity, and a greater sense of emotional well-being among residents. These resources can take on even more importance during disasters, when community members must rely upon each other to be first responders, to provide support during recovery, and to build capacity to survive the next disaster.

Evidence suggests collective efficacy and social exchange are key determinants of a community's capacity to manage problems and implement shared goals. Collective efficacy is made up of social cohesion (trust and reciprocity) and informal social control, including the willingness to act. Social exchange focuses on actual interactions between residents of a community including frequency and incidents of residents helping each other.

Community resilience is a process of adaptation based on dynamic resources and capacities. High voting rates, participation in voluntary organizations, and high levels of trust characterize community resilience and evidence suggests they are related to successful recovery from earthquakes, tsunamis, and hurricanes. Community resilience is often measured via qualitative and ethnographic data which is rich in content but not a good way to systematically measure the linkages between social resources and resilience.

This study explored the effects of social resources and resiliency on recovery after Superstorm Sandy in neighborhoods with varying economic means. Data were collected using a [multi-mode survey](#) of 12 neighborhoods (1,009 residents) that were most affected by the storm. Data collected by NORC for a specific study involving a multi-mode survey of 12 neighborhoods most affected by Sandy.

The survey asked questions about social cohesion, informal social control, social exchange between neighbors. Results indicate that all three were associated with higher levels of neighborhood disaster preparedness and higher confidence that one's neighborhood is well prepared for a disaster. In general,

residents who reported their communities exhibit social connectedness also felt better equipped to withstand another natural disaster.

The effect of neighborhood socioeconomic status was varied. Associations between social resilience factors and higher levels of disaster preparedness were found across neighborhoods regardless of socioeconomic status. However, associations between social resilience factors and confidence that the neighborhood is prepared were stronger in neighborhoods with lower socioeconomic status. This suggests that social resources may carry more importance relative to preparedness and recovery in locations where economic resources are limited.

Given these findings, the authors recommend municipalities allocate resources to establish or strengthen social infrastructure that facilitates interaction, which could increase communities' confidence in preparedness and recovery. This might include mixed-use urban space that encourages residents to pass each other as they engage in routine activities, which might facilitate connectedness and trust that can be tapped during times of crisis. Regular block parties or other activities aimed at collective engagement would also provide opportunity for social interaction. They conclude by stating that investing in activities that facilitate social connections may create resilience at the community level that is comparable to gains from investing in physical infrastructure.

9) Chan, J., To, H., & Chan, E. (2006). *Reconsidering social cohesion: Developing a definition and analytical framework for empirical research. Social Indicators Research, 75, 273-302.*

*This article summarizes a review of the ways social cohesion has been conceptualized in the literature. The authors propose a refined definition that could be operationalized into a measurement scheme.*

Social cohesion has traditionally been a focus of academic social science disciplines like sociology and social psychology, and more recently it has become a focus area for policymakers and policy-oriented analysts. Each discipline has its own definition and conceptualization for the term.

Sociologists refer to social cohesion as “a state of strong primary networks (like kinship and local voluntary organizations) at [the] communal level” (p. 275). In this vein, social cohesion is associated with civic integration, and is the opposite of social dissolution and civic corruption.

Social psychologists discuss social cohesion in terms of objective cohesion and perceived cohesion. Objective cohesion refers to the objective attributes of a group, like members' reported closeness to each other. Perceived cohesion is an individual's sense of morale and belonging in the group.

The importance of social cohesion to the progress and collective well-being of society became clear in the 1990s when the Canadian government integrated the concept into its official policy agenda, stating “a cohesive and inclusive society depends on respect for all ethnic groups and the fullest possible participation of all citizens in civic life” (p. 277). In 2001-2002 the conceptualization of social cohesion at the policy level was expanded to refer to income distribution, employment, housing, universal access to health care and education systems, and political and civic participation.

Social cohesion has been considered at the policy elsewhere as well. For example, the Council of Europe identifies public disenchantment with democratic politics as a threat to social cohesion in Europe. To counteract this threat, the Council emphasizes the importance of political and civic participation. Social cohesion is considered to be a key component of economic development by the World Bank.

Unlike others referenced in this annotated bibliography, the current authors do not define social cohesion as a process, but rather as a “state of affairs” or “the level of cohesiveness of a group or community” (p. 281). They argue that the word ‘process’ elicits a counter-intuitive implication that there exists some ‘end-state’ or ‘maximal’ level of social cohesion.”

The authors also disagree with definitions of social cohesion that characterize the concept as a “means-to-an-end” since these definitions only describe the correlates and conditions necessary to develop social cohesion. They also criticize the use of social cohesion as a catchword to describe the most pressing social issues of the day (e.g., poverty, unemployment, disenchantment with policies, exclusion, social capital, discrimination, etc.).

The authors argue that social cohesion is conceptually different from social capital, which has been defined as “features of social organization, such as networks, norms, and trust, that facilitate coordination and cooperation for mutual benefits” (p. 292). Social capital is focused mostly on the individual and group levels whereas social cohesion is concerned with society. Also, high amounts of social capital do not imply a high level of social cohesion. For example, in ethnically segregated societies, individuals may have strong networks with members of the same ethnic group and never cross social boundaries into other ethnic groups. There may be a lot of social capital within ethnic groups, but the society cannot be considered cohesive.

Also, the authors state that social cohesion does not require or imply tolerance or adherence to any particular set of values. To may correlate with certain values (e.g., liberal values), but it is not dependent on certain values. They argue that social cohesion itself is one of many social values.

Dictionaries define *cohere* as “hold firmly together, form a whole,” and “stick together, remain united”. *Cohesion* is defined as “a state in which all the parts or ideas fit together well so that they form a united whole”. Therefore, *social cohesion* should also be understood as a state of affairs concerning how well people in a society “stick” to each other. “Sticking together” is a reflection of individuals’ state of mind, which is manifested in certain attitudes and behaviors: (1) feeling that they can trust, help, and cooperate with their fellow members of society; (2) feeling that they share a common identity or a sense of belonging to their society; and (3) behaviors that demonstrate the feelings described in (1) and (2).

The authors highlight the importance of repeated interactions, indicating that social cohesion is about the continued state of cohesiveness over time. One-off or short-term acts of trust, help, or cooperation do not constitute social cohesion since such behavior may be a manifestation of universal “humanity.”

