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## The effect of social capital on community co-production: towards community-oriented development in post-disaster recovery

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### Abstract

Previous studies have emphasized the importance of social capital for disaster recovery. Yet, relatively few studies have paid attention to how bonding and bridging social capital facilitate disaster recovery differently. The paper highlights the specific role of bridging social capital in rebuilding communities, recognizing it as a 'catalyst' of co-production. This paper is structured around the theoretical themes of social interaction, emphasizing that reciprocal interaction constitutes strong social capital that enables communities to work together. Although the literature emphasizes the positive effect of social capital on co-production, this paper offers a more nuanced view based on the following two points: (a) bonding social capital, which relies on tightly-knit bonding social networks is crucial for short term disaster recovery as it draws upon the supports from close community members such as family, relatives, neighbors, and friends; and (b) bridging social capital plays a key role in long-term disaster recovery, as individuals expand their social interactions outside their community through the recovery effort. The argument is then put forward that it is bridging social capital that supports the creation of co-production. This leads to greater opportunities for community-oriented development, which emerges due to better integration among various actors. The paper makes its contribution by proposing bridging social capital as a necessary condition for co-production for disaster recovery.

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*Keywords:* Bonding and Bridging Social Capital; Community Co-production; Community-oriented Disaster Recovery; Resilience

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## 1. Introduction

Extant studies purporting to address the role of social capital in disaster recovery draw on the concept of community resilience [e.g., 1, 2, 3]. Community resilience research is burgeoning, within the disaster recovery literature with a particular focus on the contribution of community competence, citizen participation, and sense of community for community development in post-disaster recovery [4, 5]. The central place of social capital as a core element of community disaster resilience seems widely accepted despite its conceptual nuances [6, 7, 8]. Several studies have asserted, conceptually and empirically, the importance of social capital for disaster recovery, stressing that communities with stronger social capital are likely to achieve faster recovery [1]. In order to capture the role of social capital, extant studies have sought to understand how social capital influences community-oriented disaster recovery, positing that community members whose social capital is strong are not just recipients getting support from state, but they are more active citizens who cooperate with government agencies for rebuilding their community. Effective cooperation between various actors is considered critical in order to achieve a successful disaster recovery [2, 4, 5]. The role of inter-group collaboration is reminiscent of the concept of co-production, which is described as the synergistic relationship between community members and government agencies, where community members are considered co-producers for effective public service delivery [4, 5]. However, relatively few studies have looked at how bonding and bridging social capital assist this collaboration within the context of disaster recovery. In order to clarify the role social capital plays in post-disaster community recovery, this paper reviews the relevant literature to present current knowledge within the context of disaster recovery. The focus of this review is to elucidate imperative attributes that provide a better understanding of: 1) the discretion between bonding and bridging social capital; and 2) the association between bridging social capital and community co-production [9]. The paper is laid out as follows: first we present the effects of social interaction on the development of social capital, conceptually separating the development of bonding and bridging social capital. Second, the concept of co-production is reviewed. Whereas co-production has been linked to bridging social capital within the literature, there has been little discussion in the context of disaster recovery. The contribution is that it proposes the conceptual linkages between bridging social capital and co-production and their potentially benefits for community-oriented development. The definition of terms used in this paper is summarised in the Table 1.

Table 1. Definition of terms

<p><b>Community Bridging Social Capital:</b> a type of social capital which community members can utilize to derive own benefits and group benefits. Bridging capital is accumulated within a local community by frequent, heterogeneous and horizontal interaction among various actors, including non-community actors.</p> <p><b>Community Bonding Social Capital:</b> a type of primitive social capital which community members can utilize to derive own and group benefits. Bonding capital is accumulated by frequent, homogeneous and horizontal social interaction among individuals of a single group ('the community').</p> <p><b>Community Disaster Resilience:</b> capacity of the community to adapt to environmental changes after disasters and to recover faster and better from acute natural or economic shocks.</p> <p><b>Community-oriented disaster recovery:</b> disaster recovery driven by community-based initiatives. This requires community's active involvement in recovery after they experience shocks of disasters, involving decision making process, monitoring, and inherently sharing responsibility as well as ownership of the recovery process.</p> <p><b>Community co-production:</b> collaborative action of various actors in order to achieve a synergistic effect on a common objective, where potential benefits are distributed to the entire community.</p> <p><b>Sense of Community:</b> Individual's psychological sense of interpersonal connection to her/his community group. The sense of community promotes members to engage voluntarily in activities likely to create cohesion and cooperation so as to achieve their common goal</p>
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## 2. Key Themes in the literature

