Multilevel Social Mechanisms of Post-Disaster Depression

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Abstract

This study empirically shows how community social capital is related to post-disaster depression, whereas most disaster mental health research has focused on posttraumatic stress disorder. We tested differences of an earlier found multilevel social and individual mechanisms of posttraumatic stress [9] for symptoms of post-disaster depression. We used data (n = 232) from a study after a flood in Morpeth (2008), a rural town in Northern England. On the salutary community level, our multilevel analyses showed that in communities with high social capital, individuals employ less individual social support and coping effort, which protects individuals from developing symptoms of depression. Yet, on the ‘dark’ individual level of our model, we found that perceiving the disaster as less traumatic after a year was related to more feelings of depression in contrast to previous findings for posttraumatic stress. We postulate that when the traumatic appraisal of the disaster fades to the background, individuals may perceive the full scope of the disaster aftermath and start to feel depressed. We also found that more social support is related to more depression. Although depressed people may attract or receive more social support, this social support can paradoxically become disabling by reinforcing a sense of dependence, thereby undermining self-esteem and leading to feelings of helplessness. Our results imply that to curb post-disaster depression, boosting community level social capital may be an important starting point for building resilience. At the same time interventionists need to the identify risk groups of individuals for whom the traumatic experience becomes less intrusive, and individuals that experience the burden on dependency of an unequal relationship with ones’ social inner circle.

Keywords: Social Capital; Depression; Social Impact of Flood; Multilevel Modeling; England

Introduction

Literature on the salutary aspects of community social capital has grown, moving from early attempts to define the concept social capital and its associations with (mental) health and well-being [1] to empirical research on how community social capital is related to (mental) health and well-being [2-4]. There are several definitions of social capital, but in general social capital is defined as ‘the resources an individual can draw on through his or her social networks and the value ascribed to these resources by the individual’ [1,5,6].

Most disaster-related mental health research in the last thirty years has focused on posttraumatic stress disorder [3,4,7,8]. An earlier empirical study found that individual psychosocial resources (appraisal of the disaster situation, social support and coping) largely de-
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pend on access to available social resources in a community [9]. Higher social capital was associated with more adequate and efficient employment of coping strategies - including the mobilization of social support [3,9]. This parsimonious deployment of individual psychosocial resources decreases the association between the traumatic appraisal of the disaster and posttraumatic stress [9]. Hence, findings suggested that in communities with high social capital affected individuals are more resilient to symptoms of posttraumatic stress [10].

There is, however, scanty empirical evidence showing how community social capital is related to post-disaster depression. Research suggests that the disaster context may play a more prominent role for symptoms of depression [11-13]: Posttraumatic stress is by definition related to the individual experience of one or more traumatic events, whereas depression is by nature reciprocally related to the social context. On the one hand a lack of social ties can be a consequence of depressive symptoms. On the other hand, after most disasters social contexts lose their salutary 'buffer function' against depressive symptoms, as traditional social support systems do not function as before because family members or other members of the social network may be dispersed or even died and social routines are disrupted due to home loss [14,15]. Consequent social isolation and loss of social ties are among the most potent predictors of depressive symptoms [16].

In this paper, we examine how depressive symptoms may be differentially related to the social context than posttraumatic stress [9]. The study was conducted one year after a flood in Morpeth, a small town located in northern England. In September 2008 the residents of Morpeth were confronted with its worst flood in half a century which left great material damage. The revelation of how social mechanisms are associated to post-disaster depression will inform policy makers and interventionists to curb symptoms of depression in the aftermath of disasters [9].

Method

We obtained a list of flooded premises that comprised 757 households from the local authorities in Morpeth. In August and September 2009, we approached these households. In case respondents were absent, the addresses were revisited twice. Ninety respondents refused to participate in the survey due to a lack of time. Despite migration of some residents as their houses were still not livable (41 respondents), and absence of households members at the time of study (390 respondents), we were able to administer the interview to 232 respondents (72% of the approached respondents, and 30.6% of the total address list participated in the study). The demographics of the samples are depicted in table 1.

A local research firm conducted the survey with experienced local surveyors under supervision of the local principal investigator Maureen Fordham. The surveyors received one-day training in the administration of the questionnaire. Written informed consent was obtained from the participants after an introduction and explanation of the study purpose. The ethical approval for the study was obtained from (anonymous for review purposes).

Measurement of variables

Depression

Symptoms of depression were assessed by the subscale depression of the Hopkins Symptom Checklist-25 (HSCL-25 [17]). The period of reference is the last month. The depressive symptoms score is the average of the 15 depression items of the subscale. The respondent is asked to report how much he or she has been bothered by each item during the last month on a 5-point scale ranging from 1 = not at all to 5 = extremely. The internal consistency (Cronbach’s alphas) of the Depression scale in this study was .69.