Based on their review of the literature, the authors put forward their own definition of social cohesion: “a state of affairs concerning both the vertical and horizontal interactions among members of a society as characterized by a set of attitudes and norms that includes trust, a sense of belonging, and the willingness to participate and help, as well as their behavioral manifestations.” Vertical interactions refer to the relationship between the state and society at large; horizontal interactions refer to those among different individuals and groups in society. They stipulate that social cohesion is a societal-level attribute

(i.e., state or country), even though it may be measured at individual and group levels. They propose the following 2x2 measurement framework and a set of 15 sample questions to measure the components in each cell (adapted from the [World Values Survey](#)):

	<b>Subjective component (People’s state of mind)</b>	<b>Objective components (Behavioral manifestations)</b>
<b>Horizontal dimension (Cohesion within civil society)</b>	General trust with fellow citizens	Social participation and vibrancy of civil society
	Willingness to cooperate and help fellow citizens, including those from other social groups	Voluntarism and donations
	Sense of belonging or identity	Presence or absence of major inter-group alliances or cleavages
<b>Vertical dimension (State-citizen cohesion)</b>	Trust in public figures	Political participation (e.g., voting, political parties, etc.)
	Confidence in political and other major social institutions	

10) Cohen, S. (2004). Social relationships and health. *American Psychologist*, 59(8), 676-684.

*This article summarizes the work of the author and others on the association between social relationships and health, with recommendations on how to intervene in social networks to improve health.*

Certain qualities of social relationships have significant impacts on individual health and well-being. These include the structure of one’s social networks, the support received from others, the quality and quantity of social interactions, and feelings of isolation and loneliness.

Social support and social integration are characteristics of the social environment that are beneficial to health. Social support, which refers to the provision psychological and material resources by one’s social network, influences one’s ability to cope with stress. Social support can be *instrumental* (i.e., material aid), *emotional* (i.e., the expression of empathy), and *informational*. Social integration refers to participating in a broad range of social relationships. Social integration involves a behavioral component (i.e., active engagement in a wide range of social activities or relationships) and a cognitive component (i.e., sense of communality and identification with social roles). Social integration promotes health in that it implies stable social structures and adherence to norms that are protective and regulate behavior (i.e., informal social control).

Social support and social integration improve our health using different mechanisms. Social support acts as a stress buffer, which helps people cope with stress. Individuals who perceive that others (even just one other person) are available to provide aid are more capable of coping with stress and appraising stressful situations as less harmful. Social integration works through main effects—that is, individuals who participate in social networks are subject to social controls and peer pressures that influence behavior. Social interactions are thought to aid in emotional regulation and increase positive affect and help limit the intensity and duration of negative affective states. Having a wide range of network ties provides multiple sources of information that could influence health-relevant behaviors, result in more effective use of available health services, or help one to avoid stressful or other high-risk situations.

Certain aspects of our social environments can also be destructive to our health. For example, social isolation can increase negative affect feelings of of alienation, loneliness, and stress while decreasing feelings of control and self-esteem. These negative psychological states could decrease immune function and interfere with the performance of health behaviors. Indeed, evidence suggests that chronic social stressors (e.g., conflicts with spouses, friends, family members) increases one's susceptibility to contracting illness. The author suggests that the effects of negative social stressors on health are mediated by the person's appraisal of the situation (which can be remedied via increased social support).

The social environment certainly influences health and well-being, but personality characteristics play an important role as well. Sociability—the personality quality of seeking out others and being agreeable—is influential in creating and maintaining social ties. Evidence suggests that sociability is associated with greater resistance to developing disease. However, other research suggests social support buffers the negative effects of stress on some health conditions (e.g., depression) even when certain personality traits (e.g., social anxiety, social competence, and openness) are controlled.

More work needs to be done on whether changing social environments can improve health. The current intervention literature (mostly based on studies of peer support groups for seriously ill patients) has been disappointing. Future interventions should focus on enhancing natural social networks instead of promoting social support provided via peer groups of strangers. Interventions should also help people increase the availability of social support within existing social networks by improving social skills or building stronger ties to existing network members. Attention should also be paid to increasing social integration by creating and nurturing close and peripheral ties between an individual and his or her community. Finally, interventions should also help people reduce negative interactions.

11) Cox, R. S., & Hamlen, M. (2015). Community disaster resilience and the rural resilience index. *American Behavioral Scientist*, 59(2), 220-237.

*This article describes the development and pilot testing of the Rural Resilience Index (RRI), an index to assess disaster resilience in rural and remote communities.*

Community disaster resilience (CDR) is the ability of a community to survive and thrive in the face of uncertainty, and has become the preferred guiding principle and framework for global-level disaster and emergency management and disaster mitigation policies.

Modern resilience conceptualizations are more comprehensive than early resilience definitions which only considered a community's ability to "bounce back" after a disaster. Current understanding of resilience now incorporates disaster preparation, mitigation, and adaptability. This project was based on the understanding that CDR encompasses the capability of a community to anticipate and reduce risks and vulnerabilities and increase adaptive capacity and the potential for transformative learning in the face of disaster or other major changes.

The Rural Resilience Index (RRI) is a tool that was developed to help measure resilience. The RRI blends qualitative and quantitative information about a community through Likert-type scale measures based on resilience indicators. One of the potential limitations of an indicator approach to resilience is that focus tends to be only on indicators that are easily measured while ignoring things that are difficult to

measure even though they may be as or more relevant. However, indicators are useful mechanisms for reducing, simplifying, and quantifying complex, dynamic processes and constructs to assess performance and guide future policy and funding decisions.

To develop the RRI, the authors conducted literature reviews of resilience and assessment frameworks and came up with a list of principles which included: resilience is a process, not an outcome; indicators may be more relevant than an aggregated index; and communities may require incentives to prioritize CDR and/or adopt resilience enhancement measures. The authors also conducted interviews and focus groups with people living in rural communities in British Columbia, Canada.

Information gathered from the literature reviews and qualitative data was condensed into a smaller set of CDR domains, including: (1) social fabric (interdependence and connection, leadership, governance structure and processes, community involvement, volunteer networks, community well-being, social safety net), (2) community resources (major service centers, local & regional health care, housing etc.); and (3) disaster/emergency management. These domains were used to form the [RRI assessment tool](#).

12) Cox, R. S., Scannell, L., Heykoop, C., Tobin-Gurley, J., & Peek, L. (2017). Understanding youth disaster recovery: The vital role of people, places, and activities. *International Journal of Disaster Risk Reduction*, 22, 249-256.

*This article describes a qualitative research project called Youth Creating Disaster Recovery and Resilience (YCDR<sup>2</sup>). The purpose of YCDR<sup>2</sup> was to explore how youth recovered from recent disasters including major flooding, tornados, and wildfires.*

Children and youth are particularly vulnerable to the negative impacts of disasters including emotional issues, physical injury, sanitation-related illnesses and other health concerns, death, and the adverse impacts of losing child-friendly spaces (e.g., home, schools, playgrounds). Children and youth who survive disasters also experience educational decline and school dropout.