In order to gain a better understanding of the conceptual division between bonding and bridging social capital, and the association between bridging social capital and co-production, several thematic discussions were identified

in the extant literature. As a first step, we reviewed academic writings that focus on a conceptual analysis of current tendencies in the area of social capital, community resilience, and disaster recovery [e.g., 1, 10, 11]. For example, Putnam [12] delineates social interaction and individual participation as core elements for building a social capital resource. Above all, Lin [13] defines specific types of social capital, differentiating them by the extent to which individuals build different types of social interaction. In Granovetter [11], Portes [10], and Woolcock and Narayan [14], social capital is classified by the nature of social relationship, homogeneous or heterogeneous, which establishes the boundary between bonding and bridging social capital. They draw on the concept of weak ties, which is related to the likelihood and extent to which individuals and groups would be likely to develop innovative ideas. In his review of these contributions, Aldrich [1] weaves the concept of social capital into the context of disaster recovery, suggesting that a greater stock of social capital within a community offers a higher chance of faster and better community recovery. Thus four key themes emerge: 1) social interaction is a founding element of social capital; 2) different types of social capital (bonding and bridging) can be discerned; 3) synergy through cooperative actions aimed at rebuilding communities is crucial for recovery, and is promoted by social capital; and 4) rebuilding a resilient community is a long term objective.

Using Summon™ (Query 1, see Table 2), a Google-like search engine, we explored the academic peer-reviewed journal article, books, and conference proceedings using the following terms as key queries: “Bonding Social Capital”, “Bridging Social Capital”, “Community”, and “Disaster Recovery”. Our aim was to capture and specify any conjoined understanding of those concepts. In total, 128 peer reviewed journal articles were returned as relevant search outputs (see Appendix A). The abstracts of these publications were reviewed, to determine whether or not they discussed our four key themes sufficiently and extensively. Following this preselection process, 32 articles were found to conceptualize community resilience as an overarching notion incorporating social capital and other themes [e.g., 4, 15]. Only five studies implicitly studied such aspects as synergy and cooperative community action, thereby providing a potential conceptual association between bridging social capital and co-production [16, 17, 18, 19, 20].

Table 2. Database, queries and publication retrieved

Database	Queries	Publications	Selected
Summon™	1: (Bonding Bridging Social Capital) AND (Community) And (Disaster Recovery)	128	32
	2: (Coproducton) AND (Social Capital) AND (Synergy) AND (Community)	190	33
	Total	318	65 (15 overlapped)

To account for any conceptual discussions of the co-production and social capital, another Summon™ search was conducted on “Coproducton”, “Social Capital”, “Synergy” and “Community.” (Query 2, see Table 2), yielding 190 papers, 33 of which were found to have appropriate relevance. A full text review of these articles stressed the need to demarcate the concept of co-production strictly applicable to the context of post-disaster recovery, and to identify key attributes of co-production that are conceptually linked to bridging social capital. Fifteen articles showed an overlap between these concepts, with the direction of the relationship highlighting the specific effect of bridging social capital on the cooperative actions of community members [e.g., 4, 21] (see Table 2). Subsequent sections of this paper will attempt to re-assemble the jigsaw presented by extant studies and synthesize their findings.