Community variables

Social capital

We selected the SA-SCAT [18] to measure social capital. Some items of the SA-SCAT were adapted to improve the relevance for the local context (ref: anonymous for review purposes). Structural capital was measured by 8 items with a four point response format. The
Table 1: Demographic characteristics of the study sample.

*There were 16 missing values in the variable education.

Cronbach’s alpha was .74. Cognitive social capital was measured by 7 statements with a four point response format. The Cronbach’s alpha was .76.

Collective efficacy

Collective efficacy comprises 5 items with a five point response format [19]. The Collective Efficacy scale measures the willingness to
intervene (collectively) in neighborhood-threatening situations. Residents were asked about the likelihood that neighbors could count on assistance in 5 specific community situations. The Cronbach's alpha was .92.

Several scholars [1,19,20] have advocated for the inclusion of objective indicators of social capital, since social capital measured by self-report questionnaires is partly determined by the perception of individuals. Sampson and colleagues [19] showed that Residential Stability in a neighborhood can be used as an indicator for social interactions in a neighborhood. Residential Stability in this study was measured by the response options: rented (1), owned with mortgage (2), owned outright (3).

For the measurement of the individual variables we refer to a previous publication [9].

Individual level variables

Disaster property loss was defined as an indicator for the severity of the individual disaster experience. The variable was measured by four questions with a five point response format: To what extent did you experience damage or loss to: (1) the structure of your house, (2) the contents and belongings of your house, (3) personal belongings with sentimental value, (4) your car. The total Property Loss score was used in the analyses.

Primary appraisal

Primary appraisal, the perceived threat of the situation, was measured by the question "How traumatic was the flood for you at the time?" Respondents could indicate their answers on a five-point response format ranging from "not at all" [1] to "extremely" [5].

Coping effort

Coping effort is defined as the extent to which a variety of coping strategies are employed to deal with an experienced stressor. We used a questionnaire with six items with a five point response format that assessed individual coping [21]. The items referred to the strategies Avoidance, Reappraisal, Religion, Active cognitive coping, Active behavioral coping, and seeking Social support. The Cronbach's alpha was .86.

Social support

The Social Support Scale of Harper and Kelly [22] was used to assess Social Support. Respondents were asked to indicate how often they received ten types of social support on a five point response format. The Cronbach's alpha was .72.

Statistical analyses

It has been argued [23] that ecological associations are best explored using data from small areas such as the 'home patch' that constitute a homogeneous community. Thomas [23] claimed that the postcode unit is a rough proximate of the geographical area where the key social interactions take place in England. In this study, the individual scores on community variables were aggregated to the postcode units.

We used the study variable to specify a non-recursive multilevel model that we tested with multilevel structural equation modeling (ML-SEM). This model was earlier found as the best fitting for posttraumatic stress in the same sample. For a detailed description of the analyses we refer to our previous publication [9].

The multilevel modeling was based on (i) the likelihood of the estimates (significance < 0.05), (ii) the degree of support for the estimates in the literature (i.e. theoretical value), (iii) and a set of model fit indices. We evaluate the fit of the ML-SEM models by two fit indices: (1) Likelihood ratio test (LRT) for nested-model fit and (2) Akaike information criterion (AIC). Lower values of the LRT and AIC indicate closer fit [24].

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**Results**

**Demographics**

Table 1 depicts the individual demographic information of the sample. The study sample contains 232 individuals nested within 59 postcode units with an average cluster size of 3.91 individuals per postcode unit.

**Multilevel structural equation modeling**

The intra-cluster correlation for the variable Depression across postcodes was 0.21.

The model is depicted in figure 1. The structure of the individual model that was tested is similar to the model that associates the study variables with posttraumatic stress [9]. In this study, the variable Depression was related with Social Support ($\beta = 0.30; p < 0.001$) and Primary Appraisal ($\beta = -0.17; p < 0.01$), yet not with Coping Effort. Social Support was related to Gender ($\beta = 0.18; p < 0.01$) and Age ($\beta = -0.32; p < 0.001$). Coping Effort was related to Primary Appraisal ($\beta = 0.36; p < 0.001$) and Disaster Damage ($\beta = -0.16; p < 0.01$). Primary Appraisal was related to Gender ($\beta = 0.19; p < 0.01$), implying that women appraised the disaster as more traumatic, and Primary Appraisal was related by Disaster Damage ($\beta = 0.44; p < 0.001$).

At the community level, Residential Stability ($\beta = -0.18; p < 0.001$) and Structural Social Capital ($\beta = -0.74; p < 0.001$) were related to Collective Efficacy. Structural Social Capital was related to Cognitive Social Capital ($\beta = 0.17; p < 0.001$).