Much of the research on disaster recovery that involves children and youth focuses on their need to rely upon adults. This focus ignores the unique recovery and resiliency processes of youth who also rely upon peer supports and their attachments to meaningful places like schools, playgrounds, parks, fields, and other public spaces. Place attachment, place disruption, and participating in activities influence children's well-being, emotional regulation, self-esteem, and play a key role in identity development. The YCDR<sup>2</sup> project was an attempt to fill this gap in the research and understand how the recovery and resilience processes of youth are supported after disasters.

The project invited youth who survived natural disasters (wildfire, tornado, flooding) to participate in a "creative action research process" where youth were encouraged to use art to reflect on their experiences in disaster recovery. Youth participated in workshops that involved photo stories, face painting, graphic recording, digital storytelling, and stop-motion animation with the goal of fostering self-reflection and generated dialogue and knowledge.

The project specifically examined which types of support (i.e., people, places, and activities) were most likely to facilitate recovery. People who were important to youth during recovery included parents, teachers, volunteers, peers, pets, media representatives, and even celebrities. Particularly important

forms of support included emotional support (e.g., people one can trust) and companionship support (e.g., people with whom they shared sense of belonging and community). Places that were important included home and school, but also youth gathering places that were formal (e.g., youth centers) and informal (e.g., skate park, convenience stores). Natural environments like parks, recreation places, community arts centers, and disaster relief centers were also important to youth during recovery. Each of these places not only met youths' physical needs (e.g., food, Internet services), but also emotional needs like hope, normalcy, and safety.

13) Cutter, S. L., Boruss, B. J., & Shirley, W. L. (2003). Social vulnerability to environmental hazards. *Social Science Quarterly*, 84(2), 242-261.

*This article describes the development of the Social Vulnerability Index (SoVI), a measure of community-level social vulnerability to environmental hazards.*

Much of the focus on vulnerability to environmental hazards has been on the built environment. As a result, very little is known about what makes people vulnerable and/or resilient to environmental hazards from a social perspective.

Social vulnerabilities are more difficult to measure or quantify, making them easier to ignore. When they are considered, they are often described by individual characteristics (e.g., age, race, health, income, type of dwelling unit, employment). Social vulnerability is partially the product of social inequalities and place inequalities (e.g., characteristics of the built environment like urbanization growth rates).

The authors' "hazards-of-place" model stipulates that risk interacts with mitigation (i.e., measures taken to decrease risks) to produce the hazard potential, which is moderated by geography and social fabric. Social fabric includes community experience with hazards and community ability to respond to, cope with, recover from, and adapt to hazards. This ability is influenced by economic, demographic, and housing characteristics.

There is consensus about the major factors that influence social vulnerability: (1) lack of access to resources including information, knowledge, technology; (2) limited access to political power and representation; (3) social capital including social networks and connections; (4) beliefs and customs; (5) building stock and age; (6) frailty and physical limitations; and (7) type of density of infrastructure and lifelines. However, there is disagreement about how to select specific variables to represent these concepts. As a result, social vulnerability factors that are most often found in the literature are age, gender, race, and socioeconomic status.

To mitigate this limitation in the literature, the authors created the Social Vulnerability Index (SoVI) which identified 11 composite factors (reduced from 85 variables) of social vulnerability: personal wealth, age, density of built environment, single-sector economic dependence, housing stock and tenancy, African American race, Latino ethnicity, Native American ethnicity, Asian race, occupation, and infrastructure dependence. The SoVI is an additive scale (no theoretical basis for assigning different weights to each factor) where higher numbers reflect more social vulnerability.

They piloted the SoVI by calculating the index for every county in the United States and analyzed the scores against the number of presidential disaster declarations for each county in the 1990s. They found

a weak/insignificant but negative correlation between the frequency of disaster declarations and the SoVI index score.

14) Cutter, S. L., Barnes, L., Berry, M., Burton, C., Evans, E., Tate, E., & Webb, J. (2008). A place-based model for understanding community resilience to natural disasters. *Global Environmental Change*, 18, 598-606.

*This article summarizes a new framework, the disaster resilience of place (DROP) model, which was designed to improve assessments of disaster resilience at the community level.*

Resilience is defined as a system's capacity to absorb disturbance and re-organize into a fully functioning system. Resilience refers to the system's capacity to return to the state that existed before (bounce back) but also to advance the state through learning and adaptation.

Resilience is viewed in the literature as both an outcome and a process. As an outcome, resilience is conceptualized as the ability to bounce back or cope with a hazard. As a process, resilience is defined in terms of continual learning and taking responsibility for making better decisions to improve the capacity to handle hazards.

Resilience has two qualities: inherent and adaptive. Inherent resilience refers to functioning well during non-crisis periods. Adaptive resilience implies flexibility in response during disasters. Both types of resilience can be applied to infrastructure, institutions, organizations, social systems, or economic systems.

The disaster resilience of place (DROP) model illustrates the relationship between vulnerability and resilience and is mainly focused on the social resilience of places. The authors propose that vulnerability and resilience are not mutually exclusive nor are they entirely mutually inclusive.

The model defines the total impact of the hazard impact as a cumulative effect of the antecedent conditions, event characteristics, and coping responses. The overall local impact can be moderated by the absorptive capacity of the community using predetermined coping responses.

Social learning is a critical component of the model, and occurs when beneficial impromptu actions are formalized into institutional policy for handling future events. Policy-making and improvements to preparedness after the event increase resilience for the next event (reflected in feedback loops).