### 3. Social capital in post-disaster recovery

#### 3.1. Social interaction as a basic element for social capital

Social interaction is an individual’s investment in building social resources [13, 22]. It is a basic building block of social capital and encourages individuals to develop a certain level of belongingness to each other through the community in which the interaction takes place [12, 13, 23]. For example, Kulig et al. [5, 15] argue that individuals

within a community group build a sense of membership when their social interaction is frequent, which in turn may stimulate community members' motivation to influence others and their groups [24]. This can be extended to an entire community when they expand their social interaction beyond their community group boundary [4, 25]. The latter scenario is relevant to the proposition that heterogeneous and loosely connected groups are likely to adopt new and innovative ideas through frequent interaction while tightly-knit groups are more focused on their own structure and ideas [11, 26, 27]. The literature recognizes two different types of social interaction, homogeneous and heterogeneous, which generate two different forms of social capital, as argued by Portes [10], Lin [13], and Woolcock and Narayan [14]. On the one hand, bonding social capital is built as homogeneous social interaction. It is noticeable within a community group and the interaction tends to be horizontal and often informal. On the other hand, community members are likely to build bridging social capital when their interactions with individuals outside their community [13] are heterogeneous and horizontal. In sum, the interaction behind the former occurs among community members in the local area, whereas in the latter it is heterogeneous and vertical and takes place between community members and non-community actors [1, 10].

### *3.2. Bridging social capital: a conceptual separation from bonding social capital*

There are commonly-voiced claims that the concept of social capital is poorly delineated due to both philosophical and definitional confusion between the terms “social” and “capital”, and because of its embeddedness in social behavior [3, 34]. Yet, there appears to be a well-grounded interpretation of the concept within the field of disaster recovery [1, 10, 11, 13, 28]. Numerous studies [e.g., 11, 13] have claimed that survivors of disasters look to their families, friends and relatives for immediate support in the aftermath of disasters. In other terms, it is from other community members within the devastated disaster area that they obtain the important information and supplies that are crucial for their recovery; and, as time progresses, they are often motivated to work together to rebuild their community. Thus, disaster recovery studies support the proposition that a community with stronger existing social capital is likely to stimulate active community participation and collective action, which in turn leads to a faster and better recovery [29, 30]. In that premise, the literature has differentiated the specific role of bonding and bridging social capital, attesting that bridging social capital serves as a catalyst that promotes community cooperative action for rebuilding a resilient community [14, 19], claiming that social capital serves as a core mechanism to enhance community members to act together for achieving a common goal [1, 27]. Noticeably, Granovetter's [11] proposition about the strength of weak ties (that innovative ideas are likely to emerge through social weak ties - i.e., bridging social capital) has found support in the area of disaster recovery [e.g., 31, 32]. His weak ties theory raises the significance of bridging social capital for community collective action and reduces that of strong ties (i.e., bonding social capital), because communities whose bonding social capital is the dominant type of social capital are prone to isolate themselves from interacting with other communities, which in turn reduces their stock of resources available for rebuilding their community [2, 33, 34].

However, the analysis of the literature implies that extant studies have paid little attention to how the two types of social capital help individuals act jointly towards organizing collective recovery efforts [e.g., 34, 35]. That is, disaster recovery studies are more focused on whether or not bridging social capital promotes community recovery than on whether bonding social capital does [27]. The cited studies pay much attention to the positive aspect of bridging social capital, implying that community members employ their weak social ties to gather necessary information and supplies outside their community boundary, which in turn brings benefits to the whole community.

Beyond this dichotomy in the literature, presenting that bonding and bridging social capital are conceptually unrelated resources for recovery, some have instead suggested that the use and development of bridging social capital ultimately results from the prior use of bonding social capital in the immediate recovery phase, suggesting that the difference pertains to locating bonding and bridging social capital within different phases of disaster recovery [2, 13]. Under this approach, in early phases of disaster recovery, bonding social capital is strong when community members tend to rely on supports from individuals within their community group [31, 36, 37]. Once community members realize their resources are insufficient for rebuilding their neighborhoods and community group, they opt for transgressing their familiar social networks boundary and for obtaining necessary resources outside their community in the hope that cooperation with other communities can supply the necessary resources for

their recovery [2, 19, 27, 38]. In relation to this development from bonding to bridging social capital, Rost [39] and Burt [40] argued that bonding social capital provides a condition for the emergence of bridging social capital in that individuals tend to interact those who are homogeneous first, then the community members are likely to be motivated to build heterogeneous social interaction later for their own benefits.