*Figure 1: The multilevel structural equation model.*

There were two significant cross-level relationships: Collective Efficacy was associated with Social Support (β = -.19; p < .05) and Cognitive Social Capital was related to Coping Intensity (β = -.23; p < .01).

Discussion

This study empirically examined how community social capital is related to post-disaster depression. On the salutary community level, our multilevel model revealed that community social capital is related with post-disaster depression problems (e.g. symptoms of depression) via individual psychosocial mechanisms that comprise individual coping and social support. Our findings showed in a neighborhood with more collective efficacy, people mobilize less social support, and hence people may require less dependency on social support from friends and family. Further, high levels of cognitive social capital were associated with lower coping efforts. Through less dependency on individual psychosocial resources, a social community may be protective against post-disaster symptoms of depression. That is, in a community with high social capital there was less demand for the mobilization of individual psychosocial resources [16]. In other words, the social context was health sustaining by its association with the individual psychosocial mechanism constituting coping and social support. These findings suggest that in communities with high social capital, disaster-affected individuals can benefit from the social context to address disaster-related demands, and that the social context works together with individual resources (i.e. coping strategies and social support) to address such demands. This beneficial effect of the collective to address disaster-related demands on the individual was greater in communities with less residential stability. Apparently, in neighborhoods where more houses are rented, individuals benefit more from the collective and use less individual resources to address disaster-related demands than in a neighborhood where premises are owned. In a community with high social capital, such “conservation of individual psychosocial resources” was associated with less suffering from symptoms of depression.

Yet, on the ‘dark’ individual level side of our model, we counterintuitively found that perceiving the disaster as less traumatic after a year was related to more feelings of depression. This result stands in contrast to previous findings of posttraumatic stress [9]. We postulate that when the traumatic appraisal of the disaster fades to the background, individuals may perceive the full scope of the disaster aftermath and start feeling depressed. Media attention and generous outsiders often abandon communities when victims discover that the struggle to rebuild their physical and social environment has just begun [12]. In this line, Norris and colleagues [12] showed that whereas intrusions and arousal abated after the disaster, symptoms of depression increased for a substantial minority at the same time. Further, contrary to our previous multilevel model, this time we found that more social support is related to more depression. Depressed people may attract or perceive more social support. Yet, this social support can paradoxically become disabling by reinforcing a sense of dependence, thereby undermining self-esteem and leading to feelings of helplessness [16].

All in all, our results imply a nuanced notion beyond the black-and-white idea that multilevel social capital interventions -interventions that have targets (i.e. objectives) to create change on the individual and community level- naturally exert the strongest effects on health outcomes [25,26]. Rather, to curb post-disaster depression community level social capital interventions may be an important salutary starting point, as it will lead to a more parsimonious use of individual psychosocial resources. Community social capital interventions have additional cost efficient benefit to impact the health of individuals targeted by the interventions as well as people who are connected to these individuals (i.e. spillover effects, also known as “collateral benefits”). Yet, our results imply that at the same time interventionists need to the identify individuals for whom the traumatic experience becomes less intrusive, and the full consequences of the disaster start to sink in accompanied by depressed feelings. Another risk group comprises individuals that acquire much social support from friends and family and may consequently feel the burden of dependency on an unequal relationship with ones’ social inner circle. These individuals need to be targeted for additional individual psychosocial interventions.

Limitations of the Study

The study has some potential limitations. First, the cross-sectional design of our study and the absence of data on pre-flood mental health, did not allow for causal inferences of disaster related distress to the flood in specific. We tried to overcome these limitations by
adapting the mental health questions to the particular experience of the flood. Furthermore, the technique of MI-SEM enabled us to elucidate pathways within the model and provided us insight in the social mechanisms related to disaster-related distress. Second, the response rate was relatively low and it is not clear to what extent the study sample is representative for the population of affected households in Morpeth. Third, the relatively high age of the study sample may hamper the extrapolation of our study results to other disaster-affected populations. We attempted to partly overcome this limitation by modeling the age variance in our study.

Conclusion

This study demonstrated how community social capital is related to post-disaster depression. We showed a salutary association of community social capital: Our multilevel model showed that in communities with high social capital a disaster may be less demanding for individual psychosocial resources, and inherently individuals may suffer less from symptoms of depression. On the individual level we showed that people with less traumatic experience and individuals that receive more social support from family and friends may comprise risk groups for depressed feelings after a year. Our findings have nuanced implications for post-disaster community interventions.

This study is an invitation for scholars to similarly dissect the social mechanisms of post-disaster mental health as this type of research remains rather scarce. We highlight that our study is cross-sectional by nature and therefore does not allow for causal inferences. To address this methodological issue, we urge scholars to undertake longitudinal studies on social mechanisms of disaster mental health.

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