Social resilience can be increased through improvements in communication, risk awareness, preparedness, development and implementation of disaster plans, purchasing of insurance, and sharing information to aid in recovery. Some of these are a function of the demographic characteristics of the community and its access to resources

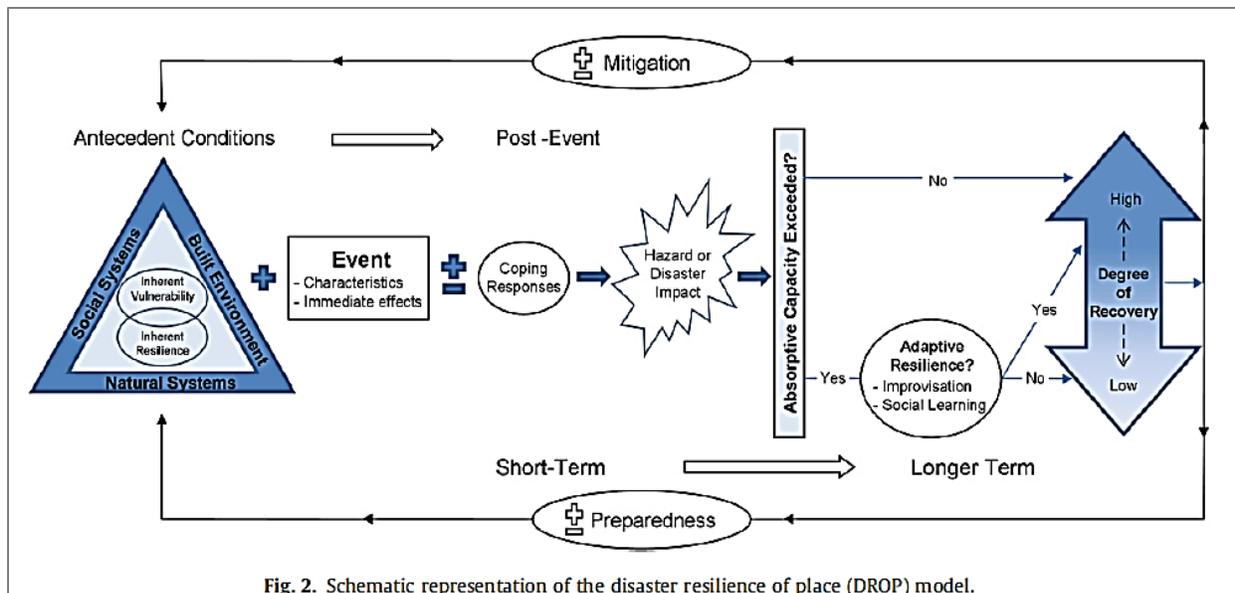


Fig. 2. Schematic representation of the disaster resilience of place (DROP) model.

15) Kawachi, I., Kennedy, B. P., Lochner, K., & Prothrow-Stith, D. (1997). Social capital, income inequality, and mortality. *American Journal of Public Health, 87*(9), 1491-1498.

*This article describes a study of the relationship between income inequality and mortality rates and the mediating influence of decreased social cohesion.*

Previous research has demonstrated a relationship between income inequality and mortality. One potential explanation for this connection is that societies that permit large disparities in income also underinvest in human capital (e.g., education), health care, and other factors that promote health.

The growing gap between the rich and the poor has led to declining levels of social cohesion and trust, or disinvestment in “social capital”. Social capital is a community-level (“ecologic”) variable whose counterpart at the individual level is measured by a person’s social networks. The current study explored the relationship between income inequality and health within the context of declining social cohesion. The authors hypothesize that income inequality is related to a reduction in social cohesion, and that this reduction and subsequent disinvestment in social capital is associated with increased mortality.

For the study, income inequality was measured using the Robin Hood Index, which is “equivalent to the proportion of aggregate income that must be redistributed from households above the mean and transferred to those below the mean in order to achieve perfect equality in the distribution of household incomes” (p. 1491). Higher values on the Index suggest more unequal distribution of income.

The authors used data from the General Social Survey conducted by NORC to estimate state variations in group membership and levels of social trust. Four measures of social capital were tested: (1) the extent of participation in civic associations; and respondents level of agreement with the statements (2) “most people would try to take advantage of you if they got a chance;” (3) “you can’t be too careful in dealing with people;” and (4) “people mostly look out for themselves.”

Results indicate that the degree of income inequality was strongly and inversely related to per capita group membership and a lack of social trust as measured by the fairness question (i.e., most people try to take advantage if they get a chance). States that had high levels of social mistrust had higher age-adjusted mortality rates both generally and for specific causes (i.e., cancer, heart disease, infant mortality, and accidental injury). The same relationships were found between the other measures of social capital and mortality and per capita group membership and mortality.

Path analyses confirmed that the primary effect of income inequality on mortality is mediated by social capital. Income inequality exerts a large indirect effect on overall mortality through the social capital variable. As income inequality increases, so does the level of social mistrust, which is in turn associated with increased mortality.

One major finding is that the size of the gap between the rich and poor is powerfully and negatively related to level of investment in social capital. In other words, disinvestment in social capital appears to be one of the pathways through which growing income inequality exerts its effects on population-level mortality.

16) Kramer, M. R., & Hogue, C. R. (2009). *Is segregation bad for your health? Epidemiologic Reviews, 31, 178-194.*

*This article is a review of studies that test an association between segregation and health outcomes, finding that the health effects of segregation are complex but consistent.*

Residential segregation is the degree to which diverse groups of people occupy different space within urban areas and the processes that create this differential spatial distribution. While segregation of new US immigrants has decreased over the years, segregation between White and Black people has increased. Between 1940 and 1970, segregation policies were supported by laws, restrictions on home loans and housing, and overt acts of intimidation by White people to maintain separation from Black people. This was nothing more than institutionalized racism, which resulted in segregation that still persists today.

Segregation has decreased modestly, but it is due to Black families moving to White neighborhoods (not from White families moving to historically Black neighborhoods). Poverty and isolation still plague many urban Black communities.

There are several hypotheses about the connection between segregation and health outcomes.

- Hypothesis 1: Residential segregation influences socioeconomic status, which affects health
  - Most economically disadvantaged Black people live in poor neighborhoods, whereas economically disadvantaged White people are more likely to live in economically diverse neighborhoods.
  - This concentration of poverty leads to reduced educational opportunities, employment opportunities, and incomes.
- Hypothesis 2: Segregation perpetuates and reproduces unhealthy neighborhood environments

- Highly segregated cities experience higher levels of violence and property crime. This is particularly true for cities with high income inequality, poverty concentration, and areas where segregation is more equivalent to isolation.
  - Neighborhood health is therefore worsened by fear of victimization and altered behaviors and social networks that come with living in dangerous environments.
  - Increased crime also results in more incarceration of young Black males, which leads to poor health for them but also destabilization of the family and health effects for women and children.
  - Segregation leads to differential access to health resources and fewer options for purchasing healthy foods (i.e., food deserts).
- Hypothesis 3: Segregation modifies social capital for a city overall or for specific racial groups
- Some scholars suggest social capital increases equality, but it has also been argued that social capital in a given area does not imply a crossing of race or class lines and in some cases may be inversely associated with racial equity.
  - It is not clear whether segregation reduces or increases social capital.
  - There is some evidence that high-isolation segregation and poverty concentration decrease Black social capital and reduce interracial trust.
  - But there is other research that suggests there are health-protective effects for Black people who live in racially homogenous ethnic enclaves. Some theorize that the adverse environment posed by isolation segregation is mitigated by increased clustering that provides social support and may enhance political power for black communities; this empowerment can buffer the negative effects of segregation on health outcomes.