#### **4. Conceptual association between bridging social capital and co-production in the context of post-disaster recovery**

Since Vincent Ostrom coined the concept of co-production, stressing its importance in urban service delivery [41], the concept has been further developed primarily for understanding which institutional settings can promote an effective public service delivery through collaboration between state and citizens [42, 21, 43, 44, 45]. The literature suggests several key attributes that consist of co-production: there has to be a collaboration between state and citizen in order to achieve a common goal, and there has to be a fair distribution of benefits to an entire community [43, 45, 46, 47, 48]. In relevance to the key attributes frequently discussed in the literature, it appears that thematic discussions of collaborative action in the context of disaster recovery have existed: cooperative action of various actors [17], active and voluntary community participation [21, 43], governments' willingness to involve community members in decision making process [46, 48], shared responsibilities for the recovery and community satisfaction with recovery operations [51]. A conceptual typology of co-production, therefore, appears relevant to community recovery. Among existing studies, Brudney and England [43] stress the importance of the degree of community participation, which determines whether co-production results in the distribution of potential benefits to a whole community. According to this view, first, individual co-production is that individuals contribute to community affairs such as reporting a faulty traffic signal. Second, group co-production requires a voluntary association to work together with other community members. An example is joining a neighborhood watch group for preventing criminal activities in their local area. Finally, collective co-production is described as an active and voluntary community cooperative action with non-community actors such as governments. It highlights that benefits through this synergistic action are redistributed to the entire community [49, 52, 53, 54, 55]. 'Community' is herein understood as a collectivity encompassing individuals, various community groups and even non-community actors such as NGOs and state governments within the local area [43]. That is, if the community is understood as a group of individuals within a community group in a local area, there should be much homogeneity among group members [56]. However, taken as a collective, the community stresses heterogeneity among various actors within the area [22], where weak social ties are noticeable among heterogeneous members, as posited by Granovetter [11] and Portes [10].

Several empirical studies [18, 35, 57, 58] have shown that collaboration is embedded in co-productive action, implying the inclusion of various actors and the sharing of responsibilities among them. Others have also discussed that coproduction encourages actor's diversity, which in turn leads to a higher community satisfaction with the recovery process [35, 38, 59, 60]. This conveys the idea of co-production as synergy [21] [44], which highlight the significance of the cooperation of various actors within a local community [55]. This reasoning alleges that the efficacy of co-production hinges upon cooperation among heterogeneous individuals or groups [21, 43, 44, 48, 61, 62]. Community co-production in post-disaster recovery is thus viewed as cooperative action among various actors within a local area. This action requires active and voluntary community involvement in order to achieve a synergistic effect in rebuilding a resilient community, and in generating potential benefits for the entire community [43, 44, 55]. This definition of co-production suggests a conceptual association with bridging social capital, as recognized in a number of studies. For example, and although social capital was not explicitly phrased in their research, Sundeen [45] and Sharp [46] set forth the proposition that cohesive communities with dense social ties are better at mobilizing their community resources for achieving their collective goals. In a similar tone, Ostrom [21] suggested that synergistic relations between citizens and government actors are facilitated by embedded social ties among citizens and public officials. In addition, Evans [44] saw social capital as a necessary condition for a successful synergy between citizen and state agencies. This conceptual association is also corroborated in several empirical studies in the specific context of disaster recovery [17, 35], who found that community members in a disaster affected area are more satisfied with reconstruction projects if they are actively involved in recovery work.

In relation to community involvement, several empirical studies have suggested that the level of active engagement in disaster recovery hinges upon the extent to which community social capital is present [11, 31, 32, 34, 47, 63]. Moreover, Frieling et al. [52], Rich [48] and Sharp [46] suggested unequivocally that co-productive actions require community members' active and voluntary participation as well as governments' willingness to involve community members in urban development projects. The literature thus appears to suggest that active and voluntary participation is related to the degree of heterogeneous social interaction beyond community boundaries [14], where the nature of the synergistic relationship between community and government is heterogeneous [21, 44].