One approach to modifying the negative health effects of segregation is to view the causal chain from segregation to health as a series of opportunities for intervention, with an overarching goal of increasing access to “opportunity neighborhoods” for all.

Of note is the authors’ distinction between the process of segregation (i.e., institutionalized racism or inequitable access to health-promoting opportunities) and the state or condition of segregation (living near Black families or far from White families). The authors state that “it is most probable that any injurious attributes of segregation result from inequity in the process rather than the condition of close proximity to Black families (or distance from White families) per se.”

17) Krellenberg, K., & Welz, J. (2017). Assessing urban vulnerability in the context of flood and heat hazard: Pathways and challenges for indicator-based analysis. *Social Indicators Research, 132*, 709-731.

*This article presents a methodology to measure components of residential vulnerability to climate change-related hazards.*

Climate change exacerbates existing vulnerabilities that are structural in nature and often linked to poverty and inequality. The authors rely on the definition of vulnerability as the “characteristics of a person or group and their situation that influence their capacity to anticipate, cope with, resist, and recover from the impact of a natural hazard” (p.711). “Urban vulnerability” is the interrelation between

the spatial-structural (socio-environmental) conditions of an urban area exposed to a discrete and identifiable event with the underlying susceptibility and response profile of its inhabitants.

“Vulnerability is therefore a human condition generated by a hazard impact” (p. 711) and takes three components into account: exposure, susceptibility, and coping capacity.

- Exposure refers to people’s physical precondition to be affected by natural hazards, like living in a hazard prone area. Exposure is affected by climate change, demographic and economic factors, and land-use rules that result in certain urban patterns.
- Susceptibility refers to people’s predisposition to suffer harm as a result of adversity, like inadequate infrastructure, physical disconnectedness, or weak connections with basic services.
- Coping capacity refers to the immediate human response to a hazard occurrence (i.e., individual coping capacity like evaluating available resources, defense mechanisms, problem solving techniques, and protective measures).

Measuring vulnerability and its components is difficult. Using indicators to measure issues via proxies helps reduce complexity. The use of composite indices with weighted averages of individual indicators allows for integration of several parameters that pose measurement challenges.

This study employed a household survey (61% response rate) to measure susceptibility and coping capacity. Susceptibility was measured via proxies of employment status and socio-economic status. Employment/job categories were ranked from high to low susceptibility: disabled and unable to work, job seeker, housewife, student, pensioner, housekeeper, self-employed, and employed. The authors argue that those who are unable to work, unemployed, and homemakers are more susceptible to flood and heat hazards because they are more likely to be at home when disaster strikes. For socioeconomic status, lower status equated to higher susceptibility.

Coping capacity was measured via proxies of social networks and a different conceptualization of employment status. Social networks were categorized as low coping capacity (i.e., homogenous social networks in terms of social roles, spatial proximity, and duration of relationship) and high coping capacity (i.e., heterogenous social networks). Social networks were measured on the household survey via questions asking respondents to identify up to four contacts and report who they would activate in case of emergency. They were also asked to report which contacts were friends, relatives, colleagues, or neighbors, where they live, and the length of the relationship. Networks were assumed to be homogenous if each contact was the same type (i.e., all relatives or all friends).

Employment status was used to approximate coping capacity through a different ranking, where unpaid family labor, pensioner, self-employed, salaried employee, and employer/entrepreneur represented low to high coping capacity, respectively. Employment status in the coping capacity dimension reflects secure income, which implies a better capacity to take measures against a potential risk. Households with secure income are assumed to be more resilient and in a better economic position to cope with and prepare for hazards.

The authors developed indices for each component of vulnerability (i.e., exposure, susceptibility, and coping capacity) based on selected indicators. A case study was conducted in Santiago de Chile to validate the indices in the context of vulnerability to flood and heat hazards. Results confirm the authors’ interpretation of indicators for susceptibility and coping capacity. Socioeconomic status and employment status were the main drivers for the overall susceptibility index related to heat and flood

hazards. Susceptibility is highest among those with low socioeconomic status and more household members who are unemployed or homemakers. The main drivers of the coping capacity index were diversity of social networks and employment status. Coping capacity was found to be highest among those with diverse social networks and those who are employed.

18) Kresge Foundation (2015). *Bounce Forward: Urban resilience in the era of climate change. A strategy paper from Island Press and The Kresge Foundation*. Retrieved from the Kresge Foundation website: <https://kresge.org/library/bounce-forward-urban-resilience-era-climate-change>

*This report was produced by Island Press, with support from The Kresge Foundation, as part of the Urban Resilience Project. The Urban Resilience Project was launched in 2013 in response to lingering questions about ways to ensure cities can survive and thrive in the face of climate change. The Project involved a survey of existing literature on resilience, key informant interviews with organizers, researchers, and planners, and an all-day assembly.*

The world population is connected as never before by global networks of commerce and information—which can accelerate the spread of innovation, information, opportunity, and social reform—but can also amplify crises (i.e., events like grid failures and epidemics have greater impact now more than ever).

Our society still suffers from rampant inequality (i.e., richest 1% claim 46% of the world’s wealth) which often leads to violence, imprisonment, and addiction. Inequality also destroys social cohesion in that when the interests of elites have more value than those of the majority, disinvestments in education, health care, infrastructure, and other public services occur more frequently.

Due to widespread inequality and inequity, the risks and opportunities associated with climate change are not equally shared. For example, affluent communities are better poised to seize the opportunities that come with climate change and shield themselves from harm and disadvantaged communities face more risks.

Social cohesion and resilience are critical to mitigate the impacts of climate change in cities. Social resilience and individual resilience are built on a foundation of ordinary factors, including close relationships with others, opportunities for agency and mastery, and communities that support human development. Social “resilience does not require anything rare or extraordinary, but instead requires that basic human adaptive systems are operating normally” (Ann Masten, “Ordinary Magic”). Humans are naturally resilient creatures, but resilience can be undermined by social factors like abuse, violence, and deprivation.

There is a need for policies and practices that support (or at least do not undermine) the innate resilience of human beings and communities. Capable and empowered people are better able to mitigate crises and seize opportunities in the rapidly changing world. Building resilience also requires different thinking around urban systems that supply our energy, transportation, food, water, and housing in that opportunities must be distributed more fairly so that all people have the chance to adapt and thrive.