## **5. Implications for community disaster resilience**

We began by suggesting that there are possibilities of a disassociation between bonding and bridging social capital, where the conceptual division offers a potential association between bridging social capital and community co-production in the context of disaster recovery. Drawing on this literature review, this paper then argues that bridging social capital, where heterogeneous social interaction is strong, is likely to generate collective co-productive actions for disaster recovery (fig. 1). This conceptual discussion is reflected in the concept of community resilience, where social capital is often viewed as a catalyst for generating community disaster resilience. It is consistently argued that the significance of bridging social capital presence among community members is that it influences the extent to which there will be cooperative action for rebuilding a resilient community. Particularly, Norris et al. [4] synthesized core elements that can enhance a community's adaptive capacities to rebuild their community, rather than remaining community members as passive recipients of governments' help. Among those elements, social interaction is regarded as a basic component for the capacity to survive, adapt and rebuild [64, 65, 66, 67, 68]. Echoing this, Kulig et al. [5, 15] also discussed the significance of social capital, arguing that social interaction, such as the intensity of a community's information sharing and frequency of internal communications, develops community resources – social capital. This leads to active community engagement in disaster recovery efforts. To reiterate, individuals build different types of social capital through various types of social interaction. Social capital as a resource is then accumulated, which can be used for obtaining their benefits, if needed. In order to associate social capital to collective action, the extant literature has stressed the significance of sense of community that encourages them to engage voluntarily in activities likely to create cohesion and cooperation so as to achieve their common goal [25, 69]. Furthermore, as discussed earlier, social capital evolves from bonding social capital created among individuals within a community group, to bridging social capital, built on the heterogeneous social interaction. This implies that community members often utilize their bridging social capital to obtain new benefits, which in turn leads to the generation of collective benefits to the entire community.

This paper thus proposes that social interaction generates bonding and bridging social capital, which in turn leads to co-production. This conveys three different types of co-production in post-disaster recovery, as proposed by Brudney and England [43]. Specifically, this paper stresses that the reciprocal interaction between community and governments produces synergistic outcomes. This aspect is reflected on the definition of co-production in the preceding section. At a single group level, co-production occurs among individuals within a community group. Potential benefits through single group co-production are enjoyed only by individuals within the group. Co-production between multiple groups is a novel collaborative effort undertaken by actors within a disaster affected area. However, the groups remain the primary beneficiaries of this type of co-production; the distribution of benefits to the entire community is limited. The most ideal type outlined in the literature is collective co-production. The synergistic nature of collective co-production between community groups and non-community actors implies that where bridging social capital is strong, community members often increase their contribution to recovery through sharing their knowledge and experience through co-productive activities designed to improve recovery. This synergistic relationship enhances recovery operations and builds community resilience: community members get immediate support from those close to them in their community and also cooperate to support rebuilding community. That is, the core of community oriented disaster recovery appears to lie on the degree of social capital development.

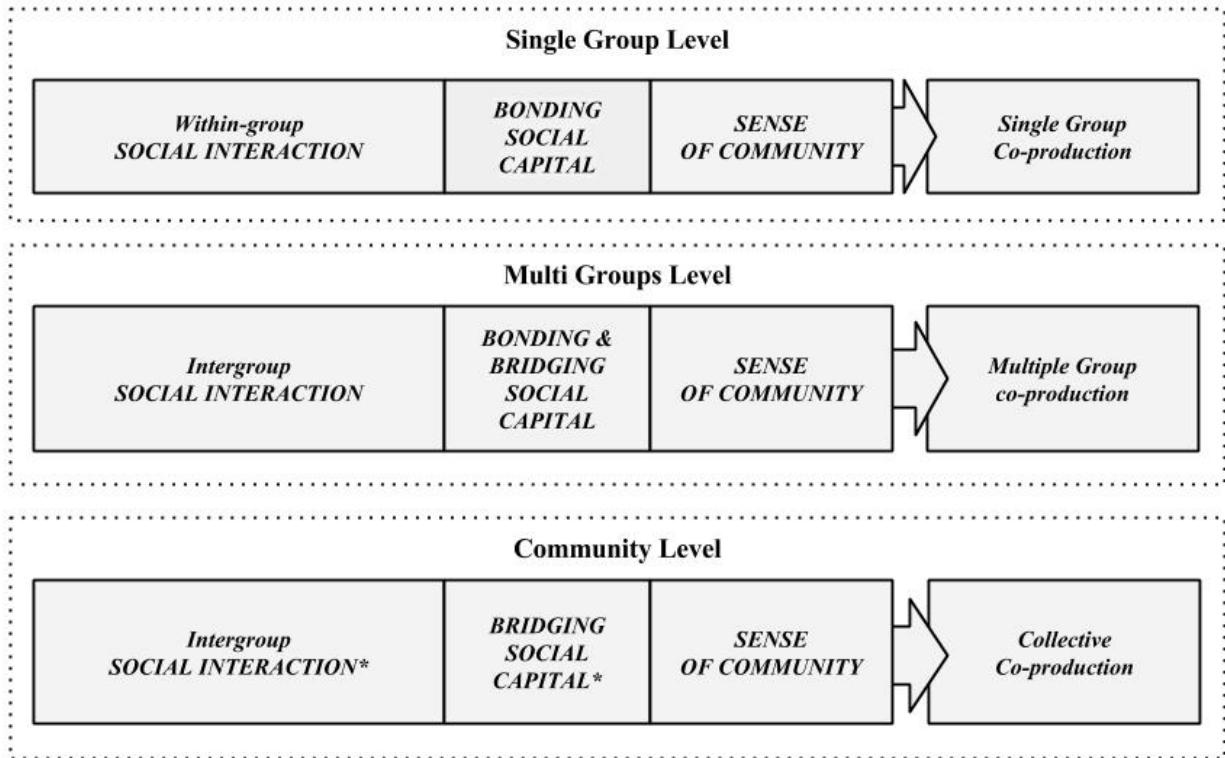


Fig. 1. Conceptual association between social capital and co-production

**6. Conclusion**

Through the systematic review of the extant literature, this paper specified the structure of social capital, dissociating bridging social capital from bonding social capital and conjoining it to community co-production. Importantly, this paper proposed a conceptual model (fig. 1) that captures how bridging social capital relates to collective co-production for disaster recovery. The aspect of synergistic relations of various actors was highlighted to suggest interactivity between bridging social capital and co-production. The argument is posited that it is bridging social capital that supports the creation of effective co-production. This paper makes the following contributions: first, we argue that social interaction provides a basic element for building social capital which, in turn, may stimulate community members’ motivation to contribute to disaster recovery. Second, by separating the forms of social capital, we demonstrate that bridging social capital assists community members to engage in co-production. We do not attempt to suggest that this paper captures sufficient conditions for disaster recovery. Rather we put forward a necessary condition through bridging social capital and co-production lens. Further research is needed to clarify the dynamic nature of community oriented post-disaster recovery 1) by understanding the role of sense of community in the association between social capital and co-production, 2) by explaining a conceptual separation between linking and bridging social capital, and 3) by developing an assessment that captures the effect of bridging social capital and community co-production within the context of disaster recovery.

**Appendix A. Selection of Studies**

Table 2. Eligible publications for Full Text Review (N = 50)

No.	Author	Title	Query
1	Adger et al. (2005)	Social-ecological resilience to coastal disasters	1