The Urban Resilience Framework is one approach to thinking and practice on building urban resilience and is grounded in a commitment to sustainability and equity. Urban Resilience is defined in this framework as “the capacity of a community to anticipate, plan for, and mitigate the risks and seize the opportunities associated with environmental and social change” (p. vii). Main components of the framework include:

- Resilience is not defined as an end state, but rather an iterative process of learning and adaptation. As such, steps in the framework must be frequently revisited as circumstances change.
- Building resilience must involve promoting social capital, which is about relationships with family, friends, and colleagues. At the community level, social capital can be measured by levels of trust, the cohesion of social networks, and the quality of leadership.
- Resilience has to promote agency. More resilient people have a sense of control over their destiny. Strategies to build agency include community organizing, education (e.g., participatory action learning), public health and safety initiatives, and civic engagement.
- Resilience has to promote equity, where opportunities and risks are equally shared. Equity is a building-block of social cohesion. The feeling that “we’re all in this together” enables communities to cooperate in times of disaster.
- Resilience is not simply “bouncing back” after a disaster, and conceptualizing resilience this way could perpetuate risk. “Bouncing back” implies a return to the status quo—circumstances and practices which degrade the environment, increase greenhouse gases, and sustain inequality—which will further undermine long-term resilience.

Building resilience must begin with meaningful community engagement, i.e., “sitting down with people as equals, and deferring to and respecting that community’s lived experience” (p. 27). Changes to the built environment should be made with an eye toward facilitating social interaction and strengthening cohesion. For example, after a tornado destroyed Greensburg Kansas in 2007, the city rebuilt many homes with big front porches in order to encourage people to sit outside and interact with neighbors.

Special consideration should be taken when working with low-income communities, where there is a great deal of unacknowledged resilience developed over years of adversity and recurring disasters with minimal outside help. Attempts to build capacity in these communities must be mindful of and reinforce those hard-won strengths.

19) Lochner, K., Kawachi, I., & Kennedy, B. P. (1999). Social capital: A guide to its measurement. *Health & Place, 5*, 259-270.

*This article reviews the concept and measurement of social capital and its influence on health at the community level. The authors focus on four constructs that tap into slightly different yet overlapping aspects of social capital: collective efficacy, psychological sense of community, neighborhood cohesion, and community competence.*

Social capital is defined as consisting of those features of social organization (e.g., networks of secondary associations, high levels of interpersonal trust, and norms of mutual aid and reciprocity) which act as resources for individuals and facilitate collective action. Social capital is an attribute of the

society and a feature of the social structure—not of the individuals within that social structure. Social capital is not the same as social networks and social support, which are attributes of individuals.

Collective efficacy refers to the notion that group members believe in the overall ability of the collective to act effectively in response to specific situational demands. Measures of collective efficacy have involved assessments of social cohesion among neighbors (e.g., “people in this neighborhood can be trusted”; “this is a close-knit neighborhood”; and “people around here are willing to help their neighbors”). Such measures of collected efficacy have been shown to be correlated with voluntary group participation and the availability of neighborhood services.

Psychological sense of community originated in the field of community psychology and includes four dimensions: membership (i.e., feeling part of a group), influence (i.e., feeling that one matters to the group and can influence it, and feeling that the group matters and one can be influenced by it), integration (i.e., feeling that one’s needs will be met by this group), and shared emotional connection (i.e., feeling of shared history in the group). Evidence suggests that one’s psychological sense of community is not dependent on the actual receipt of support from the group, just on the belief that one could seek support from the group. For example, previous research has found that people report feeling more comfortable asking for help from a stranger who lives in their neighborhood/community than asking for help from a stranger who lives in a different neighborhood/community.

Neighborhood cohesion refers to social interactions and locally available resources that can provide emotional and instrumental support. Neighborhood organizations and block groups help people build social networks by offering time for sociability and serve as a form of social capital.

In terms of measuring social capital and its components, the authors advocate for measurement to occur at the community level. They recommend researchers use a social survey approach with individual responses aggregated up to the community level or “intrinsic” measures of community characteristics, that do not rely on aggregating the responses of individuals. These intrinsic measures include directly observable features of a community like how quickly sidewalks are cleared after snowfall (i.e., reciprocity), or whether fuel stations require prepayment before motorists can fill their tanks (i.e., trust).

20) Nicholls, K., Picou, J. S., Curtis, J., & Lowman, J. A. (2015). The utility of community health workers in disaster preparedness, recovery, and resiliency. *Journal of Applied Social Science*, 9(2), 1-12.

*This article advocates for the use of Community Health Workers (CHWs) in emergency management planning and disaster recovery. The authors describe the role of CHWs in this context, review research on their utility in the field of health care, and describe their potential for enhancing social capital and community resilience.*

CHWs are one type of “lay” health worker that have been integral to health care reform in the United States. Lay health workers like CHWs focus mostly on helping patients gain access to health services and understand health-related issues. CHWs typically undergo broad training in areas such as health literacy, cultural sensitivity, social determinants of health, fundamentals of public health, patient case management, and peer listening. With additional appropriate training, CHWs could also contribute to

enhancing disaster preparedness, facilitating disaster recovery, and improving social capital to enhance community resilience.

CHWs are frontline public health workers who have a close understanding of the communities they serve. The trusting relationship between a CHW and their community enables them to serve as a link between services and community members and to improve the quality and cultural competence of service delivery. CHWs also build individual and community capacity by increasing health knowledge and self-sufficiency through a range of activities including outreach, community education, informal counseling, social support, and advocacy.

The CHW model is an effective health care approach in the face of increasing costs, decreasing health and healthy lifestyles, and multiplied risk from living in areas vulnerable to disasters. CHWs are key players in preventive care, early intervention, and chronic disease management. CHWs have been found to be effective at increasing primary and behavioral health care capacity, improving outcomes, lowering the overall cost of care, and reducing socioeconomic disparities within the health care delivery system.

CHWs can play an important role in community social capital. Community social capital consists of networks and relationships among community members that are built on trust, understanding, and acceptance of cultural norms including reciprocity and a recognition of shared goals. CHWs can help to build social capital through their basic outreach function, which involves them directly connecting with community members and establishing trusting relationships.

To help with recovery after a disaster, CHWs who are trained as peer listeners can mitigate the negative mental and behavioral health impacts of the disaster experience. Some research has shown that CHWs help overcome racial and ethnic disparities in post-disaster mental health care, and increase awareness and knowledge about emergency preparedness.

To implement a CHW model in the context of emergency preparedness and disaster recovery, the authors suggest enhancing CHW training in the following areas:

- Planning/implementing educational outreach to build knowledge of emergency management, promote preparedness, and enhance community resiliency;
- Identification, prevention, and management of diseases and conditions associated with or aggravated by disasters; and
- Understanding how to recognize, intervene, and make referrals for psychosocial problems associated with disasters

The outreach functions of CHWs can contribute significantly to improving social capital in communities at risk. Outreach provides opportunities for community members to come together to pursue mutual benefits. CHWs working to identify and share resources or refer community members for help will inevitably establish trust. Interactions between peer listeners and community members can help establish close relationships.

21) Reams, M. A., Lam, N S N., Baker, A. (2012). Measuring capacity for resilience among coastal counties of the US Northern Gulf of Mexico region. *American Journal of Climate Change*, 1, 194-204.

*This article summarizes a study of resilience in coastal communities that are especially vulnerable to climate change-related hazards such as intense storms and rising sea levels. The authors selected key indicators of resilience from the literature to create a resilience-capacity index, then calculated index scores for 52 coastal counties in the Gulf Coast of the United States.*

Coastal communities face rapid-moving hazards like hurricanes and storm surges as well as slow-moving hazards like coastal land loss, sea-level rise, and gradual disappearance of ecosystems. Hazards and risks have been the focus of measurement in much of the recent literature, but there is no good way to quantify and measure community resilience to these threats.

Based on the literature, the authors propose a working definition of resilience that includes three characteristics: 1) the magnitude of shock a system can absorb and remain within a given state; 2) the degree to which the system is capable of self-organization; and 3) the degree to which the given system can build capacity for learning and adaptation.

There is a need to consider both social and natural aspects of resilience and examine how they are linked. The authors review potential influences of social vulnerability and resilience including age, race, socioeconomic status, disability, quality and density of built environment, and gender (i.e., the authors state that women may be more vulnerable in the aftermath of a disaster because they typically take on a larger share of the work related to the recovery of the home and livelihood).

The authors developed their model using data from US Census and tested the same indicators of social vulnerability that were examined by Cutter and colleagues (2003, article 13 in this annotated bibliography). These included limited access to economic resources and political power, fewer social networks, less structurally sound housing, and more physically limited individuals.

The variables that emerged from their statistical procedure (i.e., factor analysis) were used to construct a weighted community resilience-capacity index. These included (ranked in order of statistical “importance”): government expenditures for education, median income of the parish, percent of workforce that is female, mean elevation of the parish, percent of the population below the age of 5, and percent of the population that voted in the last presidential election. Values on the index range from 0 to 1, with 1 indicating the highest resilience capacity. Index values were then calculated for 52 counties along the coasts of Louisiana, Texas, Mississippi, Alabama, and Florida.

Findings demonstrated that counties with the lowest resilience index scores had median incomes below \$30,000/year and low voter turnout. Counties with the highest resilience scores were predominantly suburban and had high percentages of women in the workforce, high voter turnout, and high government expenditures for education. The largest drivers of resilience capacity index scores were affluence and government expenditures for education.

This study is one of the only attempts at applying weights to the different indicators of resilience, and as the authors state, their weighting method is not perfect. For example, there were some counties with low socioeconomic status and lower elevation (i.e., indicating low resilience) that were categorized as

highly resilient because they had high voter turnout, a variable that was weighted more heavily in the index.

22) Rolfe, R. E. (2006). *Social cohesion and community resilience: A multi-disciplinary review of literature for rural health research*. Paper prepared for the Social Cohesion and Community Resiliency Working Group of the Atlantic Canada based Rural Centre. Halifax, Nova Scotia: The Rural Centre.

*This paper reviews literature on the relationships between community stressors (social and other) and community capital, social cohesion, and community resilience. Specific emphasis is placed on rural communities.*

Rural communities have been increasingly challenged in the recent years by environmental, industrial, economic, social, and political changes. Changes include young people and families moving to cities in search of employment, which leads to fewer infrastructural supports like stores and retail services and a loss of local health care. This domino effect of changes is referred to as “restructuring” of rural communities. Restructuring impacts individuals, households, and community relationships in varying ways and can have important effects on the mental, physical, and social health of people and communities.

Social cohesion is an important aspect of the social health of communities. Social cohesion is based on social togetherness and connectedness, and can be best described as a combination of social support and social capital. Social cohesion is not easily measured in quantifiable and absolute terms.

Some scholars have identified three categories that are relevant to the measurement of a community’s social cohesion and resilience include (1) social and support networks (including access to social support in times of need); (2) social participation; and (3) community engagement (including volunteering which involves gathering people together to work for the benefit of others). Volunteering may in turn promote other sources of cohesion like trust and help people create more support networks.

Evidence suggests social capital and community capital are critical to the survival and functioning of rural communities. Scholars define the concept of community capital as the “natural, human, social, and built capital from which a community receives benefits and on which the community relies for continued existence” (p. 9). Community capital has four components: (1) Natural capital (i.e., healthy ecosystems including natural goods or resources, clean air and water, reduction of erosion, and the beauty of nature as it contributes to quality of life); (2) Human capital (i.e., skills, health, abilities, education, community members’ values, professional competencies, engagement, and participation); (3) Social capital (i.e., the “glue” that holds communities together—informally through social networks and formally through the availability/presence of social, development, and other programs); and (4) Built capital (i.e., roads, heavy equipment, factory buildings, houses, apartment buildings, food, clothing, and cultural capital).

Formal and informal social structures within a community play an important role in the creation of the local community identity that inspires community resilience and the capacity for creative problem-solving and positive change. Formal and informal social structures function through community centers, volunteer fire halls, arenas, libraries, schools, and churches.

23) Schiefer, D., & Van der Noll, J. (2017). The essentials of social cohesion: A literature review. *Social Indicators Research*, 132, 579-603.

*This article reviews prior literature on the conceptualization of social cohesion and find commonality among the various definitions proposed by other scholars. Based on their review, the authors suggest three essential dimensions of social cohesion.*

Social cohesion is universally accepted as an important feature of a community or society, but social cohesion may be at risk of deterioration because of globalization and associated economic changes, and changes in social relationships caused by the popularity of computer-based communication technologies.

Previous work has not come to a consensus on the exact definition of social cohesion, but all conceptualizations agree that it entails social relations, a sense of belonging, and an orientation towards the common good. Other components of social cohesion (i.e., inequality, quality of life, and shared values) should be treated as antecedents or consequences of social cohesion and not as essential components.