2	Agnitch et al. (2006)	Bonding and Bridging Social Capital: The Interactive Effects on Community Action	1, 2
3	Aldrich & Meyer (2015)	Social capital and community resilience	1
4	Aldrich (2011)	The power of people: Social capital's role in recovery from the 1995 Kobe earthquake	1
5	Aldrich (2015)	Social, not physical, infrastructure: the critical role of civil society after the 1923 Tokyo earthquake	1
6	Barakat (2003)	Housing reconstruction after conflict and disaster	1
7	Bhandari (2014)	Social capital in disaster risk management: a case study of social capital mobilization following the 1934 Kathmandu Valley earthquake in Nepal	1, 2
8	Bolin & Stanford (1998)	The Northridge Earthquake: Community-based Approaches to Unmet Recovery Needs	1
9	Bovaird (2007)	Beyond Engagement and Participation: User and Community Coproduction of Public Services	2
10	Brown & Kulig (1996)	The concept of resiliency: theoretical lessons from community research	1, 2
11	Brudney & England (1983)	Toward a Definition of the Coproduction Concept	2
12	Clark (1995)	The State, Popular Participation, and the Voluntary Sector	2
13	Coyne & Lemke (2011)	Polycentric in Disaster Relief	1, 2
14	Cutter et al. (2008)	A place-based model for understanding community resilience to natural disasters	1
15	Davidson et al. (2007)	Truths and myths about community participation in post-disaster housing projects	1, 2
16	Evans (1996)	Government Action, Social Capital and Development	2
17	Fallahi (2007)	Lessons learned from the housing reconstruction following the Bam earthquake in Iran	2
18	Frieling et al. (2012)	Collaborative Communities through Coproduction: Two case studies	1, 2
19	Grube & Storr (2014)	The capacity for self-governance and post-disaster recovery	1, 2
20	Hawkins & Maurer (2010)	Bonding, Bridging and Linking: How Social Capital Operated in New Orleans following Hurricane Katrina	1
21	Islam & Walkerden (2014)	How bonding and bridging networks contribute to disaster resilience and recovery on the Bangladeshi coast	1
22	Islam & Walkerden (2015)	How do links between households and NGOs promote disaster resilience and recovery?	1
23	Kiser (1984)	Toward an Institution Theory Of Citizen Coproduction	2
24	Kulig (2000)	Community Resiliency: The Potential for community health nursing theory development	1
26	Kulig et al. (2013)	Community Resiliency: Emerging Theoretical Insight	1, 2
27	Levine (1984)	Citizenship and Service Delivery: The Promise of Coproduction	2
28	Magis (2010)	Community Resilience: An Indicator of Social Sustainability	1, 2
29	Nakagawa & Shaw (2004)	Social Capital: A missing link to disaster recovery	1
30	Nance & Ortolano (2007)	Community participation in Urban Sanitation: Experiences in Northeast Brazil	2
31	Norris et al. (2008)	Community resilience as a metaphor, theory, set of capacities, and strategy for disaster readiness	1, 2
32	Onstad et al. (2012)	The road to recovery from a natural disaster: voices from the community	1, 2
33	Ostrom (1977)	Structure and Performance	2
34	Ostrom (1996)	Crossing the Great Divide: Coproduction, Synergy, and Development	1, 2
35	Percy (1984)	Citizen participation in the Coproduction of Urban Services	2
36	Rich (1981)	Interaction of the voluntary and governmental sectors: Toward an understanding of the Coproduction of Municipal Services	2
37	Robinson & White (1997)	The role of Civic Organizations in the Provision of Social Services: Toward Synergy	2
38	Rost (2011)	The strength of strong ties in the creation of innovation	2
40	Shaw & Goda (2004)	From disaster to sustainable civil society, the Kobe experience	1
41	Storr & Haeffle-Bache (2012)	Post-disaster community recovery in heterogenous, loosely connected communities	1, 2



42	Sundeen (1985)	Coproduction and Communities: Implications for Local Administrators	2
43	Tomas et al. (2011)	Coproduction, participation and satisfaction with rehabilitation services following the 2001 earthquake in Gujarat, India	1, 2
44	Ueda & Shaw (2016)	Managing and bridging communities in temporary housing: case of the Great East Japan Earthquake and Tsunami in Kesenuma City	1
45	Vallance (2015)	Disaster recovery as participation: lessons from the Shaky Isles	1
46	van Houwelingen (2012)	Neighborhood associations and Social capital in Japan	1
47	Wang et al. (2013)	Community Resilience after Disaster in Taiwan: A case study of Jialan Village with the Strength Perspective	1
48	Whitaker (1980)	Coproduction: Citizen Participation in Service Delivery	2
49	Woolcock & Narayan (2000)	Social Capital: Implications for Development Theory, Research, and Policy	2
50	Woolcock (1998)	Social Capital and Economic Development: Toward a Theoretical Synthesis and Policy Framework	2

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