Social cohesion has been examined for years and by a number of scholars. For example, early sociologists stated that social cohesion is rooted in feelings of solidarity, shared loyalties, cooperation, and mutual action. Others defined social cohesion by distinguishing between groups of socially connected individuals acting for the sake of the community (i.e., *Gemeinschaft*) and groups of individuals living together geographically but who are socially more isolated and connected only instrumentally (i.e., *Gesellschaft*). Some argued that cohesive societies are bound by cultural traditions and the same language, and by deference of the individual to the social order and the acceptance of their position in society. Recent sociologists have stated that social cohesion is present when individuals and groups with different cultures, values, beliefs, life styles, and socioeconomic resources have equal access to all domains of life and live together without conflict. Social cohesion has also recently been adopted at the policy level. The Canadian Policy Research Network has proposed five dimensions of social cohesion: (1) belonging/isolation (i.e., shared values, collective identities); (2) economic inclusion/exclusion; (3) participation and involvement in public affairs; (4) recognition versus rejection of diversity and pluralism; and (5) the degree of legitimacy of societal institutions.

Taking these historical perspectives into account, the current authors identify six common dimensions of social cohesion: *social relations, identification, orientation towards the common good, shared values, quality of life, and inequality.*

*Social relations* includes social networks (i.e., the quality and quantity of social interactions with family members, friends, and acquaintances), which resembles the concept of social capital.

*Social relations* also refers to trust between people and towards institutions which strengthens cooperation, unity, and identification, and is crucial for social development. *Social relations* also implies a society that requires mutual tolerance between diverse groups and the inclusion of all groups (especially minority groups). Finally, *social relations* refers to civic participation or engagement which reflects a sense of belonging, solidarity, and readiness for mutual cooperation in the pursuit of common goals. Civic participation also promotes social interactions, which strengthen shared values, sense of belonging, and trust.

*Identification* refers to the concept that social cohesion is enhanced when individuals identify with the geographical space in which social interactions take place. If they do not identify with the space (i.e., neighborhood or community), any behavior for the common good might just reflect their humanity. Emotional attachment to the geographic entity is an expression of shared values, lifestyles, and socialization contexts. Identification with and attachment to a place provides security and self-worth which strengthens the willingness to participate and develop social networks.

*Orientation towards the common good* refers to feelings of responsibility for the common good and compliance to social rules and order. This is related to solidarity, which entails caring for another regardless of whether one knows the person or not. Solidarity manifests itself at the institutional level (e.g., social welfare and public assistance programs), but also at the individual level in people's willingness to give to others (e.g., blood donating and charitable contributions). Orientation toward the common good entails accepting the social order and complying with social rules and norms. This requires, however, that the public must believe in the legitimacy of institutions charged with regulating and monitoring social order.

*Shared values* promote cohesion because they enable society members to identify common goals and plans and structure social interactions by means of shared behavioral codes. *Shared values* does not imply valuing homogeneity, rather it refers to the notion that cohesion strongly relies on the acceptance of and constructive dealing with diversity and respective conflicts. *Shared values* does not mean that the society should value consensus, but rather the coexistence of individuals who differ in their values.

*Inequality* refers to unequal opportunities for societal members and unequal distribution of accessible resources. Resources include employment, income, education, health care, social welfare, and legal means.

*Quality of life* refers to psychological well-being, physical health, and one's living conditions.

In light of their review and findings, the authors define social cohesion as "a descriptive attribute of a collective, indicating the quality of collective togetherness" (p. 592). A cohesive society is characterized by close social relations, pronounced emotional connectedness to the social entity, and a strong orientation towards the common good. Social cohesion as a gradual phenomenon, meaning that societies may exhibit greater or lesser degrees of cohesion, and this degree of cohesion manifests itself in the attitudes and behaviors of all individuals and groups in the society.

The authors state that equality, cohesion, and quality of life are part of a causal chain, that is "when individuals and groups have equal access to resources, this will strengthen their trust in others and in institutions, enable them to participate and network, and facilitate a positive sense of belonging. This, in turn, contributes to their well-being and health, which in turn increases their general quality of life" (p. 594). Social cohesion is further described as the degree to which members of a community feel connected, experience belonging and mutual trust, and work together for the common good.

24) Ungar, M. (2011). Community resilience for youth and families: Facilitative physical and social capital in contexts of adversity. *Children and Youth Services Review, 33*; 1742-1748.

*This article reviews previous work on the community-level factors of physical and social capital and their relation to resilience among young people.*

A community's resilience is determined by its social capital, physical infrastructure, and culturally embedded patterns of interdependence. These features contribute to the community's potential to recover from dramatic change, to sustain its adaptability, and to support new growth that incorporates lessons learned during the time of crisis.

Some of the main functions of a community are supporting the growth of individual members, regulating the distribution of goods and services, socializing its members, and facilitating inclusion. Catastrophic events impair a community's capacity to fulfill these functions. Recovery after an event is highly dependent on the resources available to the community and the strengths that are nurtured before the event occurs. These resources include human capital, social capital, natural capital, physical capital, and financial capital.

When these resources are built carefully, people are more likely to get what they need to recover, sustain, and grow. For this reason, resilience is best understood as the capacity of individuals to access the resources they need to sustain well-being and the capacity of their communities and governments to provide them with what they need in ways that are meaningful. Individual resilience is therefore determined by how well a person's community provides needed resources when risk factors are present.

The authors argue that the factors that best predict a community's resilience are those that are most relevant to the individuals with the greatest need. For example, studies have demonstrated how poor families caring for children with special health needs must exert tremendous effort to get the child to and from service providers, but those who are rich enough to afford a car or who live in communities with good public transportation have to exert less effort. Investing in services like public transit will mostly benefit families with the greatest need and will provide fewer direct benefits for families who do not have the need. However, the broader impact on the community is greater because it will interrupt patterns of cumulative disadvantage that make it likely children with disabilities will develop poorly over time. This example shows that a community's resilience is shaped by its capacity to care for its most vulnerable members.

The example above also shows that distal factors like municipal infrastructure (e.g., public transit and the availability of social services) and proximal factors (e.g., the social support experienced when families interact) are co-dependent. Improving one area improves other areas as well.

More generally, a better educated and cohesive community is more likely to be an effective advocate for improved public services. The better prepared children are in terms of health, education, and family attachment, the better they will be able to cope during a crisis. The explanation for any individual child being successful or unsuccessful depends on the combined influences of their neighborhood, family, school, and peer group, together with their own personal attributes, characteristics, and personal choices.

Actions by authorities that shape the availability and accessibility of needed resources contribute a great deal to a community's resilience. Government-level policies and programs such as child support, parental leave benefits, a living wage for caregivers, health insurance, and tax credits for the working poor would go far to help children develop and grow. Formal programs can help ensure young people and their families can sustain themselves when less formal networks have broken down because of a natural disaster. However, the formal system is a weak substitute for a well-resourced community with the social capital and collective commons to look after itself.